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Abstract.

The thesis argues that the absence of traditional referential elements, such as tonality and metre, affects the exactitude with which the listener perceives certain aspects ~~certain aspects~~ of nontonal music. It claims that the listener might impose his own interpretation on a work in which the musical patterns are too complex to be perceived exactly and that, in extreme cases, the patterns which the listener reads into the music may be completely subjective.

The thesis examines the extent to which Webern and some post-Webernian composers determine the listener's response to their music and shows that certain aspects of Webern's music are simple enough to be easily grasped and to be perceived exactly and that these aspects control the way in which the listener understands Webern's music. It suggests that the nature of the musical material and the procedures employed in much post-Webernian music precludes the use of many of the controls found in Webern, but that other methods of determining the listener's response to the music can be found in some of the works of the post-Webernian composers. It argues, however, that in some post-Webernian music, and particularly in that composed using chance or serial methods, the listener's response to the music may not be determined by the composer.

The thesis claims that many of the important formal problems facing post-Webernian music must be considered in relation to the problems of auditory perception.

J. D. A. Jarman.

Problems of Perceptibility Affecting Formal
Design in Nontonal Music.

Ph.D. Thesis, 1969.

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Introduction

"We are neglecting the gift of comprehending things by what our senses tell us about them", says Rudólf Arnheim in his introduction to 'Art and Visual Perception', "concept is split from precept and thought moves amongst abstractions." (1) This reproof could be levelled at many articles on contemporary music, composers and critics alike discussing the value of technical procedures without referring to the audible effect of these procedures.

The difference between the impression given by the descriptions of the procedures used to composed an avant-garde piece and the effect of the work itself is often very striking; just as striking, though less frequently mentioned, is the difference between the impression given in articles describing the procedures used by Schoenberg and the effect of Schoenberg's music.

It seems to be commonly assumed that Schoenberg's twelve note method does, in some way, work, but exactly how it works, to what extent it works and whether it works as Schoenberg seems to have intended is not known. There is as yet no evidence to suggest that the twelve note system works at all and one has the impression that commentators on twelve note music are pinning their hopes on the fact that the twelve note system might work in the way Schoenberg described, almost as much as Schoenberg himself did.

The difficulty facing anyone attempting analytical work on twelve note and post-twelve note music is the lack of any objective evidence about what the ear can and can not hear. The writer on music has no body of objective

(1) Arnheim 'Art and Visual Perception'. Pg. v.

experimental work to which he can turn, in the way that the writer on art can turn to the work of Köhler or Wertheimer. Psychological work on perception has tended to concentrate on visual perception and has almost completely ignored auditory perception. A further difficulty (and perhaps one of the reasons for the psychologists' neglect of the subject) is that auditory perception raises not only the question of what can be heard, but also the question of by whom it can be heard, for training and musical knowledge will necessarily affect the exactitude with which the listener hears a sequence of notes.

The following thesis argues that nontonal music brings into play certain perceptual limitations that do not operate in tonal music. The way in which the listener reacts to or interprets what he hears will doubtless depend upon his previous knowledge and training, but it seems likely that these perceptual limitations are determined by psychological features common to all listeners and that it is, therefore, possible to talk about how this music is heard in general terms.

The thesis attempts to examine the relationship between control and uncertainty in nontonal music and to show that the perceptual limitations which cause uncertainty must be considered in any examination of formal design in nontonal music and how they themselves can become part of the formal design. I have assembled what psychological evidence is available on the subject but in many cases it has been necessary to apply to auditory perception findings resulting from experiments carried out on visual perception. It has also been necessary to make a number of assumptions that are not supported by

any objective evidence. Though both these practices have obvious dangers, it must be emphasised that the assumptions made are in line with what psychologists believe to be the likely answers to the problems of auditory perception and that these assumptions are not contradicted by any existing evidence.

The thesis concentrates on the late works of Webern and on three post-Weberian composers - Boulez, Stockhausen and Berio. The later works of Webern have been chosen because the conclusions to be drawn from these pieces are, to a large extent, equally applicable to the earlier works, and because the late works represent Webern's final solution to the kind of problems discussed in this thesis. Boulez, Stockhausen and Berio have been chosen as representative avant-garde composers because the problems discussed in relation to post-Weberian music can be illustrated from the works of a handful of composers and because these three composers are generally regarded as being amongst the most important and the most interesting of the contemporary avant-garde.

The present thesis only attempts to suggest a possible line of approach to the topic discussed. No valuable detailed consideration of the relationship between technique and effect in nontonal music, and perhaps little valuable work at all on the period, can be done until more objective evidence is available; this music can be analysed in terms that can be shown to have some meaningful relation to the music's audible effect only when such evidence becomes available. Until then one can only guess at the answers to many of the problems raised by nontonal music.

I. The Audibility of the Twelve Note Row.

In the present chapter I shall consider the theoretical basis and the practical application of the twelve note row. Before discussing the audibility of the twelve note row I shall give some account of the way in which the listener's past experience affects auditory perception since this is especially relevant to a discussion of row audibility.

All perceptual acts are, of necessity, subjective - "even the most elementary perceptions have the character of inferential constructions." (1) The subjective nature of auditory perception will be a recurring topic during this thesis.

1. The influence of past experience on perception.

The perception of stimuli, the response to and understanding of them are determined by the observer's attitude, expectation and previous knowledge. A new phenomenon^{on} can only be understood by the observer finding in it some aspect which relates to his past experience:

"Instead of looking through a given filter-frame for an object which matches the filter, he (the subject) must try out one frame after another to look at the object before his nose, until he finds a frame into which it fits, i.e. until the object presents some familiar aspect - which is then perceived as an analogy with past experience and allows him to come to grips with it." (2)

In art, the artist and his public both work against the background of past experience. The extent to which

(1) D. E. Broadbent; 'Perception and Communication'Pg. 159
 (2) Koestler; 'The Act of Creation'. Pg. 573

the artist's previous experience affects his work is illustrated by Gombrich. Gombrich shows (3) two pictures of the same subject. The first is Dürer's woodcut of a rhinoceros - a picture based on second hand information and containing many errors. The second is an engraving of a rhinoceros, published over 200 years after the Dürer woodcut. The text that accompanies the engraving denounces the Dürer woodcut as being "wonderfully ill-executed in all its parts and the origin of all the monstrous forms under which the animal has been painted ever since", and claims that the new engraving is "designed from the life". The engraving shows, however, that the artist's memory of the Dürer has made it impossible for him to give a true representation of the animal. The engraving 'designed from life' corresponds as little as does Dürer's woodcut to any known species of rhinoceros.

Gombrich uses the term 'schemata' to denote this residue of past experiences and sensations. A new experience can modify this schemata but it cannot destroy it:

"Roger Fry and the Impressionists talked of the difficulty of finding out what things looked like to the unbiased eye because of what they called the 'conceptual habits' necessary to life. But, if these habits are necessary to life, the postulate of an unbiased eye demands the impossible ... the innocent eye is a myth." (4)

The innocent ear is also a myth. It is impossible for the listener to divorce himself from his past experience, because it is through his past experience that he

(3) Gombrich; 'Art and Illusion'. Pg. 71

(4) Gombrich; Ibid. Pg. 251

understands a phenomenon:

"The pattern of the behavioural matrix to which the organism is attuned at the time ... determines what shall and what shall not constitute a stimulus ... In addition at least, the figure-background relationship ... is not something innate in perceptual organisation but dependent upon past experience and present state of mind" (5)

"Es hört doch jeder nur was er versteht", says Goethe.(6)

In the Western hemisphere one person's past experience of music differs from that of another only through the amount of music, not through the kind of music heard; it is possible, therefore, to talk in general terms about the way in which music is heard, because everyone in the Western hemisphere shares a common musical past. Of the many aspects of traditional music which make up the listener's past experience of music, tonality is amongst the most important. (I shall deal with other aspects, such as rhythm and phrase structure - which are, in any case, directly dependent upon tonality - in later chapters).(7)

It is generally accepted that if a nontonal work has any features that are overtly reminiscent of tonal music, they will tend to attract the ear and will seem to stand out with particular clarity - witness the avoidance of octave relationships in twelve note music. But so strong is the influence of past experience and the mind's desire to understand a phenomenon, that it is impossible to hear 'nontonally'. In nontonal music the ear will constantly and inevitably attempt to relate the notes to one another by forcing them into tonal associations. Nontonal music becomes, therefore, a means of extending the listener's previous experience of tonal music.

In the following consideration of the audibility of

(5) Koestler. Op. cit. Pg. 519

(6) Goethe. 'Maximen' (quoted in Koestler Pg. 539)

(7) See Pg. 30-33

the twelve note row I shall examine both the theoretical basis and the practical application of twelve note technique; a discussion of either of these aspects alone would fail to show the many discrepancies between the two.

2. The audibility of the Twelve Note Row.

I A consideration of the theoretical basis.

a) Recognition of interval class

The twelve note row is defined exclusively in terms of interval succession and, in theory at least, the recognition of this interval succession was the *raison d'être* of the twelve note system.

It seems likely that, in certain circumstances, the listener is unable to identify the class of intervals in nontonal music. (8) In tonal music the ear is able to judge the size of an interval because each note can be referred to the tonic; the relationship of an interval to the tonic is also made clear by the accompanying harmony. The tonal hierarchy establishes a frame of reference which is both understood by and perceptible to the listener and which enables him to measure the class of an interval. In tonal music the class of wide intervals is recognisable precisely because the notes are related, not only to one another but also to an external referential element.

(8) The term 'interval class' is used to denote the group of intervals to which one particular interval belongs - all major thirds, for example, form one interval class and all semitones another. With regard to twelve note music the term also denotes all those intervals which twelve note theory regards as equivalent - thus a semitone and a minor ninth are different intervals but belong to the same interval class.

The absence of tonality inevitably affects the exactitude with which an interval can be perceived. I have already said (see Pg.3) that, when listening to nontonal music, the ear will attempt to impose tonal associations upon it; when this is possible the class of an interval will be perceptible. If an interval is smaller than an octave, the interval class will be perceptible because the notes can easily be related tonally, but when the interval is a large one it becomes more difficult to relate the notes tonally and it seems likely that, beyond a certain limit, the listener will not be able to hear the exact class of intervals in nontonal music. A wide interval will be heard exactly, in the sense that it will have an exact, precise effect but this effect cannot be accurately defined in terms of a smaller interval - a wide interval is not heard as a stretched-out smaller interval. Although intervals A and B below belong, according to twelve note theory, to the same interval class, it is unlikely that the ear will identify the class of interval B and recognise its relationship to interval A:



Ex. 1.

Since the ear needs time to form the tonal associations which enable it to recognise the class of an interval, the speed at which an interval is presented will also affect the exactitude with which the ear hears it.

Although it seems incorrect to assume, as twelve note theory does, that the listener hears all intervals of the same class as being equivalent, it is difficult to determine the extent to which the ear does hear intervals

exactly in nontonal music - it is possible that at times the mind simply infers that it hears them.(9) When listening to Webern, for example, the knowledge that Webern invariably restricts the intervals in his music to a few classes, previous study of the score, and the desire to hear relationships (10) might all lead the listener to infer that he hears certain intervals. (11)

Twelve note theory regards the note row as a self sufficient sequence of intervals, without considering the way in which this sequence is projected by the musical figurations in a composition. But in music that has obvious thematic figurations (such as that of Schoenberg) the listener's perception of the interval sequence cannot be divorced from his perception of the figurations themselves and I shall, therefore, discuss the recognition of interval succession when I consider the practical applications of twelve note theory. (12)

b) Twelve note harmony

Twelve note theory defines only one method of deriving chords from a note row - that of playing adjacent notes in the row together. I shall call this method 'simultaneity'. Peter Stadlen has criticised

(9) The extent to which inferential perception influences even apparently objective observations is illustrated by the following anecdote from Koestler: "Rosenthal gave one of his groups of research workers rats which, he explained, were 'geniuses' specially bred from a stock with exceptionally good maze-learning records. To a second group he gave what he explained were 'stupid rats'. In fact all the rats were of the same common or garden breed; yet the score sheets of the 'genius' rats showed unmistakably that they had learned to run the maze much faster than the 'stupid' rats. 2

(Koestler. Op. cit. Pg. 573)

(10) See Pg. 40-43

(11) See Pg. 85-87

(12) See Pg. 11 et seq.

this method because, he says, "it is taking the time factor out of a sequence and thus abolishing it without a trace." (13) This criticism is a simplification of the facts, because under certain conditions it is possible to hear the relationship between a horizontal sequence of notes and a chord formed from this sequence. The horizontal row A below, and the series of chords B are recognisably the same and the harmonic area defined by cell I of row A can be heard as being that of chord I of B:

The image shows two musical staves. Staff A contains a horizontal sequence of notes: G4, A4, B4, C5, D5, E5, F5, G5. Below the notes are labels 'A', 'I', 'II', and 'III' corresponding to the first, second, third, and fourth notes respectively. Staff B contains three chords: Chord I (G4, B4, D5), Chord II (A4, C5, E5), and Chord III (B4, D5, F5). Below each chord is a label 'B I', 'II', and 'III' respectively.

Ex. 2.

Although the note order of A is abolished in B, its identity is still maintained.

But a relationship of this kind is only perceptible if certain conditions are met - when, for example, the notes which form the chords are presented horizontally they must be articulated in a way that defines them as something separate from what precedes and succeeds them.

In the above example the chords of B maintain the notes of A at their original pitch - there is no octave transposition and no transposition by any other interval. The relationship between A and B would probably be destroyed if some of the notes were transposed by an octave.

Speaking of octave transposition, Stadlen says " a note and its octave are not identical except in respect of their harmonic functions." (14) This again is a simplification of the facts, for the identity of a note

 (13) Stadlen. 'Serialism reconsidered' Pg. 22

(14) Stadlen. Ibid. Pg. 23

and its octave is not necessarily even harmonically true. The two chords in Ex. 3 below use the same notes but are not heard as being the same chord - the octave transpositions have resulted in the stressing of different tonal areas::



Ex. 3.

The ear desires to interpret harmony in a traditional way and will hear tonal references in chords, in the same way that it will attempt to impose tonal centres of a horizontal sequence of notes; a change in the tonal implications of a chord will lead the ear to hear it as a different chord. The relationship of two chords formed from the same notes can be altered by such things as the placing of the notes (particularly of the bass and treble) spacing and instrumentation.

Because the listener can remember the characteristics of a small group of notes more easily than those of a large group of notes, his recognition of the relationship between a horizontal and a vertical statement of the same group probably depends on the number of notes in a group - pitch becoming an important factor as the number of notes increases. If a group consists of only 2 notes the ear can recognise a relationship between vertical and horizontal statements even if the notes are transposed an octave; the ear can recognise a similar relationship if a group consists of three notes. But if four or five note groups are used (as in Ex. 2) the ear may not recognise the relationship between vertical and

horizontal statements if notes are transposed. (15)

It seems likely, therefore that twelve note theory is incorrect in assuming that a note and its octave transposition are necessarily identical.

Simultaneity, as Stadlen observes (16), inevitably adds new intervals to the row. The following diagram shows how the note rows used in the passage from Schoenberg's Fourth Quartet given in Ex. 5 overleaf.

	Row 0.....	Row RI.....	Row 0.....
Violin 1	: 1 2 [*] 4 5 6 7 [*] 2 3 4 [*] 9	10	: 6 [*] 8 9
Violin 2	: 3 [*] 9:10 [*] 6 7 8		: 4 [*] 5 [*] 7 [*] 10
Viola	: 8:12 1 [*] 5	7	: 1 2 3
'Cello	: :11	11 12	: 1112

Ex. 4.

New melodic intervals are created in the 1st Violin part most noticeably between notes 2 and 4 of 0, notes 7 of Row 0 and 2 of Row RI, notes 4 and 9 of Row RI and notes

(15) This is also true of transposition other than the octave. Cell ii in Ex. A below is a transposition of cell i; if cell i is played as a horizontal group and cell ii as a chord (as in Ex. B below) the ear will probably recognise that the two are related, even if the notes of cell ii are spaced differently from those of cell i (as they are in Ex. c, for example.) A similar relationship between two six note groups is less likely to be recognised (even if both have similar spacing) and that between two twelve note groups will probably only be recognised if they share some particularly memorable characteristic (as do the two twelve note groups in Ex. D, for example).

(16) Stadlen. Op. cit. Pg. 24

6 and 8 of Row 0; in the 2nd Violin part between notes 3 and 9 of Row 0, note 10 of Row 0 and 6 of Row RI, notes 5 and 7 of Row 0 and notes 7 and 10 of Row 0 and, in the Viola part, between notes 8 and 12 of Row 0 and notes 1 and 5 of Row RI. These are marked * in the above diagram and in the following example. (New intervals are also created at other points but I have discounted them because the notes are separated from each other by phrasing or rests.)

633 634 635 636

mf 1 2 4 5 6 7 pp 2 3 4 p 9 10 6 8 9

mf 3 9 10 pp 6 7 8 p 4 5 7 10 1 2 3

8 12 1 6 p > 7 11 12 pizz 11.12

0 RI 0

Row Forms:

0 1 2 3 4 5 6 7 8 9 10 11 12

RI 1 2 3 4 5 6 7 8 9 10 11 12

Ex. 5.

Another traditional method of obtaining twelve note harmony is the simultaneous use of two row forms. This method does not create new row intervals horizontally

(as does simultaneity) but the vertical relationships between the parts - the intervals formed between the two rows - are not controlled by the row.

Twelve note theory has, therefore, no real method (none consistent with its own postulates) of controlling harmonic formations. The relationship between vertical and horizontal expositions of the same or similar groups of notes can be deliberately exploited by a composer, but the methods described by twelve note theory do not in themselves automatically provide a relationship because they disregard many important issues.

That twelve note theory ignores the points discussed above throws doubt on some of its original postulates and upon the assumption that the note row automatically gives a piece a sense of unity; other doubts arise when the practical applications of the theories are considered.

3. A Consideration of the Practical application of Twelve Note Theory

a) Destruction of interval succession and the creation of new intervals

For the listener to hear the note row he would have to be able to tell where one row ends and another starts; the music would have to be articulated in such a way as to make ~~it~~ clear the change over from one row to another. X

Unless the two rows are clearly separate the join between one row and another creates a new 'non-row' interval. Although this interval may not be differentiated from the intervals that do belong to the row, the non-row interval is assumed, in theory, not to belong to the row whilst the other intervals are assumed to belong to the row.

Although twelve note theory makes no provisions for avoiding these 'non-row' intervals, Schoenberg - in his later works at least - usually arranged his main theme so that the end of the theme or a phrase of the theme coincided with the end of the row. The opening theme of the Fourth Quartet, for example, is one statement of the complete row:



Ex. 6.

But this treatment is not applied consistently throughout the Quartet. The following passage, for example, (b.26 - 28 of the First Movement) blurs the change from one row to another:

Row forms:

Ex. 7.

Here the rhythmic and melodic figures bring together (at the points marked * in Ex. 7) the last note of one

row and the first of another, and create new intervals. It will be noticed, however, that these new 'non-row' intervals are related motivically to what has gone before; the 3 note figure B - G - Ab at b.27 and 28, for example, (in which the B and the G belong to different rows) is a version of the three note figure D sharp - E - C at b.27.

In the first and third movements of Webern's Concerto Op.24 the row endings are clearly and consistently defined but in other works, such as the Symphony Op. 21, the joins between one row and the next are deliberately concealed. (17)

Non-row intervals are created not only at the junction of two rows but whenever complex row treatment is employed - when, for example, certain notes of the row used by the principal voice are given to a subsidiary voice, when rows change from an upper to a lower part or when, as in the above example, certain notes have a subsidiary, accompanimental, role. Similarly, whenever certain notes are stressed by the rhythm or instrumentation or when some notes are used as grace notes, the ear tends to move from one important note to another and, thus, the intervals heard are not those of the note row. Moreover, if it is correct to assume that the listener can only classify intervals by relating the notes tonally, then, not only the speed at which the intervals are presented but also the thickness of the instrumental texture will affect the recognition of intervals.

There are works by both Berg and Schoenberg in which more than one note row is used. The String Trio Op. 45 and the 'Ode to Napoleon' of Schoenberg both use rows in which permutation takes place within the two hexachords which form the row, whilst both the 'Lyric Suite' and 'Lulu' of Berg use a number of different, though related,

(17) See Pg. 110-127

rows. Since the permutations used in the String Trio necessarily mean a reordering of the interval succession of the original row and also bring about the creation of new intervals, it is clear that the technique used in this work implies a radical revision of Schoenberg's original row postulates. In the 'Ode to Napoleon' the row can only be defined in terms of the content of the two hexachords and implies no interval succession at all. (18) In such a work the most important feature of the row is the total harmonic content of each hexachord, not the interval sequence.

Even in the works of Webern (the most strict of the three Viennese composers in his handling of the note row) passages can be found in which notes are deliberately concealed, and the audibility of the intervals succession destroyed. I shall cite examples from two such passages.

i) Symphony Op. 21. Movement 2. Bars 23 - 34

In the second of the variations which form the Second Movement of the Symphony Op. 21. Webern uses four forms of the note row. Two of these forms (a and b below) are given to the Horn, the other two (c and d below) are given to the other instruments:

Ex. 8.

(18) See Perle: 'Serial Composition and Atonality' Pg. 96-97

Rows a and b are related in that, when played together, they produce six diads, each of which occurs twice (i, ii, iii, iv, v, and vi below.) Because of the way these diads are used (both row forms are played by the same instrument, the notes of row a alternating with those of row b) the intervals of the note row are obscured:

Sehr Lebhaft
Horn
f >f p f

Ex. 9.

Rows c and d are similarly related:

Ex. 10.

but these diads are not used in the other instrumental parts. Instead Webern chooses to relate the rows in such a way as to form a series of fourths and fifths. The way in which this relationship comes about is shown in the following examples:

Ex. 11.

These fourths and fifths are marked * in Ex. 12 overleaf, which shows the eleven bars of this variation. The rows given in Ex. 10 above are followed by their retrograde versions at b.29 et seq. In selecting the intervals of a fourth and fifth Webern gives prominence to two intervals which do not appear in the original row; the actual row intervals are not used at all. (19)

ii Saxophone Quartet Op. 22. Movement II. B.38 - 43 and 49 - 50.

In both these passages from the Quartet Op. 22 notes are hidden in order to give an appearance of canonic writing where a straightforward use of the row does not provide it. The three upper parts from b.38 - 43 are given below. The clarinet and the saxophone share one row form; the violin and piano share another:

The image shows a musical score for three instruments: Violin (VI.), Clarinet (Cl.), and Saxophone (Sax.). The score covers measures 38 to 43. The Violin part starts with a whole rest in measure 38, followed by a half note in measure 39, and then a series of notes in measures 40, 41, 42, and 43. The Clarinet and Saxophone parts have similar rhythmic patterns. Dynamics include *pp*, *p*, and *f*. Below the main score, two rows of notes are shown with red brackets and arrows. The first row is labeled 'Sax.' and has a bracket labeled 'b.38-43'. The second row is labeled 'VI.' and has two brackets labeled 'b.39-40' and 'b.42-43'.

Ex. 13

An appearance of imitation is given at b.38 - 40 between the violin and the clarinet figures although only the contours and rhythms are the same. At b.42 a figuration on the clarinet seems to refer back to the clarinet figuration at b.38 but this relationship does not appear in the row, and in order to make the two figures appear

(19) See Westgaard: 'Toward a Twelve tone Polyphony'.Pg. 96.

II Var
mehr lebhaft (ca. 30)

The first system of the musical score begins with a piano introduction consisting of four staves. The first staff is the treble clef, and the second is the bass clef. The introduction is followed by the second variation, marked 'II Var' and 'mehr lebhaft (ca. 30)'. This section also consists of four staves, with the first staff in treble clef and the others in bass clef. The notation includes various musical symbols such as notes, rests, and dynamic markings.

The second system of the musical score continues the piano introduction and the second variation. It consists of four staves, with the first staff in treble clef and the others in bass clef. The notation is dense with musical symbols, including notes, rests, and dynamic markings, continuing the piece from the first system.

Ex. 12

related Webern has to hide the note B natural, which is reduced to a gracenote in the clarinet part at b.43:

Ex. 14.

A similar example can be found at b.49 - 50 of this movement where the violin and the clarinet seem to use similar figures:

Ex. 15.

Here both instruments are using the same note row and, again, a note has to be concealed by reducing it to a gracenote (the G sharp in b.50) in order to preserve an appearance of imitation.

In both these passages Webern effectively destroys the interval succession of the row but enhances apparent motivic relationships. (20)

That the listener is not disturbed by such row treatment (that, in fact, he never even notices it) suggests that, even when all the intervals can be

(20) See Fennelly: 'Structure and Process in Webern's Op. 22'. Pg. 319

perceived, he does not hear the interval succession as a row.

In traditional music the listener hears themes, motives and configurations and it seems likely that these are also what he hears in twelve note music because, as I have shown (21), the listener is unable to break with his past experience and listen in a new and different way.

Even when the theme of a Schoenberg work coincides with the note row the listener does not hear the row but a number of figurations and a theme built of figurations. The figurations are not referred back to the row but live a completely independent existence.

The example from Schoenberg's Fourth Quartet (Ex. 7, Pg. 12) shows a deliberate blurring of the point where two rows meet and the creation of a new 'non-row' interval. The listener is not aware that one of the intervals is a non-row interval - he is only aware that the figuration presented is related to what has gone before. This not only suggests that motivic considerations outweigh those of row technique in this particular instance but also suggests that the listener is completely unaware of the row rotation in twelve note music generally. The listener hears figurations, and this is not the same thing as hearing a row - the difference between the two is important, as I shall later show. (22) When Hans Keller claims that the retrograde form of the row is audible because the motive G - E - C is recognisable as the retrograde of the motive C - E - G he confuses the two and assumes that a three note figure is comparable to a twelve note row; there is no justification for such an assumption. (23) Keller also invalidates his argument

 (21) See Pgs. 1-4

(22) See Pg. 26-28

(23) Keller: 'The Audibility of Twelve Note Technique'
 Pgs. 231 - 234

by choosing a motive which has overt tonal connotations - his claim that the retrograde of the motive is more easily audible than the inversion is true but depends upon the fact that twelve note music uses only 'real' inversions and the 'real' inversion of this motive produces a minor triad, whereas the original and retrograde forms are both major triads. Tonal music, on the other hand, can use both 'real' and 'tonal' inversions - 'tonal' inversions being the most easily audible of the two. 'Real' inversions are more difficult to hear because they do not maintain the tonal associations of the original patterns.

The listener might hear certain relationships in a twelve note piece but these relationships are the result of the composer's decision to exploit certain intervals and certain motives in a particular way. The intervals exploited may be characteristic of the note row or, as in the example from the second movement of the Webern Symphony, they may be intervals that do not occur in the row. The composer may construct a row that is particularly rich in certain relationships but, even so, the importance of these relationships will depend upon how they are enhanced in the composition; using the complex methods of row manipulation described above (the interchanging of rows from different voices, the suppression of certain notes in preference to others etc.) any row can be made to emphasise any characteristics.

It is possible that the listener might infer that he hears the note row - just as he might infer that he hears the exact class of all the intervals (24) That many people who claim to hear the note row in a Schoenberg work would probably not claim to hear the note row in Boulez's

(24) See Pg.6

'Structures' (although the row of 'Structures' is used more strictly than are the rows of most of Schoenberg's works) re-enforces the suggestion that the listener hears motives, not rows.

If all the notes of a twelve note row were kept within the interval of an octave (so as to make the intervals readily perceptible), if the row was rotated in a very simple manner and if all the chords were derived by simultaneity (and the notes were kept at the register at which they first appeared) then the row might be audible as a row; but this is far removed from the ways in which a note row is used in practice. Outside these limits it seems likely that the unifying power of the row depends upon the composer's decision to articulate certain features in a way that is consistent and clearly audible. Apart from the use of thematic motives such articulation is rarely found in the music of Schoenberg.

There have been few psychological experiments testing note row audibility. The only experiments of which I am aware are those done by Alan Walker (25) which are unconvincing because the experiments take into account none of those elements (such as row continuation, row combination, speed or thickness of texture) which tend to destroy the row's audibility in a composition. Walker's experiments show only that the ear can recognise the four basic versions of the row when they are played by themselves, and with breaks between each row. This method of handling the row is far removed from the way the note row is used in any twelve note composition - it is as far removed as is the usual method of writing out note rows without rhythm and with all the notes within an octave. Even the results of these tests are suspect

(25) See Alan Walker 'Back to Schoenberg'.

because Walker does not give a full description of how the tests were carried out. It seems possible the subject's recognition of 'rows' was really recognition of the opening and closing notes or recognition of certain motives..

Walker's experiments dealt only with the horizontal use of the row - he did not test the audibility of the different ways of obtaining chords from the row because, as he says 'Schoenberg himself was not sure how twelve note harmony worked.' This is true and the harmonic aspects of twelve note music are, perhaps, the most problematic. Little consideration of harmonic formations is found in Schoenberg's original theories, mainly because the twelve note row was originally a formulation of Schoenberg's thematic practices and its function in his music is primarily motivic.

The harmonic practices of the three Viennese composers are so different that it is impossible to talk in general terms about twelve note harmony as exemplified in their music. In the rest of this chapter I shall consider Schoenberg's harmonic procedures because they illustrate the deficiencies of twelve note theory in this respect, and seem to show that the note row - outside the narrowest of limits - has no organising logic in itself.

b) Twelve Note harmony in the music of Schoenberg

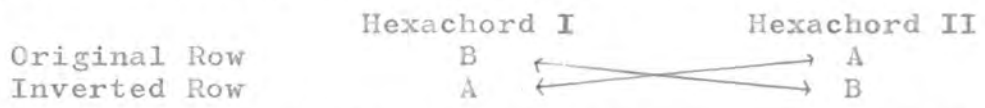
Milton Babbitt has shown that by 1933 Schoenberg had devised a method of controlling row association which, Babbitt claims, controls the relationship between melody and accompaniment and overcomes the harmonic deficiencies implicit in the original postulates of twelve note theory. This method, which Babbitt calls 'combinatoriality', has been fully investigated in a number of articles (26) and

(26) In particular see Babbitt 'Some Aspects of Twelve Tone Composition'.

the following paragraph gives only a brief sketch of its characteristics.

Combinatoriality as a harmonic contol

In the majority of his twelve note works Schoenberg employs a 'semi-combinatorial' row - that is, a row in which the first six notes of the original form are the same as the last six notes of another, transposed, form of the row. In Schoenberg the related rows are always the original row and its inversion a perfect fifth above. The note order of the two rows is different but the total content of the second hexachord of the inversion ^{is the same as the total content of the first hexachord of the original} The relationship between the two can be shown diagrammatically:



The following example from Schoenberg's Violin Concerto will make clear the practical application of this method;

Row Forms

$iO(a)$ $iiO(b)$ $iI(b)$ $iiI(a)$

Babbitt claims that combinatorial and semi-combinatorial rows (27) "effect an interrelation of the vertical and horizontal far beyond mere identity, in generating fixed units of harmonic progression with which to generate associative and variable relationships, and ... they determine transpositional levels and regions analogous to the 'circle of fifths'". (28)

Such a claim seems exaggerated. It is difficult to see how a combinatorial row can effect an interrelation of the vertical and horizontal beyond that effected by the more usual unmotivated coupling of two row forms. The principle of combinatoriality cannot, in itself, imply fixed harmonic units because the way in which the chords are to be derived from the hexachord which forms the accompaniment is not defined by the row; the composer decides how the notes are to be grouped into chords and can change these groupings at will. The following example from Schoenberg's Fourth Quartet (already cited) illustrates this point:

(27) A 'semi-combinatorial' row is one in which the original row possesses a combinatorial relationship with one of its transformations (other than its retrograde) when transposed: an 'all-combinatorial' row is one in which the original row possesses such a relationship to all its transformations at one or more transpositions.

(28) Babbitt. Ibid. Pg. 58

Twelve note groups.

Row forms:

Ex. 17.

Bar 25 of this example uses the original row, b.26 uses the inversion. Both are then used together - the original in the upper parts and the inversion in the lower parts (b.27), the inversion in the upper two parts and the original in the lower (b.28), and the retrograde in the upper parts and the retrograde inversion in the lower (b.29 - 30) The row treatment is shown in the following diagram:

Ex. 18.

The harmonic relationships set up between the two parts in b.25 and 26 are destroyed in b.27 et seq. when the two rows are put together - new harmonies are created through the addition of another two parts and the original relationships are destroyed by octave transposition. The four bars 27- 30 cannot be considered as presenting distinct harmonic units in the way Babbitt suggests, because each half bar includes all twelve notes of the chromatic scale (See Ex. 17. above).

A certain harmonic stability is provided by the repetition of notes in the 'Cello part (b.27 and 28) but the choice of these notes is the composer's - in this case the decision is determined by motivic rather than harmonic considerations.

Bars 474 - 481 of Schoenberg's Violin Concerto may be cited as a further example. In these bars (See Ex. 19 below) the orchestral accompaniment uses the same six notes throughout b.474 - 478 and another six notes from b.478 - 481, but, since the notes change octaves, the chord formations change. Moreover the chords themselves last such a short length of time that it is doubtful whether the listener is aware of the relationship between the chords. The relationships that can be seen in this passage could have been made clearly perceptible - the pitch of the notes and the chord formations could have been maintained throughout and the duration of the chords lengthened - but combinatoriality does not in itself automatically ensure the existence of perceptible relationships.

The image shows a musical score for a string quartet, labeled 'Ex. 19'. The score is written for four parts: SI. VI. (Solo Violin), VI. 1 + 2 (Violin 1 and 2), Vln. (Violin), and Vcl. (Violoncello). The music is in 4/4 time and features a complex melodic line in the first violin, with various ornaments and a 'sim.' marking. Red lines and boxes highlight specific intervals and note groupings across the staves, illustrating the concept of combinatoriality discussed in the text below.

Ex. 19.

The only thing that combinatoriality ensures is the absence of simultaneous octaves between melody and accompaniment; this is the only claim that Schoenberg himself made for the procedure. (29)

Combinatoriality amounts to a denial of the original principles of twelve note theory. It implies that the most important feature of the row is not the horizontal interval succession but the total harmonic effect of each six note group - the combinatorial rows maintain the harmonic identities of the two hexachords but have different note orders. Thus, combinatoriality is a recognition of the fact that the relationship between the harmony and the horizontal ordering of the row may be arbitrary.

Combinatoriality also recognises that a strict rotation of the notes is impossible unless the same row

(29) See Schoenberg: 'Style and Idea'. Pg. 116

form is used throughout a piece. By allowing note repetitions between six - note groups, combinatoriality only extends further the premature repetitions which occur whenever different transpositions or different row forms are joined together.

The harmony that Schoenberg produces using combinatorial techniques is determined by the same considerations as that produced without these techniques - the desire for maximum chromaticism. Other considerations are primarily thematic. The opening of the Fourth Quartet illustrates this point. The opening bars of the work are shown in Ex. 20 below:

The image shows a musical score for the opening of Schoenberg's Fourth Quartet. It consists of four staves of music. The first staff is the first violin part, the second is the second violin part, the third is the viola part, and the fourth is the cello part. The music is in 4/4 time and features a complex, chromatic harmonic language. Below the four staves, there are four types of chords labeled 'a', 'b', 'c', and 'd'. These chords are shown as vertical formations of notes on a single staff. The chords are: 'a' (F, A, C), 'b' (B, D, F), 'c' (C, E, G), and 'd' (D, F, A). The chords are marked with 'Sim.' (simultaneous) and are shown in various positions across the staves.

Ex. 20.

The accompanying chords on Second Violin, Viola and Cello are four types (a, b, c, and d): these are shown on the bottom staff of the above example and are marked on the full score. Because the notes change octave at every appearance, the listener is probably unaware of the relationships between these chords. More important in determining the vertical formations is the fact that, horizontally, the lower parts have figurations

similar to those used in the melody. In bar 1 the second violin part has a version of the last three notes of the melody in b.2, the 'cello has a free imitation of the same figure and the viola part is an inversion of the opening three notes of the melody. In b.2 the second violin part is a free inversion of the last three notes of the first violin part in the same bar, the viola figure is a retrograde version of the three note figure on the first violin in b.3 and the cello part is an inversion of the three note motive (A - Bb - F) in the first violin in the same bar. In bar 3 the second violin and viola both have versions of the opening notes of the first violin's melody in b.1 and the 'cello has an inverted version of the last three notes of the melody in b.2. The chords, however, sound arbitrary. (30)

Schoenberg seems to have believed that tonal associations do not occur in a totally chromatic texture and thus failed to take into account the fact that the vertical formation of harmonies is of considerable importance to the listener. He similarly failed to take into account the metric and rhythmic stresses which make certain harmonies attract the ear more than others, and the length of time it takes for a harmonic progression to become audible. Consequently, while the move from one chord to another might be organised, the movement to and from chords that command attention is frequently uncontrolled in Schoenberg's music.

Schoenberg believed that the note row had its own logic and that this logic would justify harmonic procedures;

(30) See Neighbour. 'In Defense of Schoenberg' for a similar analysis of this passage

"Evaluation of (quasi-) harmonic progressions in such music is obviously a necessity, though more for the teacher than for the composer. But as such progressions do not derive from roots, harmony is not under discussion and the evaluation of structural functions cannot be considered. They are the vertical projections of the basic set and the combination is justified by its logic." (31)

As I have tried to show, the note row does not have an audible logic and does not automatically justify harmonic formations. I have said (32) that the ear does not hear the note row as a row (as, that is, an abstract sequence of intervals) but hears musical patterns and figurations which are not referred back to the row. The music may enhance certain characteristics of the note row but these characteristics only acquire importance because of the way they are projected by the musical figurations. An interrelation between melody and harmony can only come about through a deliberate decision to use motivic features as perceptible harmonic units. Because Schoenberg believed that the logic of the note row would, of its own accord, justify vertical formations, such usage is lacking in his music and the listener is unable to hear any perceptible relationship between the chords and the melodies. As a result, the harmony sounds arbitrary. The apparent irrationality of Schoenberg's harmony is emphasised by other compositional elements - a topic which I shall discuss in the following chapter. (33)

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- (31) Schoenberg. 'Structural Functions of Harmony' Pg. 194
 (32) See Pg. 18-20
 (33) See Pgs. 32-33

II. Formal and Perceptual Problems in Nontonal Music

In this chapter I shall survey the problems raised by the supposed abolition of tonal criteria. The rest of this thesis will be an examination of these problems.

1a) The effect of the abolition of tonal criteria upon other compositional elements.

The most immediately apparent result of the abolition of tonality is that there are no longer any criteria governing the formation of harmonic and melodic patterns. It was to establishing such criteria that Schoenberg chiefly addressed himself. The twelve note row was intended to be a self sufficient sequence of intervals to which all the melodic and harmonic events in a work could be referred. I have said, in Chp. 1, that it does not automatically fulfill this intention.

The abolition of tonal criteria affects other compositional elements besides harmony and melody. Since harmony in nontonal music is not governed by tonal criteria the traditional forms of harmonic tension and relaxation (the resolution of discords to concords) are no longer possible. But because the ear perceives gradients, not absolutes (1), tension and relaxation can still

(1) Although not an exact parallel, Gombrich's account of Köhler's famous experiment on the perception of visual stimuli by animals may be quoted in support of this statement: "You can take two pieces of paper - one dark, one bright - and teach chickens to expect food on the brighter of the two. If you then remove the dark piece and replace it by one brighter than the other one, the deluded creatures will look for their dinner not on the identical grey paper where they have always found it but on the paper where they would expect it to be in terms of relationships - that is, on the brighter of the two." Gombrich. Op. cit. Pg. 45)

operate in nontonal music - a chord which creates a feeling of tension in one context may create a feeling of relaxation in another. In context the final chord of Berg's Violin Concerto, for example, relaxes, not increases tension although it is a discord if judged by classical standards.

Since tension and relaxation are relative, they can be achieved within the framework of a nontonal piece without having reference to any 'absolute' values existing outside the norms established by the work.

In tonal music a discord has the effect of moving the music forward; the listener expects a discord to be resolved. The composer's exploitation of the feeling that a discord must be resolved (and, on a larger scale, the feeling that the music must return to the tonic) gives tonal music a sense of motivation and a reason for continuing. In nontonal music the listener does not expect a discord to be resolved and does not feel that the music must move from a point of tension to a point of relaxation. Because nontonal music is not based upon any hierarchy of relationships which has a general validity, it does not, by nature, have any long term motivation.

By emphasising certain notes at the expense of others, a composer can give preference to and exploit certain harmonic formations and pitch relationships and in this way the music can seem to establish a system of hierarchies. But these hierarchies have no means of asserting pulls comparable to those of the tonal hierarchy. Moreover, the choice of the characteristics which are exploited in a piece is not determined by any general terms of reference and the characteristics chosen are, therefore, arbitrary in that they have no validity outside the confines of one particular work. I shall discuss this topic in Chp. VIII. Had the twelve note system worked

as Schoenberg seems to have intended, then the desire of the ear to hear the row completed once begun would perhaps have provided some such motivation.

The abolition of tonality also affects rhythm and metre. In tonal music harmony and melody are closely linked to metre and the important harmonic points are usually the important metric points - if the melody or the harmony emphasise weak beats of the bar the listener feels a syncopation and expects the melodic and harmonic accents to correct themselves and once more coincide with the metric accents. The regular beat and the functional harmony are interdependent, the one helping to clarify the other.

b) Schoenberg, Berg and Webern

In Schoenberg's music the harmony sounds arbitrary and the ear cannot always grasp exactly the intervals of the melody, yet the music has a traditionally strong metre and the rhythmic patterns are reminiscent of those of tonal music. The rhythmic stresses and melodic contours suggest that some notes are essential harmony notes and that others are appoggiaturas, anticipations or decorations around harmony notes:



Ex. 21

but the listener is unable to see any relationship between the harmonic implications of the rhythmic stresses and the actual harmony; the apparent irrationality of

the harmony (which suggests that any notes will suffice provided that they do not bring about octave relationships with the melody) conflicts with the traditional rhythmic stresses (which suggest that certain notes are of particular importance.):

The image shows a handwritten musical score for four staves. The notation is complex, featuring various note values, rests, and dynamic markings. The first staff has a treble clef and a key signature of two flats. The second and third staves have a 7/8 time signature. The fourth staff has a bass clef. The score includes markings for 'pizz' (pizzicato) and 'arco' (arco). The notation is dense and appears to be a study or exercise.

Ex. 22.

It is to the paradoxical relationship between the elements in Schoenberg's music that Boulez has objected in his article 'Schoenberg is Dead!'. In addition to the points discussed above Boulez also observes that Schoenberg continued to use traditional forms which depend upon tonality for their *raison d'être* even though the material used was nontonal:

"The two worlds are incompatible, and he has tried to justify the one by the other." (2)

To the listener, the aspects of Schoenberg's music that sound least arbitrary are usually those that are not affected by the note row (such as rhythm, phrase structure and balance of phrases) and that are the most traditional. It seems possible that it is these traditional aspects that are most important in determining the listener's response to Schoenberg's music and that the listener simply accepts that the harmonic, and some

(2) Boulez: 'Schoenberg is Dead' Pg. 20

of the melodic, formations have no relevance to other aspects of a composition.

Because of this paradox, Schoenberg's music presents problems that are essentially different from those with which this thesis is concerned and I shall not discuss his work in detail.

Nor shall I discuss the music of Berg in detail in later chapters because, both melodically and harmonically, Berg's music seems to^{be} governed by traditional tonal criteria. The following passage (Ex. 23 overleaf) from the orchestral interlude between Scenes 2 and 3 of Act I of 'Lulu' illustrates this point. This passage is particularly clear in its tonal implications but is not untypical of the work.

The passage is in D flat major. The tonic has a traditional tonal function and exerts traditional pulls - the music moves away from and returns to it. Every chord in these 8 bars is a diatonic chord with added notes:

- | | |
|-----------------------------|---|
| b.958. D flat (tonic chord) | - A flat 7
(Dominant 7th) |
| b.959. E flat/G minor | - E major |
| b.960. A minor | - F sharp major 7 |
| b.961. G minor | - D major |
| b.962. F sharp minor | - E flat major over an
F sharp/C sharp pedal |
| b.963. E flat/C minor | - C major |
| b.964. A flat/B flat | - Dominant discord |
| b.965. D flat (tonic chord) | |

Grave $\text{♩} = 38$

Stgs.

958 b^{\flat} p p 959 h^{\flat} p p p

960 h^{\flat} p 961 h^{\flat} p 962 h^{\flat} p

963 h^{\flat} p 964 h^{\flat} p 965 b^{\flat} p

basso accel. rit. a tempo

Ex. 23.

The discordant notes within this diatonic sequence are all approached and quitted in a traditional way. The discordant E natural in b.958, for example, is a suspension from the previous bar and resolves by moving up a semitone to F natural on the second quaver of the beat. The F natural in turn moves to G flat to form the seventh of an A flat dominant seventh chord. The discordant A natural in the E flat supertonic chord of b.959 is a chromatic passing note, leading from the previous A flat to the following B flat, the resolution of which is delayed until the second beat, by which time the harmony has changed to G minor. The B flat then ascends to a B natural, forming part of an E major chord on the third beat of b.959.

The more complex chords are explicable as the result of an harmonic ellipsis - the chord on the last beat of b.961 and the first beat of b.962, for example, is a form of augmented sixth chord in F sharp and an F sharp minor chord; the discord and its resolution appear together.

The return to the tonic D flat is carefully prepared by the downward progression of the bass beneath a dominant discord (b.963 - 964) and the bass finally returns to the tonic by way of the leading note. The whole Interlude follows a key scheme similar to that of the above passage; a middle section repeats the opening theme in the dominant key (A flat) and the final section returns to the tonic key, where it restates the main theme.

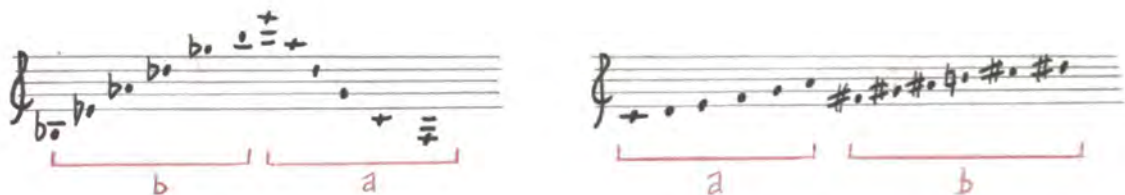
The diatonicism of much of 'Lulu' is unusually clear, but even in less overtly diatonic works, Berg's melodies and harmonies are reminiscent of those of traditional music and seem to obey the same laws. The first movement of the 'Lyric Suite' illustrates this. The movement begins with music based upon the following row:



Ex. 24

This note row is made up of two hexachords, each of which is a different tonal area; the opposition of these two tonal areas is exploited throughout the movement.

During the course of the movement two other note rows are used:



Ex. 25.

Both of these rows use the same two tonal areas as the opening row. Throughout the movement Berg uses only the original position of the rows (that is, he does not use transpositions) thus emphasising the two tonal areas.

Each hexachord of the opening row contains a minor triad (x in Ex. 24) and the interval of a fourth or fifth (y in Ex. 24) - the intervals of a fourth and fifth are emphasised in the first of the two derived rows (which is a chain of fourths and fifths). All these characteristics are deliberately reminiscent of tonal music. The Example on the following page (Ex. 26) shows the opening of the movement: the two tonal areas are marked a and b respectively, chords and melodic fragments built of minor triads are marked x and chords and melodic fragments built of superimposed fourths are marked y.

The interval of a semitone (the first and last interval of the note row) assumes an important cadential role during the movement. This interval is emphasised at the cadence at b.4 and at the transitional bars 5 and 6

Urheberrecht vorbehalten
Verdichtung des Textes

LYRISCHE SUITE

I

Allegretto gioviale

Alban Berg
(1885-1935)

1. 100 (Tempo I)

Violin I
Violin II
Viola
Cello

Handwritten annotations: 'a', 'b', 'a', 'poco f', 'fp', 'mf', 'fp', 'mf', 'fp', 'X'.

poco pesante

Violin I
Violin II
Viola
Cello

Handwritten annotations: 'a', 'b', 'a', 'poco f', 'fp', 'mf', 'poco mar.', 'X', 'poco', 'poco f'.

tempo

Violin I
Violin II
Viola
Cello

Handwritten annotations: 'a', 'b', 'a', 'poco', 'molto', 'pizz', 'X'.

In die „Philharmonia“ Partiturrensammlung aufgenommen
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Ex 26.

It is marked p in Ex. 26. The way in which this interval is emphasised at cadence points is again reminiscent of tonal music and may remind the listener of the semitone movement from the flattened sixth or the sharpened fourth to the dominant, or from the neopolitan second or the leading note to the tonic in tonal music.

Because Berg's music uses melodies and harmonies so like those of tonal music, and does not use a completely chromatic texture, it avoids the kind of problems discussed in this chapter. The music uses traditional rhythmic patterns and melodic shapes without the listener feeling any contradiction between the melodic-rhythmic shapes and the harmony. Tonality retains many of its traditional functions and the traditional concepts of discord and concord are still valid. Berg's music, therefore, falls outside the scope of the present thesis.

The rest of this thesis will be chiefly concerned with the music of Webern and the post-Webernian composers. The music of Webern avoids rhythmic patterns that are too reminiscent of traditional music and usually avoids establishing a strong metre. In most of Webern's music the listener is aware of a steady pulse, but the pulses are rarely grouped into regular strong-beat and weak-beat patterns and such things as phrasing, melodic shape and instrumentation continually emphasise different pulses, so that the music seems to have a very fluid rhythmic structure. On the rare occasions when Webern does group the pulses into regular metres (as in some sections of the opening movement of Op.28 or the third movement of Op.24 (3)), the metre is soon destroyed or

(3) See Fgs. 71-80 + 100-103

changed in some way and sections in which the listener can hear a regular metre lead to sections with a very fluid rhythm.

Webern also avoids the usual melody and accompaniment texture because of its traditional connotations; because the abolition of a regular metre and traditional rhythmic patterns inevitably brings about the abolition of the kind of rhetorical melodic lines which are found in the music of Schoenberg. As I shall show (4) the music of Webern and the post-Webernian composers presents formal and perceptual problems that are not found in tonal music or in the music of Schoenberg and Berg.

2. Auditory perception in nontonal music.

The hierarchy of relationships in tonal music (the relationship of different diatonic and chromatic notes to the tonic, the degrees of relationship of chords to the tonic chord and of keys to the tonic key) form terms of reference which have a general validity for all tonal music. The listener knows, understands, and is able to perceive these terms of reference working within the music. Because of this, tonality acts as a referential element which enables the listener to measure phenomena - I have already said that it acts as a standard against which the class of an interval can be judged.(5) The absence of such a means of measuring inevitably affects the exactitude with which the listener perceives phenomena.

Because a regular rhythmic reference point makes it easier for the listener to hear the relative length of different notes, the weakening of the metre has a similar effect upon the exactitude with which the listener hears durations. As I shall later show (6) a regular

(4) See pgs. 39-45

(5) See Pgs. 4-5

(6) See Pgs. 56-60, 69-76 + 127-129

pulse of some kind still operates in the music of Webern so that, for most of the time, the listener is able to judge the relative lengths of notes; but the exactitude with which durations are perceived in complex post-Webernian music is more questionable.

In the absence of the reference points of tonality and metre the listener hears the music with less exactitude and the musical material seems more imprecise and unclear.

a) Inferential perception and association

The more imprecise the musical material seems to the listener, the more difficult it becomes for the composer to control the listener's response to the music. If the ear cannot hear exact patterns it will cling to any hint of pattern the music might suggest and will supply approximate patterns of its own.

The mind will attempt to understand a phenomenon and to do so it must relate the stimuli into groups - "The business of an organism is to organize" says Gombrich (7) and such organization is automatic and inevitable because it is essential to understanding. Myers says,

"The human mind will go to any lengths to avoid the doubts and anxieties which are created by ambiguity. That is, the mind will tend to apprehend a group of stimuli as a pattern or a shape if there is any possible way of relating the stimuli to one another." (8)

So determined is the mind to understand a phenomenon that, when confronted with a phenomenon which is not understandable in terms of its past experience, the mind can ignore those parts that it cannot understand:

(7) Gombrich Op. cit. Pg. 171

(8) Myers 'Emotion and Meaning in Music' Pg. 162

"The higher centres exercise a selective influence on the sensations and perceptions; those aspects of the input which are irrelevant will be treated as 'noise' and forgotten without leaving a trace. But the criteria of relevance depends upon the 'rules of the game' which the organism is playing at the time." (9)

Koestler cites the following example of this phenomenon:

"When an object of the appearance of a tennis ball is inflated against a homogenous background, it will be seen as if it were retaining its size and approaching the observer. The knowledge that tennis balls behave reasonably and do not grow into footballs somehow manages to discard the anomalies in the situation as irrelevant." (10)

Koestler says that the observer must look "until he finds a frame" into which a new phenomenon fits (11) - if the observer is unable to find a frame that fits, he will ignore as much of the information presented by the phenomenon as is necessary to make it fit into a frame. If the listener cannot understand a passage of nontonal music because he is unable to grasp certain features, he can ignore or modify some of the information presented by the passage in order to resolve the uncertainty he feels.

The mind understands a series of stimuli by relating these stimuli to form groups and patterns and, in music, the listener will try to form the stimuli into patterns which relate to one another in a traditional way - which balance each other in length, have similar intervals, similar contours etc. The following example will

(9) Koestler. Op. cit. Pg. 519

(10) Koestler. Ibid. Pg. 526

(11) See Pg. 1

illustrate this point:



Ex. 27.

Whilst the second of the two phrases is being played (and after it has ended) the ear will try to hear a recognisable pattern and will try out many different frames of reference in the hope that one such frame will fit. Had the second note of the second phrase risen, the listener might have remembered the first phrase (in which the second note rises) and have considered the second phrase as some kind of variation of the first phrase; because the second note of the second phrase falls the listener might assume that the phrase is some kind of inversion of the first phrase. Also because it is shorter than the first phrase, the second phrase might be considered to be some kind of diminution of the previous phrase. In fact, the second phrase is neither an inversion nor a diminution of the first phrase but these explanations are likely to be adopted because they most closely fit and enable the listener to understand the second phrase as being related to the first. It is the desire to understand, rather than any similarities between the two phrases themselves, that leads the listener to assume that the two phrases are related. Thus, in the above example, the ear might infer a relationship even though the two phrases are of different lengths, use different intervals and rhythms,

and have different contours. (12) The mind cannot avoid some pattern forming of this kind; it will tend to impose patterns even upon a random series of stimuli(13)

The mind inevitably attempts to hear recognisable patterns and shapes in a sequence of sounds, and must hear such shapes in order to understand the music. If the listener finds the music very difficult to grasp, he will interpret it as best he can and the ear will cling to any hint of shape that seems to suggest itself. Since even a random sequence of notes must suggest some shape, the listener can, and will, read patterns into any music.

The more difficult it is to hear exactly the information presented by a piece of music (the wider the intervals, the more complex the rhythms, the faster moving and more complicated the texture, the fewer the referential elements such as tonality and pulse) the more important the role played by the listener's subjective associations in trying to understand the piece and the more difficult it is for the composer to control the listener's associations and determine his response to the music - if the music is very complicated, every listener might interpret it differently.

In the following chapter I shall argue that there are present in Webern a number of perceptible referential elements that enable him to control the listener's associations; I shall examine the kind of patterns which the mind might form in post-Webernian music in Chp. VII.

(12) The listener might also assume that the second phrase of Ex. 22 is an inversion or diminution of the first because he knows from previous experience that nontonal music frequently employs such procedures.

(13) See Cohen: 'Subjective Probability'.

b) The perception of simple and complex material

A distinction must be drawn between the way in which the ear hears simple and complex passages. In a 'simple' passage of music - by which is meant a passage with, for example, a slow rate of movement, a sparse texture, a passage in which every element is clearly perceptible - the ear has time to form associations, to relate the individual notes to one another, to form them into groups and phrases and to consider the rhythmic relationship between one group and another. In a 'complex' passage - by which is meant a passage with a thick texture in which there is a large amount of activity, a passage in which the ear cannot perceive clearly every detail - the ear does not have time to form such relationships.

A complex passage presents more information than the mind can absorb and the ear picks out only the most obvious characteristics of the passage (the overall shape, for example.) The way in which the ear hears complex material has not been investigated but H. J. Clark has concluded, from an experiment dealing with visual association and the recognition of complex shapes, that there might be different processes underlying the perception of simple and complex forms. (14)

Stockhausen's 'Klavierstücke I - V' alternate simple and complex blocks of material and Stockhausen has described the effect of a complex block upon the listener as follows:

"Let us imagine a stone close to us - we can see many details, line strata, folds ... let us imagine this stone as a whole - we shall understand it not as the sum of the pontillistic details, although they will be

(14) See H. J. Clark. 'Recognition memory for random shapes as a function of complexity, association value and delay'.

collectively in our image of it as a stone and not as something made out of wood. We shall not say that this or that structural characteristic is particularly important and we shall not describe the lines but comprehend the stone as an entity."(15)

I have said (16) that harmonic tension and relaxation can operate within the norms established by a nontonal work without having reference to traditional ideas of discord and concord. Tension and relaxation in nontonal music can also result from the exploitation of the listener's perceptual limitations. For example, because large intervals are difficult to perceive exactly and because the listener feels a need to try and hear them exactly in order to understand them, such intervals can create tension. Smaller intervals, on the other hand, feel relaxed because they are easily grasped. Tension can be generated whenever the listener has difficulty in perceiving the material exactly. Thus, if the ear does hear simple and complex material in a different way, this difference can be used as a formal element. The perceptual problems resulting from the absence of tonality can provide a composer with a new method of controlling tension and relaxation - a method which is not comparable to any found in tonal music. (17)

3. Musical grammar and continuity.

The absence of tonality, and the effect this absence has on other compositional elements, will necessarily affect the grammar of the musical language. The

(15) Stockhausen. 'Gruppenkomposition: Klavierstück I. Anleitung zum Hören'. Pg. 66

(16) See Pg. 31

(17) See Chp. IV and Pg. 192-205

grammar of traditional music (by which is meant the logic governing the construction of music over a period of time) is dependent upon such things as functional harmony and the hierarchy of tonal and metric relationships. Continuity, expectation and surprise in tonal music depend upon the fact that the listener understands and can perceive the working of this grammar. To see how expectation, surprise and a sense of continuity can be felt in amusical language in which the listener cannot exactly define the grammatical rules - a language in which he is unsure of the criteria governing the relationship between one element and another - it is necessary to consider what is meant by 'continuity' in music.

a) Hypothesis theory: its relation to expectation, surprise and musical continuity

The 'hypothesis' theory of Bruner and Postman suggests that all cognitive processes, whether thinking, perceiving or recalling, represent "hypotheses which the organism sets up, or that are evoked by a particular situation. These hypotheses, in perception at least, are largely in the background ... they require answers in the form of some further experience, answers that will either confirm or disprove them." (18)

This theory is applicable to ideas of musical continuity; an event suggests certain possibilities of continuation to the listener and the mind sets up an hypothesis on the basis of these possibilities. The hypothesis is based on many factors - the awareness that something will follow, the information presented by the situation and the listener's previous experience of music (which might lead him to expect such things

(18) Allport. 'Theories of Perception and the Concept of Structure'

as an antecedent-consequent construction, balancing phrases etc.)

The listener expects to hear relationships to what has gone before and assumes that what happens represents a decision, on the part of the composer, which has some relevance to what has happened earlier in the piece.

Continuity and logic in music are the result of a listener feeling that the different events are relevant to one another. Such logic must exist if the listener is to continue to be interested in a piece. A break in the musical continuity will surprise the listener and arouse his curiosity, but if such breaks occur too often the listener will become bored and the music will seem unpredictable and lacking in continuity. D. E. Berlyne has suggested that "not all novel stimuli are effective (in arousing interest) but only those which are familiar in some respect and novel in others."(19)

The listener will also become bored by music that is too predictable: the continuous unvaried repetition of material has no surprise and cannot arouse the listener's interest.

The information presented by an event determines the mind's hypothesis, and this hypothesis requires answers in the form of further experience to confirm or disprove it. When listening to traditional music the listener knows the grammar and is able to absorb large units of information by a process known to psychologists as 'chunking'. (This process will be described in more detail later in the thesis (20)). The more information the listener can 'chunk' into one

(19) Berlyne. 'Novelty and Curiosity as determinants of exploratory behaviour'. Pg. 1

(20) See Pgs. 157-158

unit, the more grammatical relationships he is able to see; and the more grammatical relationships he knows, the more information he can 'chunk' into one unit.

Because the listener understands the grammatical relationships of traditional music, the information conveyed seems very precise, and he might expect a very definite kind of event to occur. Because certain aspects of nontonal music are unclear some of the information conveyed seems very imprecise and it is unlikely that the listener will have expectations of a very definite kind. In complex nontonal music, for example - where the details of the music are not perceptible with any exactitude - an event will not suggest any precise continuation and, thus, any one of a large number of possible events can follow and seem relevant to what has gone before. The relevance an event appears to have to those that precede it depends upon the nature of the musical material and the listener's knowledge of the music's grammar. I shall consider the implications of this fact in greater detail in Chp. VIII (21)

In the rest of this thesis I shall show how the perceptual limitations discussed in this chapter affect the listener's understanding of nontonal music; I shall examine the music of Webern and the avant-garde composers to show the extent to which the listener's response to the music, the musical patterns he hears and the relevance one pattern seems to have to another are determined by the composer.

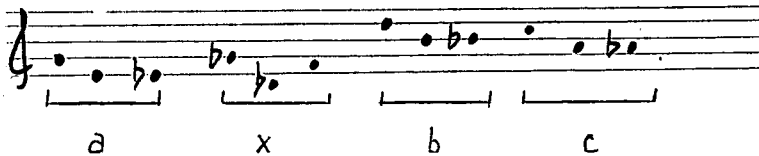
III. Some Examples of Perceptible Limits in the
Music of Webern.

In this chapter I shall shown that a number of audible referential elements are established in the music of Webern and that, because of these, the music seems to work within perceptible limits which determine the listener's response to the music. I have chosen to discuss the first of the Three Songs Op. 25 and the Concerto Op. 24 in detail, but perceptible limits of the kind discussed in these pieces can be found in almost all Webern's works and further examples will be given in the following chapter.

Three Songs Op. 25. No. 1.

a) Melodic and Harmonic limits

The note row of the Three Songs Op. 25 is shown below:



Ex. 27.

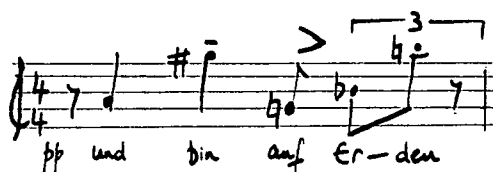
If divided into four three note cells the row contains three identical cells built of a minor third and a semitone (cells a, b and c above) and a fourth cell (cell x above) built of a fifth and a major third.

Notes 1, 3 and 4 of the row form a three note cell similar, though not identical, to cells a, b and c (cell d in Ex. 28 below) and notes 5, 6 and 7 and 8, 10 and 12 form two other such cells (cells e and f below):



Ex. 28.

Webern chooses to enhance these features of the note row in the first Song. The complete song is shown in Ex. 29 overleaf. Three note cells appear most noticeably in the piano's semiquaver triplet figurations, but they can also be seen in the voice part at b.3 ('Noch einmal' - cell e above) and b.10 ('ins Werden' - cell f above) where they are separated by phrasing, pitch or rhythm from what precedes or follows them. At other places in the voice part these cells are obscured slightly, but are still perceptible: at b.11, for example, the cell G - Bb - B (notes 1, 2 and 3 of the inverted row) forms part of a five note phrase ('Und bin auf Erden') but the three note cell is separated rhythmically from the other two notes of the phrase:



Ex. 30.

at b.3 and 4 the three note cell C - A - G sharp ('alles grün') forms part of a five note phrase but the other two notes act as an anacrusis to the stressed C natural, the first note of the three note cell:



Ex. 31

Ex. 29.

DREI LIEDER

nach Gedichten
von
Hildegard Jone

English version
Eric Smith

THREE SONGS

on poems
by
Hildegard Jone

ANTON WEBERN, op. 25

I

Langsam $\text{♩} \approx 60$ rit. - - tempo rit. - -

Song
voice

Piano

Wie bin ich froh!
What great de-light!

noch ein-mal wird mir al-les grün und
Once more now all the greens un-furled and

leuch-tet so! noch u-ber-
shines so bright! And still the

blühn die Blu - men mir die Welt! noch ein -
 world is o - ver grown with flow'rs! Once more

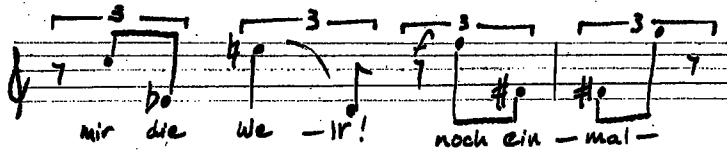
mal bin ich ganz ins Wer - den hin - ge - stellt
 I in cre - a tions por - tal live my hours,

rit -

und bin auf Er - den.
 and yet am mor - tal.

sehr langsam $\text{♩} = \text{ca } 42$ tempo I

at b.8 - 9 the three cells C - Eb - E; D - F - F sharp; G - E - Eb (the last six notes of the inverted row and the first three notes of the original row) are obscured by the phrasing ('mir die Welt - noch einmal, bin ich ganz') but the cell Eb - D - F sharp is emphasised because these three notes are placed at a different register from the other three notes of the phrase:



Ex. 32

Because the three note cells in the piano's semiquaver triplet figurations are so clearly perceptible, the listener is likely to hear those of the voice part, even when they form part of a four or five note phrase. At a number of points in the song the voice part and the piano part use the same or similar groups of notes and this draws the attention to the similarities between the three note cells in the piano part and the longer phrases in the voice part:-

i) The notes of the piano's semiquaver triplet figure at b.2 appear, at the same time, in the voice part:

Ex. 33.

ii) The cell C - A - G sharp, which appears in the voice part at b.4, has two notes in common with the three note cell which appears in the piano part at the same time:

Handwritten musical score for Ex. 34. The piano part consists of two staves. The right hand has a triplet of eighth notes: G#4, A4, B4. The left hand has a triplet of eighth notes: F#3, G3, A3. The voice part is on a single staff with notes A4, G#4, and A4, with lyrics "al- les grün".

Ex. 34.

iii) The G sharp - C sharp - A of the voice part at b.7 seems similar to the piano semiquaver figuration which precedes it, although it has only two notes in common with that figure and one of these notes is at a different pitch:

Handwritten musical score for Ex. 35. The piano part consists of two staves. The right hand has a triplet of eighth notes: F#4, G4, A4. The left hand has a triplet of eighth notes: F#3, G3, A3. The voice part is on a single staff with notes G#4, A4, and G#4, with lyrics "die Blü-men".

Ex. 35.

iv) The four note phrase in the voice at b.8 has two notes in common with the piano's semiquaver figuration in the same bar:

Handwritten musical score for Ex. 36. The piano part consists of two staves. The right hand has a triplet of eighth notes: F#4, G4, A4. The left hand has a triplet of eighth notes: F#3, G3, A3. The voice part is on a single staff with notes F#4, G4, A4, and B4, with lyrics "mir die We- it!".

Ex. 36.

v) The notes of the semiquaver triplet figuration on the piano at b.9 appear in the voice part at the beginning of the next bar, although only one note has the same register in both parts:

Handwritten musical score for Ex. 37. The piano part consists of two staves. The right hand has a triplet of eighth notes: F#4, G4, A4. The left hand has a triplet of eighth notes: F#3, G3, A3. The voice part is on a single staff with notes F#4, G4, and A4, with lyrics "ganz wie wer-den".

Ex. 37.

That both parts use the same or similar groups of notes within a short space of time enables the listener to see the relationship between the cells in the piano and voice parts; it also has the effect of making the two parts seem closely linked and of giving a sense of leisurely harmonic movement.(1)

The constant repetition of similar cells (which is easily perceptible because of the sparse texture) gives the Song a sense of melodic and harmonic homogeneity and the harmonic and melodic formations seem to work within perceptible limits.

b) Limitation and exploitation of patterns.

The Song begins with a short piano passage built of four cells - a semiquaver triplet figure (a), a descending two note figure (b) a chord (c) and an ascending two note figure (d):



Ex. 58.

(1) The effect of leisurely harmonic movement is also due to the row forms which Webern chooses to use. The row and its inversion beginning on the same note have four diads in common. Two of these diads (E - Eb and F - D, i and ii below) are identical in both the row and its inversion; in the other two the notes forming the diads are reversed in the inversion (D - Bb becoming Bb - B and C - A becoming A - C, iii and iv below.) The First Song uses only the row and its inversion beginning on G. The constant repetition of these diads and the use of only 2 row forms has the effect of avoiding a completely chromatic texture and enhances the sense of slow harmonic movement.

		i			ii	iii	iv		
O:	G	$\overline{E \quad Eb}$	Gb	Db	$\overline{F \quad D}$	$\overline{B \quad Bb}$	$\overline{C \quad A}$	Ab	
I:	G	$\overline{Bb \quad B}$	Ab	Db	$\overline{A \quad C}$	$\overline{E \quad Eb}$	$\overline{D \quad F}$	Gb	
		iii			iv	i	ii		

The piano part uses only these four cells during the song but the cells and the order of the cells which make up the composite opening pattern are constantly varied or modified. The alterations of the original pattern of four cells during the first five bars of the song are summarised in the following diagram:



On the pattern's second appearance at b.2, cell d is omitted and, instead, cell a returns earlier than expected. This new appearance of cell a (b.3) leads to a further repetition of the pattern - this time the second of the two notes of cell b is omitted and the cell reduced to a single note, and cell c is unexpectedly lengthened by a quaver's rest (this cell, which has always been followed by a quaver's rest on its previous appearance is now followed by a crotchet's rest.) Cell a appears again at the beginning of b.4 and is followed by the single note of cell b (cell b having been reduced to a single note on its appearance at b.3). This note is delayed by a third of a beat and is immediately followed by cell a again. The chord of cell c appears 'forte' in b.5. where it seems to mark the end of the first half of the song.

Another short piano passage at b.6 introduces the second half of the song. This piano passage uses all four cells in their original order, but cells a and c

are repeated. The modifications of the original pattern in this second half of the song are summarised in the following diagram:

The diagram illustrates rhythmic patterns across several bars, labeled b.6 through b.12. The patterns are categorized into cells a, b, c, and d, which are defined as follows:

- Cell a:** A rhythmic figure consisting of two eighth notes followed by a quarter note.
- Cell b:** A rhythmic figure consisting of a quarter note followed by an eighth note.
- Cell c:** A rhythmic figure consisting of a quarter note followed by a quarter rest, then a quarter note.
- Cell d:** A rhythmic figure consisting of a quarter note followed by a quarter rest, then a quarter note.

The diagram shows how these cells are combined and modified in various bars:

- b.6:** Cell a, Cell a, Cell b, Cell c, Cell c, Cell d.
- b.7:** Cell a, Cell b, Cell c, Cell c.
- b.8/9:** Cell a, Cell b, Cell c.
- b.9:** Cell a, Cell b.
- b.10:** Cell a.
- b.10/11:** Cell a, Cell b, Cell c, Cell d, Cell c.
- b.12:** Cell a, Cell b.
- b.12:** Cell a.

On the repetition of the pattern at b.7 cell d is omitted and cell c is delayed by a quaver's rest. It is followed (b.8) by cells a and b (cell b again reduced to a single note) and by cell c, which is further delayed by a crotchet's rest. In the second half of b.9 cells a and b appear (b, a single note, is now delayed by a third of a beat) and are followed by cell a. A final appearance of the whole pattern begins in b.10 where cells a and b are separated from cells c and d, both of which are altered rhythmically. Cell d is followed by an unexpected repetition of the chord, cell c. The last bar, bar 12, has cells a and b followed by a final appearance of cell a.

In addition to these contractions and expansions of the pattern presented in the opening bars of the song, the cells themselves are varied during the course of the piece; the chord formation of cell c changes, cell b - originally a descending two note figure becomes an ascending figure, cell d - originally an ascending two note figure - becomes a descending figure, and cell a continually changes its contour. Some of the shapes which cell a adopts are shown in the following example:

The image contains five staves of handwritten musical notation. The first three staves on the left represent the piano part, and the two staves on the right represent the voice part. Each staff features a triplet of notes. The piano part includes dynamics such as *f* (forte) and *p* (piano), and includes a sharp sign (#) above a note in the first staff. The voice part also includes dynamics like *f* and features a sharp sign (#) above a note in the second staff. The notation is in a single melodic line on a five-line staff.

Ex. 39.

At the beginning of the song the piano presents a pattern built of four short cells. The cell order and the rhythmic characteristics of this pattern are constantly modified during the course of the song and much of the interest in the song lies in the way the opening pattern varies. The listener is interested in the way this pattern changes only because the thematic material is very simple and clearly defined in the opening bars of the piece.

The more lyrical voice part is less concerned with developing and exploiting patterns in this way.

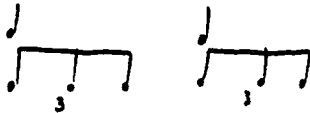
c) Rhythmic limitations

The four cells of the piano part employ three main rhythms - the held chord (cell c) is a crotchet (usually followed by a quaver's rest), both notes of the two note cells b and d are quavers and cell a is a semiquaver triplet. All three rhythms always appear on the main beats or the half beats of the bar, so that, although the beats which the listener hears as being important are not always those indicated by the time signature, a basic crotchet pulse can be felt throughout the song. The time signature varies from $3/4$ to $4/4$.

The semiquaver and quaver figurations can be understood as subdivisions of the crotchet pulse:



A further rhythm, a quaver triplet, appears in the voice part. This rhythm never obscures or contradicts the basic pulse and, like the other rhythms, can be understood as a subdivision of the crotchet pulse:



The quaver triplet rhythm also occurs in the piano part at b.4, 5, 9 and 11, but as a crotchet preceded by a quaver rest. At these points the effect is of a delayed main beat.

The conflicting simple and compound subdivisions of the pulse give the song rhythmic flexibility.

Though a basic pulse can be felt throughout the song, a strong metre is avoided since the accents within the pulse are continually shifting, and those of the piano part continually contradicting those of the vocal line. The opening piano phrase seems to establish a regular crotchet beat with an accent on each half beat of the metre indicated by the time signature:

Crotchet Pulse

The fourth note of the phrase (E natural) is stressed by its melodic placing and its dynamic marking (*sforzando*) while the four note chord (b.1) is marked 'marcato' and is stressed because it is a chord (only single notes have appeared previously.) The opening triplet figure is, therefore, probably heard as an anacrusis to the *sforzando* E natural and the listener is likely to hear this opening passage as having a regular crotchet beat.

This regular crotchet beat in the piano part continues in b.2, 3 and 4:

Example 41 shows a piano part with a regular crotchet beat. The piano part consists of a series of notes with accents and triplets. The vocal part has accents that coincide with the piano part in some measures but not in others.

Ex. 41.

At the entry of the voice part the vocal accents coincide with those of the piano part but the voice's F sharp in b.2 disturbs this regular flow and in b.3 and 4 the vocal accents do not coincide with those of the piano part:

Example 42 shows a vocal part with accents that coincide with those of the piano part in some measures but not in others. The piano part has a regular crotchet beat. The vocal part has accents that coincide with the piano part in some measures but not in others.

Vocal Accents
Piano Accents

Ex. 42.

Because the regular crotchet beat of the piano passage encourages the listener to hear the piano's first

semiquaver triplet figure as an anacrusis, he is likely to regard this figure as an anacrusis whenever it appears; in b.4, however, the semiquaver triplet figure is always followed by a rest, never by the expected downbeat accent. This further disturbs the regular rhythmic pattern established in the opening bars:



Ex. 43.

Throughout the second part of the song the stresses of the piano figurations constantly conflict with those of the vocal line and a regular beat and metre are thus avoided. The following example (b.7 - 10 of the Song) attempts to show how the accents of the piano and voice parts conflict with one another:

A musical score for two staves. The top staff is a vocal line in treble clef, and the bottom staff is a piano accompaniment in bass clef. The key signature has one sharp (F#) and the time signature is 3/4. The piano part features a complex rhythmic pattern with accents and rests. The vocal line has a similar pattern. Dynamics include 'f' (forte) and 'p' (piano). There are also some handwritten annotations like 'L 3' and 'p'. The lyrics are: "-ber blüht die Blö-men nur die Welt! noch ein mal bin ich ganz in's weisse".

Ex. 44.

Because only simple rhythmic patterns are used and complicated subdivisions avoided, a controlling rhythmic pulse can be felt throughout the song. The rhythmic patterns tend to accentuate the beats or half beats of the pulse and although some patterns avoid these beats (the piano at b.4, 5, 9 and 11 for example) such patterns

are rare and do not obscure the pulse. A strong regular beat or metre is avoided through the continual shifting of accents and the total effect is of a very fluid rhythmic structure working within clearly perceptible limits.

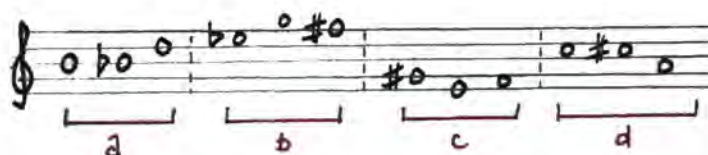
The three compositional elements which I have examined in this song - the melodic and harmonic formations, the rhythmic patterns and the thematic patterns and figurations - all seem to work within clearly defined limits; the listener can hear that one melodic or harmonic formation is similar to another and what happens in one phrase seems relevant to what happens in another. Moreover, the listener can perceive certain aspects of the music with some exactitude because some aspects are kept as simple as possible - the thematic material of the piano part, for example, is built of simple two or three note cells, the rhythmic patterns, though flexible, sound controlled, not arbitrary, and a basic pulse can be felt throughout the song so that, for most of the time, the listener can hear the relative lengths of notes accurately.

As a further example of the kind of perceptible limits established in Webern's music I shall now examine the Concerto Op. 24.

Concerto Op. 24.

a) Harmonic and melodic limits

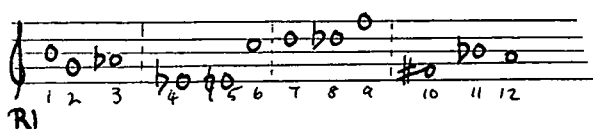
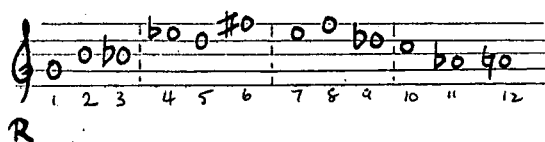
The note row of the Concerto is given in the following example:



The row is built of four similar three note cells. The opening cell (a) is followed by its retrograde inversion (b), its inversion (c) and its retrograde (d). Webern maintains these cell divisions throughout most of the work and uses these cells as a source of melodic and harmonic material, thus securing the melodic and harmonic unity of the work. The cell divisions of the row are maintained throughout the 3rd movement of the work and are obscured at only two points in the 1st movement - at b. 13 - 17, where the piano uses the row as a series of two note major 7th chords, and during the "development" section at b. 28 - 34 (the first movement is in sonata-form) where the short three note groups of the rest of the movement give way to longer 5, 6 and 7 note figurations.

The second movement of the work uses the row in a more complex way than the outer movements but maintains their melodic and harmonic characteristics. I shall examine the first section of the ternary form second movement to illustrate this more complex row treatment.

The first section of the movement is shown at Ex. 46 overleaf. Throughout the first section the piano plays two note chords and the other instruments play either two note figures or single notes. All the piano chords are major 3rds or major 7ths. The two note figures on the other instruments all span the intervals of a major third, a major 7th or a minor 6th (the inversion of the major 3rd). The movement begins with a retrograde and then a retrograde inversion of the row:



Ex. 47.

Handwritten musical score for the first system. It consists of multiple staves with musical notation, including notes, rests, and dynamic markings such as *p* and *pp*. Several passages are circled in red, and a large rectangular box highlights a significant section of the score. The notation includes various rhythmic values and articulation marks.

Handwritten musical score for the second system. It continues the notation from the first system, featuring similar musical elements and dynamic markings. Red annotations, including circles and boxes, are present throughout the system.

Handwritten musical score for the third system. It consists of multiple staves with musical notation, including notes, rests, and dynamic markings such as *p* and *pp*. Several passages are circled in red, and a large rectangular box highlights a significant section of the score. The notation includes various rhythmic values and articulation marks.

Handwritten musical score for the fourth system. It continues the notation from the third system, featuring similar musical elements and dynamic markings. Red annotations, including circles and boxes, are present throughout the system.

II

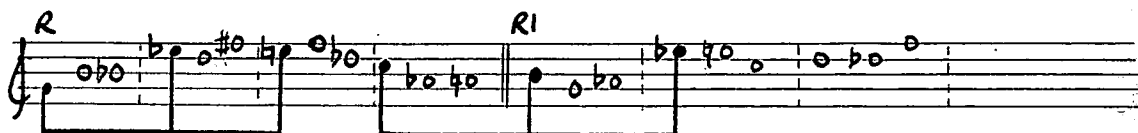
SOFT (PENSIVO) - 3/4 (C. 40)

calando

Tempo

calando

The last two notes of each three note cell (notes 2 and 3, 5 and 6, 8 and 9 and 11 and 12 of the rows above) are given to the piano; the first note of each cell is given to the other instrumental parts. The first notes of cells 1, 2 and 3 of the retrograde row (notes 1, 4 and 7) form a version of the original three note cells; the first note of cell 4 of the retrograde row and the first notes of cells 1 and 2 of the retrograde inversion form a similar cell:



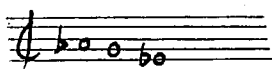
Ex. 48.

Webern chooses to give notes 2 and 3 of each cell to the piano and the first note of each cell to another instrument. Thus, any one note of an instrumental motive forms part of a vertical and horizontal cell:

The image shows three musical staves labeled 'Trp.', 'Vla.', and 'Pf.'. The 'Trp.' staff is in G major, the 'Vla.' staff is in G major, and the 'Pf.' staff is in G major. The notation includes notes, rests, and various markings. Dashed lines connect notes across staves, illustrating vertical and horizontal cells.

Ex. 49.

At a few points in this section a note of an instrumental motive forms, horizontally, a chord which is not the same as those formed by the original cells. At such points the chord is almost always a version of the following chord:

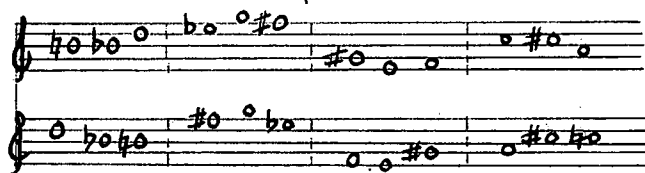


Ex. 50.

which, though not including the minor third of the original cells, does include the characteristic intervals of a major 3rd and a semitone or 7th.

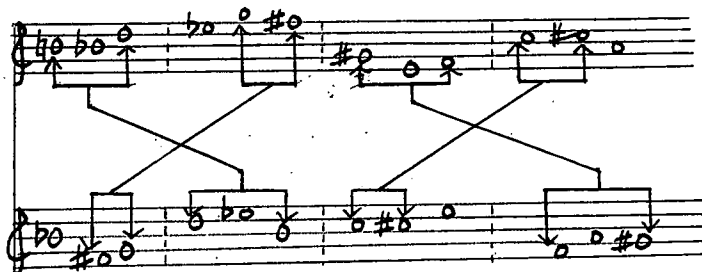
Vertical cells are marked with oval brackets in Ex. 46; horizontal cells are indicated by square brackets. Chords which are not versions of the original cells but are versions of the chord at Ex. 50 above are indicated by dotted lines. Two chords which fall into neither category are marked*.

The row of the Concerto, like that of the Op. 22 songs already examined (2) reproduces certain characteristics at different transpositions. The retrograde inversion beginning on D natural, for example, reproduces the cells of the original row in the same order but with the note order within the cells changed:



Ex. 51

Other transpositions reproduce four diads of the original row. In the four cells of the retrograde inversion beginning on B flat, for example, two notes of each cell are the same as two notes of each cell of the original row form; the third note is different:



Ex. 52.

(2) See footnote (1) - Pg. 53

Throughout the first and last movements of the work, Webern uses rows which are connected in this way. I shall examine the opening section of the first movement to show how these row interconnections are used and how the three note cell divisions are maintained. The first three pages of the score (b.1 - 25) are shown in Ex. 53 overleaf. The diagram which follows on Pg.65 shows the rows used in this section of the movement, with the connections between rows marked.

The opening row (0/0) is shared between the wind instruments, each cell being given to a different instrument and having a different rhythm. This structure is then repeated in a varied form on the piano - the row RI/3 maintaining the order of the cells but permuting the notes within each of the original cells. The rhythmic characteristics of each cell are maintained. At b.6 a new row - RI/2 - appears on wind and strings; again each cell is played by a different instrument. This row has two notes of each cell in common with the cells of the previous row, the previous row ending at b.5 on the piano with the notes A - C sharp - C and the new row beginning at b.6, on the clarinet, with the notes C sharp - A - B flat. The relationship between the two rows are emphasised by keeping the note groups common to both at the same pitch.

At b.7 the row 0/1 is shared between the piano (which has the first two cells) and the flute and trumpet (which have the remaining two cells). Again the row has two notes of each cell in common with the cells of the previous row and, again, the correspondence is emphasised by the juxtaposition of the last cell of the previous row and the first cell of this row - the oboe at b.6 and 7 playing the notes Ab - C - B and the piano beginning the new row at b.7 with the notes C - B - E flat. A *ritenuto* at b.8 marks the end of the first block of

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Arnold Schoenberg zum 80. Geburtstag

KONZERT

für

Flöte, Oboe, Klarinette, Horn, Trompete, Posaune,
Geige, Bratsche und Klavier

I

ANTON WEBERN, op. 24

Etwas lebhaft *allegretto*

rit. tempo rit.

* klingen wie notiert

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Universal Edition No. U 1430 12487

2

6

Tempo and

Tempo and

11

molto cresc.

pp

pp

pp

17

pp

pp

pp

pp

pp

pp

pp

pp

pp

Handwritten musical score for Ex. 54, featuring seven staves of music with various annotations and red bracketing.

The staves are labeled with measure numbers and instrument parts:

- Staff 1: Measure 0/0. Annotation: $R1/3 (= 0/0)$.
- Staff 2: Measure b.6. Annotation: $R1/2$. A red box encloses measures 6 through 11.
- Staff 3: Measure b.9. Annotations: $1/1 (= 0/0)$, $1/6$, $R1/4 (= 0/0)$. A red box encloses measures 9 through 14.
- Staff 4: Measure b13-17. Annotations: $R1/5$, $1/2 (= R/5)$. Instrument: (Ob. Horn. V. Vla).
- Staff 5: Measure b13-17. Annotations: $1/7 (= 0/0)$, $R1/0 (= 0/0)$. Instrument: (Piano).
- Staff 6: Measure b.17. Annotations: $0/4$, $R1/0$, $R1/3$. Instruments: (Tr. Tb. Sfgs.), (Ob. H. Sfgs.).
- Staff 7: Measure b21-25. Annotations: $R1/6$, $R1/7$. Instrument: (Piano).
- Staff 8: Measure b23-26. Annotation: $R1/6$.

Red lines and boxes connect the annotations across the staves, indicating relationships between different parts of the score.

material and a short piano passage introduces the second. Whereas the first block of material was monophonic (the harmonic rate depending upon the speed of note rotation, and harmonic stability being avoided by the rhythmic accentuation of different notes) the second has held chords in the piano part and gives the impression of a more leisurely harmonic rate.

The piano passage (b.9 and 10), which acts as a transition between two blocks of material, uses a new row form. The new row (I/1) has no diad links with the previous row but returns to the cells of the original row at b.1 - 3; the cells of row I/1 are those of the opening row but in reverse order.

In this second block of material two rows are always presented simultaneously - one row forming the chords of the piano part whilst another is shared by the instrumental voices.

The trumpet, clarinet, violin and viola present Row I/6 at b.10 - 13. This row has the same cells as those used at b.6. (row RI/2) but in a different order. Each cell is given to a different instrument.

At the same time, Row R/4 is presented by the piano. This row has two diads in common with that being used by the wind and strings but these relationships are obscured because the piano part uses the last 8 notes of the row as a series of two note major 7th chords. Such repartitioning of the row is rare.

At b.13 - 17 the oboe, horn, violin and viola present rows R/5 and I/2, two rows which have the same cells but in a different order. The two rows overlap so that the last two cells of R/5 are also the first two cells of row I/2. Each cell of row I/2 has also two notes in common with each cell of row I/7, the row used by the trumpet, clarinet and strings at b.10 - 13. The

similarities between the two overlapping rows R/5 and I/2 are noticeable because the same cells in both rows are played at the same pitch and by the same instruments.

A similar procedure takes place at the same time in the piano part where the rows I/7 and R/0 overlap. These two rows have the same cells as row R/4 - the row used by the piano in the previous bars. The overlapping rows (I/7 and R/0) on the piano have two diads in common with the rows being used by the other instruments; the similarities between the piano part and the other parts are emphasised by the juxtaposition of the similar cells (see piano and violin b.15 and the piano and oboe at b.16 on Ex. 53).

At b.17 the trumpet, trombone and strings follow with row O/4, which is related to the rows I/7 and R/0 used by the piano in the previous bars; at the same time the piano repeats R/0.

A further related row (R/3) appears on the oboe, flute and strings at b.19. Two more related rows (R/6 beginning on the flute at b.21 and R/0 on the piano) lead to the second block of material and the end of the first section at b.25.

The passage from b.23 to b. 26 uses a row which is not immediately related to those which precede it and which is repartitioned into a sequence of two-note figures. The fragmentary nature of this passage and the indication 'ritenuto' suggest that it has a cadential function.

Webern's consistent use of similar three-note cells as the source of both melodic and harmonic figurations inevitably limits the kind of patterns used in this movement. Much of the interest of the movement lies, not

in the manipulation of a number of different melodic units (as in Op. 25 No. 1 (3)), but in the way the similar three-note figures contrast with one another (differences of rhythm, contour, pitch or instrumentation), the various ways in which they overlap and the ways in which they form larger units of differing lengths. (4)

Although, when analysing the two works, the melodic and harmonic figurations of the Concerto seem to be more dependent upon row rotation than do those of the first of the Op. 25 songs, (the three-note patterns of Op. 24 seem to be directly related to the cellular construction of the note row, whereas the note row of Op. 25 does not necessarily suggest many of the melodic patterns found in the first Song) it is important to recognise that the structure of the note row of Op. 24 does not, in itself, automatically ensure an effect of harmonic and melodic homogeneity. The homogeneity of the work is due, not to row rotation, but to the fact that Webern chooses to always use similar three-note cells and to make these cells easily perceptible through such things as instrumentation, pitch and dynamics. Using the same note row a composer could, if he wished, write a work that emphasised a different set of relationships from those found in the Webern Concerto, or could produce a completely arbitrary sounding piece; it should be noticed that the row of Op. 24 contains the interval of a fourth (between notes 9 and 10 of the original row) but this interval is always obscured because it lies outside the limits which Webern has decided to impose on the work. In performance, the three note patterns of

(3) See Pgs. 53-56

(4) See Pgs. 74-78

Op. 24 are not referred back to the note row but, like the patterns of Op. 25 No. 1, live a completely independent existence.

In the Concerto, as in the first of the Op. 25 songs (5), the juxtaposition of identical three-note cells, or of three-note cells which include identical diads, has the effect of avoiding a totally chromatic texture by making the harmony seem stable over a long period of time, and gives the impression of harmonic movement from one section to another, thus helping to differentiate the important formal sections.

b) Rhythmic limitations.

Except for those of the second movement, the rhythmic limits established in the Concerto seem to have a different purpose from those of the first of the Op. 25 Songs (6).

In the First movement different rhythmic patterns are established for each of the important formal sections, although a basic minim pulse can be felt throughout the movement. The first subject of the sonata form first movement is built of three short structures which have the following rhythmic patterns:

The image shows three rhythmic patterns labeled 1, 2, and 3. Pattern 1 is in 2/4 time and consists of a sequence of notes: a quarter note, a dotted quarter note, and an eighth note. Pattern 2 is in 2/4 time and consists of a sequence of notes: a quarter note, a dotted quarter note, and an eighth note, followed by a triplet of eighth notes. Pattern 3 is in 2/4 time and consists of a sequence of notes: a quarter note, a dotted quarter note, and an eighth note, followed by a triplet of eighth notes.

Ex. 55.

(5) See Pg. 53 and Footnote 1

(6) See Pgs. 56-60

The second of these structures reverses the rhythmic patterns of the first, whilst the third begins with a regular semiquaver pattern but then uses patterns similar to those used in the earlier structures.

It is difficult to be certain of the exact rhythmic effect intended in these opening bars because the 'ritenuto' markings seem to conflict with the notation(7), but because each three note cell within these structures has a regular pattern the total effect is of a regular but flexible pulse. A brief quaver triplet pattern (b.9 and 10) separates the 'first' and 'second' subject sections.

The second subject (b.11 - 16) establishes a regular quaver pattern with a note on every quaver of the 2/4 bar.

A second short quaver triplet passage at b.17 - 18 (in which the triplet patterns appear at the same time as quaver duplets in the piano part) leads to a 'codetta' (b.22 - 25) which begins with a series of regular quaver triplets and ends with more irrational rhythmic patterns.

The development section is characterised by more fluid rhythms.

Each section of the first movement is thus characterised by different rhythmic patterns or different subdivisions of the main pulse. The quaver triplets, which act as a transition from one section to another, have the effect of breaking the rhythmic patterns

(7) At b.8, for example (which is marked 'ritenuto' throughout) it seems likely that the effect of the gradual slowing down will make the duration of the trumpet's triplet quavers as long, if not longer than the duration of the flute's duplet quavers. A similar problem occurs when trying to estimate the exact rhythmic relationship between the clarinet figuration at b.2 and 3 and the previous trumpet and flute figurations.

established in the previous section and prepare for the establishment of new rhythmic patterns.

I shall not examine the second movement, which establishes a very clear rhythmic pulse, in any detail. The movement is in 2/4 and uses only crotchets and minims which always appear on the main beats of the bar. Except at b.29 - 30 (the beginning of the middle section of the ternary movement), b.56 (the beginning of the repeat of the first section) and b.69 - 78 (the end of the movement) a note appears on every crotchet of the bar.

The third movement of the Concerto is one of the few movements in Webern which establish a regular metre, rather than a pulse. The opening of the movement (which has an *alla breve* time signature) establishes a regular metre with the strong beat on the first of the bar:

Musical score for measures 56-58. The score is in 2/4 time and features four staves: Snare Drum (sb.), Clarinet (cl.), Horn (Hrn.), and Trumpet (Trb.). The key signature has one sharp (F#). The snare drum part has a dynamic marking of *f* at the start of measure 56. The clarinet part has a dynamic marking of *f* at the start of measure 57. The horn part has a dynamic marking of *f* at the start of measure 56 and a sharp sign (#) above the first note. The trumpet part has a dynamic marking of *f* at the start of measure 56 and a flat sign (b) below the first note.

Ex. 56.

At b.4 the strong beat shifts to the third crotchet of the bar:

Musical score for measures 56-58. The score is in 2/4 time and features three staves: Trumpet (Trp.), Trombone (Trb.), and Piano (Pf.). The key signature has one sharp (F#). The trumpet part has a dynamic marking of *f* at the start of measure 56 and a sharp sign (#) above the first note. The trombone part has a dynamic marking of *f* at the start of measure 56 and a flat sign (b) below the first note. The piano part has a dynamic marking of *pp* at the start of measure 56 and a sharp sign (#) above the first note.

Ex. 57.

but shifts back to the first beat at b.9 et seq.:

Musical score for Example 58. The top staff is for Clarinet (Cl.) and the bottom staff is for Piano (Pf.). The piano part features a three-chord pattern starting at measure 14, marked with a forte (f) dynamic.

Ex. 58.

A three chord pattern which appears at b.14

Musical score for Example 59. The top staff is for Horn (Hr.), the middle staff is for Clarinet (Cl.), and the bottom staff is for Trombone (Trb.). The piano part features a three-chord pattern starting at measure 14, marked with a forte (f) dynamic.

Ex. 59.

is later displaced so that the strong beat falls on the second crotchet of the 4/4 bar:

Musical score for Example 60. The top staff is for Clarinet (Cl.), the second staff is for Trombone (Trb.), the third staff is for Viola (Vla.), and the bottom staff is for Piano (Pf.). The piano part features a three-chord pattern starting at measure 14, marked with a sforzando (sf) dynamic.

Ex. 60.

and then moved again so that it falls on the fourth beat of the bar:



Ex. 61.

There follows a more fluid section (b.27 et seq.) which maintains a regular crotchet pulse throughout but avoids the effect of a regular metre, by continually changing the placing of the accents within the bar (Ex. 62 below), and a section (b.40 et seq.) in which new metres are continually established and then contradicted (Ex. 63 below). The final section of the movement re-establishes the regular alla breve metre of the opening, but with the strong beat on the second crotchet of the bar (Ex. 64):

Handwritten musical score for orchestra. The score includes staves for Oboe (ob.), Clarinet (Cl.), Trumpet (Trp.), Violin (Vl.), and Piano (Pf.). The music is written in a complex, fluid style with frequent changes in rhythm and accentuation. Dynamics such as *f*, *sf*, and *obf* are used throughout. The piano part features a prominent bass line with various chords and accidentals.

Ex. 62.

Handwritten musical score for orchestra. The score includes staves for Horn (Hrn.), Trumpet (Trp.), Trombone (Tib.), and Piano (Pf.). The music is characterized by a regular crotchet pulse with accents placed at different positions within the bars. Dynamics such as *sf* and *ff* are used. The piano part provides a harmonic and rhythmic foundation.

Ex. 63.

The musical score consists of four staves. The top staff is for Oboe (ob.), the second for Clarinet (cl.), the third for Trumpet (Trp.), and the bottom for Piano (Pf.). The music is written in a common time signature. The first measure shows a rest for the Oboe and Clarinet, followed by notes in the Trumpet and Piano parts. The second measure continues with similar patterns. The third and fourth measures show more complex rhythmic and melodic developments across all parts, with dynamic markings such as *ff* and *f* and various accidentals.

Ex. 64.

In all three movements of the piece the rhythmic patterns used are controlled by criteria which are perceptible to the listener. The limits controlling these patterns are most obvious in the second movement, with its regular crotchet flow, and the third movement (which exploits the regular metre established in its opening bars) but even in the first movement the listener is aware of some kind of regular pulse.

c) Limitation and exploitation of patterns.

I have already said that the consistent use of three note cells as melodic units automatically imposes limitations upon the kind of patterns used in the Concerto (8), and much of the interest in the work lies in the way these cells (the smallest units which can be described as 'patterns') are varied and change their shape. I shall now discuss the larger patterns (structures built of three or four cells) in the third movement of the work. I have chosen to examine the Third movement because the patterns at the beginning of the first movement have already been discussed (9) and the second

 (8) See Pg. 60-64

(9) See Pgs. 64-69

movement is less concerned than the outer movements with the exploitation of patterns.

The third movement is like a set of variations. The movement uses two main motives - a regular three note figure (A) and a three note figure in which the second note is shorter than the other two. In the original pattern, announced at the opening of the movement, two appearances of A on the brass are followed by two appearances of B on the wind. (See Ex. 55 above) The following diagram shows the variations of this pattern in the opening section of the movement:

The diagram consists of three parts of handwritten musical notation, each with red brackets labeling motives A and B.
 - The first part, labeled 'b.1-4', shows motive A (two notes, then a note with a shorter second note) and motive B (three notes, with the second note shorter).
 - The second part, labeled 'b.4-9', shows a variation where motive A is repeated, followed by four appearances of motive B.
 - The third part, labeled 'b.9-13', shows another variation where motive A is repeated, followed by four appearances of motive B, with different rhythmic relationships than in the previous section.

On the second appearance of the pattern at b.4, A (now starting on the third crotchet of the bar, beginning the metric shifts described above) is again repeated but is followed by four appearances of B, which is now on the piano, wind and strings. (Ex. 57 above)

B.9. On the pattern's third appearance motive A and its repetition is on the piano and is again followed by four appearances of B. The rhythmic relationships between the version of B are different from those in the pattern's previous appearance. (See Ex. 58 above)

The modifications of the original pattern in the second section of the movement (the First Variation,

b. 14 - 27) are summarised in the following diagram:

The diagram illustrates the relationship between motives A and B in two sections of music. In the first section (b. 14-19), motives A and B alternate. Motive A is a quarter note followed by two eighth notes. Motive B is a quarter note followed by two eighth notes, with the first eighth note being a rest. In the second section (b. 19-27), motives A and B alternate regularly, with the last note of one motive coinciding with the first note of the next, except for a crotchet's rest at b. 25.

In the first half of this section (b. 14 - 19) single appearances of the two motives A and B alternate but the relationship between the two is constantly altered. At first A is followed by B after a crotchet's rest (See Ex. 59.); the next A, the first note of which coincides with the last note of the previous motive B, is immediately followed by B. On A's third appearance in this section the last note of A coincides with the first note of motive B. (See Ex. 60 above)

In the second half of this section (b. 19 - 27) motives A and B alternate regularly, the last note of one motive always coinciding with the first note of another, until b. 25 where one appearance of motive B is separated by a crotchet's rest from the following appearance of A:

Ex. 65. Musical score for measures 14-27. The score is in 2/4 time and features four staves: Violin (VI.), Horn (H.), Clarinet (Cl.), and Trombone (Tr.). Motive B is bracketed in red above the Violin staff, and Motive A is bracketed in red below the Trombone staff. The score includes dynamic markings such as *f* and *sf*.

Ex. 65.

In this half of the section motive A at first appears as three three-note crotchet chords (b.19 - 27, the three notes of A were originally minims); towards the end of the section it appears with its original note lengths:

Ex. 66.

and in a syncopated version in which the second note is shortened - a rhythm which is reminiscent of motive B:

Ex. 67.

Much of the interest in the second half of this section lies in the instrumentation: at b.14 - 18 motive A on the flute, clarinet and trombone alternates with motive A on the piano. This sequence is unexpectedly altered at b.19 where motive A appears on the piano three times in succession. At b.22 - 23 motive A is again on the flute, clarinet and trombone and the following A (b.23 - 24) is on the piano - suggesting a return to the previous alternation of these instrumental groups.

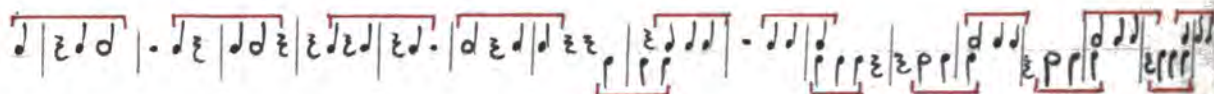
On its next two appearances, however, (b.24 - 25 and 26 - 27) the first chord of motive A is given to the flute, clarinet and trombone and the second and third chords to the piano.

B.27.

The third section of the movement (b.27 et seq.) is not concerned with the kind of rhythmic and metric patterns that are used in the rest of the movement and does not use the two motives which are the basis of the rest of the movement.

B.41 - 55.

During the fourth section of the movement (the third Variation) the piano has a number of three note chords and the other instruments use three note figures which are similar to motives A and B but have different rhythms and shapes. The following diagram summarises the figures during this section:



The first two of these figurations are similar to the syncopated version of motive A that appeared at b.26 - 27 (See Ex. 67 above). These two figurations are divided between different instruments (the first two notes of both are given to the horn, the third to the trombone), a feature that is also reminiscent of motive A at b.24 - 27, where the first chord was on wind and brass and the second and third on the piano (See Ex. 66 and 67 above).

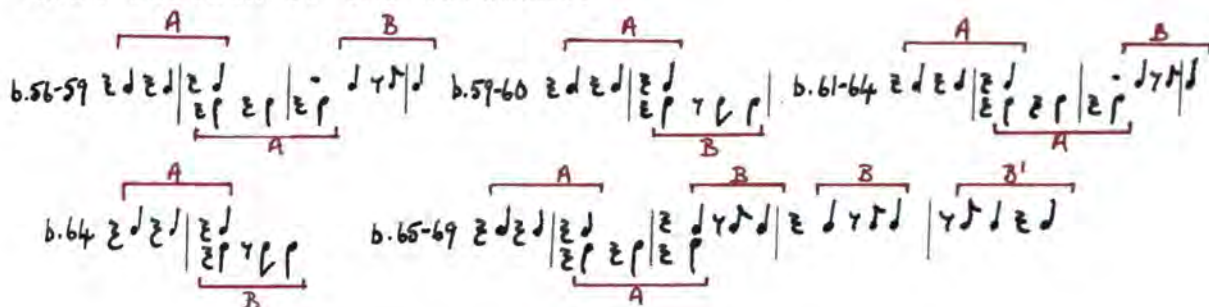
I have already said (10) that this syncopated version of motive A is similar to motive B and, although

(10) See Pg.77

the relevance of these three note figures to those used earlier in the movement is clear, it is impossible to tell which figures in this section derive from motive A and which from motive B.

b. 56 - 69

The following diagram shows the varying patterns in the last section of the movement:



This section clearly returns to the rhythmic and thematic figures at the beginning of the movement. Two appearances of motive A and a single appearance of motive B are followed by single appearances of both motives. (See Ex. 64 above) The patterns of these two structures **are** then repeated. The final passage presents two appearances of motive A followed by two appearances of motive B and a final appearance of motive B in which the first note of the group is omitted.

In this movement, as in the first of the Op. 25 Songs (11), the interest which the listener derives from the changing patterns only comes about because the patterns themselves are essentially very simple and can be easily grasped. The exploitation of these patterns in the last movement of the Concerto is partly dependent upon the association of a particular figuration with a

(11) See Pg. 53-56

particular group of instruments - at b. 14 - 18, for example, the alterations and modifications which maintain the listener's interest are not those of the motives themselves but of the instrumental groups associated with them. At this point the instrumentation assumes a formal role. Although instrumentation cannot itself define limitations of the kind I have discussed in connection with the melodic and harmonic formations and rhythm, it can (as can any of the compositional elements (12)) act as a means of characterising certain sections - most of the 'development' section of the first movement, for example, uses only the piano, violin and clarinet. I shall examine the way in which instrumentation can be exploited as a formal element when I analyse the first movement of the Cantata Op. 29. (13)

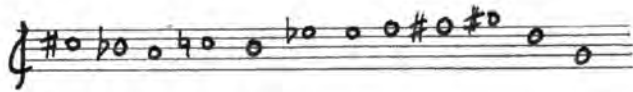
The Concerto, and, to a lesser extent, the Op.25 songs both use rows that can be partitioned into a number of identical or similar segments. Not all Webern's twelve note works use such rows and I shall now examine the first movement of the Saxophone Quartet Op. 22 to show how Webern establishes perceptible harmonic and melodic limits when using a less tightly constructed note row. I shall examine only the harmonic and melodic aspects of the movement.

Saxophone Quartet. Op. 22. Movement 1.

The note row of the Saxophone Quartet is given below:

(12) Harmonic movement, for example. The opening section of the Concerto is mainly monodic and the rate of movement (which depends upon the speed at which the three note cells are presented) is erratic. The second section has a more regular harmonic rate and seems more relaxed and fluid as a result. Thus, the two sections are differentiated by their contrasting harmonic movement.

(13) See Pg.103-109



Ex. 68.

The last three notes of the row use intervals not found in the rest of the row - a tritone and a fourth or fifth. Except at two points in the movement, these three notes are always separated from the rest of the row and are used to mark cadence points at the end of structures. I shall discuss the two exceptions to this procedure later. (14)

The first nine notes of the row use only three intervals: the minor third (between notes 1 and 2 and notes 3 and 4), the major third (between notes 5 and 6) and the semitone (between notes 2 and 3, 4 and 5, 6 and 7, 7 and 8 and 8 and 9). The whole tone between notes 9 and 10 is always obscured by instrumentation or phrasing.

The first nine notes of the row are partitioned in a number of different ways during the course of the movement, each of which brings one particular interval or group of intervals into prominence:

i)



Ex. 69.

This method of partitioning the row is used in the opening bars of the work:

 (14) See Pg. 83

I form VI.

 Sax

Ex. 70.

The first six notes are used as two similar three note cells (both of which include a minor third and a semitone); note 9 is separated from notes 7 and 8 leaving the interval of a semitone.

ii)

Inverted Row

Ex. 71.

This method is used in the saxophone part at b.6 - 10:

Ex. 72.

Notes 1 and 2 and notes 3 and 4 are used as two minor thirds and notes 5 and 6 as a major third. Note 9 is separated from notes 7 and 8 leaving a semitone diad.

iii)

Inverted Row

Ex. 73.

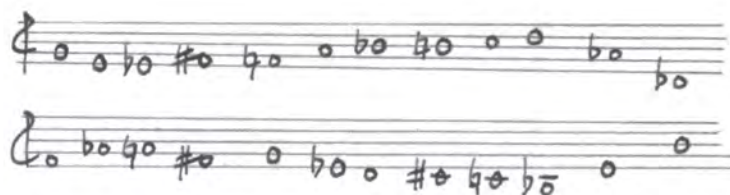
This method is used in the saxophone part at b.11 - 14:



Ex. 74.

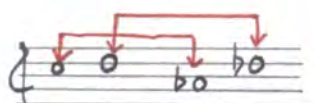
Notes 2 and 3, 4 and 5, 6 and 7 and 8 and 9 are used as four semitone diads. These three methods of partitioning the row are used throughout the movement.

At two points in the movement Webern obscures the characteristic intervals of a tritone and a fourth (notes 10 - 12 of the original row) in order to avoid the cadential pattern with which the last three notes of the row have become associated. At b.6 - 11 Webern uses two row forms:



Ex. 75.

The first eight notes of each row are partitioned as at (ii) above. The last four notes of each row are used as major third and semitone diads:



Ex. 76.

At b.33, where Webern again uses two rows, the interval of tritone (between notes 10 and 11 of the rows) is obscured but the interval of a fourth (between notes 11 and 12 of both rows) is still perceptible, notes 11 and 12 being played as two two-note chords:



Ex. 77.

All the melodic and harmonic formations of the first movement are built of the intervals of a major 3rd, minor 3rd and a semitone. Although the row is not constructed as a sequence of identical cells, Webern manipulates the row in such a way as to give an impression of melodic and harmonic unity.

In this chapter I have examined the perceptible limits controlling harmony, melody, rhythm and thematic patterns in the first of the Op. 25 songs and in the Concerto Op.24; similar, though not identical, limits can be found in all Webern's later works.

It is important to recognise that there are great differences between Webern's use of the twelve note row and that of Schoenberg. Schoenberg seems to have conceived the function of the row as being primarily melodic (the harmonic deficiencies of the original twelve note theory, the fact that the twelve note method was, originally, a formulation of Schoenberg's melodic practices and that, whenever beginning a new work, Schoenberg always first conceived the row as a melody, all bear witness to this). In Webern's music, on the other hand, the row is not conceived as a melody but is usually constructed, as in the Concerto, as a sequence of similar or identical cells and, more importantly,

Webern ensures that the row is used in such a way as to make these cells perceptible. That certain aspects of Schoenberg's music sound arbitrary is, partly, due to the kind of rows Schoenberg uses but mainly due to the way in which he uses the row. Schoenberg believed (15) that the note row had a logic of its own and that this logic automatically justified any melodic or harmonic events; as a consequence of this belief Schoenberg seems not to have thought it necessary to ensure that the row was used in a way that would ensure that certain limits and certain relationships were perceptible to the listener.

I have said (16) that the more imprecise the musical material seems to the listener, the more difficult it becomes for the composer to control the listener's response to the music. The listener cannot hear every aspect of Webern's music exactly (and, as I shall show in the following chapter, Webern exploits the resulting uncertainty) but because some aspects of Webern's music are very simple and seem to work within certain perceptible limits, the listener can hear certain aspects of the music with some exactitude, and, in this respect, the music seems to present very precise information. Because of this the listener is willing to assume that other, less clearly perceptible aspects, are also subject to some kind of control. If, for example, the listener cannot exactly grasp the wide intervals of some of the three note patterns in the Concerto Op.24, he is prepared to assume that the intervals are in some way similar to those used earlier in the work; in previous sections he has been able to hear that all the three note patterns use the same intervals and he is willing to accept that the other three note patterns have the same kind of

(15) See Pg.29

(16) See Pg.43

relevance to one another, even when he cannot hear the intervals exactly.

The listener's willingness to take certain aspects of the music on trust might, to some extent, be due to his natural desire to hear the music as a sequence of related patterns (17) or to previous knowledge of the score or the kind of techniques which Webern favours (18). The way in which this knowledge might affect the listener's understanding of Webern's music can be illustrated by the opening of the First Cantata Op.29:

Fl. b.1 b.2 b.3 b.4 b.5 b.6 b.7 b.8 b.9 b.10 b.11

Cl.

BscCl.

Hrn.

Trp.

Tbn.

Hrn.

Cel.

Bass Drum

Vi. 1

Vi. 2

Vla.

Vlc.

Getragen Lebhaft $\text{♩} = 138$ Getragen Lebhaft

pp < > sf f pp < > sf Lebhaft

pp < > pp < > f f

Ex. 78

(17) See Pg. 40-43

(18) See Pg. 6

It seems likely that many of the details of the imitative sections at b.2 - 3 and b.8 - 11 are not perceptible in performance (both are short and fairly fast moving), and that the most important feature of this passage is the contrast between the contrapuntal structures on wind, violins, harp and celesta (b.2 - 5 and 8 - 11) and the homophonic structures on the brass and lower strings (b.1 and b.6 - 7). If the listener has previously studied the score and knows how the contrapuntal passages are constructed, or has some knowledge of the kind of techniques that Webern uses, then this knowledge will inevitably influence the way in which he understands and perceives the contrapuntal structures and might give them an added interest.

But the listener's willingness to take on trust the relevance of those aspects of Webern's music which he cannot exactly grasp is also due to the fact that other aspects of the music are very easily perceived and seem to work within some kind of limits.


The listener still feels some uncertainty when listening to Webern's music because not every aspect of the music can be easily grasped and those aspects that are simple and can be easily grasped at one point may become complex later. In the following chapter I shall examine more closely the interaction of control and uncertainty in Webern's music.

IV. The Interaction of Control and Uncertainty
in the music of Webern

I have said that, although certain aspects of Webern's music work within clearly perceptible limits, the listener still feels some uncertainty when listening to Webern's music because not every aspect of the music can be easily grasped. (1) In this chapter I shall give some examples which seem to show how Webern exploits the listener's uncertainty as a formal element whilst, at the same time, determining the way in which the listener responds to the music.

I shall examine four movements or sections of movements and in each I shall consider one element (such as rhythm, phrase structure or instrumentation). The examples discussed are chosen because each seems to illustrate the use of a certain element with particular clarity. After discussing the different elements in isolation I shall show, using the first movement of the Symphony Op. 21 as an example, how a number of elements can be used together to define the formal structure of a work.

i) The use of balancing structures in the Piano Variations Op. 27 Movement 3.

The whole of this movement is given in Ex. 80 overleaf. The movement is built of a number of two note cells which usually have the rhythm  . The notes are paired in the following way - Bb always appears with G sharp, B natural with G natural, C with F sharp, C sharp with F natural, D with E, E flat with

(1) See Pgs. 87

Sehr schnell ♩ = ca 160

This musical score is for Exercise 80, titled "Sehr schnell" (Very fast) with a tempo of approximately 160 beats per minute. The piece is in 2/4 time and consists of 22 measures. The notation is arranged in four systems, each with two staves (treble and bass clef). The score includes various dynamic markings such as *f* (forte), *p* (piano), and *ff* (fortissimo), as well as articulation marks like accents and slurs. Measure 3 features a triplet of eighth notes in the right hand. Measure 12 contains a double bar line, indicating a repeat or section change. The piece concludes with a double bar line and repeat dots at the end of measure 22.

E flat and A natural with A natural. (2)

The first four cells are shown below:

(A)

Ex. 79.

Because these 4 cells are followed by a rest which is longer than any of the previous rests (the first three cells are followed by a quaver rest, the fourth by a crotchet rest) the listener is likely to assume that the four cells form one structure (3). The dynamic pattern of the four cells (f - p - f - p) suggests a symmetrical construction in which the first two cells balance the second two. If the listener accepts this balance he will probably consider the acciaccaturas of cell IV as differentiating it from the other cells (and suggesting a cadence point) and the long notes of cell iii as emphasising the beginning of the second part of the structure.

(2) Throughout the movement the rows are always used in pairs; the two pairs of rows which are used during the first half of the movement illustrate the note pairing discussed above:

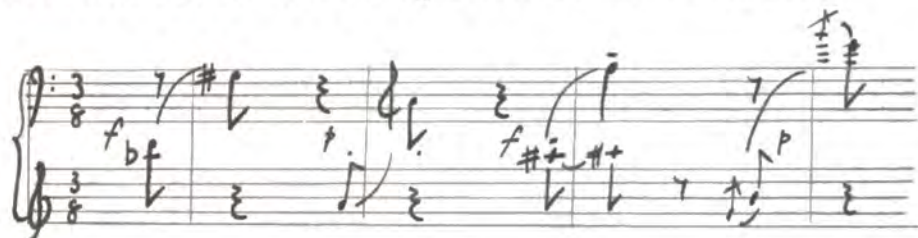
Bb A Db B D C Gb F E G Ab Eb:
Ab A F G E Gb C Db D Bb B Eb:

Eb D Gb E G F B Bb A Db C Ab
Eb E C D B Db G Ab A F Gb Bb

The simultaneous use of rows (always an O form and an I form) which produce such invariant diads is a recurring feature of Webern's row technique.

(3) The term 'structure' is here used to describe a small formal unit built of a number of cells.

Despite the 2/4 time signature the ear probably hears a regular 3/8 rhythmic pattern, set up by the two note quaver cells and the quaver rest between each. The second note of each cell might be heard as the strong beat and the first note regarded as an anacrusis:



Ex. 81.

The regular 3/8 pattern and the balance of cells, will probably lead the listener to expect other regularities of structure and balance. An obviously symmetrical, and rather boring, pattern of continuation which could have been used is -



The listener's interest is maintained because of the differences between such an obviously balancing pattern as that above and what actually happens. Although the listener may be surprised by these differences, he is able to understand them as related to what has gone before. The avoidance of obviously symmetrical patterns is a positive choice made by the composer.

b.3 - 6

The next structure of four cells (Structure B) is separated from the first (A) by a crotchet rest. Because the ear has set up a regular 3/8 pattern during

the previous structure the first cell of this second structure appears to come on the offbeat, the syncopated effect being emphasised by the two accentuated three note chords which form the first cell of this structure. The ear readjusts to accomodate this apparent change of pattern. The second structure is shown below:

(B)

V VI VII VIII

Ex. 82.

The last cell of the second structure is separated from the first cell of the third by only a quaver rest, but if the listener has accepted the first four cells of the piece as one structure he will probably assume that the second set of four cells forms a similar balancing structure. This balance is suggested by the dynamic pattern, which is the same as that of the opening structure - f - p - f - p. The regular 3/8 pattern which appeared in the first structure is here disturbed by the omission of the expected quaver rests between the third and fourth cells of the structure (cells VII and VIII above.) Again, the ear readjusts to accommodate the disturbance. Despite these irregularities the two opening structures are probably understood as balancing each other:

A f p f p

B f p f p

b.6 - 11.

Having established such a balance of cells and structures,

the listener might expect another similar balance to follow but in the next two structures (C and D) the balances become more complex. Both structures are shown below:

Ex. 83.

The following diagram represents the rhythmic pattern of the eight cells which form these structures; there is a regular 3/8 pattern except at the contraction marked *:

Cells XII - XV (the end of b.8 to the beginning of b.11 on the full score) have the same pattern as Structure B and, like the first cell of that structure, the first of these cells consists of two accentuated three note chords:

Ex. 84.

This similarity to Structure B suggests that these four cells form a similar balancing structure, a suggestion

re-enforced by the dynamic pattern of the cells, which follows the $f - p - f - p$ of the cells of Structures A and B, except that the first of these cells is here marked 'ff' instead of 'f'. This group of four cells is also similar to Structure A; Cell XIII, the second cell of this group, is the same as the second cell of Structure A and cell XIV, the third cell of this group, uses the same notes as the third cell of Structure A:

The musical score for Example 85 consists of five measures. The first measure is labeled 'Structure A I' and contains a half note G4 (f), a quarter note A4 (p), and a quarter note B4 (f). The second measure is labeled 'II' and contains a quarter note C5 (f), a quarter note D5 (p), and a quarter note E5 (f). The third measure is labeled 'III' and contains a quarter note F#5 (f), a quarter note G#5 (p), and a quarter note A5 (f). The fourth measure is labeled 'IV' and contains a quarter note B5 (ff), a quarter note C6 (p), and a quarter note D6 (f). The fifth measure is labeled 'XIII' and contains a quarter note E5 (f), a quarter note F#5 (p), and a quarter note G#5 (f). The sixth measure is labeled 'XIV' and contains a quarter note A5 (f), a quarter note B5 (p), and a quarter note C6 (f). The seventh measure is labeled 'XV' and contains a quarter note D6 (f), a quarter note E6 (p), and a quarter note F#6 (f). Dynamics are indicated by 'f', 'p', 'ff', and 'f'. The key signature has one sharp (F#).

Ex. 85.

Cells XII - XV are probably regarded, therefore, as being equivalent to Structures A and B.

If, because of the similarities to the first two structures, the ear accepts these four cells as forming one Structure (D), there are only three cells (IX - XI in Ex. 72 above) between the end of Structure B and the beginning of Structure D:

The musical score for Example 86 consists of three measures. The first measure is labeled 'IX' and contains a half note G4 (Af), a quarter note A4 (p), and a quarter note B4 (f). The second measure is labeled 'X' and contains a quarter note C5 (f), a quarter note D5 (p), and a quarter note E5 (f). The third measure is labeled 'XI' and contains a quarter note F#5 (p), a quarter note G#5 (f), and a quarter note A5 (p). Dynamics are indicated by 'Af', 'f', and 'p'. The key signature has one sharp (F#).

Ex. 86.

This is unexpected because the two opening structures (A and B) both had four cells and the listener might expect Structure C to have four cells and to maintain the $2 + 2$ balance of cells established in the opening

structures. In retrospect the listener might modify his view of b.6 - 8 and, because cells IX and XI both have gracenotes before them, he might consider the three cells as forming an ABA structure.

To this point b.1 - 11 might be considered as falling into four structures which balance thus:

A musical notation diagram showing four structures labeled A, B, C, and D. Each structure consists of a sequence of notes with stems and beams, representing rhythmic patterns. Structure A begins with a double bar line and a repeat sign. Structure B follows with a similar sequence. Structure C and D also follow with similar sequences. A bracketed section of notation is shown to the right of structure D.

The whole of this passage is repeated. If the listener does adopt this pattern of balancing structure the final two note cell of b.11 (XVI) will be regarded as starting the repetition of the first half but the appearance of this cell at the end of the repetition is unexpected. After the repetition the listener might revise his reading of the structures and (in retrospect) consider them as balancing thus:

A musical notation diagram showing four structures labeled A, B, C, and D, representing a revised balancing. Each structure consists of a sequence of notes with stems and beams. Structure A begins with a double bar line and a repeat sign. Structure B follows with a similar sequence. Structure C and D also follow with similar sequences.

Such a revision is possible because the rest after each cell of Structures C and D (with the exception of the contraction marked * in the diagram at the top of Pg. 92) is a quaver; there is no long rest, which would imply that they ended in a particular place, in these two

structures. Such a reading of the structures, however, destroys the relationship between Structures A and B and Structure D.

The clarity of the opening patterns of the movement is used as a norm which leads the listener to expect similar balances. The listener is unsure of the intended balance in the last two structures of this half of the movement and, during the course of these structures, is constantly altering and modifying his expectations and his reading of the structures. If the movement is listened to in this way the uncertainty serves both to increase the tension towards the end of the first half of the movement and to ensure the listener's involvement in the music; the regularity of rhythm, the simplicity of the material and the opening balance of structures control his response. The second half of the movement uses a similar technique.

ii) Interval control in Op.25 No.2.

Wide intervals create tension because they are difficult to perceive (4); the listener finds them difficult to grasp and yet is forced to try to grasp them in order to understand the music.

In most of his late works Webern deliberately keeps his material as simple as possible and avoids such things as complex, fast moving textures, in order to make important interval relationships perceptible. But although the perceptibility of these relationships is one of the chief factors in his music it is not the only factor - had Webern wished to make the audibility of the interval relationships of paramount importance he could have made them easily perceptible by avoiding wide intervals and keeping all the note groups within the range of an octave.

In Webern's music some intervals are difficult to

(4) See Pgs. 45

perceive because they are wider than an octave; the music oscillates between sections in which the material is easily grasped (and which may seem relaxed as a result) and sections in which the material is complex and elusive (and which may seem tense as a result). I shall examine the second of the Op. 25 Songs to show how the tension and relaxation, created by the oscillation between large and small intervals, are used to define the phrase structures of the piece (5).

The text of the second song is as follows:

Des Herzens Purpurovogel fliegt durch Nacht,
 Der Augen Falter, die im Hellen gaukeln,
 Sind im Voraus, wenn sie im Tage schaukeln,
 Und doch ist er's, der sie ans Ziel gebracht.
 Sie ruhen oft, die bald sich neu erheben
 Zu neuem Flug. Doch rastet endlich er
 Am Ast des Todes, müd und flügel schwer,
 Dann müssen sie zum letzten Blick verbeben.

The whole of this song is given in Ex. 88 overleaf. The first section of the song can be considered as ending with the words 'wenn sie im Tage schaukeln'. This section can be heard as falling into two phrases: the first line of the text (Des Herzens Purpurovogel fliegt durch Nacht) forms the first phrase, the antecedent. A bar rest in the vocal part separates it from the second phrase, a complex consequent made from lines 2 and 3 of the text. The running together of the second and third lines of the text follows the literal sense of the poem, in which the second half of line 2 is a subsidiary clause.

The opening line of the text is set as a series of very large intervals which give way to smaller intervals at the end of the line, on the words 'fliegt durch Nacht'. The smaller intervals at this point (a semitone, major second and minor third) all move within the interval of

(5) The characteristics of the note row of the Op. 25 songs, and the way in which these limit both harmony and melody in the first song of the group, have already been discussed. See Pgs. 49-60

1 2 3 4

Des Her - - - zens
The heart's

5 6 7 8

Pur - - pur - - vo - gel
pur - - ple ea - gle

fliegt durch
flies by

Nacht.
night.

rit. - - tempo rit. - - tempo

9 10 11 12

Der Au - gen
The eyes,

- gen like
Fal ter
day light's

rit. - - tempo

13 14 15 16

die im Hel - - - len gau - keln,
but - ter - flies that ho - ver,

sind ihm vor -
stat - ter a

aus, wenn sie im Ta - ge schau - keln.
 head and fly be - fore it e - ver. *tempo*

rit. - - - tempo

22 23 24

Und doch ist er's,
 Yet it's the bird

rit. - - - tempo rit. - - - tempo

26 27 28

der sie ans Ziel ge - bracht, Sie ru - hen oft,
 that brought them to their goal. They of - ten rest

rit. - - - tempo rit. - - - tempo

30 31 32

die bald sich neu er - he - ben zu neu - em Flug. Doch
 who soon must rise to hea - ven to fly a - gain. Yet

3 langsamer, $\text{♩} = \text{ca } 84$

ra - stet end - lich er am Ast des To - des, müd
 fin - al - ly he rests on death's grey branches, tired

34 35 rit *pp*

p *p* *p*

6 - tempo rit. - - - - - immer langsamer, $\text{♩} = \text{ca } 58$

und flü - gel - schwer, dann müs - sen sie
 with hea - vy wings: the but - ter - flies

37 38 39 *pp* *pp* *p* *pp*

pp *p* *pp* *p* *pp*

pp *pp* *p* *pp*

verlöschend

zum letz - ten Blick ver - be - ben.
 then look their last and pe - rish.

41 42 *pp* *ppp*

pp *ppp*

a. minor third:



Ex. 87.

In contrast to the wide intervals at the beginning of the phrase, these intervals are easily perceived and the resulting relaxation of tension helps to mark the cadence point. The relaxed effect at this point is aided by a 'ritenuto' at b.9 and by the piano accompaniment at b.8 and 9. The accompaniment consists of two held three note chords - these are the first three note chords in the piece and their duration (a dotted quaver each) contrasts with the more fluid quaver and semiquaver movement of the accompaniment before this point:

A musical score for a vocal line and piano accompaniment. The vocal line is in treble clef and contains the notes G4, A4, B4, C5, B4, A4, G4, with lyrics "fliegt durch Nacht -". The piano accompaniment is in bass clef and consists of two held three-note chords: G4-A4-B4 and G4-A4-B4. Dynamics include piano (p), piano fortissimo (pp), and piano (p). A 'ritenuto' (rit.) marking is present above the vocal line at the end of the phrase.

Ex. 89.

The sense of relaxation is also enhanced by the fact that these chords form a short sequence which is easily grasped.

The second phrase (the consequent, consisting of lines 2 and 3 of the text) is again built of wide intervals. A small interval (the minor third G sharp - B) appears at the word 'Falter' (b.12) and serves to mark the beginning of the text's subsidiary clause 'die

im Hellen gaukeln'. After this, small intervals appear again only at the very end of the phrase - at the words 'im Tage schaukeln':

Handwritten musical score for a vocal line and piano accompaniment. The vocal line is in G major and 4/4 time, with lyrics: "Der Aug-e Falter, die im Hel-len gaukeln sind ihm vor-aus - wenn sie im Tage schaukeln". The piano part is in G major and 4/4 time, featuring a complex, irrational pattern of wide intervals. The score includes various dynamics (p, f, pp) and performance markings such as "rit...", "ratto", and "rit."

Ex. 90.

This cadence is again marked by a *ritenuto*. The cadence is prepared for and supported by the repetitions of the two note chord E flat - E natural in the piano part, which help to give the effect of a more slowly moving harmony.

The second section of the song can be considered as starting after this cadence point at b.20, and lasting until b.32 where the speed changes to 'langsam'. The section covers lines 4, 5 and the first part of line 6 of the text. It falls into two phrases - the first is line four of the text ('Und doch ist er's, der sie ans Ziel gebracht'), the second is line five and part of line six of the text ('Sie ruhen oft, die bald sich neu erheben zu neuem Flug'). After the *ritenuto* at b.19 and 20 (the end of the previous section) the vocal part has a two bar rest. The piano returns to the original tempo for a short piano passage which reintroduces the voice. This piano passage has very wide intervals and a complex, irrational pattern:



Ex. 91.

There is a momentary relaxation of tension immediately after the voice's entry (the interval of a minor third D - F appears in the voice part and there is a slower harmonic rate because of the repetition of the notes C sharp and E flat from the voice part in the piano part,) and a clearer cadence at b.26. This cadence has the interval of a major third (B flat - F sharp) in the voice part; the B flat is a dotted quaver in length, the F sharp is a semiquaver at first and is then repeated as a quaver (although the duration of both notes is lengthened by the 'ritenuto'.) The longer note values and the small intervals give an effect of relaxation and, as at the previous cadence, the harmonic momentum is slowed down by the repetition of notes from the vocal line in the piano part.

The second phrase is more relaxed and prepares for the change of speed to 'langsam' at b.33. A minor third (A - C) suggests a small cadence at the words 'sie ruhen oft' (b.28) and each word of the phrase 'die bald sich neu' is set to small intervals, although a clear cadential effect is avoided, (there is no ritenuto and the semiquaver movement is maintained.)

The final cadence of this section (b.31 et seq.) is marked by a ritenuto and the voice has the interval of a major third, F - D.

The final section of the song (b.33 et seq.) is much

more relaxed than any of the previous sections. It uses small intervals, for the most part, but the slower speed (Quaver = 84 and, later, 58 as opposed to the Quaver = 112 of the previous sections) gives the ear time to relate the notes tonally and so grasp even the large intervals in this section.

The notes C sharp and C natural appear in both the voice and the piano part at b.33. The minor third E - C sharp (voice b.34) is followed by the major third F sharp - D (b.35) at the same register; the two small intervals are easily grasped and because of their common register are easily related to one another. The setting of the words 'müd und flügel schwer' uses only small intervals and moves within the minor third G - B flat. The notes of this phrase are then used backwards for the words 'Dann müssen sie' - the repetition of these notes, the small intervals and the gradual move towards an even slower speed (Immer langsam) all helping to give a very relaxed effect.

In this song small, easily grasped intervals are used at cadence points or at other points of relaxation (the relaxed effect which they give being further encouraged by other elements of the composition); larger intervals, which are difficult to perceive, are used in the middle of phrases in order to create tension. The final section (b.33 et seq.) uses some large intervals but has a relaxed effect because of the slower speed.

iii) Rhythmic control in the String Quartet Op. 28

Movement 1.

The first movement of the String Quartet Op.28 uses only crotchets, minims and semibreves (which always fall on one of the four crotchet beats of the 2/2 bar); a regular pulse can be felt throughout the movement.

Throughout the movement sections with regular rhythmic

patterns alternate with sections in which the rhythmic patterns are irregular; the way in which regular and irregular rhythmic patterns are used in this movement is comparable to the way in which large and small intervals are used in the Op.25 song examined above - the music oscillating between sections in which the rhythmic patterns are clearly perceptible and seem to suggest a regular metre and sections in which the rhythmic patterns are more complex and the accents continually shifting. The opening bars of the movement establish a regular minim and semibreve pulse:

The image shows a handwritten musical score for the opening of a movement. It consists of four staves. The first staff is a treble clef with a 2/2 time signature, containing a single minim note on a whole rest, marked with a forte 'f' dynamic. The second staff is a bass clef with a 2/2 time signature, containing a single minim note on a whole rest, also marked with a forte 'f' dynamic. The third staff is a bass clef with a 2/2 time signature, containing a single minim note on a whole rest, marked with a forte 'f' dynamic. The fourth staff is a bass clef with a 2/2 time signature, containing a single minim note on a whole rest, marked with a forte 'f' dynamic. There are various annotations and markings throughout the score, including a sharp sign above the first staff, a sharp sign above the second staff, a sharp sign above the third staff, and a sharp sign above the fourth staff. There are also some handwritten notes and symbols, such as 'sfz' and 'f', scattered across the staves.

Ex. 92.

Once established, this pattern is broken down: the texture becomes more complex and more quickly moving, two and three note figurations with different rhythms begin to overlap and the accents to contradict each other so that a very fluid rhythmic structure results.

Four sections appear in which the listener can hear a regular rhythmic pattern. After the opening section, the second such section appears at b.22:

Handwritten musical score for Ex. 93, consisting of four staves. The notation includes various dynamics such as *pizz f*, *f*, *arco*, and *pizz sf*. The music is written in a complex texture with overlapping figures.

Ex. 93.

This is again followed by a section with a more complex texture, in which the figures have different rhythms and overlap in a less regular way:

Handwritten musical score for Ex. 94, consisting of four staves. The notation includes various dynamics such as *sf*, *pizz*, *f*, and *fl*. The music is written in a complex texture with overlapping figures and different rhythms.

Ex. 94.

The third section with a regular rhythmic pattern appears at b.33:

Handwritten musical score for Ex. 95, consisting of four staves. The notation includes various dynamics such as *pizz f*, *f*, and *fl*. The music is written in a regular rhythmic pattern.

Ex. 95.

and is followed by a long section with a very flexible

rhythmic structure. The fourth, and final, section with a regular rhythm, in which the ear can hear a 3/4 pattern, appears at b.96, the end of the movement:

The musical score for Ex. 96 consists of four staves. The first staff is marked with a forte (ff) dynamic and a fermata. The second staff has a sforzando (sf) dynamic and a fermata. The third staff has a mezzo-forte (mf) dynamic and a fermata. The fourth staff has a fortissimo (ff) dynamic and a fermata. The score includes various dynamics such as sf, p, and ff, and articulations like accents (>) and slurs. The key signature has one sharp (F#) and the time signature is 3/4.

Ex. 96.

The sections with regular rhythmic patterns tend to have simple textures and to use figurations which are obviously similar to and balance one another; in the rhythmically more complex sections different figurations (with different rhythms and a different number of notes) overlap so that, despite the fact that some of the figurations are played pizzicato and tend to stand out from the texture, the increase in texture and complexity makes it more difficult for the listener to perceive the figurations exactly.

The regular pulse which can be felt throughout the movement is, nevertheless, a perceptible rhythmic control of the kind discussed in the previous chapter. The fact that this pulse is not obscured in the more irregular sections ensures that the listener hears these sections as having some relevance to the more regular sections.

iv) Instrumentation and thematic material in the Cantata No. 1. Op. 29 Movement 1.

The first five bars of the work present two clearly

contrasted ideas - the first bar presents three pianissimo four-part chords on the trumpet, trombone, viola and 'cello. I shall call this structure 'A'. Bars 2 - 5 present a more contrapuntal structure with overlapping two and three note figures on the wind and strings, and with single notes on the harp and the celesta. This structure, which I shall call 'B', begins 'forte' and ends 'piano' and is much longer than the previous structures:

The musical score for Ex. 97 is divided into two sections, A and B, indicated by red brackets at the bottom. Section A (bars 1-2) is marked 'Gehagen' and 'pp'. Section B (bars 3-5) is marked 'Lebhaft' and 'f'. The score includes staves for Cl., Bs. Cl., Harp. & cel., Trp., Trb., Vla., and Vlc. with various musical notations like dynamics, articulation, and fingerings.

Ex. 97.

A

B

The opening homophonic structure is marked 'getragen' and has homogeneous instrumentation; the contrapuntal structure (B) is marked 'lebhaft' and has a more heterogeneous instrumentation. As the movement progresses the differences between the two contrasting structures are gradually broken down to show the elements they have in common. The gradual exchange of the instrumentation which characterises the two structures plays an important role in this process.

b.6-11.

Structure A returns at b.6 and 7 with the same instrumentation, dynamics and 'getragen' marking as on its first appearance. This time the viola and 'cello parts of the chords do not coincide with the brass parts but are displaced by a minim's rest:

Ex. 98.

The structure is also extended from three to four chords, an unexpected chord on the wind and horns (another homogeneous instrumental group) following the brass and string chords. This new chord is supported by a brass drum roll, an effect which becomes associated with the chords of structure A. (See Ex. 86 above).

Structure B returns at b.8 - 11 but is this time interrupted by a drum roll and by trumpet and trombone notes. This is the first time that the trumpet and trombone have appeared in this structure.

b.12.

A further reappearance of structure A at b.12 continues the displacement of the chord pattern, a displacement which began at b.6. The trumpet, trombone, viola and 'cello are supported by a bass drum roll but the bass clarinet, clarinet and horn are also used this time:

Handwritten musical score for Ex. 99, measures 23-24. The score includes parts for Clarinet (Cl.), Bass Clarinet (Bsc.), Horn (Hrn.), Trumpet (Trp.), Trombone (Trb.), Bass Drum (B.D.), Viola (Vla.), and Violoncello (Vlc.). The time signature is 4/2. Dynamics include p, pp, and sf. The Horn part features a drum roll (drum roll) and a forte note (f). The Violoncello part has a forte note (f) with an accent (>).

Ex. 99.

This is followed by an 'a capella' chorus section.

b.23 - 24.

The short orchestral passage at b.23 and 24, separating two choral sections, consists of two short references to the two structures A and B. Structure A, on the brass and 'cello supported by a drum roll, is now so fragmented that it consists of only isolated 'forte' notes:

Handwritten musical score for Ex. 100, measures 23-24. The score includes parts for Horn (Hrn.), Trumpet (Trp.), Trombone (Trb.), Timpani (Timp), and Violoncello (Vlc.). The time signature is 3/2. Dynamics include sf, molto f, and p. The Horn part has a sf note. The Trumpet part has a molto f note. The Trombone part has a molto f note and a sf note. The Timpani part has a sf note and a p note. The Violoncello part has a p note. The score is marked "molto f" at the bottom.

Ex. 100.

Structure B is now reduced to two two-note figures on

violin and 'cello:

Ex. 101.

Except for their instrumentation, the original characteristics of the two structures are now almost completely abolished. The final step is the breaking down of the characteristic instrumentation associated with the two structures.

b.30 - 31.

A second short orchestral passage, separating two choral sections, appears at b.30 - 31. Two imitative three-note figures on the violin and the cello are so arranged that the last two notes of one coincide with the first two notes of the other:

Ex. 102.

The original imitative contrapuntal figures are here displaced and form chords, just as the different parts of the chords of structure A were displaced to form imitative contrapuntal figures at b.12.

b. 36 - 47.

Three chords (a version of structure A) on the clarinet, bass clarinet, harp and celesta appear at b.36. They

are marked 'lebhaft' and have the dynamics 'pp':

Cl. $\frac{3}{4}$ pp

Bs. Cl. $\frac{3}{4}$ pp

Hrp. $\frac{3}{4}$ pp

Cel. $\frac{3}{4}$ pp

Ex. 103.

They are followed, at b.37 - 40, by a contrapuntal structure built of overlapping imitative figures on the trumpet, trombone, horn, viola and 'cello supported by a drum roll and with single isolated notes on the harp:

Hrn. $\frac{3}{4}$ p

Trp. $\frac{3}{4}$ #p f

Trb. $\frac{3}{4}$ #p f

Hrp. $\frac{3}{4}$ trum

Timp $\frac{3}{4}$ p

Vla. $\frac{3}{4}$ pp pizz

Vlc. $\frac{3}{4}$ f

Ex. 104.

At b.41 there appear three pianissimo four-part chords on pizzicato strings. These chords are marked 'lebhaft':

Ex. 105.

Thus, in this section, the homophonic chords appear on the instruments originally associated with the contrapuntal structure and the contrapuntal figurations appear on the instruments originally associated with the homophonic chord structure.

In the final bars of the movement the two structures return to their original instrumentation - the contrapuntal structure (B) at b.42 - 46, with overlapping figurations on the wind and strings, is followed by a final 'getragen' sequence of chords on the trumpet, trombone and lower strings supported by a bass drum roll.

In this work, the two contrasted structures which open the movement are each associated with certain groups of instruments. This instrumentation is exploited during the course of the movement and, as the other characteristics of the two sections become less clearly defined, their characteristic instrumentation disappears until, eventually, the two groups of material exchange instrumentation.

In some of the above examples the music establishes clearly perceptible patterns which are then abolished (as in the first movement of Op. 27, for example); in other examples (such as the second of the Op.25 Songs) sections in which the details are clearly perceptible alternate with sections in which these details cannot be exactly grasped. All these examples, however, illustrate

ways in which the composer, by the deliberate use of material and ideas which perplex the listener, can make the listener feel uncertain about certain aspects of the music and can exploit this uncertainty as a formal element whilst, at the same time, determining the listener's response to the music.

v) Symphony Op. 21. Movement 1.

a) Overall design of the first movement.

I shall now consider the interaction of control and uncertainty in the first movement of Webern's Symphony Op. 21 and I shall show how the elements which I have considered separately in the first half of this chapter, here combine to define the formal structure of the movement. I have chosen this movement because it seems to illustrate with particular clarity the ways in which non-tonal music can exploit the kind of perceptual limitations that I have discussed in Chp.II.

Although the first movement has some affinities with the traditional symphonic first movement it is not a classical sonata-form structure. The movement is in binary form, the first half of which has two distinct groups of material. The second half develops the material of the first half. Both halves are repeated.

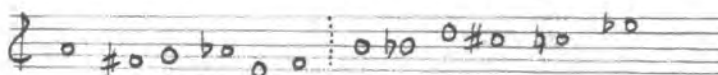
The movement is constructed as a double canon (or, at some points, a single canon) by inversion. The canonic voices, however, are blurred by the klangfarben technique and the chief audible effect of the canon is that it produces a complex of interlocking thematic and rhythmic relationships. The movement begins by establishing a number of regular and perceptible patterns and the second half of the movement breaks down the regular patterns established in the first half. The whole movement moves from a controlled opening, in which such things as thematic and rhythmic relationships,

melodic patterns and phrase structures seem symmetrical and are clearly perceptible, to a situation of great complexity where these things are unpredictable and difficult to grasp. The elements of pulse, rhythm, phrase structure, pitch, thematic relationships and texture all serve to define the development of this formal design and I shall consider each element separately.

b) Row structure and treatment.

Although not consisting of a number of identical cells, in the manner of the note row of the Concerto, the row of the Symphony has a number of distinct characteristics which partly determine the use of one row form in preference to another.

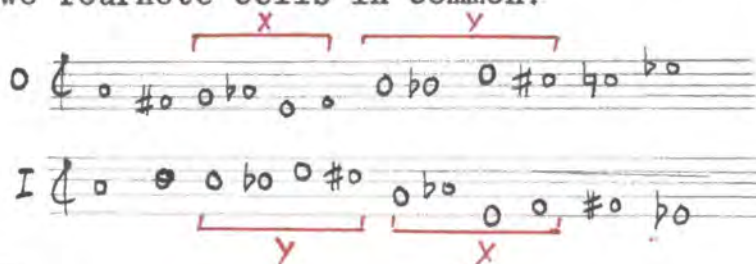
The note row is a palindrome and can be divided into two hexachords arranged symmetrically around a central tritone:



Ex. 106.

Many transpositions of the row and its inversion (one cannot talk of retrograde forms since the row is a palindrome) reproduce certain characteristics of the original row. The most important of these are listed below:

i) The row and its inversion beginning on the same note have two fournote cells in common:



Ex. 107.

Notes 3, 4, 5 and 6 of the row are the same as notes 7, 8, 9 and 10 of the inversion and notes 7, 8, 9 and 10 of the row are the same as notes 3, 4, 5 and 6 of the inversion.

ii) A row, its inversion beginning on the note a minor 6th above and its inversion beginning on the note a tone above have two three note cells in common:

Ex. 108.

Notes 2, 3 and 4 of the row are the retrograde of notes 2, 3 and 4 of the inversion beginning on the note a minor 6th above and are the same as notes 9, 10 and 11 of the inversion beginning on the note a tone above. Notes 9, 10 and 11 of the row are the retrograde of notes 9, 10 and 11 of the inversion beginning on the note a minor 6th above and are the same as notes 2, 3 and 4 of the row beginning on the note a tone above.

iii) A row and its inversion at the major third above have a tritone in common:

Ex. 109.

Notes 6 and 7 of the row are the same as notes 6 and 7 of the inversion.

Throughout the movement (with the exception of b.25 - 28, the beginning of the second half) Webern overlaps rows in which the last two notes of one row are the same as the first two notes of another. The four rows (used simultaneously) with which the movement begins all overlap with four other rows in this way:

Four staves of musical notation showing overlapping rows. Each staff has a red bracket under a segment of notes. Above the first staff is $0/0$, above the second $1/8$, above the third $1/0$, and above the fourth $0/4$. Red numbers above the brackets indicate the starting row of the overlapping segment: $1/3$, $0/5$, $0/9$, and $1/7$.

Ex. 110.

I shall now show how these row relationships are used in the first movement. The whole movement is shown in the example overleaf.

The opening rows of the first half of the movement are shown below:

A diagram showing the opening rows of the first half of the movement. It consists of four horizontal lines representing rows, with various segments marked by brackets and labeled with row numbers:

- Row 1: $0/0$ (start), $1/3$ (bracketed segment), end.
- Row 2: $1/8$ (bracketed segment), $0/5$ (bracketed segment), $1/8$ (bracketed segment), $0/5$ (bracketed segment), end.
- Row 3: $1/0$ (bracketed segment), $0/9$ (bracketed segment), end.
- Row 4: $0/4$ (bracketed segment), $1/7$ (bracketed segment), $0/4$ (bracketed segment), end.

0/0 a b d i g h j

1/8 a f d 1/5 1/8 1/5

1/0 b d a c 1/9 g i j h

1/4 b f c 1/7 1/4

The lettering of the diads indicates the order in which they appear in the movement.

Ex. 111.

These rows overlap in the way described on Pg. 112 and have a number of note groups in common. The note groups which the rows have in common are indicated in the above example. The letters above each group refer to the paragraph in which each group is considered in the following discussion.

I shall now show how these note repetitions are used in the composition.

a) Rows 0/0, 1/8 and 1/0 have the diad G - Ab in common, G - Ab appearing as notes 3 and 4 of 0/0 and notes 7 and 8 of 1/0 and Ab - G appearing as notes 2 and 3 of 1/8. The G - Ab of 0/0 (on the horn at b.3 and 4) appears simultaneously with the Ab - G of 1/8 (on the cello):

0/0 Hm

1/8 Vlc

pizz

Ex. 112.

Ex. 113

MEINER TOCHTER CHRISTINE

Allföhrungsweite - verbunden

Ruhig schreitend: ca 80

ANTON WEBERN, OP. 21

This system contains the first four measures of the score. The instruments listed on the left are:

- Alto- und Klarinette (Alto and Clarinet)
- Klarinette (Clarinet)
- Flöte (Flute)
- Horn (Horn)
- 1. Fagott (1st Bassoon)
- 2. Fagott (2nd Bassoon)
- Bratsche (Violin)
- Viola (Viola)

The notation includes various dynamic markings such as *pp*, *p*, *mp*, and *pia*, and articulation marks like accents and slurs.

Allegro molto scherzoso

This system contains the next four measures of the score, corresponding to measures 5-8. The instrumentation remains the same as in the first system. The notation is dense with complex rhythmic patterns and dynamic markings including *pp*, *p*, *mp*, *pia*, and *mf*. There are also some performance instructions like *ritardando* and *rit.*

rit - - - tempo

KL
Bl
1
Hrn
2
Hr
1
2
Br
Tie

Allegro
Alte. Dpf.
Dämpfer ab
Alte. ab
Dämpfer ab
Alte. Dpf.
Dämpfer ab
Alte. Dpf.
Dämpfer ab

Detailed description: This block contains the first ten measures of the score. It features staves for Clarinet (KL), Bassoon (Bl), two Horns (1, 2), two Trumpets (1, 2), Trombones (Br), and Timpani (Tie). The music is marked 'rit' (ritardando) and 'tempo'. Dynamics include 'Allegro', 'Alte. Dpf.' (Alto Flute, piano), and 'Dämpfer ab' (mutes removed). There are various articulations and phrasing slurs throughout the passage.

KL
Bl
1
Hrn
2
Hr
1
2
Br
Tie

Alte. Dpf.
Dämpfer ab
Alte. Dpf.
Dämpfer ab
Alte. Dpf.
Dämpfer ab
Alte. Dpf.
Dämpfer ab

Detailed description: This block contains measures 11 through 20. The instrumentation remains the same. The music continues with 'Alte. Dpf.' and 'Dämpfer ab' markings. There are significant phrasing slurs and dynamic markings such as 'Alte. Dpf.' and 'Dämpfer ab'. The tempo remains steady.

KL
Bl
1
Hrn
2
Hr
1
2
Br
Tie

Alte. Dpf.
Dämpfer ab
Alte. Dpf.
Dämpfer ab
Alte. Dpf.
Dämpfer ab
Alte. Dpf.
Dämpfer ab

Detailed description: This block contains measures 21 through 30. The instrumentation remains the same. The music continues with 'Alte. Dpf.' and 'Dämpfer ab' markings. There are significant phrasing slurs and dynamic markings such as 'Alte. Dpf.' and 'Dämpfer ab'. The tempo remains steady.

KL
Bl
1
Hrn
2
Hr
1
2
Br
Tie

Alte. Dpf.
Dämpfer ab
Alte. Dpf.
Dämpfer ab
Alte. Dpf.
Dämpfer ab
Alte. Dpf.
Dämpfer ab

Detailed description: This block contains measures 31 through 40. The instrumentation remains the same. The music continues with 'Alte. Dpf.' and 'Dämpfer ab' markings. There are significant phrasing slurs and dynamic markings such as 'Alte. Dpf.' and 'Dämpfer ab'. The tempo remains steady.

80 87 94

rit. tempo

Kl. Flut. 1. Horn. 2. Horn. Horn. 1. Oboe. 2. Oboe. Horn. Vl.

Abzuehler auf. pp. Solo in Dpt. pp.

101 108 115

rit. tempo

Kl. Flut. 1. Horn. 2. Horn. Horn. 1. Oboe. 2. Oboe. Horn. Vl.

Abzuehler auf. Solo in Dpt. Alle Abzuehler auf. Abzuehler auf.

122 129 136

rit. tempo

Kl. Flut. 1. Horn. 2. Horn. Horn. 1. Oboe. 2. Oboe. Horn. Vl.

pp. Solo in Dpt. pp.

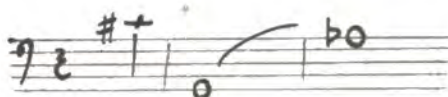
143 150 157

rit. tempo rit.

Kl. Flut. 1. Horn. 2. Horn. Horn. 1. Oboe. 2. Oboe. Horn. Vl.

pp. Solo in Dpt. Alle in Dpt. pp. Solo in Dpt. pp. Alle in Dpt. pp.

The G - Ab of I/O appears on the bass clarinet at b.9 - 10 in a figuration which is similar to that of the horn G - Ab at b.3 - 4:



Ex. 114.

b) Rows 0/0, I/O and 0/4 have the diad B - Bb in common, B - Bb appearing as notes 7 and 8 of 0/0 and notes 3 and 4 of I/O and Bb - B appearing as notes 2 and 3 of 0/4. The B - Bb of I/O (on the horn at b.5 and 6) appears simultaneously with the Bb - B of 0/4 on the viola and is followed by the B - Bb of 0/0 of the clarinet at b.7 and 8, which uses a similar figuration to the horn at b.5 and 6. At the same time the Bb (note 5) of I/8 - which does not form part of a B - Bb diad - is isolated by rhythm and orchestration (it is the first note played by the violins and is followed by rests) and juxtaposed with the other B - Bb diads:

Ex. 115.

The rhythm, instrumentation and phrasing of these B - Bb diads is similar to those of the G - Ab diads already discussed at (a) above.

c) Rows 0/0, I/0 and 0/4 have the diad E - G in common. The E - F of 0/0 (notes 5 and 6) and I/0 (notes 9 and 10) have similar figurations:

Ex. 116.

The F - E diad of 0/4 (notes 10 and 11) is obscured by the instrumentation.

d) Rows 0/0, I/0 and I/8 have the diad D - C sharp in common. The D - C sharp of 0/0 (notes 9 and 10) and I/0 (notes 5 and 6) are juxtaposed and use similar figurations:

Ex. 117.

The C sharp - D diad of I/8 (notes 10 and 11) is obscured by the instrumentation.

e) Rows I/8 and 0/4 have the diad A - Eb in common (notes 6 and 7 of both rows). Both diads appear as two note chords on the harp:

Ex. 118.

f) Notes 3 and 4 of the new rows, which start at b.11 - 14, are the same as notes 9 and 10 of the previous rows. The repeated notes use figurations similar to those used on their first appearance:

Ex. 119.

g) Rows I/3 and 0/9 have the diad E - F in common (notes 5 and 6 of I/3 and 3 and 4 of 0/9). These appear simultaneously on the clarinet and viola at b.14 - 15. Both use similar figurations and are reminiscent of the E - F diads at b.11 and 13 ('c' above).

Ex. 120.

h) Rows I/3 and 0/9 have the diads B - B flat in common (notes 7 and 8 of I/3 and notes 9 and 10 of 0/9). The Bb - B of I/3 appears on the clarinet at b.16 - 17 and the B - Bb of 0/9 on the horn at b.20 - 21. Both diads use similar figuration and both are similar in rhythm and

instrumentation to the Bb - B diads of b.5 - 8,
('b' above)

Ex. 121.

i) Rows I/3 and 0/9 have the diad D - C sharp in common (notes 3 and 4 of I/3 and 5 and 6 of 0/9). The D - C sharp of 0/3 appears on the cell at b.13 and C sharp - D of 0/9 on the bass clarinet at b.16 and 17. Both diads use similar figurations and both are similar to the D - C sharp diads of b.9 and 10. ('d' above)

Ex. 122.

j) Rows 0/3 and 0/9 have the diad Ab - G in common (notes 9 and 10 of I/3 and notes 7 and 8 of 0/9). These appear simultaneously on the horn and the bass clarinet at b.18 and 19:

Ex. 123.

The rest of the first half of the movement repeats the two opening rows - I/8 and 0/4. The diad Eb - A which is common to both rows (see 'e' above) again appears as two-note chords, this time on viola (b.19 - pizzicato)

and on the cello (b.21, pizzicato):

The image shows two staves of handwritten musical notation. The first staff is for Viola (Vla.) and the second is for Violin (Vlc.).

Viola Staff (b.19): The staff shows a sequence of notes: a quarter note G⁴ (marked *pizz*), a quarter note A⁴ (marked *pizz*), a quarter note B⁴ (marked *pizz*), and a quarter note C⁵ (marked *arco*). A red $1/8$ is written below the first note. Above the first two notes is the marking "b.19" and above the last two notes is "b.21".

Violin Staff (b.21): The staff shows a sequence of notes: a quarter note G⁴ (marked *pizz*), a quarter note A⁴ (marked *pizz*), a quarter note B⁴ (marked *pizz*), and a quarter note C⁵ (marked *arco*). A red $0/4$ is written below the first note. Above the first two notes is the marking "b.21".

Ex. 124.

During the first half of the movement the relationships between the different row forms are made perceptible by constant emphasis of the note groups which the rows have in common and by giving similar figurations and similar instrumentation to similar note groups. Because similar groups of notes are juxtaposed, and because these note groups recur as four unchanging diads (Bb - B, D - C sharp, G - A flat and F sharp - F) the music avoids giving the effect of a totally chromatic texture and the listener has the impression of a leisurely, slow moving harmonic rate. The repetition of notes is most noticeable at b.9 - 14 and at b.18 et seq. because at these points one set of row forms ends and another begins. The wealth of note repetitions at these points gives a feeling of very slow moving, almost static, harmony and, as I shall later show, these two points are of great structural importance (6).

The second half of the movement uses the following row forms:

(6) See Pgs. 129-131

b.25. b.26. b.27. b.28 b.31 b.32. b.33. b.34 b.36. b.37. b.38 b.42. b.44. b.45.

i) $1/7$ ————— || $1/1 (=1/7R)$ ————— $0/4$ —————
 ii) $1/3$ ————— || $1/9 (=1/3R)$ ————— $1/8$ —————
 iii) $0/7$ ————— || $0/1 (=0/7R)$ ————— $1/0$ —————
 iv) $0/11$ ————— || $0/5 (=0/11R)$ ————— $0/0$ —————

b.51. b.52. b.54 b.58 b.60. b.62. b.64. b.66

(i) ————— $1/7$ ————— $0/4$ ————— $1/7$ ————— ||
 (ii) ————— $0/5$ ————— $1/8$ ————— $0/5$ ————— ||
 (iii) ————— $0/9$ ————— ||
 (iv) $1/3$ ————— ||

The musical notation consists of four staves. Each staff has a key signature of one flat (Bb) and a time signature of 3/4. The notes are circled in red, and chord symbols are written above them:

- Staff 1: $1/7$ (K, L, M, N), $1/1$ (r, t, q), $1/7$ (u), $0/4$ (v), $1/7$
- Staff 2: $1/3$ (m, o, l), $1/9$, $1/8$ (p, f, s), $0/5$ (v, u), $1/8$, $0/5$
- Staff 3: $0/7$ (m, n, k, l), $0/1$, $1/0$ (r, s, p, q), $0/9$ (w, x, y, z)
- Staff 4: $0/11$ (k, o, n), $0/5$, $0/0$ (p, q, r, s), $1/3$ (x, w, z, y)

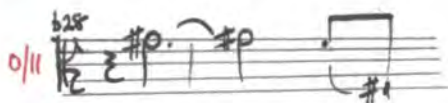
Ex. 125.

b.25 - 34.

The opening rows of the second half ($I/7$, $I/3$, $0/7$ and $0/11$) share characteristics similar to those shared by the opening rows of the first half. The similarities between the different row forms, however, are now obscured.

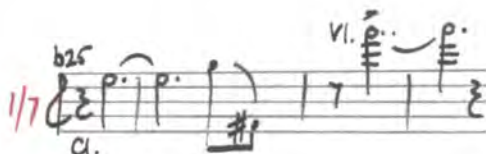
k) Rows $I/7$, $0/7$ and $0/11$ have the diad Gb - F in common, Gb - F appearing as notes 3 and 4 of $I/7$ and notes 7 and 8 of $0/7$ and F - Gb appearing as notes 2 and 3 of $0/11$. (This relationship is the same as that between the notes G - Ab of rows $0/0$, $I/8$ and $I/0$ at the beginning of the

movement; see 'a' above, Pg. 113). The F - Gb of 0/11 appears on the viola at b.29:



Ex. 126.

The Gb - F diads in rows I/7 and 0/7 are obscured. The Gb of I/7 appears as the last note of a clarinet figuration at b.26 and the F appears on the violins at b.27:



Ex. 127.

The F of the Gb - F of 0/7 appears as a grace note to an A on the violins at b.32:



Ex. 128.

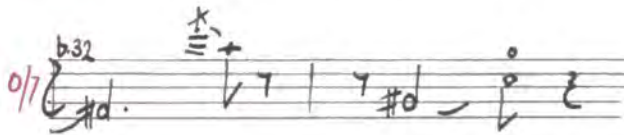
Thus, all three diads have different figurations and the relation between them is concealed.

1) Rows I/7, I/3 and 0/7 have the diad A - Ab in common, A - Ab appearing as notes 5 and 6 of I/7 and notes 9 and 10 of 0/7, and Ab - A appearing as notes 10 and 11 of I/3. The A - Ab diad of I/7 appears on the harp at b.28 - 29:



Ex. 129.

That of 0/7 is obscured because the two notes form part of different figurations on the violin at b.32 - 33:



Ex. 130.

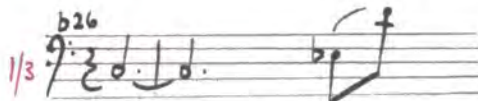
and that of I/3 is obscured because the A appears as a gracenote to an F sharp on the clarinet at b.32:



Ex. 131.

Again the similarities between the three diads is concealed.

m) Rows 0/7, I/7 and I/3 have the diad D - Eb in common, D - Eb appearing as notes 7 and 8 of I/7 and 3 and 4 of 0/7, whilst Eb - D appears as notes 2 and 3 of I/3. The Eb - D of I/3 appears on the cello at b.27:



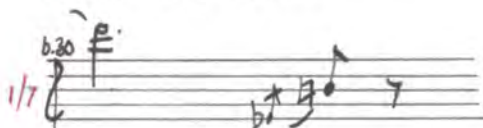
Ex. 132.

The relation between the D - Eb diads of rows 0/7 and I/7 is obscured. The D of 0/7 appears as the last note of a clarinet figure at b.28 and the Eb on the violins at b.29:



Ex. 133

The Eb of I/7 appears as a grace note to the note B natural on the violins at b.30:



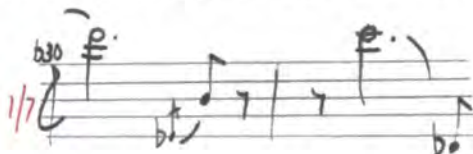
Ex. 134

n) Rows I/7, 0/7 and 0/11 have the diad B - C in common, B - C appearing as notes 9 and 10 of I/7 and notes 5 and 6 of 0/7 whilst C - B appears as notes 10 and 11 of 0/11. The B - C of 0/7 appears on the harp at b.30 - 31:



Ex. 135.

The B - C of I/7 is obscured because the two notes form part of different figurations on the violin at b.30 - 31:



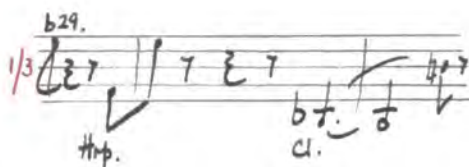
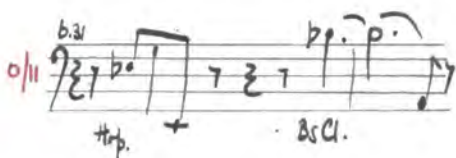
Ex. 136.

and the C - B of 0/11 is obscured because the B natural forms a grace note to a D natural on the harp at b.34:



Ex. 137.

o) Rows I/3 and 0/11 have the diad E - Bb in common (notes 6 and 7 of each row). Both diads are obscured:



Ex. 138.

Unlike the relationships between the rows of the first half of the movement (which are similar to the relationships between the row forms used in this section) these relationships are obscured in the composition and the note groups which the row forms have in common are no longer perceptible. The obscuring of these relationships has the effect of concealing some of the motivic connections between one phrase and the next (or, at least, making these connections more difficult to perceive) and the music seems to have a more quickly moving and less rational harmonic rate than in the previous section.

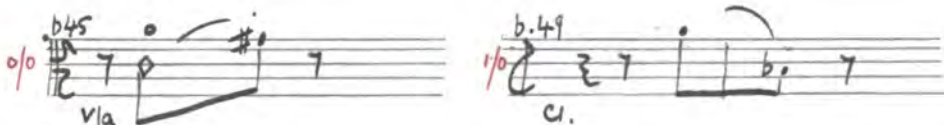
b.34 - 43.

This section is a retrograde of the previous section and the note groups which the rows have in common are, therefore, again obscured.

b.44 - 51.

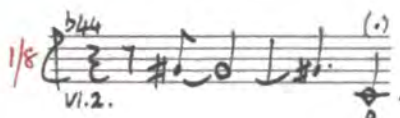
During this section the note groups which the rows have in common become, to a certain extent, perceptible again but note groups which are similar usually employ very different figurations. Although the listener can hear the repetition of note groups in this section he cannot hear any motivic connections between similar groups and the note repetitions tend to sound irrational.

p) Rows I/8, I/0 and 0/0 have the diad G - Ab in common, G - Ab appearing as notes 7 and 8 of I/0 and 3 and 4 of 0/0 and Ab - G appearing as notes 2 and 3 of I/8. The diads of 0/0 and I/0 use similar figurations:



Ex. 139.

The Ab - G diad of 1/8, which appears simultaneously with the G - Ab of 0/0 uses a different figuration:



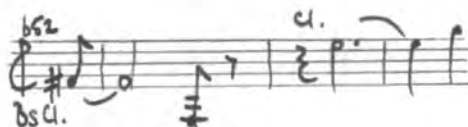
Ex. 140.

q) Rows 1/0, 0/0 and 0/4 have the diad E - F in common, E - F appearing as notes 5 and 6 of 0/0 and 9 and 10 of 1/0, while F - E appears as notes 10 and 11 of 0/4. The diads of 1/0 and 0/0 use different figurations:



Ex. 141.

and that of 0/4 is obscured, the F forming the last note of a bass clarinet figuration at b.52 and 53 and the E being the first note of a clarinet figure at b.54:



Ex. 142.

r) Rows 1/0, 0/0 and 0/4 have the diad Bb - B in common, B - Bb appearing as notes 3 and 4 of 1/0 and notes 7 and 8 of 0/0, whilst Bb - B appears as notes 2 and 3 of 0/4. The three diads are juxtaposed in b.46 - 48, that of 0/4 using a different figuration from the other two:

Ex. 143.

The note Bb from row I/8 (which does not form part of a Bb - B diad) is isolated and juxtaposed with the B - Bb diads of the other rows; this note is marked in red in the above example.

s) Rows I/0, 0/0 and I/8 have the diad D - Db in common, D - Db appearing as notes 5 and 6 of I/0 and 9 and 10 of 0/0 and Db - D appearing as notes 10 and 11 of I/8. The diads of I/0 and 0/0 appear simultaneously but have different figurations:

Ex. 144.

The Db - D of I/8 is obscured, the Db appearing as the last note of a violin figuration at b.52 and the D as the first note of a figure on the horn at b.52 - 53:

Ex. 145.

t) Rows I/0 and 0/4 have the diad A - Eb in common (notes 6 and 7 of both rows). Both diads use the A as a gracenote to the Eb but the figurations are at a different pitch:

Ex. 146

The repetition of note groups in this section is perceptible but, because the groups uses different figurations and the rhythmic patterns are so irregular at this point (7), the repetitions do not give the impression of a relaxed, slowly moving harmony which they gave during the first half of the movement. The listener probably hears only a series of arbitrary sounding note repetitions.

During the final section of the movement (b.51 - 66), which I shall not examine in detail, few of the similarities between the different row forms are emphasised (though some are perceptible (8) but the music becomes simpler and more easy to grasp in other ways, as I shall show in the rest of this chapter.

In the first half of the movement the repetition of similar note groups is very clear and the similarity between one group of notes and another is enhanced by the fact that similar note groups tend to have similar figurations and be played by the same instruments. Because of these repetitions the opening half of the movement seems to have a slow, almost static, harmonic movement and the listener can hear a number of clearly perceptible motivic connections between one phrase and the next.

During the second half of the movement these repetitions are less perceptible and the similarity between note groups is concealed. The harmonic movement seems less relaxed and more irrational; those note repetitions which attract the listener's attention sound arbitrary. Towards the end of the movement the note repetitions become more perceptible and less irrational but the clear motivic connections at the beginning of

(7) See Pg. 128

(8) See for example, the diad G - G sharp on the violin and the clarinet at b.57 and the diad F sharp - F on the viola at b.64.

the work do not recur and the harmonic movement never returns to the leisurely pace of the opening half.

This progression from a relaxed opening in which certain symmetries and repetitions are clearly perceptible to a second half which sounds more irrational is, as I shall show below, reflected by the other compositional elements.

c) Pulse and Rhythmic development

The first half of the movement falls into two sections: b.1 - 10 and b.15 - 25a. Bars 11 - 14 act as a transition between the two. Both sections establish regular rhythmic patterns. In the first section a note is played on the first, second and fourth crotchets of every bar, giving the rhythm: 2/2 ♩ ♩ ♩ | ♩ ♩ ♩



This rhythm disappears in the transitional passage (b.11 - 14) where there is a less obvious rhythm:

In the second section of the first half, a regular crotchet pulse is established and a note is played on every crotchet of the 2/2 bar: ♩ ♩ ♩ ♩ | ♩ ♩ ♩ ♩

This regular pulse is not related to the metre indicated by the bar lines, since varying stresses are laid on different pulses (some having only single notes, some two notes, some three note chords and others being accentuated melodically or by instrumentation). The pulse, though regular, is fluid. The only interruption of this pulse in the first half of the movement comes at b.23a, 24a and 25a where it disintegrates towards the cadence point at the end of the first half in preparation for the re-establishment of the opening pulse on the repetition of this half. The same disintegration appears at b.23b, 24b and 25b, where it prepares for the second half of the movement.

During the second half of the movement the regular

pulse is gradually destroyed. This destruction begins at b.26 with the introduction of notes and rests of a quaver's value. This is the first time that notes of less than a crotchet's value have appeared in the movement.

New rhythmic patterns are momentarily established during the second half of the movement but none last for any length of time. At b.29, for example, the rhythmic pattern  appears for a few bars and at b.38 the pattern . Both of these patterns are soon destroyed and after b.48 no two bars have the same rhythmic pattern. The following diagram shows the rhythmic pattern from b.27 onwards - the diagram shows only when notes begin; not all held notes are shown.



This diagram, however, gives no indication of the complexity and flexibility of the shifting accentuation within this section. One of the chief reasons for the instability of pulse in this half is that the varying degrees of emphasis in the different instrumental parts constantly contradict one another and avoid the appearance of any kind of regularly accented rhythmic pattern. The rhythmic complexity is at its height at b.48 et seq., the only point in the movement where the dynamics increase

to forte and sforzando. The regular rhythmic patterns do not reappear at the end of the movement, but the texture becomes much simpler (9) and the rhythmic patterns, therefore, seem to become less complicated.

d) Phrase structure and instrumentation

At the opening of the movement the phrase structures are simple and seem to balance each other symmetrically. The first half of the movement is in two sections. The first of these can be heard as consisting of three symmetrical four bar units which balance each other thematically and rhythmically:

Ex. 147.

These twelve bars might be heard as balancing structures, in the way suggested in the above example, because the texture at this point is simple enough to allow the listener to form the patterns into groups, and the harmonic area of b.5 - 8 (characterised by the repeated B - Bb) suggests that these four bars form a separate unit from the first four bars and from b.9 - 12. The harmony is leisurely throughout these twelve bars, but during b.9 - 12 it seems to become more static because of a repeated

 (9) See Hg. 134

D natural in the bass - the lowest note to this point. The note D natural is repeated at the same pitch in b.13 which, because this note seems to link the bar to what has gone before and because a new sequence of balancing units seems to begin at b.14, acts as a transition. A note is played on the third crotchet of a bar for the first time in b.13:

Ex. 148.

The second section of this half continues the symmetrically balancing structures of the first section. Two balancing two bar units begin the section (b.14 and 15, b.16 and 17):

Ex. 149.

The thematic and rhythmic balance of these units is underlined by their complementary instrumentation. In the first a pizzicato note and a bowed note on the strings (the bowed note being preceded by a grace note) is followed by a two note figure on the clarinet; in the second a pizzicato note and a bowed note on the strings (the bowed note being again preceded by a grace note) is followed by a two note figure on the bass clarinet.

This is followed by a further structure built of two balancing units (less obvious than the previous one because more fragmentary). Again the instrumentation underlines the repetition of figures and draws attention to the similarities between the two units:

(incomplete reprise.)

Ex. 150.

The introduction of solo strings at b.21 begins the reduction of texture which helps to mark the cadence ending the first half of the movement. Unlike the rest of this half, the final passage (b.21 - 25) is built of a series of short units of one bar or less. The fragmentary nature of this passage emphasises its cadential function. One of the two canons ends at b.22, there is a 'ritenuto' and there is less harmonic momentum because of the large number of repeated notes:

Ex. 151.

During this first half of the movement a sense of continuity is achieved through the instrumentation. The opening passage of this half is dominated by the horn timbre and the closing passage by the homogeneous string texture.

Throughout this half, similar motives are given to the same or similar instruments - the answering horn

figures (b.1 - 6) are followed by figures in which the bass clarinet answers the clarinet and by two complementary cello figures.

The second half of the movement falls into three sections: Section 1 b.25 - 44; Section 2 b.48 - 60; Section 3 b.61 - 66. The third of these sections acts as a code. A short transitional and cadential passage (b.44 - 48) separates the first and second sections. The three sections are defined by 'ritardando' and 'a tempo' markings.

The first section of the second half can be divided into two parts: b.25 - 33 and b.36 - 44, the first part of which can be subdivided thus: b.25 - 28 (the clarinet motive and b.25 and 26, and its inversion at b.27 and 28 may lead the listener to hear these four bars as one unit) and from the end of this passage until the pause at b.33, which the listener might hear as a five bar unit. The definition of these units is blurred, however, by the overlapping of motives and the division into balancing structures is not as clear as was that in the first half of the movement. The asymmetrical five bar structure is, in itself, a new complexity when compared to the previous 2 and 4 bar structures.

Two bars for solo cello and harp lead to the second part of this section. The second of these two bars (b.34 and 35) is a retrograde of the first, which has the effect of making the harmony seem to move more slowly. This and the sparse texture suggests that these two bars are transitional.

The second part of this section presents a more regular balance of units:

(incomplete texture)

Ex. 152.

The transitional passage (b.44 - 48), which leads to the second main section of this half, acts, as a point of relaxation before the complexities of the next section; the texture is simple and, at the end of a passage, a number of notes are repeated, giving an effect of static harmony:

(incomplete texture)

Ex. 153.

The second main section presents the most complex structures yet heard. It is not possible to divide this section into separate balancing units, so complex are the many overlaps, extensions and contractions. The rhythmic diagram (Pg. 128) shows the complexity of entries at this point. Towards the end of the section (b.58 et seq.) the voices become less complex and the texture thins in preparation for the third section.

The instrumental homogeneity of the first half disappears in the second and motifs are isolated on different instruments.

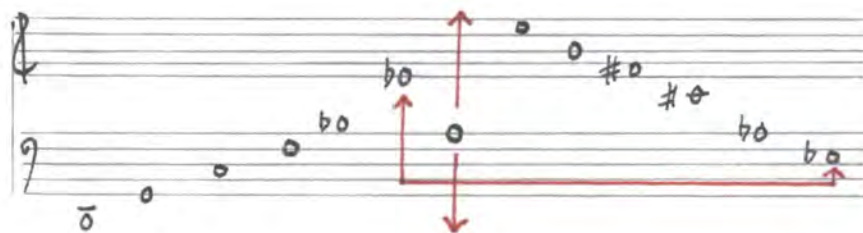
The third section acts as a coda and is reminiscent of the codetta of the first half. One of the two canons is omitted, so that the texture becomes simpler

and the events more clearly perceptible, and the listener can once more hear the short phrases as forming some kind of balance. Almost all the last section is played by the solo strings and the instrumental homogeneity, like that at the beginning of the movement, gives an effect of continuity.

The increase of texture and of rhythmic complexity, the lack of clear balancing structures and motivic connections and the disappearance of the slow harmonic rate all make the events of the second half of the movement seem more irrational and less clearly perceptible than those of the first half.

e) Pitch.

A feature of the first half of the movement is that each note always appears at one register throughout. The following pitch arrangement is used:



Ex. 154.

The arrangement forms two sets of fourths, arranged symmetrically around an A natural which is common to both. The only note that changes pitch in the first half of the movement is the note E flat which, like the note A natural, is common to both sets of fourths. The static, frozen effect which results from each note appearing at only one pitch enhances the effect of slow

moving harmony during the first half of the movement.

At the beginning of the second half of the movement, when other elements start to become less stable, notes other than the E flat begin to change pitch and the pitch area becomes much wider. The first note to change octaves is the G natural in the clarinet at b.26. The effect of increasing harmonic momentum in the second half of the movement is partly due to the abolition of the first half's pitch arrangement. A new pitch arrangement appears at the climax of the movement and the harmony gradually becomes more slow moving as this new arrangement, which is maintained throughout the rest of the movement, is established.

Summary

Thus, all the different elements combine to establish the stability of the opening half; the patterns are symmetrical, the pulse regular (and the rhythmic relationships are, therefore, clear), the harmonic rate is very slow and although the texture becomes complex at some points it is never complex for a long time. In this first half the structures and the relationships can be grasped without great difficulty. As the second half progresses the texture and the way in which the phrases overlap becomes more complex, the regularity of the pulse is destroyed and the rate of movement becomes less predictable, so that the ear cannot easily grasp the structures and the relationships. The second half of the movement uses more wide intervals than the first half (although there are some wide intervals in the first half) and the ear is given less time in which to grasp them::



Throughout the movement the listener must make a number of subjective decisions if he is to understand the music (decisions as to how the motives balance, how they form groups, what their relationships are) but these decisions are more difficult to make in the second half of the movement. The climactic second half achieves its tension by breaking down the regular patterns of the first half of the movement and by making it more difficult for the listener to perceive the structures exactly - thus increasing his uncertainty. The two halves have enough in common for the listener to try to understand the second half in terms of what happened in the first half (rather than to simply accept that the complex shapes of the second half have no relevance to what has gone before) and although almost all the patterns established in the first half are broken down in the second, the listener's response to the second half of the movement is still determined and controlled by the limits established earlier in the work.

Because Webern's music establishes perceptible limits (of the kind discussed in the previous chapter) and because certain aspects of his music are simple enough to be perceived exactly, the listener's reaction to his music is not purely subjective but is carefully determined. Given such limits the composer can, as I have shown in this chapter, exploit the perceptual limitations which nontonal music brings into play, (and the listener's uncertainty can itself be used as a formal element) without losing control of the way in which the listener reacts to and understands a work.

V. A. Consideration of some Avant-Garde Techniques

The material of most avant-garde music is so complex that it inevitably precludes many of the controls that are found in the music of Webern: the textures are often complicated and fast moving, the melodic and harmonic formations are rarely governed by any perceptible criteria, the melodic patterns tend to be longer and more complicated than those of Webern (and to avoid the simple cellular construction of most of Webern's melodic units (1)), and the rhythmic patterns often use complex subdivisions of the beat (triplets, quintuplets, septuplets etc.) which prevent the listener from feeling any regular pulse.

The apparent lack of any perceptible controls in post-Webernian music seems to be in striking contrast to the increasingly complex organisational procedures described in the theoretical writings of the avant-garde composers. The seemingly paradoxical relationship between these procedures and the music itself can only be understood by a consideration of some representative avant-garde writings.

The examples in this chapter are all taken from Boulez's 'Eventuellement ...' which was written in 1952; the conclusions that can be drawn from Boulez's article are applicable to much avant-garde music of the early 1950's and, perhaps also, to music written after that period.


1. Rhythmic Techniques



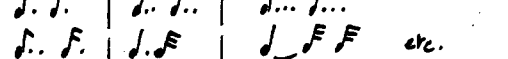

In 'Eventuellement ...' Boulez discusses two kinds

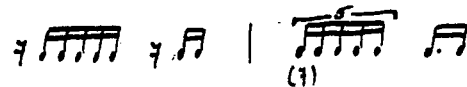
- (1) An increase in the number of notes in a phrase inevitably makes it more difficult to remember.
See Pg.9

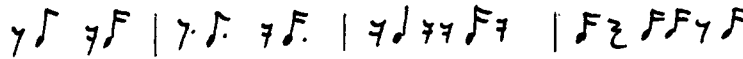
of rhythmic techniques: the building of a rhythmic structure using rhythmic cells which exist independently of pitch structures and the use of a rhythmic row in conjunction with a note row. I shall first consider his description of the use of independent rhythmic cells. (2)

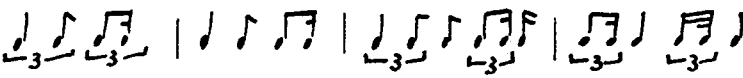
Boulez gives the following table to illustrate the ways in which a simple rhythmic cell can be varied.

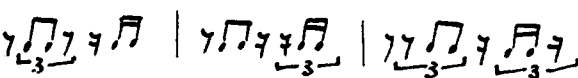
(A) 


(1) a 
 b 
 c 
 d 


(2) 

(3) 

(4) 

(5) 

(6) 

(7) 

The basic rhythmic cell is given at (A) above; the rest of the table shows a number of transformations of this cell. These are derived in the following way:

Line 1. The original cell is augmented or diminished in various ways. Some of the augmentations and

(2) Boulez: "Eventuellement ...". Pg. 130 et seq.

diminutions are exact (that is, the relative lengths of the two notes forming the original cell are maintained), others are inexact (the relative lengths are altered).

- Line 2. The two notes of the original cell (or of a variant of the original cell) are broken down into two groups of notes of smaller values. In the first of the cells shown in Line 2, the first note of each group is replaced by a semiquaver rest.
- Line 3. Part of the value of each note of the original cell (or one of its variants) is converted into a rest. In the first two cells of Line 3, the first half of each value is converted into a rest, in the third cell the new note value is enclosed by two rests and in the fourth cell the rest is enclosed by two notes.
- Line 4. Each note value of the original cell (or one of its variants) is broken down to form a new rhythm.
- Line 5. Again, each note value of the original cell is broken down to form a new rhythm but some notes of the new rhythm are converted into rests.
- Line 6. A crotchet rest replaces the first note of the original rhythmic cell.
- Line 7. A quaver rest replaces the second note of the original rhythmic cell.

In his example, Boulez indicates the beginning and the end of each cell by a vertical stroke and it is possible to see a relationship between one cell and another when looking at the table; however, Boulez does not describe how the cells are to be differentiated from one another or how the beginning and the end of each cell is to be made clear to the listener when the cells are used in a composition. To hear a relationship between one cell and another the listener must be able to hear where one cell ends and another begins; the audibility of the rhythmic cells, as cells, depends upon the way in which they are used in a piece.

It seems possible that many of the cells given in Boulez's table could be used in a way that would enable the listener to hear a relationship between one cell of a line and another cell of the same line. If, for example, each rhythmic cell of the sequence of cells in line 4 above was given to a different instrument ~~that~~ the listener might hear a relationship between the resulting figurations.



Ex. 157.

In this example the listener might hear a relationship between the two four-note figures on the oboe and the flute in bars 1 and 2, and between the two six-note figures on the violin and the clarinet in bars 3 and 4 and might hear the two six-note figures as extensions of the two four-note figures; the listener might even hear a relationship

between the rhythmic patterns of these four figures and that of the original cell (although it seems more likely that the listener will hear each figuration of Ex. 157 as being built of a number of versions of the original cell, than that he will hear each figuration as a transformation of the original cell; the opening oboe figuration of Ex. 157, for example, might be considered, not as a single variant of the original cell, but as being built of two diminutions of the original cell - $\underline{\underline{d}} \underline{\underline{3}}$ and $\underline{\underline{f}} \underline{\underline{3}}$)

But even if the listener does hear a rhythmic relationship between the cells used in the above example, the relationship is only heard because of the way in which the cells are used. The audibility of the rhythmic cells cannot be divorced from the audibility of the thematic patterns with which the cells are used. In Ex. 157 the beginning of each instrumental figuration coincides with the beginning of a rhythmic cell; but, if he wished to do so, a composer could ensure that the instrumental figurations did not coincide with the rhythmic cells:

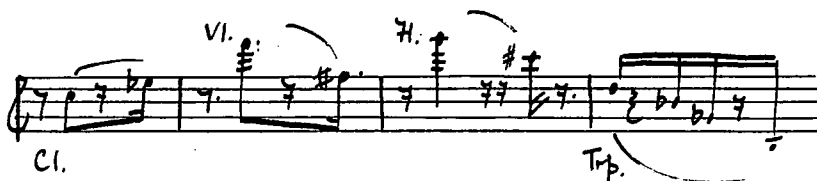
The image shows a musical score for Ex. 158. It features a single staff with various instruments indicated by abbreviations: Hrn., Cl., Vla. piz2, Ob., Vl., and Vla. piz2. The score is divided into two sections, A and B, marked with brackets below the staff. Section A contains rhythmic cells marked with '3' and '7' above the notes. Section B contains rhythmic cells marked with '3' and '7' above the notes. The notation includes various rhythmic values, accidentals, and dynamic markings like 'piz2' (pizzicato).

Ex. 158.

Although the listener might hear rhythmic relationships between the different figurations in the above example (between the cells marked A and B for example), these relationships are not those between the rhythmic cells in Line 4 of Boulez's original table; the example uses the rhythmic sequence of Line 4 of Boulez's table but the

rhythmic cells which Boulez indicates are here obscured.

The audibility of the relationships between the cells in Lines 3 and 5 of Boulez's example is even more problematic. If each cell of Line 3 of Boulez's table is given to a different instrument, then the listener might recognise a relationship between the different figures:



Ex. 159.

But even if the rhythmic cells are differentiated in this way, it seems possible that any relationships which the listener might feel between the resulting figurations are due to either thematic similarities (that the clarinet, violin and flute figurations in the above example all have two notes each might in itself suggest that they are similar in some way), or to rhythmic relationships other than those of Boulez's rhythmic cells. Indeed, it seems likely that the rhythmic patterns the listener hears in Ex. 159, will be different from those indicated in Line 3 of Boulez's table. In Lines 3 and 5 of his table, Boulez substitutes rests for part of the value of the original cell; in many cases these rests replace the first note of the cell. In performance these rests will be heard as rhythmic components of the sounding patterns which they follow, not as the beginning of a new cell or as note values in their own right. The following example shows the difference between the lengths of Boulez's rhythmic cells and those of the rhythmic patterns which the listener is likely to hear in Ex. 159:

Cells as indicated in Boulez's table

Cells as they are likely to be heard by the listener.

Ex. 160.

The rhythmic patterns which the listener is likely to hear in Ex. 159 are not those of the rhythmic cells in Line 3 of Boulez's table. The rhythmic patterns of Ex. 159 may seem similar, in some ways, to the one of Boulez's table but this is chiefly because the thematic patterns and the instrumentation of Ex. 159, maintain the note groupings of Line 3 of Boulez's table. A change of instrumentation or of thematic groupings could obscure even this resemblance, whilst the same rhythmic sequence deprived of any means of thematic, dynamic or instrumental differentiation (as in the following example) would probably sound completely arbitrary:





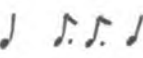
Maracas:

Sempre p

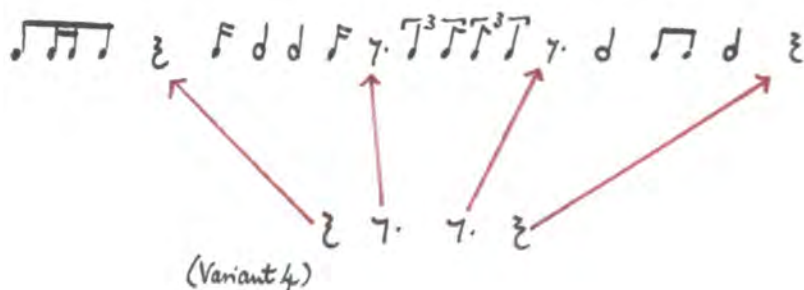
Ex. 161.

Boulez gives other examples illustrating how rests may be substituted for the notes of rhythmic cells. The following example is designed to show the 'rhythmic functions of silence':-

From a basic cell (a) Boulez derives four variants:

- a) 
- Variant 1)  (the central notes of the basic cell (a) are augmented, the outer ones are diminished)
- Variant 2)  (an augmentation of (a))
- Variant 3)  (an inexact augmentation of (a) in which the outer notes are four times as long as in (a) and the inner notes are twice as long as in (a))
- Variant 4)  (an inexact augmentation of (a) in which the inner notes have added values)

Boulez converts the last of these variants into rests: $\xi \gamma \cdot \gamma \cdot \xi$. The original cell (a) and the first three variants are then written in succession but the four cells are separated by the rests derived from the fourth variant:



It seems unlikely that, even in such a relatively simple example, the silences between the rhythms will sound anything other than arbitrary - even if the listener recognises that there might be a relationship between the basic cell (a) and its variants.

For such a technique to be audible it would have to be possible to compare the length of a silence with that of a note - such a correlation is not possible. In this

as in the previous example (Ex. 159) the rests are heard only as rhythmic components of the sounding patterns which they follow; they are not heard as durations in their own right. This technique only ensures that the length of the rests between the cells is irregular and unpredictable.

All the above examples deal with single rhythmic lines. Boulez gives the following example to show how rhythmic cells can be combined to form a complex polyrhythmic structure:

I

Ex. 162.

II

This example shows two structures (I and II) each of which has three strands and each strand of which uses three rhythmic cells (marked a, b and c). The techniques of variation applied to the three cells are similar to those discussed on Pgs. 138 - 139 : the cells are changed to, or from, triplets or quintuplets; they are reversed, notes are converted into rest and rests into notes and the cell order is changed.

The cells are derived thus:-

Structure I

- Line 1: The three cells a, b and c in their original form and order.
- Line 2: The cell order is now b, a and c. Cell c becomes a quintuplet.
- Line 3: The cell order is now c, a and b. Cell c is in its original form (as in Line 1), cell a is reversed and becomes a triplet, and cell b (which is also reversed) changes from a semiquaver triplet to three semiquavers.

Structure II

Throughout this structure the notes of the original cells are converted into rests and the rests of the original cells are replaced by notes.

- Line 1: The cell order is now b, a and c. Cell b is reversed (as in Structure 1, Line 1) and cell a is also reversed (as in Structure 1, Line 3)
- Line 2: The cell order is c, a and b. Cell c is a quintuplet (as in Structure 1, Line 2) and cells a and b are in their original form.
- Line 3: The cell order is c, b and a. All three cells are in their original form.

"Here," says Boulez, "the two structures are the same structure seen through independent lenses". (3)

To understand how these structures are built, the listener must hear each structure as consisting of three different strands, he must hear how the cells are varied in the six strands of which the two structures are built and he must hear the relationship between the two structures. If he chose to, a composer could differentiate the cells of one strand from those of another (by orchestration, for example) so that the listener could

(3) Boulez. Ibid. Pg. 132.


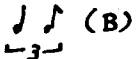
hear each structure as consisting of three distinct strands, but even then it seems doubtful whether the listener would be able to hear the relationships between the two structures and the way in which the cells are varied (the conversion of notes into rests makes this unlikely, for reasons given above (4)). Even if the different strands were clearly differentiated in some way, it seems likely that the only effect of the way in which the rhythmic cells are used in this example will be to produce a completely irrational sounding rhythmic structure.

I have said (5) that the audibility of the procedures described in "Eventuellement" depends upon the way in which they are used. Some of the procedures described (especially the conversion of notes into rests) produce transformations that are so different from the original cell that it seems unlikely that the listener will recognise a relationship between the original cell and its variants, no matter how carefully the cells are used. But it is important to recognise that many of the procedures which Boulez describes, could be used in a way that would produce a piece in which the rhythmic structure sounded highly organised and in which the listener could hear a relationship

(4) See Pg. 142

(5) See Pg. 140

between the different rhythmic cells (6). The complex way in which Boulez uses these cells, however, tends to prevent them from producing a rhythmic structure which sounds highly organised.

The following passage from Boulez's early "Sonatina for Flute and Piano", for example, uses a relatively simple method of varying the rhythmic cells (7). The passage uses only one basic rhythmic cell -  (A) and one variant of this cell, an exact augmentation:  (B)

The passage shown in Ex. 163 uses three rhythmic sequences derived from different juxtapositions of these cells

1. 
2. 
3. 

Sequence 1 juxtaposes variant B and two versions of cell A (the cell and its retrograde), the two versions of A being separated by a semiquaver rest.

- (6) In his analysis of 'The Rite of Spring' (See Boulez 'Stravinsky Demeure') Boulez finds rhythmic cells which are varied by methods similar to (though less complex than) some of those described in 'Eventuellement', and Boulez's methods of varying rhythmic cells by exact and inexact augmentation and diminution and by the use of added values and rests are almost identical with those described by Messiaen in his 'The Technique of my Musical Language'. That the rhythmic structure of Stravinsky's and much of Messiaen's music does not sound arbitrary shows that these procedures (albeit, used in Stravinsky's and Messiaen's music in conjunction with material in which the thematic, metric and harmonic patterns, the textures and the balance of phrase structures are more reminiscent of traditional music than are those of Boulez) need not produce an irrational sounding rhythm.
- (7) This description of the construction of the passage shown in Ex. 163 is based upon Boulez's own analysis published in 'Polyphonic' (1948) and reprinted in part in Golea's 'Recontres avec Pierre Boulez' Pg. 51-52

Sequence 2 juxtaposes the retrograde of cell A, variant B and cell A and its retrograde.

Sequence 3 juxtaposes cell A and two versions of variant B (the cell and its retrograde), the two versions of B being separated by a semiquaver rest.

In Ex. 163 these three rhythmic sequences are used as follows:

	b.1.		b.2.
Flute		Sequence 1	Sequence 2 Retrograde
Piano	Right hand	Sequence 2	Sequence 3 Retrograde
	Left hand	Sequence 3	Sequence 1 Retrograde

The musical score for Ex. 163 consists of three staves. The top staff is for the Flute, the middle for the Piano Right Hand, and the bottom for the Piano Left Hand. The music is written in a key with one sharp (F#) and a 7/8 time signature. It features complex rhythmic patterns, including triplets and sixteenth notes, with various accidentals and dynamic markings like 'pp' and 'f'.

Ex. 163.

In this passage the three rhythmic sequences (on the Flute, the right hand of the piano and the left hand of the piano part) are differentiated by pitch and instrumentation, and only one cell and its retrograde and one variant (an exact augmentation) and its retrograde are used; it seems possible that the listener might hear some rhythmic and thematic similarities in this passage. However, it seems unlikely that the listener

will hear how the three voices are constructed (the ends of the rhythmic sequences used in b.1 are obscured by being joined to the beginning of the sequences used in b.2) or will be aware of the cellular construction of the passage, and, because of the thick fast-moving texture and the complex rhythm which results from the superimposition of the three rhythmic sequences (there is no perceptible pulse and the voices are superimposed in such a way that all three meet only on the first note of the second bar), the overall rhythmic structure will probably sound arbitrary.

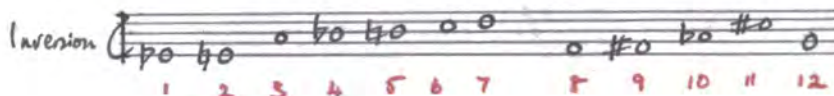
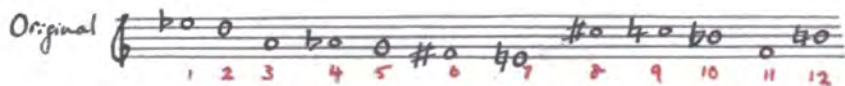
The 'Sonatina for Flute and Piano' is an early work, and the procedures used are much simpler than those described in "Eventuellement", which was written some years after the 'Sonatina' - the handling of the superimposed lines in Ex. 163 is much more straightforward than in Ex. 162, for example - yet, even here, the procedures are used in a way that tends to prevent them from producing music in which the rhythmic structure sounds highly organised. In Boulez's later works, with their greater complexity of texture and thematic and rhythmic material, even such fleeting similarities as can be found in the above example tend to be obscured and, to the listener the rhythmic structure sounds completely irrational.

I shall consider why Boulez and the other avant-garde composers use such procedures in a way that prevents them from making the music sound organised later in this chapter.

After discussing methods of varying rhythmic cells, Boulez then discusses the use of a duration row. This procedure must be considered in relation to Boulez's attempt to find a "logical and coherent" method of handling the note row.

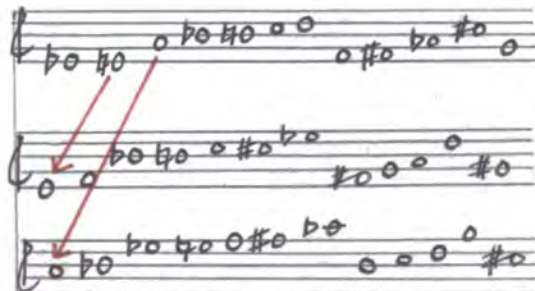
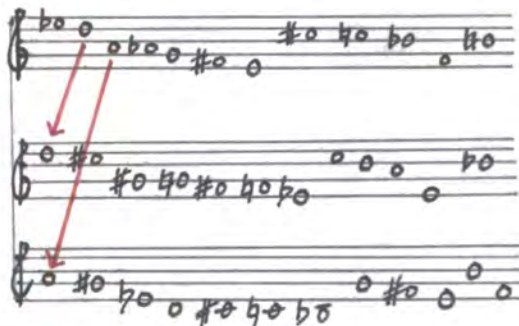
2. The use of related duration and note rows.

The method of handling a note row which Boulez's describes (8) consists firstly of numbering the notes of a row and its inversion in the usual manner:



Ex. 164.

The ordering of the transpositions is then determined by the ordering of the notes in the row; the first transposition begins on the second note of the original row, the second transposition begins on the third note of the original row, and so on:



Ex. 165.

In this way one obtains the following transpositional table:

(8) Boulez Ibid. Pg. 126-127

1	2	3	4	5	6	7	8	9	10	11	12
2	8	4	5	6	11	1	9	12	3	7	10
3	4	1	2	8	9	10	5	6	7	12	11
4	5	2									
5	6	8									
6	11	9									
7	1	10									

etc.

Original Series.

etc.

1	7	3	10	12	9	2	11	6	4	8	5
7	11	10	12	9	8	1	6	5	3	2	4
3	10	1									
10	1	7									
12	9	11									
9	8	6									

etc.

Inverted Series.

etc.

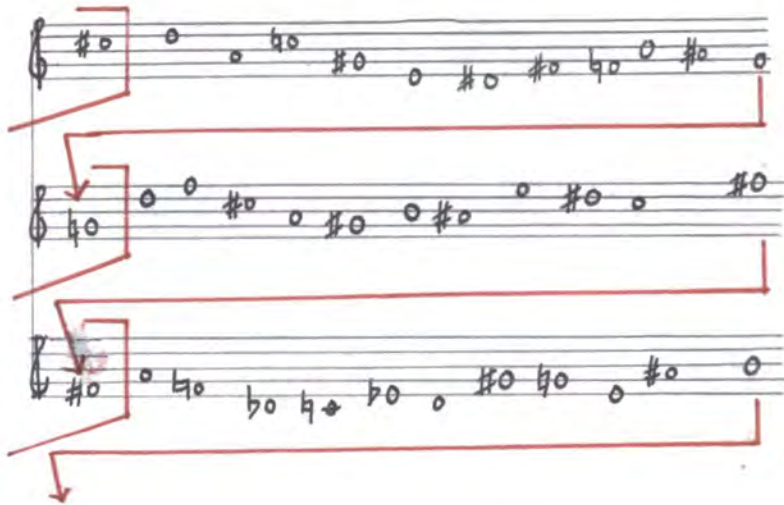
In this way, argues Boulez, "one defines the universe of a work" by establishing a "net of possibilities", whilst at the same time avoiding "the purely mechanical and passive" application of the series implied by the usual method of row transposition. (9)

The pre-compositional method of tabulating the notes is here more complicated than the usual semitone transpositions of traditional twelve note technique but it is hardly more "logical" or "coherent" as far as the listener is concerned, unless the composer deliberately chooses to use the row in a very simple way or to enhance

(9) Boulez Ibid. Pg. 123.

certain features of this transpositional scheme.

At the beginning of 'Zeitmasse' Stockhausen employs a row technique which, though not the same, is similar to that described by Boulez. In the opening section of 'Zeitmasse' Stockhausen employs the following procedures the 12th note of each row becomes the first note of the row which follows. As first note, instead of corresponding to the first note of the row before (which would result in an exact transposition), it corresponds to the 2nd note of the previous row, giving a progressive series of transpositions thus:



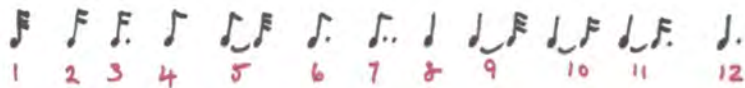
Ex. 166.

This row technique is not perceptible in performance; later in the work Stockhausen stops using the row without affecting the continuity of the work for the worse. (10) The complexity of Boulez's transpositional scheme serves

 (10) Stockhausen, however, chooses to exploit certain thematic patterns derived from the row; it is these patterns, rather than the row technique, which provide 'logic' in the piece. (See Pg. 228-238)

to ensure that few note groups recur at the same pitch and to provide a fluid and chromatic texture.

Boulez describes a method of using the above note row (Ex. 164 above) in conjunction with a duration row. The duration row, in which a different duration is allotted to each note of the row, is shown below:



A table of durations, corresponding to that of notes, is drawn up:

Boulez argues that if, after using the durational table and the note table together for some time, the relationship between them is then changed, there will be created a "counterpoint of structures between pitch and rhythm". (11) This is a speculation which is only tenable at an abstract level. To create such a 'counterpoint' the two rows must be established in the listener's mind firstly as interdependent (so that the associations between them can be remembered and the change of associations can be recognised when it occurs)

(11) Boulez Ibid. Pg. 127

and, secondly, as independent (so that the two rows can be recognised when separated from each other).

If, as I have suggested (12), a note row is not perceived as a row, then no audible relationship between the note row and the duration row can be established - a relationship, that is, which is independent of the actual motives and configurations projected in the music. Moreover, it seems unlikely that the durations themselves are perceived with enough exactitude to make this "counterpoint of structures" perceptible.

Nicholas Ruwet and Francis Burt have both expressed doubts about the exactitude with which the ear perceives durations in the absence of a referential element such as pulse or metre:

"There are oppositions whose halves are too remote for any clear basis of comparison to emerge. This applies to rhythm and the lack of any rhythmic periodicities which could provide some points of reference. But if very long values alternate with very short, it can happen that the listener does not perceive the exact relationship between the two. He only grasps more or less long, or more or less short values". (13)

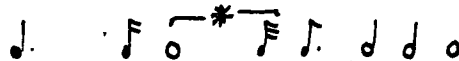
"Although everything connected with duration is measured with mathematical exactness, the clarity of the result is endangered by the frequent absence of a metrical unit: in all electronic music and such of the instrumental music as deals in pure durations of sound there is no feeling of tempo, only of an infinite variety of durations. Boulez mentions this in an article in the first issue of *Die Reihe* but fails, I think, to give sufficient weight to the ensuing difficulties. He states that the ear perceives differences of duration so long as the proportionate differences are fairly great (i.e. ♩:♩ or 2:1 would be clear but ♩:♩ or 64:65 would not). However the tones often

(12) See Pgs. 14 and 15

(13) Ruwet 'Contradictions within the Serial Language'
Pg. 74.

overlap and I cannot see how any listener could get any very exact idea of their relative durations when there is no metrical unit common to them all - or even if there is a metrical unit when the relationships are fairly complicated e. g. 33:18:8." (14)

It seems likely that, without some kind of reference point, the listener will be able to perceive the relationships between durations exactly only if these relationships are very simple. Even in an example such as that below, where all the durations are simple subdivisions or multiples of each other and there are no complex values (triplets, quintuplets, septuplets etc.), it is doubtful whether the ear will be aware of the exact relationships - it seems unlikely, for example, that the listener will be able to hear the exact relationship between the two notes marked * because the first four notes do not establish any kind of regular pattern which would enable the ear to judge the relative length of the notes:



The last note of this example, on the other hand, is easily recognisable as being twice as long as the two notes before it, because these two notes temporarily establish a regular rhythmic pattern, which acts as a reference point enabling the ear to measure the length of the final note.

Boulez durational row, however, is completely unpredictable and it seems likely that the listener will hear only relatively long or short notes - he cannot be aware of the exact relationships. Like the note row, the duration row ensures complete unpredictability.

The note row and the duration row discussed above are those used by Boulez in 'Structures'. The kind of techniques discussed in this chapter appear in their most extreme form in serial music, and I shall now consider avant-garde row techniques as they are exemplified in serial music, using Boulez's 'Structures' as an example where necessary. Detailed accounts of the techniques used in writing 'Structures' have appeared in a number of articles (notably that by György Ligeti in Die Reihe Vol. IV) and reference may be made to these articles.

3. A Consideration of serial techniques in relation to perceptual limitations

In serial music most rows are made up of twelve separate units. The immediate span of memory is only about six or seven units. However, the total number of units which the mind can recall can be extended by a process known to psychologists as 'chunking'.

'Chunking' can best be understood through an example such as the following:

If, in speech, the word is taken as the unit, then six words, such as 'The cat sat on the mat' would cover the total extent of the memory span; however, these six words can be remembered by chunking them all into a single unit and it then becomes possible to remember a large number of words - 'The cat sat on the mat and went to sleep in front of the fire', for example.

Although the total number of units that can be remembered is still six or seven, the memory span can be effectively lengthened by making the size of the units larger - by forming the individual units into what I shall call a 'complex unit'.

Chunking can only take place when a sequence of events obeys some perceptible rules of syntax and preserves

certain syntactical relationships. The observer - the person who will do the chunking - must be aware of, or in a position to perceive, these rules and relationships. The larger the number of events that can be chunked into one 'complex unit', the larger the number of rules and relationships that can be perceived; similarly, the larger the number of rules and relationships that are known, the larger the number of events that can be chunked into one complex unit. Thus, chunking is only possible when the relationships which allow the observer to remember a series of events as a complex unit are maintained.

It must be recognised that, in music, the listener does not perceive absolute values - exact durations or intensities, for example (15) - but gradients, and that the effect of a single unit in a serial row will differ according to context; the effect of the dynamic 'fff' in a soft passage will seem different from the effect of the same dynamic in a loud passage. For the listener to hear and remember the single units of a series each one must be clearly characterised and differentiated from the other units in the series.

If serial procedures were to produce music that sounded highly organised, the relationships within each series and between the different series would have to be maintained, each unit within a series would have to be clearly differentiated from the other units in the series, and each series, and the way in which the different series were used, would have to take into account the fact that the effect an event has depends upon its context.

(15) See Pgs. 23-24

The serial threads of 'Structures', and the way in which they are used, do not take any of these factors into consideration: the methods of handling the different series constantly create new relationships, the elements within a series are not always differentiated sufficiently (this is particularly true of the dynamic series in which the distinction between 'quasi p' and 'p', between 'quasi f' and 'f', though perhaps adequate in isolation, is inadequate in performance because it does not take into account the effect of pitch upon dynamics - an effect which is particularly noticeable upon the piano), and each element of a series is taken as an absolute and permuted without regard to its original context. To the listener the units or elements within a series are perceived in context and an individual unit has significance only as part of that pattern of relationships which is its context - it has no individual numerical significance.

The 12 note row was originally intended to promote unity; serialism as it is used in 'Structures' hinders the appearance of those features which could make a work sound unified. There is no reason why the use of a series of dynamics, durations and modes of attack as well as a series of notes should, in itself, prevent the appearance of such features. But serial music could only sound highly organised if the different series were manipulated within certain limits.

To sound highly organised serial music would probably have to confine the notes within the range of an octave (16) so that each interval could be exactly perceived and either not use permutations or use only those permutations

(16) Or at least confine some of the notes within the range of an octave so that the listener could identify any notes that moved outside this range.

that maintain the characteristic relationships of the original row (though perhaps it can be claimed that those relationships would then exist independently of their identity as serial elements); the durational series would have to define some perceptible pattern that could be comprehended as a whole (a gradual *accelerando* or *ritenuto*, for example) and the intensity series would also have to define some such pattern (a *crescendo*, a *decrescendo* or a *crescendo-decrescendo* pattern, for example). The relationships within each series and between one series and another would have to be maintained throughout the course of a work. Although some of the different series of 'Structures' do have some kind of recognisable pattern in their original form, these patterns are effectively destroyed by the permutations to which the rows are subjected - for example, the values of the durations gradually increase in the original duration row and the row has an overall 'ritenuto' pattern, but this pattern is destroyed by later permutations. Any thematic characteristics which the original note row possesses are similarly destroyed.

It may be that the narrow limits, within which the rows would have to work to be perceptible, are too restrictive to be useful as the basis of a compositional method. Whether this is true or not, there remains the question of why composers use serial and over-complex techniques at all when these techniques are used in a manner that prevents them from organising the unifying of the material. One answer to this question can be discovered by considering the nature of what is generally known as 'randomness'.

A random sequence of decimal digits might be:

094467825

In this sequence the mind would probably perceive the three digits '678' as forming a pattern. Indeed, the sequence 0123456789 might be a random sequence of decimal digits - such a sequence would be a random sequence in that it was produced by random methods, but the observer would not perceive it as random because it is reminiscent of a pattern which he already knows. In music, a random series of notes might not appear random to the listener; a random sequence might produce a major chord or a perfect cadence.

The row techniques used in 'Structures' are an extension of the techniques which Boulez describes in 'Eventuellement ...'. In effect, the serial paraphernalia of the work, as Boulez uses ~~them~~, ~~are~~, like the rhythmic procedures discussed earlier, a means of producing not a work which sounds highly organised, but a work which sounds arbitrary, the complex organisational techniques guarding against the accidental appearance of elements which do not sound random.

Because, in all music, spontaneity of expression tends to be the antithesis of calculation and control, apparent randomness is equated with spontaneity and serial techniques thus become a means of producing an effect which sounds spontaneous.

That the technical procedures described in the theoretical writings of the avant-garde composers are not audible in their music, is not, in itself, a criticism of these procedures. If a composer wishes to write a piece in which certain aspects of the music sound arbitrary and wishes to avoid the appearance of symmetrical or easily-perceived patterns (patterns which are, perhaps, too

reminiscent of previous music) then these procedures are a useful way of ensuring that such patterns do not occur. That the procedures are not audible is not a criticism of the music but of the frequently-made assumption that these procedures automatically give the music a certain intellectual validity. I shall return to this point later (17).

I have already said (18) that few of the procedures discussed in chapter need necessarily produce an arbitrary-sounding effect; any technique, whether serial or not, can be used in a way that will give an audible effect of organisation if the composer chooses to use it in such a way. That the rhythmic and row techniques described by Boulez are not audible in his music can only be due to the fact that he does not choose to enhance their characteristics in a way that would make them perceptible. I shall deal later (19) with the question of whether this is because Boulez (and other avant garde composers, since these techniques and the way in which they are used can be regarded as representative) believes that these techniques will inevitably make their presence felt in some way, or because he intends them only to ensure that the music sounds spontaneous.

Whatever the reason, the total effect of these techniques, as used in avant-garde music, is to create a music in which few of the patterns can be exactly perceived by the listener. If the listener cannot hear the patterns exactly, he will interpret them as best he can and, because of his past experience, will cling to any tonal or metric allusions that occur (no matter how fleetingly and to any group of notes which seems to

(17) See Pg. 269-270

(18) See Pg. 147

(19) See Pg. 268-269

suggest a recognisable shape. I have already said (20) that, since the listener's subjective associations play a large role in such music, it is possible that - if the information presented seems very imprecise - each listener will interpret the music in a different way.

Although the different rows of a work such as 'Structures' might each follow a logical design (at least in their original form, before this design is destroyed by permutation), and although the way in which the different rows are employed might follow a similar logical design, the total combination of rows is arbitrary because there is no logical relationship between one series and another. The composer of a serial work can predict the occurrence of certain effects and certain events - as Boulez does in 'Structures' (21) - but he cannot predict in detail the results which occur when the different threads are combined and interact. For the reasons discussed above (22) the ear might cling to and regard as significant some of the resulting unpredictable details. In Chp. 7 I shall argue that 'Structures' can be understood on the basis of such chance details.

Henri Pousseur has said:

"If one goes beyond a simple analysis of such music (as 'Structures') and beyond a dissection of its notation, if one relies primarily on concrete hearing ... it is not seldom that one has the impression of finding oneself in the presence of the consequence of an aleatory free play." (23)

To the listener the effect of most serial music is very similar to that of music composed by chance methods - inevitably so since in both cases the details to which the ear clings are the products of chance.

(20) See Pg. 43 *et seq.*

(21) See Pg. 213 *et seq.*

(22) See Pg. 1-4 & 39-45

(23) Pousseur 'The Question of Order in New Music' Pg. 93.

I have shown (24) that in Webern the listener's response to the music is determined by the perceptible and severely restricted limits within which it seems to work, by the simplicity of the material, by the fact that the complex aspects of the music are balanced by simple aspects and the elements which are difficult to perceive by elements which are easily grasped. With the increased complexity of avant-garde music - the more complicated material, the absence of a regular pulse, the thicker textures and the less limited harmonic and melodic formations - the composer inevitably forfeits many of Webern's methods of controlling the listener's associations. (25).

If there were no perceptible controls in avant-garde music, if every listener understood the music purely on the basis of his own subjective associations and if the listener's response was in no way determined by the composer, then one might assume that there was no difference between a work such as Stockhausen's 'Zeitmasse' and a work composed using chance methods. As I shall show in the following chapter some kind of perceptible controls do exist in avant-garde music and although these controls are less precise than those found in the music of Webern they do, to some extent, control the listener's response to a piece.

In Chp. 7 I shall consider a serial work, a 'chance' composition and avant-garde works which are neither serial nor produced by chance methods, in order to compare the extent to which the listener's subjective associations in each work might be determined by the composer.

(24) See Pgs. 49-86

(25) Though not necessarily all these methods - Stockhausen's use of simple 3 and 4 note patterns in certain sections of 'Zeitmasse' is not unlike Webern's use of similar patterns. (See Pg. 228 et seq.)

VI. Some Examples of Perceptible Controls in
Avant-Garde Music.

In this chapter I shall show how compositional elements such as texture, instrumentation and harmonic tension and relaxation can be used to define the formal structure of a post-Webernian work. I have not attempted to give examples illustrating the use of all the compositional elements that can be employed for this purpose. I have chosen one work by Stockhausen, one by Boulez and one by Berio and in each I have examined those elements that seem to play the most important structural role. In addition, I have chosen to examine one movement of 'Le Marteau sans Maître' in detail, because it seems to be a particularly good example of the way in which harmonic tension and relaxation can be used to clarify a formal design.

1. Texture as a formal element in Boulez's 'Le Marteau sans Maître'.

According to Boulez's own titles, the nine movements of 'Le Marteau sans Maître' fall into three groups:
Group 1. The movements associated with the poem 'L'Artisanat Furieux' (Mvt. 1 "Avant 'L'Artisanat Furieux'", Mvt. 3 "L'Artisanat Furieux" and Mvt. 7 "Après 'L'Artisanat Furieux'".)

Group 2. The movements associated with the poem 'Bourreaux de Solitude', (Mvt. 2 "Commentaire I de 'Bourreaux de Solitude'", Mvt. 4 "Commentaire II de 'Bourreaux de Solitude'", Mvt. 6 "Bourreaux de Solitude", and Mvt. III "Commentaire III de 'Bourreaux de Solitude'".)

Group 3. The two settings of the poem 'Bel Édifice et les presentiments', (Mvt. 5 and Mvt. 9.)

The relationships between the movements of a group and the differences between one group and another are largely

textural.

The first movement, 'Avant L'Artisanat Furieux', is predominantly polyphonic. Sometimes the figurations of one instrumental part are reflected in another:

Handwritten musical score for four instruments: Fl. in G, Vib., Guit., and Vla. The score shows a polyphonic texture with various dynamics (ff, f, arco) and articulations (pizz, arco). Red arrows and brackets highlight specific rhythmic and melodic patterns that are mirrored across different parts, such as a triplet in the Flute and Violin, and a similar triplet in the Viola. The guitar part features a 3/4 time signature and a 2/4 time signature. The score is marked with 'ff' (fortissimo) and 'f' (forte) dynamics, and includes instructions like 'pizz' (pizzicato) and 'arco' (arco).

Ex. 168

but for most of the movement the different parts seems to use independent figurations.

The movement has a number of short homophonic and monodic or two part passages, but these mark special structural points. The monodic or two part passages are usually episodes between blocks of more complex four part polyphony, whilst the homophonic passages mark the ends of sections:

Ex. 169.

The second movement of the Group - Movement III, the setting of the poem 'L'Artisanat Furieux' - Begins monodically, alternating the solo flute and the voice; the two parts then join to form a two part polyphony and, towards the end of the movement, they begin to move together, their parallel lines and similar rhythms resulting in the loss of their previous independence. (1) The third movement of the Group, like the first, is predominantly polyphonic but extends the homophonic passages of the first movement. The parts have less rhythmic independence than in the first movement and in many passages, and especially towards the end of the movement, the three parts, or two of the three parts, move together:

(1) See Pgs. 178-191

Handwritten musical score for Ex. 170, featuring three staves: Flute (Fl.), Vibraphone (Vib.), and Guitar (Guit.). The score is in 2/8 time and consists of four measures. The Flute part begins with a dynamic marking of *ff* and includes a slur over the first two notes. The Vibraphone part also starts with *ff* and features a series of chords and melodic lines. The Guitar part is marked *ff* and includes a *ppoco dim* instruction in the second measure. The score is heavily annotated with accidentals, slurs, and dynamic markings.

Ex. 170.

The 'Bourreaux de Solitude' Movements have a particularly characteristic texture in which a number of independent instrumental parts share a basic rhythmic line. The following example illustrates this textural characteristic:

Handwritten musical score for Ex. 171, featuring five staves: Xylophone (Xyl.), Vibraphone (Vib.), Guitar (Guit.), Viola (Vla.), and Gymbal. The score is in 2/8 time and consists of four measures. The Xylophone part starts with a dynamic marking of *ff* and includes a *b.l* marking. The Vibraphone part begins with *p* and features a series of chords and melodic lines. The Guitar part is marked *ff* and includes a *f* marking. The Viola part starts with *ff* and includes a *f* marking. The Gymbal part is marked *ff* and includes a *f* marking. The score is heavily annotated with accidentals, slurs, and dynamic markings.

Ex. 171.

The basic rhythmic line is shared between a large number of instruments; in b.1 and 2 of the above example the independent lines of the three upper parts all accentuate, in different ways, the basic rhythmic pattern which appears in the viola.

The instruments do not move in consistent groupings (the guitar and the vibraphone, for example, do not always move together) and the number of instruments that play notes at the same time constantly changes - sometimes two instruments play notes at the same time, sometimes three, sometimes more - but only rarely does an instrument play alone. The following example (from the beginning of Mvt. IV) illustrates this - the figures below the example indicate the number of notes played at that point.

Handwritten musical score for four instruments: Xyl., Vib., Guit., and Vla. The score is written in a single system with four staves. The key signature has one sharp (F#). The music is characterized by complex rhythmic patterns and dynamic markings. Below the staves, a series of red numbers indicates the number of notes played at each point in time.

Notes below the staves (from left to right):

2 7 5 3 10 5 4 2 4 2 5 5 5 3 2 7 3 2

Ex. 172.

This kind of texture, which is neither polyphonic nor homophonic, characterises the whole 'Bourreaux' group.

The 'Bourreaux de Solitude' group is predominantly heterophonic. The following example, from Mvt. II, illustrates what is meant by this term. Each voice accentuates the same group of notes, at the same pitch, as the other voices; although each voice is rhythmically independent, all the voices define the same harmonic area. The arrows in the following example indicate note repetitions. A simplified harmonic plan is given below the example.

The image shows a musical score for four instruments: Flute (Fl.), Xylophone (Xyl.), Tambour sur cadre, and Viola (Vla.). The score is annotated with red circles and arrows indicating note repetitions across the different parts. A simplified harmonic plan is shown at the bottom.

The Flute part is marked with a key signature of one sharp (F#) and a time signature of 3/8. The Xylophone part is marked with a key signature of one flat (Bb) and a time signature of 3/8. The Tambour sur cadre part is marked with a key signature of one flat (Bb) and a time signature of 3/8. The Viola part is marked with a key signature of one flat (Bb) and a time signature of 3/8.

The simplified harmonic plan at the bottom shows four chords, each with a key signature of one flat (Bb) and a time signature of 3/8. The chords are: 1. Bb major triad (Bb, D, F), 2. Bb major triad (Bb, D, F), 3. Bb major triad (Bb, D, F), 4. Bb major triad (Bb, D, F).

Ex. 173.

This characteristic becomes more prominent at each recurrence and is particularly noticeable in Mvt. VI (the setting of the poem 'Bourreaux de Solitude') and at the beginning of Mvt. VIII ('Commentaire III de 'Bourreaux de Solitude') where all the different voices are decorations of a single line.

Fl. (sounding as wr. than)

Xyl. (sounding 8ve higher)

Vib.

Guit. (sounding 8ve lower)

Vla. Mvt. VI.

b.25

mf ff mp wff p

+ # + # + # + # +

b e g # b e g # b e g # b e g # b e g # b e g

Ex. 174.

Towards the end of the last movement of the group (Mvt. VIII) the texture becomes more fragmentary and gives way to a number of extended solo passages. The 'Bourreaux' group is also differentiated by instrumentation and is the only group in the work to use the xylorimba and the percussion.

The first setting of 'Bel Édifice' is clearly differentiated from both the 'Artisanat Furieux' and the 'Bourreaux de Solitude' movements. It alternates monodic or two part writing with homophonic sections. Such long passages of overt homophony have not appeared before and do not appear again until the final movement, the 'Bel Édifice Double'.

Fl. *pp* *mf* *ff*

Guit. *pp* *mf* *ff*

Voc. *pp* *mf* *ff*

Vla. *pp* *mf* *ff*

la je-tée - pro-mé-na - de son - vége

Mvt. V b. 63

Ex. 175.

The 'Bel Édifice Double' acts as a recapitulation of the previous movements and incorporates material from them. Sometimes the 'Bel Édifice Double' quotes directly from the earlier movements; more often only the characteristic textures of the earlier movements return. The following break down of Movement 9 clarifies this point:

Le Marteau sans Maître: Mvt. 9.

"'Bel Édifice et les pressentiments' Double".

b.1 - 13. Mvt. VI - Bourreaux de Solitude. (cf. Mvt. II b.1 and Mvt. IV b.21)

b.13 - 36 Mvt. V Bel Édifice I: homophony. (c.f. Mvt. IX b.17 - 21 and Mvt. IV b.63 - 67)

b.36 - 41 Mvt. III Artisanat: 2 part polyphony (c.f. Mvt. IX b.34 - 41 and Mvt. III b.39 - 42)

b.42 - 50 Mvt. VI Bourreaux de Solitude

b.51 - 58 Mvt. V Bel Édifice I: monody and homophony.

- b.59 - 68 Mvt. VI Bourreaux de Solitude
 b.68 - 78 Mvt. V. Bel Édifice I: homophony
 b.79 - 81 Mvt. VI Bourreaux de Solitude
 b.81 - 87 Mvt. V Bel Édifice I: homophony
 b.88 - 95 Mvt. III Artisanat Furieux - solo flute
 b.96 et seq: Coda using elements from all sections.

Although the three groups of movements are clearly differentiated by texture, certain textural characteristics are gradually extended and begin to merge with one another as the work progresses - the development of the homophonic passages of Mvt. I in Mvt. VII makes it reminiscent of Mvt. V (Bel Édifice), whilst the extended solo passages of Mvts. V and VIII may be reminiscent of the solo passages at the beginning of Mvt. III.

2. The use of instrumentation and instrumental effects in Berio's Serenata No. 1.

Berio's 'Serenata No. 1.' is written for solo flute and fourteen instruments. The work has clear affinities with the traditional concerto in its use of solo-tutti juxtapositions (and, like the traditional concerto, exploits the drama inherent in such juxtapositions) and in its inclusion of a solo cadenza before the final tutti.

Throughout the piece, tutti sections alternate with sections for flute and a small group of accompanying instruments or sections for solo flute alone. The larger formal outlines of the piece are, therefore, made clear by changes of texture; within these larger outlines smaller sections are defined by instrumentation. The diagram on the following page shows the main outlines of the work as they are defined by instrumentation and by the alternation of solo and tutti passages. The instrumental groups which characterise certain sections of the first

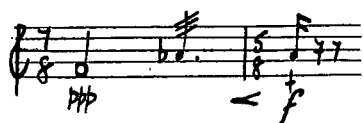
Berio: Serenata No. 1.(2)

- b.1 - 12. Introduction. Solo flute.
- I. b.12 - 25. Tutti.....
- b.28 - 32. Solo flute
- II. b.32 - 56. Solo flute + Strings and Horn.....
- b.57 - 63. Tutti ending with -
- III. b.64 - 66. Solo flute + Harp and Piano.....
- b.66 - 72. Solo flute.
- b.73. Harp cadence.
- b.74 - 94. Solo flute + Strings and Bass Cl.....
- IV. b.94 -101. Solo flute + Trumpet and Trombone.
- b.101-117. Solo flute + Strings and Bass Cl.....
- b.117-123. Solo flute
- b.124-127. Solo flute + Harp, Piano and Bass Cl.
- b.128-134. Solo flute + Strings, and Woodwind.
- III. b.135-140. Woodwind, Harp and Piano.
- b.140-169. Solo flute + Harp and Piano (later +
other instruments).....
- b.169-179. Complex chord on Woodwind and Harp
- b.174-180. Tutti on Woodwind and Harp
- II. b.180-190. Solo flute + Strings and Horn.....
- I. b.191-229. Tutti.
- b.229-241. Solo flute cadenza.
- b.241-258. Final Tutti

(2) A similar analysis of the instrumentation in this work appeared, after the above was written, in Reginald Smith-Brindle's "Serial Composition". The only important differences between the two analyses is that Professor Smith-Brindle does not mention the return of the solo flute, strings and horn passage from b.32 - 56 at b.180-190, and does not draw attention to the arch-shape of the piece.

half of the work reappear later (when they are associated with similar, though not identical, material) and because of the reappearance of these sections the piece seems to have an overall arch-shape.

A number of instrumental effects on the solo flute attract attention during the course of the work and these become associated with important structural points. The most important of these is the 'fluttertongue' which first appears in the solo flute passage which opens the work. The opening solo begins with the minor third F - Ab and ends with the minor third F sharp - A. On both occasions the minor third is associated with flutter-tonguing::



Ex. 176.

The last notes of the opening minor third also uses a special tonguing effect indicated by the sign +. This tonguing also appears at the very end of the flute solo, before the repetition of the opening minor third::



Ex. 177.

The next solo flute entry (at b.25, after the first tutti) begins with a long held note (again fluttertongued and ascending a minor third) (3):



Ex. 178.

as does its third entry::



Ex. 179.

The first section of the flute's third solo ends with two notes marked + :



Ex. 180.

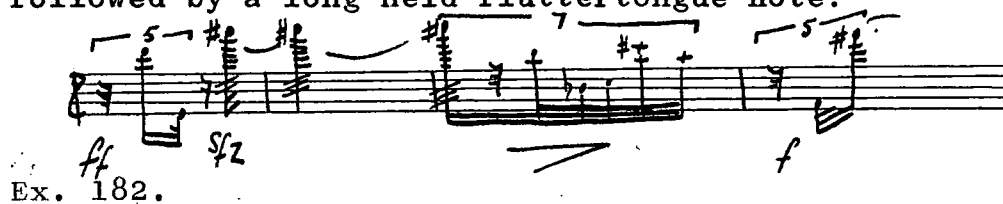
Although the flute plays through most of the long accompanied passage from b.74-192 its re-entries after long rests during the section, usually begin with long held fluttertongue notes:



Ex. 181.

-
- (3) The opening of the 2nd solo is a varied repetition of the opening of the 1st solo and the two notes of the minor 3rd are again F and Ab. Throughout the piece Berio seems to attach especial importance to the notes F - Ab - C and the notes F sharp - A - C sharp; these notes are constantly emphasized at important structural and dramatic points: e.g. b.41, b.54 - 56, b.63, b.99 - 100, b.160, b.166 and b.222. The constant repetition of these notes at these points suggests that Berio might intend the two triads to act as some kind of polarities. The note Bb seems to play a similar role in his 'Allelujah I'.

After the long orchestral tutti (b.191-229) the flute's final entry begins with a short two note figure followed by a long held fluttertongue note:

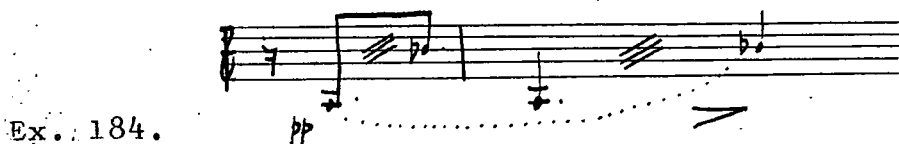


The held fluttertongue note thus becomes associated with important structural points such as the beginnings and ends of sections. The tonguing indicated by the sign +, though less important than the fluttertongue effect, becomes associated with the ends of phrases or structures and becomes a means of punctuating the music.

At b.99 the fluttertongue effect on solo flute is applied to two oscillating notes, instead of a single note:



This effect then appears in a number of forms on other instruments. At b.113 a similar effect appears on the cello and two note oscillating figures appear in the cello part throughout the following section:



Once this effect has become associated with instruments other than the solo flute, similar effects (fluttertongue notes, tremolando figures and trills) appear frequently and become important figurations. Such figurations are particularly noticeable in the final section of the work where they give an effect of a slowly moving harmonic rate.

In this work instrumentation (though not exploited as a formal element in the way that it is in Webern's Op.29 (4) is used to define the different sections of the piece, to point the change from one section to another and to give an effect of continuity throughout a section. The fluttertongue note on solo flute also marks the move from one section to another and, in addition, gives rise to a number of important and easily identifiable thematic figurations.

3. Harmonic and rhythmic tension and relaxation as a means of defining phrase structures in Boulez's 'Le Marteau sans Maître' Mvt. 3.

This movement is written for voice and solo flute and for much of the time consists of only a single line. In the following examination of the movement I shall consider the way in which the rhythm, and the harmonic fields implied by the monodic or two-part texture act as a means of defining important structural units.

The whole of this movement is given in the example overleaf. I shall regard the movement as having five sections, the fourth of which refers back to the second, and the fifth of which acts as a coda. At the beginning of the movement certain patterns are established - certain balances of phrases and orders of entry - which are obscured during the third and fourth sections. The movement begins with a monodic texture, alternating the flute and the voice. As the movement progresses the flute and voice parts begin to overlap and coincide with each other. I shall examine this overall shape and the

(4) See Pg. 103-108

III. (d'artisanat furieux)

Moderato sans rigueur (♩ = 52)

Flûte en sol

Voix d'Alto

Flûte en sol

Voix

Flûte en sol

Voix

flatter-sunge

Flûte en sol

Voix

Flûte en sol

Voix

24 *Fl. assol.* *Vox*

160
156

70 *104*

ff *senza dim.*

rit. sempre

cresc. al - - - ff *tenuto senza dim.*

3/4

29 *Fl. assol.* *Vox*

3+1+3 *3+2+3*

chevous de *a*

4/4 *4/4*

32 *Fl. assol.* *Vox*

3+4 *70* *104*

3/4 *7/8* *160* *8*

4/4 *8*

fact *e* *no* *o*

36 *Fl. assol.* *Vox*

70 *3+2+3*

ppp *pp*

4/4 *4/4*

40 *Fl. assol.* *Vox*

senza dim.

52 *104* *70*

4/4 *3/4* *4/4*

44 *Fl. assol.* *Vox*

104 *52* *70* *104*

pp *pp*

6/8 *2/4* *4/4* *4/4*

non *clausura* *non* *clausura* *arret. long.*

way in which the phrases are defined.

The five sections of the movement are as follows:

- Section 1. b. 1 - 9
- Section 2. b. 9 - 15
- Section 3. b.16 - 27
- Section 4. b.28 - 37
- Section 5. b.38 - 48

The text of the movement is:

'La roulotte rouge au bord du clou
Et cadavre dans le panier
Et chevaux de labours dans le fer à cheval
Je rêve la tête sur la pointe de mon couteau le Perou.'

The first and second sections of the movement cover the first line of the text, the third section covers line 2, the fourth section line 3 and the fifth section line 4.

The end of the first vocal phrase (a long held note over which the flute re-enters) is the end of the first section; the pause on the last note of the second vocal phrase marks the end of the second section; the end of the vocal melisma which finishes the third vocal phrase and the clear cadence, pattern on the flute mark the end of the third section, and the pause at the end of the flute arabesque, which appears above the held note at the end of the fourth vocal phrase, is the end of the fourth section. I shall examine each section separately.

Section 1.

This section can be divided into two subsections, the first on the flute (I in the example below) the second on the voice (II below). Each subsection is monodic and each has two phrases (Ia and Ib, IIa and IIb.)

Fl. 7. 3/8 mp 4 < f > 4/3 mp > 3 3 mp 3 4 > 5 7 8 3 4 3 2 4 4

Voice mp La rou-sotte ru-je au bord f

I II

Ex. 186.

(Fl. in G written as sounding in all following examples)

The first flute phrase is a short introductory flourish (Ia, b.1 and 2). The second (Ib, b.3 and 6) is longer; beginning more slowly than the previous phrase, it increases in speed and ends on a held note (B natural). The beginning of Ib seems harmonically relaxed because it repeats, at the same pitch, the notes which ended the previous phrase. This repetition also helps to make phrase Ib seem linked to what has gone before. Although other notes are repeated in the middle of phrase Ib, the harmony seems to move more quickly and new notes are introduced as the speed increases (new notes are marked * in Ex. 187 below). The implied harmony moves more slowly at the end of the phrase because of the increase in note length (the held B natural) and the repetition of the note E flat:

Ia Ib

Ex. 187.

The two vocal phrases of this section are also of different lengths (IIa, b.6 - 8; IIb, b.8 - 9) although this time the first phrase is the longer of the two.

The figurations of the vocal phrase are similar to those of the previous flute phrase - the relationship is felt particularly strongly at the opening of the vocal phrase, where the falling 7th C - C sharp is reminiscent of the falling 7th F - F sharp at the beginning of the second flute phrase (Ia) and of the rising 9th (A - B) which ended the flute phrase at b.5:



Ex. 188.

The similarity between the opening of the flute phrase (Ib) and that of the vocal phrase (IIa) might lead the listener to consider the rest of the vocal phrase as some form of inversion of the flute phrase; the intervals of the two phrases are different but their contours suggest such a relationship:

Ex. 189.

The listener is likely to infer the existence of such similarities throughout the movement. Although he cannot perceive the exact details of the patterns, the sparse texture of this movement allows him to grasp the general contours of the phrases, and the ear is likely to cling even to such inexact and fleeting similarities of

contour as those mentioned above.

Section 2.

The second section, like the first, has two subsections (III and IV below). Again, the first subsection is given to the flute and the second to the voice. This time, however, the flute has a three note phrase during the voice's subsection:

Handwritten musical score for Ex. 190. The top staff is for flute and the bottom for voice. The flute part starts with a fluttertongue note (marked with a wavy line) and includes a three-note phrase (measures 12-14). The voice part has lyrics "du" and "clou". The score is divided into two subsections, III and IV, by red brackets below the staves. Measure numbers 9, 11, 12, 13, and 15 are indicated above the flute staff. Dynamics include *mp* and *mf*.

Ex. 190.

As the piece progresses the two monodic parts come closer together, eventually forming a two part homophony.

The flute's phrase (III) begins with a held fluttertongue note - the fluttertongue is an important instrumental effect and here serves to mark the beginning of the new section. The flute begins with the notes which ended the previous section, thus appearing to link the two sections and giving the opening of this section an effect of harmonic relaxation:

Handwritten musical score for Ex. 191. The top staff is for flute and the bottom for voice. The flute part starts with a held fluttertongue note (marked with a wavy line) and includes a three-note phrase (measures 3-5). The voice part has lyrics "rou-ge" and "au bord". The score is divided into two subsections, III and IV, by red brackets below the staves. Measure numbers 3, 4, 5, and 8 are indicated above the flute staff. Dynamics include *p* and *f*.

Ex. 191.

The relaxed effect at the end of the vocal phrase (b.15) results from both harmonic elements (the voice has the same notes as the flute had at the beginning of the phrase: E - C sharp - F) and rhythmic elements (the voice has the regular four note pattern that the flute had at the beginning of the phrase). The arrangement of the notes E, C sharp and F suggests a relationship with the flute's figure at b.12:

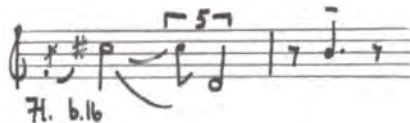


Ex. 195.

Thus, the phrases of this second section, like those of the first, begin and end with slowly-moving harmony and the harmonic movement increases in the middle of the phrase.

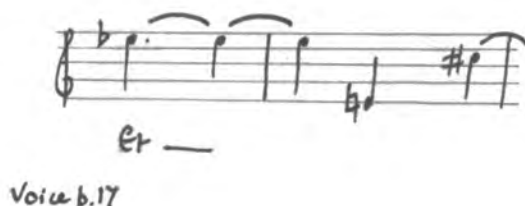
Section 3.

This section develops further the overlapping of parts which began in the second section. The two parts, though still independent, now overlap for a period of five bars. The flute has one solo bar (b.16) before the voice enters. The ear might connect the flute figuration at b.16 - 18 with the flute's previous figuration (b.3 - 6) and with the voice's entry at b.6. At b.16 the flute begins with a falling 7th and the contour of the figuration is reminiscent of those of the earlier passages:



Ex. 196.

The voice at b.17 begins with an imitation of the flute figuration:



Ex. 197.

The harmony at the opening of Section 3 seems relaxed; an effect achieved by both the melody (the imitation gives the ear an easy point of reference) and the harmony (the flute begins with the last notes of the previous vocal phrase and the voice also emphasises one of these notes)

Ex. 198.

The effect of harmonic relaxation is maintained by the repetition of the note G sharp in the flute and voice at b.20 and by the voice's repetition of the note F sharp in b.20 and 21:

Ex. 199.

The harmony then becomes less relaxed as the voice develops a long melisma (b.22 - 26)

A prominent characteristic of earlier sections has been the sequence of flute followed by voice. As the flute and voice parts overlap more this sequence becomes less obvious and the phrase structures become less clear. The phrases of the two previous sections tended to be harmonically stable at the beginning and end and to have more rapid harmonic movement in the middle. This pattern is not as clear in this third section, although a cadential relaxation is achieved at the end of the section (b.26 - 27) when a note is held in the voice part and the flute enters with a cadential figure. The flute figure seems relaxed because it consists of three equal note values and momentarily establishes a regular and perceptible rhythmic pattern:

Ex. 200.

Section 4.

Like the previous sections, the fourth begins with the solo flute. The opening flute figuration is fluttertongue and has a regular rhythmic pattern which seems to refer back to the beginning of the second section:



Ex. 201.

The section has two subsections. The first beginning on the flute (b.28), though later joined by the voice, ends at b.33. The second subsection begins on the voice (b.34) and ends with a flute solo (b.36 - 37).

Handwritten musical notation for Ex. 202, showing two staves. The top staff is for the flute and the bottom for the voice. The key signature is one sharp (F#). The music includes various dynamics such as *f*, *ff*, *mp*, *p*, and *f*. There are also markings for *mf* and *mp*. The lyrics are: "Et — chevaux de la-bours dans le fer — à". A red bracket labeled 'A' spans the entire passage from measure 28 to 37. Measure numbers 28, 29, 30, 31, 32, and 33 are marked in red above the staff.

Ex. 202.

In the first subsection (A in Ex. 202 above) the flute and voice are together for much of the time and the two parts are no longer completely independent: they move together at the important cadence points at b.31 (the end of the first phrase of the first subsection) and, later, at b.33 (the end of the second phrase of the first subsection):

Handwritten musical notation for Ex. 203, showing two staves. The top staff is for the flute and the bottom for the voice. The key signature is one sharp (F#). The music includes dynamics *p* and *mf*. The lyrics are: "la bours". A red bracket labeled 'A' spans the entire passage from measure 31 to 33. Measure numbers 31 and 32 are marked in red above the staff.

Ex. 203.

Handwritten musical notation for Ex. 203, showing two staves. The top staff is for the flute and the bottom for the voice. The key signature is one sharp (F#). The music includes dynamics *f* and *mf*. The lyrics are: "le fer — à". A red bracket labeled 'A' spans the entire passage from measure 33 to 35. Measure numbers 33 and 34 are marked in red above the staff.

In the second subsection (B) both parts are heard one after the other - first the voice (b.34 - 35) and then the flute:

Ex. 204. **B**

This order is unusual because the flute now ends the section whereas previously the flute began and the voice ended the section.

The harmony seems relaxed at the beginning of the section because the flute begins with the notes which appeared in the voice part at the end of the last section:

Ex. 205.

During the rest of the section the occasional note repetitions within each part give some sense of harmonic relaxation, though not very much. There is some effect of rhythmic relaxation in the first half of the section because the parts move together at the cadence points at b.31 and 33.

The fourth section, like the third but unlike the first two, does not seem relaxed at the beginning and the end. Instead, the section moves from a harmonically slow moving opening to a less relaxed close; even the

final cadence of the section is not established as a point of relaxation - there is no note repetition and the rate of activity increases:



Ex. 206.

The cadence is marked only by the pause at the end of b.37.

Section 5.

The fifth section has two subsections - the first from b.38 - 42, the second from b.43 - 48. Each of these subsections has two main phrases - those of the first subsection are marked Va and Vb in Ex.207 below, those of the second are marked VIa and VIb:

Handwritten musical notation for Ex. 207. It consists of two staves. The top staff is for voice and the bottom for flute. The music is in treble clef with a key signature of one sharp (F#). The lyrics are: "Je rê-ve la tête sur la - poin-té de mon coureau le - Per ou". The notation includes notes, rests, and dynamic markings such as 'pp', 'mf', 'mp', 'f', and 'ff'. Above the staff, there are handwritten annotations: a bracketed '5' over a group of notes, a bracketed '3' over another group, and an 'x' over a note. Below the staff, there are handwritten annotations: '3/4', '4/4', '7/8', '3/2', '5/8', '2/3', '2/4', '3/2', '6/8', '2/4', '4/4'. The music is divided into four subsections: Va (measures 38-42), Vb (measures 43-47), VIa (measures 48-51), and VIb (measures 52-55). The first staff ends with a held note at measure 42.

Ex. 207.

The first subsection is for the voice, the flute only marking the cadence at b.41 - 42 and having a held note at the beginning of the subsection. The second subsection is for flute and voice and ends with a short three note codetta on the solo flute. By exploiting the gradual overlapping of phrases, the original flute/voice sequence

has now been reversed.

The first subsection is harmonically relaxed at the beginning because of the held flute note (b.38 - 39) and it later seems stable because of the clear motivic work in the voice part. During this subsection the vocal line has a series of major and minor sixths which provide the ear with an easily grasped point of reference. In addition the second phrase of the subsection sounds like a transposed version of the last part of the previous phrase:

Fl.

pp

Voice

pp *r2 - ve* *la* *te - le* *sur* *la* *mf*

Ex. 208.

The phrase seems relaxed because the ear can easily perceive these relationships.

The second subsection seems rhythmically stable because the two parts move together; it is harmonically relaxed because of the repeated notes between the two parts and because the second half of the subsection is a retrograde of the first half. The beginning of this retrograde, where the repetition of notes is most evident, seems very slow moving harmonically:

Voice

mp

f

mf

pp

la) *poin le* *de mon - cyreau* *le re - rou*

R

Ex. 209.

The fifth section is more relaxed than the second section, in which there is a similar retrograde, because the flute and voice parts have more notes in common and because it seems more stable rhythmically. The clear phrase structures which appeared in the first two sections, but which were obscured in the second and third sections, now reappear. Because it sounds so relaxed the fifth section is probably heard as a coda.

In this movement from 'Le Marteau sans Maître' harmonic tension and relaxation are used to help define the separate phrase structures. The pattern of tension and relaxation established at the opening of the movement is gradually broken down as the movement progresses; the monodic texture and the alternation of the flute and voice with which the movement begins are also gradually abolished as the music progresses, the flute and voice parts becoming less independent.

Although a regular equal note rhythmic pattern appears at a number of points (b.10, 12, 15, 27 and 29) there seems to be no perceptible overall control of rhythm or of melodic and harmonic formations. The listener might infer that some of the phrases have similar contours (this movement, unlike most of the other movements of 'Le Marteau sans Maître', has a sparse texture which allows the listener to grasp the general shape of the phrases with some ease) but it is difficult for him to know whether these similarities are intended, and, because of the complexity of the material and the lack of obvious controls, the listener is not as willing to take such similarities on trust as he would be if listening to the music of Webern.

4. Texture, Instrumentation and Dynamics as a means of defining formal structure in Stockhausen's 'Zeitmasse'

One of the basic formal principles of 'Zeitmasse' is the contrast between 'simple' passages (in which the listener can perceive each note and event) and 'complex' passages (in which the individual details are not perceptible and the listener is only aware of the total impression).

The two extremes are represented by 'Complexes' - fast and highly complicated passages of total movement (and usually of maximum density) which present the listener with an over abundance of information (5) - and, directly opposed to these, by static held chords. Other formal elements are brought into play to unite and differentiate sections and to articulate the movement between these extreme limits.

The other important formal elements are:

a) Thematic patterns

During most of the simpler passages of the work Stockhausen uses a number of clearly perceptible two, three and four note patterns. Most of these patterns use the intervals of either a semitone, a major 7th or minor 9th and the intervals of either a minor 3rd, major 3rd, minor 6th or major 6th. In some parts of the work the interval relationships between the patterns can be clearly heard; at other points the listener is unlikely to hear the interval relationships and may only notice that patterns have similar contours, or that all the patterns in one section of the piece are built of a small and a large interval.

Even when the listener cannot hear the exact intervals, so much use is made of these patterns during the early sections of the piece that he might come to regard all

 (5) See Pg. 44-45

two, three and four note patterns as being relevant to one another in some way; because some of the patterns are clearly similar (the listener can hear some interval relationships), because they are short and can be easily remembered and because the texture is sparse in the sections which use these patterns, the listener is willing to assume (to a greater extent than he is in the Berio 'Serenata' and 'Le Marteau sans Maître') that the patterns which he cannot grasp are relevant to what has gone before. Thus, although the musical material is more complicated than that of the Webern works examined previously (6), Stockhausen encourages the listener's desire to form the music of the simpler passages into comprehensible patterns and determines the kind of patterns formed. I shall consider Stockhausen's use of these patterns in greater detail in Chp. VII. (7)

b) Dynamics.

Three distinct forms of dynamics are employed during the work:

- i) Block Dynamics:: when all the instruments, or all of a group of instruments observe the same dynamic indications for some length of time.
- ii) Varied Dynamics:: when all the instruments have different dynamics and there is a seemingly random distribution of intensities with a new dynamic for each note. Varied dynamics occur mainly during sections built of isolated notes.
- iii) Changing Dynamics:: when a group of instruments move together over a period of time but each instrument has different dynamics - one instrument, for example, might

(6) See Chp. III and IV

(7) See Pgs. 228-238

move from 'pp' to 'ff', a second might move from 'f' to 'ppp' and a third maintain a mezzoforte. This means that, within a consistent texture (such as a held chord) different instruments dominate at different points.

The terms 'Block Dynamics', 'Changing Dynamics', and 'Varied Dynamics' will be used throughout this discussion of 'Zeitmasse'.

In addition to these three main forms of dynamics there are sections which, though using 'varied dynamics', employ only a very small dynamics range. The opening of the work, for example, moves between 'ppp' and 'p' with occasional 'forte' or 'mezzoforte' dynamics. In such sections I shall talk about a 'Dominant Dynamic' since, despite variations, these sections are characterised by one single dynamic.

As the work progresses the different dynamic procedures are combined so that, for example, four instruments might have block dynamics in one passage whilst the fifth has a free solo part with varying dynamics.

c) Instrumentation

Certain sections of the piece use only the flute, clarinet and oboe. This combination of instruments first becomes noticeable in the passage from b.44 to b.58 and occurs again at b.111. The whole of the passage from b.111 to b.153 is dominated by this combination of instruments, which returns at b.211 - 230 before the final section of the work. All the passages characterised in this way have similar textures and use similar thematic material.

d) Other elements.

The work restricts itself to a small number of ideas:
i) The held chord already discussed (8). This chord

(8) See Rg.192

varies in density from 2 to 5 notes and its length and intensity also vary from one appearance to another.

ii) The sections with dense textures and with very fast and complicated movement which have already been mentioned (9) and which I shall call 'Complexes'. The shapes and characteristics of these sections vary (10) but all present the listener with more information than he can absorb. The listener can only perceive the general outlines, not the details of these sections (11).

iii) A quick arabesque-like figuration which first appears at the end or the beginning of a held chord (on the clarinet at b.2 or the flute at b.6 for example). Because this figuration can gradually increase its activity from a series of short arabesques around a held chord until it develops into a full complex, it is used as a means of moving from a static to a more fluid texture.

iv) Block movement. A development of the arabesque figurations when a group of instruments move together and play arabesque-like figures simultaneously. The parts usually have the same rhythmic patterns and move parallel to each other. Such passages are usually built of short cells separated from one another, and are often characterised by the use of a regular rhythmic pulse:

The image shows a handwritten musical score for three staves: Bassoon (b55), Flute (7), and Clarinet (C.). The music is written in 7/8 time with a key signature of one sharp (F#). It features a 'block movement' where all three instruments play similar rhythmic patterns simultaneously. The score includes various dynamic markings such as *p*, *f*, *ff*, *sfz*, and *mp*, along with accents and slurs. The notation is dense and complex, with many beamed notes and rests.

Ex. 210.

(9) See Pg.192

(10) See Pg.228-238

(11) See Pg.44-45.

Some passages alter one of the characteristics of 'block movement' but maintain others - for example, the instruments might use the same rhythmic patterns but one instrument might have a line which moves in a different direction from the others:

Ex. 211 is a musical score for three instruments: Oboe (Ob.), Flute (Fl.), and Clarinet (Cl.). The score covers measures 137 to 142. The key signature is one sharp (F#). The Oboe part starts with a dynamic of *f* and features a melodic line that generally descends. The Flute part starts with a dynamic of *f* and features a melodic line that generally ascends. The Clarinet part starts with a dynamic of *f* and features a melodic line that generally descends. The three parts move in parallel motion, with the Oboe and Clarinet moving in the same direction and the Flute moving in the opposite direction.

Ex. 211.

Other passages are reminiscent of block movement but have few of its characteristics. In the passage for flute, clarinet and oboe at b.106 et seq., for example, the instruments do not have exactly the same rhythmic patterns nor do they move parallel to one another, but all the voices have short cells that begin and end together and the effect is similar to that of some passages of block movement:

Ex. 212 is a musical score for three instruments: Oboe (Ob.), Flute (Fl.), and Clarinet (Cl.). The score covers measures 106 to 111. The key signature is one sharp (F#). The Oboe part starts with a dynamic of *p* and features a melodic line that generally ascends. The Flute part starts with a dynamic of *pp* and features a melodic line that generally ascends. The Clarinet part starts with a dynamic of *pp* and features a melodic line that generally ascends. The three parts move in parallel motion, with the Oboe and Clarinet moving in the same direction and the Flute moving in the opposite direction.

Ex. 212.

iv) Single staccato notes.

These may be single isolated notes or a sequence of staccato notes 'thrown' from instrument to instrument. Often these single notes are prefixed by a gracenote. The gracenote is almost always a 7th or 9th above or below the staccato note and because of this, the staccato note and its attendant gracenote might sound like a diminution of the thematic patterns used in the simpler sections of the piece (12)

Ex. 213.

In some cases the isolated notes on different instruments begin to coincide and lead to a section of block movement:

Ex. 214.

All the elements discussed above seem to be related to one another - held chords lead to the arabesque figures and to slowly moving three or four note patterns, which lead to single staccato notes which in turn lead to a passage of block movement and, from there, to a Complex. Each idea is thus placed in a scale between the two

 (12) See Pgs. 228-238

extremes of total movement and total stasis. In some sections the thematic figurations overlap so that the first note of one coincides with the last note of another. Though the instruments are not moving together the 'entry coincidence' of such sections makes them sound similar to sections of block movement. These sections often have a very stable and relaxed effect. In the Coda 'entry coincidence' and passages of regular rhythmic movement are used to give an effect of relaxation towards the end of the piece:

The musical score for Ex. 215 consists of five staves. The top staff is for Oboe (Ob.), the second for Horn (H.), the third for Clarinet in A (C.A.), the fourth for Clarinet in Bb (Cl.), and the fifth for Bassoon (Bsn.). The music is written in a common time signature. The Oboe part begins with a measure marked '272'. The Horn part has a dynamic marking of 'mp' and a 'p' marking. The Clarinet in A part has a dynamic marking of 'p' and a 'p' marking. The Clarinet in Bb part has a dynamic marking of 'p' and a 'p' marking. The Bassoon part has a dynamic marking of 'p'. The score shows overlapping thematic figures with various dynamics and articulation marks.

Ex. 215.

The chart on the following pages shows the main sections of the work, and shows how the different thematic, textural and dynamic characteristics and ideas are used in different combinations and vary their relationship to one another throughout the work.

The simpler sections of this work - sections in which the listener can clearly perceive the patterns presented - will be discussed in the following chapter.

(13) In the 'Complexes' the patterns are less easy to grasp and only the main outlines, the most important

 (13) See Pgs. 228-238

ZeitmasseBars:Main Sections:

1-20 Short structures built of small balancing units. Medium pitch range, fairly slow harmonic movement, predominantly soft.

21-22 Clarinet Solo.

23-27 Isolated notes leading to arabesque which end on held chord. Predominantly 'p'.

27-28 Passage of Block Movement on flute, clarinet and bassoon. Block Dynamics. Loud.

29-45 Complex ending in held chords. Changing dynamics; soft at end of section.

44-58 Arabesque figures ('ff') held chord ('p') and isolated notes lead to an extended passage of Block Movement on the flute, oboe and clarinet. The section of Block Movement has a regular semiquaver rhythm. Varied Dynamics

58-72 Held chords and 2, 3 and 4 note thematic patterns. Simple texture. Mainly soft.

73-79 Section of complicated texture leads to a held chord. Changing Dynamics but predominantly soft. Chord becomes louder and leads to activity: solo flute leads to next passage:-

80-84 Short Complex (reminiscent of block movement) has 3 sections differentiated by texture and dynamics.

84-86 Bassoon solo linking previous Complex to following Complex.

87-91 Short Complex. Changing dynamics. Cor Anglais solo at end leads to next Complex

91-100 Short Complex, becoming a little simpler at end. Changing dynamics.

100-111 Clarinet solo leads to single notes. These lead to Complex and a passage of Block Movement. Varied Dynamics. Flute, clarinet and oboe alone after b.105.

111-136 Very varied section after previous long sequence of Complexes. Single notes and arabesques lead to held chord at b.123. Short passage of Block Movement leads to held chord. Section begins and ends with only flute, clarinet and oboe. Detached arabesques lead to

Flute,
Cl. and
Oboe
through-
out.
Slow-
moving.

Bars: Main Sections:

- 136-141 Block Movement with regular rhythms and short 2, 3 or 4 note cells. Block Dynamics Flute, Clarinet and Oboe only. predominantly soft throughout.
- 142-149 Semi-Block Movement. Flute, Clarinet and Oboe only. Varied dynamics
- 149-153 Held chord on Flute, clarinet and oboe, (mainly soft) ends with isolated oboe notes.
- 154-210 A long climatic sequence of Complexes separated by pauses. 154-164, Block dynamics. 165-8 Single bar units, Changing dynamics. 168 et seq. Changing and Varied dynamics. 173-77. Staccato notes, Varied Dynamics. 177. Various solos lead to Block Movement. 187. Held chord, Changing dynamics. 191. Chords lead to short staccato note passage, Varied dynamics. 195. Solo and Accompaniment, Varied against Block dynamics. 200. Staccato notes against held notes on the flute and clarinet. 201. Long Complex, with Block Dynamics, ending with isolated notes on flute, clarinet and oboe. Fast, Complicated and dense texture throughout. Predominantly loud.
- 211-275 A sequence of short, varied units which develop into a sequence of overlapping chords, leading to a series of chords separated by arabesques. Begins on flute, clarinet and oboe. Changing and Block dynamics.
- 275-352 Coda. Short units gradually develop into complicated passages of Complexes. Predominantly soft, though all main types of dynamic procedures and figurations appear. Seems relaxed at end because of regular rhythmic patterns.

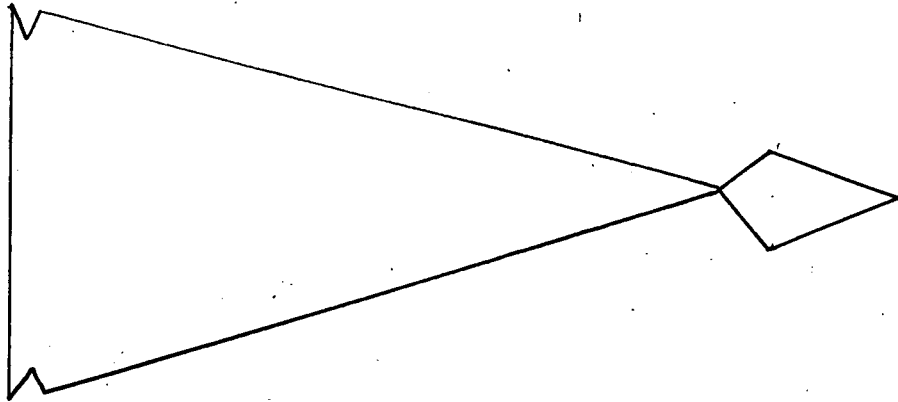
characteristics of the music can be absorbed. The 'Complexes' are differentiated from one another by their overall shape and texture. I shall examine the chain of short Complexes from b.81 - 103. This section has three main blocks; b.81 - 84, b.87 - 96 and b.100 - 103. The first block is linked to the second by a bassoon solo and the second to the third by a clarinet solo.

The first block falls into three parts, the first and second of which are separated by a held chord, the second and third by a 'breathing space' which has the effect of a rest. In the first part the tension gradually increase - instruments are added during the course of the part and the instrumental voices move in contrary motion, the oboe and flute ascending whilst the cor anglais, clarinet and bassoon descend. At the same time the dynamics increase from 'pp' to 'ff'. In the third part tension is gradually decreased, the instruments are gradually withdrawn and the pitch area diminishes. In the second part all the instruments play all the time, the wide pitch area is maintained and the dynamics are all 'ff'. The first block can be represented graphically thus:-

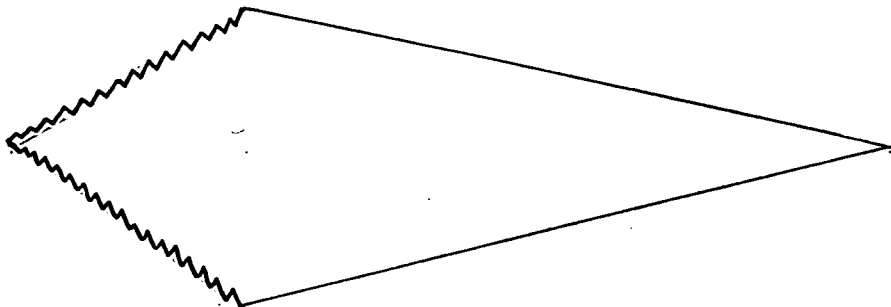


The second block begins on a held chord which leads, suddenly, to a Complex (tutti) from which the instruments are then withdrawn and the dynamics decrease until only the cor anglais remains, playing 'piano'. A sudden

arabesque-like flourish on the clarinet, cor anglais and flute leads to a momentary outburst of activity but the movement gradually dies away leaving, once more, the solo cor anglais. The second block can be represented thus:-

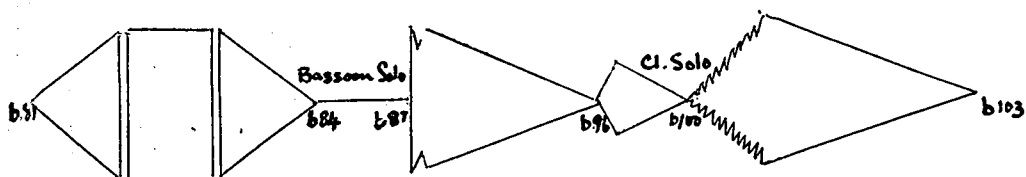


The third block begins with isolated single notes on the cor anglais, which are then adopted by the other instruments. These single notes become more and more frequent until a continuous tutti is achieved. This reaches a climax and then dies away as the instruments are withdrawn and the dynamics become softer. Single notes reappear on the cor anglais but they are this time accompanied by held notes, which give an effect of relaxed harmonic movement. The third block can be represented thus:-



Not only does each block in this sequence have a clear and individual shape but the three blocks are also differentiated by other characteristics. In the first block all the instruments follow the same dynamic scheme

(Block dynamics), in the second each instrument follows a different dynamic scheme (Changing dynamics), whilst in the third block each separate note has its own dynamic marking (Varied dynamics) until the climax when all the instruments have the same dynamics. The whole of the section discussed can be represented thus:



All the Complexes in the piece - even the long climatic series of Complexes at b.152-210 - have a similarly clear, motivated shape.

The basis of the formal design of 'Zeitmasse' is the contrast between a held chord and a complicated fast-moving texture; the whole of the work can be understood in terms of a progression between the two extremes of total movement and total stasis.

The beginning of the piece presents a sequence of held chords and arabesques. Gradually, starting with an unexpected flute entry at b.16, the music gathers momentum and leads, firstly, to a fragmentary sequence of staccato notes and then to a section of block movement (b.28.) The block movement leads to a short Complex.

After the Complex (b.45) a sequence of staccato notes (now with gracenotes) leads again to a section of block movement which this time ends on a chord. Flickers of activity (which are, at first, only decorative) start around the chord and, as the activity increases, the held

chord gradually disappears. This activity leads to a complicated section and a section of block movement, which, as always, is fairly fast. A short Complex at b.82 et seq. leads to a longer Complex. The rate of activity gradually becomes slower as held notes are introduced and as the fragmentary phrases develop into longer phrases. The texture thins towards the end of this section. After a short pause (b.111) the fragmentary staccato-note texture, which appeared at the very end of the last section, develops into a series of chords which change at the same point in all the parts. The speed of the chord-change increases and develops, momentarily, into a passage of block movement but this is only short and the development of a long passage of block movement is not achieved until b.137, after which the music leads to a climatic series of Complexes. This sequence of Complexes, and the sequence of chords which follows it, form the two largest blocks in the work and, thus, in this climatic form, the two basic ideas of the work are juxtaposed. This section ends at b.279 with a trilled and fluttertongued chord followed by a rest. The final section, beginning at b.275, is more relaxed than most of the previous sections and acts as a coda. The effect of relaxation is achieved mainly through rhythmic means:- b.281-293 present a sequence of regular quaver patterns and b.337-342 present a regular crotchet pulse. (14)

Because Zeitmasse can be understood as always moving towards or away from the total movement of the Complexes the piece gives an impression of development and progression, and seems to have a sense of motivation that is lacking in the Boulez and Berio works. I shall discuss the problem of motivation in post-Webernian music in Chp. VIII. (15)

(14) See Ex. 215 on Pg. 198

(15) See Pg. 264-265

The elements discussed in this chapter are primarily concerned with differentiating or relating the different sections of a work (as instrumentation and harmonic movement were in the Concerto Op. 24) (16) and not with determining the way in which the listener interprets the patterns presented by the music. Although these elements do, to some extent, control the way in which the listener understands the music, they are not used to establish severely restricted perceptible limits of the kind discussed in Chps. III and IV. (For reasons I have already discussed (17) the nature of the musical material used in these works precludes the establishment of many such limits).

Although the different textural characteristics of the movements of 'Le Marteau sans Maître' are gradually extended or varied as the work progresses, and, in the Berio 'Serenata', figurations similar to the recurrent flute fluttertongue effect appear on other instruments later in the work, the elements discussed in relation to these two works are used only as a means of defining the overall formal structure and are not exploited in any other way. The elements discussed in relation to Stockhausen's 'Zeitmasse', on the other hand, not only point the large scale formal design but are also exploited in other, more interesting ways. At b.48, for example, a texture made up of staccato notes on the flute, oboe and clarinet, lasting for six bars, leads to a short section of block movement which is built of six units. On its next appearance (at b.135, again on the flute, oboe and clarinet) the staccato texture lasts for only two bars. It leads to a section of block movement built

(16) See Pgs. 80

(17) See Pg. 164

of nine units. On its third and final appearance (b.216) the staccato note texture of the flute, oboe and clarinet lasts four bars. It leads to a bar's rest and to a different texture. Since the staccato note texture leads to sections of block movement (of increasing length) on its first two appearances, the listener might expect an extended section of block movement to follow its third appearance and might be surprised when no such section appears. In this example, and in the many other similar examples to be found in 'Zeitmasse', texture, instrumentation and the length and order of the different passages are used as a means of arousing the listener's interest and involving him in the music, not simply as a means of differentiating sections.

Although in both 'Le Marteau sans Maître' and the Berio 'Serenata' the listener can hear patterns that seem to resemble one another, many of the patterns in these works appear arbitrary and seem to be controlled by no perceptible melodic, harmonic or rhythmic criteria. The patterns in Stockhausen's 'Zeitmasse', on the other hand, seem to be very carefully controlled and to work within definable perceptible limits; these patterns play an important role in determining the way in which the listener understands the structure of the work and I shall consider them in the following chapter.

VII. Subjective Association in Nontonal Music.

In my discussion of inferential perception (1) I have said that the more difficult it is for the listener to hear exactly the information presented by a piece of music, the more important the role played by his subjective associations. I have shown (2) that the harmonic, melodic and rhythmic patterns of Webern's music work within severely restricted, perceptible limits and that these limits determine the way in which the listener responds to the music. If, however, the musical material of a work is very complex and elusive and does not seem to work within any perceptible limits, the listener will cling to, and regard as significant, any shapes or patterns that suggest themselves; these patterns might not be determined by the composer.

I shall examine the opening of Stockhausen's 'Klavierstück I' to show how a listener might understand a work in a way different from that intended by the composer. I have chosen to examine this piece because, in his lecture 'Group composition: Klavierstück I: A guide for the listener', Stockhausen has discussed what he thinks the listener should look for and hear in this work; it is, therefore, possible to consider the way in which a listener might respond to the work in relation to the composer's expressed intentions. This lecture has not yet been published in English and a translation is given in the Appendix. **B**. The first page of the score is shown in the example overleaf.

(1) See Pgs. 40-43

(2) See Pgs. 49-86

KLAVIERSTÜCKE

Ex. 216

I

KARLHEINZ STOCKHAUSEN

Group Complex 1

The musical score consists of four systems, each with a treble and bass clef staff. The notation is highly complex, featuring various time signatures and dynamic markings. The score is annotated with 'Group Complex 1' and 'Group Complex 2'. Time signatures and ratios like 11:10, 7:5, 5:4, 11:12, 13:12, 14:12, 8:7, and 14:12 are indicated above and below the staves. Measure numbers 1 through 10 are visible at the beginning of each system. The notation includes various note values, rests, and articulation marks.

Stockhausen: Klavierstück I

The piece is built of a number of independent 'groups' which, Stockhausen believes, form themselves into 'main groups' and, at a still higher level, into 'group complexes'. It is noteworthy that Stockhausen himself makes no mention of the row technique used in composing this piece (3) nor does he specifically mention the interval relationships between notes or the exact notes used. His chief concern is with the perception of the characteristics which differentiate or relate the different groups.

In the 'Klavierstück' Stockhausen makes no allowance for the different way in which the listener hears the simple and complex groups (4). For example, his analysis (See Appendix) describes Group 10 (b.12) as being related to Group 4 (b.4) but such a description fails to take into account the fact that Group 10 has connotations which do not occur in Group 4: in Group 10 the listener has time to form tonal associations which allow him to hear the intervals more exactly and might enable him to establish a rhythmic norm which will allow him to understand the rhythmic features of Group 10 with greater exactitude than is possible in Group 4 where there is not time to form such associations. It is arguable that these subjective associations are more important, to the listener, as group characteristics than are those relationships which Stockhausen claims as being the basis of his 'Group form'. Thus, for example, Stockhausen claims that Group 7 (b.8) is reminiscent of Group 6 (b.7) in its time and intensity proportions, but

(3) The Klavierstück uses a row consisting of a rising chromatic scale divided into two hexachords (C - F/ Gb - B): permutations occur within the hexachords. A brief description of the technique used will be found in Nono's 'Zur Entwicklung der Serientechnik'.
Pg. 15.

(4) See Pgs. 44-46.

to Group 3 (b.3) in overall duration and to Group 1 (b.1) in average intensity. It is doubtful whether the awareness of these relationships forms part of the listener's musical experience. At least it can be claimed that Stockhausen does not take advantage of many aspects of the listener's experience to point the formal design of the piece and does not control the listener's experience as he might.

If the method of listening to the piece suggested by Stockhausen in his article is compared with the actual impression received from the music, then further criticisms of Stockhausen's view of the piece suggest themselves. Some of the features mentioned by Stockhausen are not perceptible, although his remarks are intended as a guide for the listener. He comments on the difference between the number of notes in a group and the number of 'entries' in the same group, but the listener is not aware of the exact number of notes played (especially when, as in Group 5, the number of notes played is as large as 26); the listener is only aware that a number of single notes or chords predominate. To ask the listener to be aware of the ratio of note to 'entry' numbers is to demand a perception of which the listener is not capable. If the ratio of entry and note numbers in a group were changed, the listener would hear a different effect but he would not hear an exact ratio which had any numerical significance.

This indecision as to what are truly perceptible relationships and what is a relationship in theory only, runs through all Stockhausen's lecture. Thus at one point Stockhausen can, truthfully, say that the "manner in which the notes are combined and how they appear in groups stays in the memory; less so do the specific details; the particular intervals or durations", while

at another time he can imply that these specific details should be perceived and remembered - "We shall not go further into the more subtle connections in both Groups - which intervals, which intensities and temporal durations occur."

Stockhausen points out that the total duration of the first six groups of the piece form the proportion row 5:2:3:1:4:6, the first group being 5 crotchets in length, the second two crotchets and so on. This proportion row is, in fact, only approximate for whereas the first three groups are 5 crotchets, 2 crotchets and 3 crotchets in length respectively, Group 4 is three quavers in length (rather than 1 crotchet) and is, therefore, three quarters, not half the length of Group 2. This in itself suggests that Stockhausen is not sure that the proportion row is perceptible since he is here prepared to discount as unimportant 33% of the total duration of this group. But it seems unlikely that the listener will be aware of the total duration of each group; he will only hear that one group is relatively longer or shorter than another. If Stockhausen is using the proportion row as a means of making all the groups in a 'group complex' different in length, and thus ensuring an asymmetrical balance of groups, then it does not matter that the listener hears the lengths of the groups with some inexactitude; if Stockhausen expects the listener to be aware of the numerical significance of the proportion row - as his lecture suggests he does - then he is over-estimating both the listener's capabilities and his inclinations. But even were such an exact awareness possible, it would be necessary for the groups to be so clearly defined that the listener would be certain of the limits of each group and it is questionable whether the groups in this 'Klavierstück' are defined

with such clarity. For example, bars 3 and 4 are described as consisting of two groups (Group 3 and Group 4); bars 5 and 6 are considered as being one group (Group 5). The difference between the two one-bar groups and the one two-bar group is not made clear in the composition. Similarly, the critical point in the first twelve bars is the end of b.7, where the first Group Complex ends and the second starts, but this point is not brought out in the music and, indeed, Groups 6 and 7 are less well defined and separated from each other than are many of the other groups - Groups 7 and 8, for example. While certain groups are delineated with some care - Groups 1 and 2, for example, are carefully separated from Group 3 - other Groups are not defined with the clarity necessary for the listener to understand the relationships between the Groups in one Group Complex and those in another. A comparison of what one hears when listening to the piece with Stockhausen's description of what he intends the listener to hear suggests that the composer's intentions are not fully realised.

A more obvious way of analysing the opening page of the score would be to consider b.1 and 2 (which are clearly separated from what follows by the crotchet rest at the beginning of b.3) as a single unit - rising to the climatic two-note chord at the beginning of b.2 and then falling away from it. Bars 3 and 4 can be heard as a second two-bar unit, similar to the first in that it has the same ascending motion, but without the descending motion which ended the first unit. The held two-note chord in b.5 may be reminiscent of the similar chord in b.3 and, since there is no obvious break in texture until the beginning of b.9, bars 5 to 8 may be considered as a four bar extension of the previous two bar units; like them, it begins with an ascending figure which is followed,

as in b.1 and 2, by a descending figure. Because b.8 is clearly separated from what follows by a rest, and because it uses figurations that are unlike those in the following bars but seem similar to the figurations used previously, it may be heard as a cadential extension of this unit. The four note chord at b.9, which is separated from the previous figurations by rests, may then be regarded as starting a new section. If the opening page of the work is heard in this way, the different events can seem relevant to one another and the passage can seem to have a coherent and interesting shape; this interpretation, however, obscures the Group form and the relationships between the different Groups that, according to his lecture, Stockhausen intends the listener to hear.

Because much avant-garde music presents patterns that are too elusive to be exactly perceived, the listener is forced to interpret the music as best he can; the above discussion of Stockhausen's 'Klavierstück I' shows that the way in which the listener interprets the music might not be that intended by the composer.

In the rest of this chapter I shall examine in more detail the kind of patterns which the listener might read into complex post-Webernian music. I have already said (5) that the ear tends to impose patterns upon even a random series of stimuli, and I have said that, to the listener, the effect of most serial music is similar to that of music composed by chance methods since, in both cases, the patterns to which the ear clings are the products of chance (6). I shall illustrate this point by examining a serial work (Boulez's 'Structure Ia') and

(5) See Pg 43.

(6) See Pg 43.

a work composed using chance operations (Cage's 'Music of Changes'); I shall then examine two avant-garde works which employ neither serial nor chance techniques, and in which the patterns that the listener hears seem to be more carefully controlled by the composer.

1. Boulez:: Structure Ia.

i) Overall Shape of the section

Structure Ia falls into five sections, each indicated by a change of metronome marking. Each is differentiated from that which precedes and succeeds it by texture, dynamics and other characteristics. The general characteristics of the five sections may be summarised as follows::

I. b.1 - 7. 'Très Modéré'. Quaver = 120

This section has a sparse texture in which every note is perceptible (the section uses only 2 forms of the note row) and has a fairly slow pace. The notes are evenly spread over a very wide compass and are very loud ('ffff') or soft ('quasi 'p').

II. b.8 - 23. 'Modéré' presque Vif. Quaver = 144

There is a marked increase of activity in this section, compared to the previous section (the section uses four forms of the row at once). The dynamics are predominantly soft ('ppp', 'p' and 'mf' with occasional sforzando notes) and, because of the soft dynamics and the large number of rests in this section, the effect is of a scherzando passage with occasional vigorous fortes. Towards the end of the section the dynamics become louder and the music increase in vigour but the texture becomes sparser (the number of row forms used is reduced from four to three). The durations become longer in the last two bars, giving an effect of harmonic relaxation at the end of the section.

IIa b.24 - 31. Same metronome marking as for II.

This section consists of single held notes (the section uses only one row form). The dynamics are 'quasi forte'. In effect this section is reminiscent of the opening section.

III. b.32 - 39. 'Lento' Semiquaver = 120.

Despite the slow metronome marking and the indication 'Lento', this section is not heard as being slow, because there is an increase of texture and activity (the section uses six forms of the note row simultaneously). The section begins with a six note chord and there are a number of chords throughout the section - all the previous sections have been characterised by a texture made up of single notes. Because of the increase of activity and texture the effect is of a very complex and energetic section - energetic because of the loud dynamic markings and the many rests.

IV. b.40 - 56. 'Modéré, presque Vif'. Quaver = 144.

This section has a sparse texture (only two row forms are used). The dynamic markings are 'ff' and 'quasi f' with occasional sforzando notes and there are a large number of rests. The effect is of fairly vigorous movement. After b.47 the texture increases but the music becomes softer as the dynamics are reduced to 'ppp' with occasional mezzoforte notes.

V. b.57 - 64. 'Très Modéré'. Quaver = 120.

This section consists of single held notes marked 'ffff'. The pace is slow but, because of the loud dynamics, the section is less relaxed than the earlier slow sections. The single held notes are reminiscent of Section IIa.

The whole block from b.1 - 65 presents a series of clearly contrasted sections, slower, more relaxed sections alternating with more energetic and vigorous sections. Within these broad contrasts there exist other contrasts: the scherzando effect of Section II, for example, contrasts

with the more impressionistic Section IV, although both sections are fairly active. Some sections seem to be similar to previous ones (the two sections which use only single notes, for example) whilst others seem to act as Codas to or extensions of previous sections (sections III and IV, for example).

These broad formal outlines are clear to the listener. I shall now consider what the listener hears within these outlines and how he moves from moment to moment within each section.

I shall consider Sections I, II, IIa and III (b.1 - 39) in detail - the full score of these sections is given in the example overleaf on the staves marked 'A'. The staves marked 'B' in this example attempt to show the clearest and most important of the thematic and rhythmic figures which the ear might pick out during this passage. The ear picks out many motives and many complicated patterns not given in this example but those indicated are the clearest and most obvious.

The ear can place the figures into three main categories:

- i) Intervals of a fourth or a fifth. These intervals are picked out and seem significant because of their tonal implications.

- ii) A repeated note figure. This figure attracts the attention and seems significant because, in such a chromatic texture, any repeated note is immediately noticeable.

- iii) A four note rhythmic figure; the formation of this figure varies but it is always built of three equal notes and a shorter note and usually includes repeated notes. This figure attracts attention because of the repeated notes and because it is an easily recognisable rhythmic pattern.

In complex sections the ear can move from point to

Modéré, presque Vif. $\text{♩} = 144$

Piano I

Musical notation for Piano I, measures 8-14. The notation includes various dynamics such as *mp subito*, *sfz*, and *sfz*. It features complex rhythmic patterns with many accidentals (sharps, flats, naturals) and slurs. The tempo is marked as *Modéré, presque Vif* with a quarter note equal to 144 beats per minute.

Piano II

Musical notation for Piano II, measures 8-14. The notation includes dynamics such as *ppp subito* and *pp*. It features complex rhythmic patterns with many accidentals and slurs, mirroring the complexity of Piano I.

b. 8 9 10 11 12 13 14

Theremin
Mitarbeiter

Musical notation for Theremin/Mitarbeiter, measures 8-14. The notation shows a series of notes, primarily in the lower register, with a 'Tonal pull' indicated by a slur and a 'Stable bass' section. There are also some repeated notes in measure 14.

$4^{\#}$ $4^{\#}$ $4^{\#}$ $4^{\#}$ $4^{\#}$ $4^{\#}$ Stable bass repeated notes

Rhythm
Mitarbeiter

Rhythmic notation for Rhythm Mitarbeiter, measures 8-14. The notation shows a series of rhythmic patterns, including a '7' in measure 8 and a '7-1-1-1' pattern in measure 14.

C

Shepard
Ballet

Musical notation for Shepard Ballet, measures 8-14. The notation shows a series of notes, primarily in the lower register, with a '7-1-1-1' pattern in measure 14.

Tempo: Moderato D=120

Piano

Piano 2

Thematic Motives

Rhythmic Motives

Shapes & Balance Structures Patterns

Handwritten musical score for Piano and Piano 2. The score is divided into two systems, each with a treble and bass clef staff. The first system is marked 'Piano' and the second 'Piano 2'. The music features complex rhythmic patterns with various time signatures (3/8, 2/8, 5/8, 3/8) and dynamic markings such as *fff*, *legato sempre*, *quasi p sempre*, and *pp*. The notation includes many accidentals (sharps and flats) and slurs. The piece is labeled 'A' in both systems.

b.1 2 3 4 5 6 7

Handwritten musical score for Thematic Motives. It consists of a single treble clef staff with seven measures. The notes are grouped into pairs and triplets. The piece is labeled 'B'.

5th 5th repeated note 4th repeated note

Handwritten musical score for Rhythmic Motives. It consists of a single treble clef staff with seven measures, showing rhythmic patterns with vertical stems and beams. The piece is labeled 'B'.

Handwritten musical score for Shapes & Balance Structures Patterns. It consists of a single treble clef staff with seven measures. The notes are represented by 'x' marks, and the piece is labeled 'C'.

Piano I

Piano II

b.15 16 17 18 19 20 21

Theme Motives

repeated note 4th 4th 4th repeated notes repeated notes (remains of b.17) repeated notes 4th #5

Rhythmic Motives

C

Second Ending

Lento

A

Piano I

Piano II

Sempre quasi f legato

b.22 23 24 25 26 27 28 29 30 31 32

B

Thematic Motives

Rhythmic Motives

B 4th repeated notes


repeated notes

repeated notes

C

Shapes & Figures

(2 falling two note figures : 2 rising two note figures)

point by using these motives as references - because of the procedures used in writing the piece, the larger the number of row forms used at any one point the more complicated the texture and the more frequent the occurrence of these motives. The listener can hear many complicated and subtle similarities between different figurations by referring everything back to these three basic motives: for example, after some time he might come to consider all two note figures as augmentations or diminutions of the rhythm  which first appears with the repeated note figure.

In the simpler sections (those with sparse textures, that use only one or two row forms), when the listener is able to perceive and absorb the patterns with more accuracy, the ear might attempt to hear the different patterns as balancing or complementing one another. Such balancing patterns are shown on stave 'C' of the example overleaf. In some cases the listener will not be able to hear the large intervals which make up these patterns and will probably only remember the general shape and pitch of the patterns - thus, the listener might hear two patterns as balancing each other without being aware of the intervals which make up these patterns. For this reason the patterns on stave 'C' are indicated only in diagrammatic form.

Section I. b.1 - 7.

Motives::

In b.1 - 7 two similar-sounding figures stand out with particular clarity: the rising 5th D - A (b.2), in which the A is repeated and then falls back to D, and the falling fourth F sharp - C sharp (b.5 and 6). The F sharp and the C sharp are both repeated. It is

possible that the ear is first attracted to the F sharp in b.4 because of its tonal relations to the D - A motive in b.2 and 3. The immediate repetitions of the note C sharp establishes the rhythm: ♪ ♪ .

Balancing Patterns:

Because the texture of this section is relatively simple, the listener will probably attempt to hear it as a sequence of balancing patterns. The opening notes of the piece (which are too far apart for the listener to hear the interval exactly) are followed by the notes D - A - Bb. The D natural appears some time after the previous note but is immediately followed by the A natural. Because the ear can recognise the rising 5th D - A, the D is likely to be heard as the start of a new figure and is probably heard as an anacrusis to the A natural. The A and the B flat can then be heard as a two note figure (with the D forming a gracenote to the A) similar to that in the opening bar - both figures have the same contour and are approximately the same length:

Ex. 218.



In b.3 - 5 the ear will probably become confused and be unable to divide the music into balancing patterns - possibly because the texture, although fairly simple, is not simple enough to allow the ear to grasp details very easily - but the ear regains interest at b.6, perhaps because of the single held C sharp on both pianos. In


b.6 and 7 the listener can hear a falling two note figure (C - Bb) followed by another falling two note figure (F - B). The ear is drawn to the first of these (C - Bb, b.6) because of the sudden change of pitch from the repeated C sharp; the C - Bb, together, seem to form a two note figure because they are closer to one another than either is to the C sharp. The F - B (b.7) are also close together and seem to form a two note figure because both follow a considerable time after the C - Bb. The high G natural in b.6 and 7 that the ear does not incorporate it into its scheme - although the listener might gain some slight satisfaction from its perversity in cutting across the balancing patterns he is trying to establish. If the listener does hear the opening bars in the way suggested above then the first section will seem to begin and end with two descending two-note figures.

Section II. b.8 - 24

Motives:

A number of fifths and fourths can be heard during this section. The sequence of rising fourths Bb - Eb - Ab (b.8), the repetitions of the notes Ab and Eb and the retrograde of this three note sequence (Ab - Eb - Bb) in b.9 and 10 give the effect of a static harmony which helps the listener to adjust to the new rate of activity, brought about by the increase in the number of row forms used, at the beginning of this section.

At b.16 the falling 5th F - Bb and its retrograde are reminiscent of earlier repeated-note figures and use the four note rhythm: . This figure is accompanied by a rising fourth (A - D, b16) in the bass. The low repeated F natural in b.11 - 13 provides another stable harmonic reference point. The repetition of the notes D - C at b 14 uses the rhythm  and the figures at

both b.16 (F -- Bb) and b.17 (Eb -- E) might also remind the listener of this rhythm. In all three cases the figure includes repeated notes. The repeated Eb - D at b.17 - 19 and the repeated F sharp - C sharp at b.21 - 22 can be heard as extensions of this figure. Repeated notes also occur at b.15 (F sharp), b.20 (a low B) and b.22 (C). By this time the ear will probably have become so accustomed to the association of the repeated notes with the rhythm  that any repeated notes can be heard as extensions or diminutions of this rhythm.

The texture of this section is too complex and the speed too fast for the listener to impose any balancing patterns upon the music.

Section IIa. b.23 - 31

Motives:





Because only single notes are used in this section, the ear can hear few motives. However, the texture is so simple that the mind is able to interpret the music as a series of balancing patterns.

Balancing Patterns:

The two notes D - E (b.25 and 26) can be heard as a descending two note figure and the notes E - F sharp at b.27 and 28 as a further descending two note figure, the two figures having similar contours. The high A natural (b.28) is so far removed from the pitch area of the rest of the passage that it probably ignored. The Bb - C (b.29) and the F - B which follow might then be heard as two rising two-note figures, balancing the two descending figures at the start of the passage. It is important to recognise that the ear can associate these different figurations, and hear them as balancing each other, in spite of their different intervals and durations.

Section III b.32 - 39

Motives:

A number of repeated notes at the start of this section use a four note rhythmic pattern similar to the patterns that appeared at b.15 - 17 of Section II. A repeated note figure appears at b.37 - 38 with the rhythm , a repeated Db in b.35 - 36 has the rhythm  (which the listener might regard as an augmentation of the earlier rhythmic patterns); the figuration Bb - Ab - Db - Ab at b.39 can also be heard as a variant of the rhythmic motives and the four note figure at b.37 has a similar rhythm, although it does not include a repeated note: . The ear can hear many references to the rhythm  in this section (the rhythm first associated with the repeated notes in Section I); these references are too numerous to be shown on the example.

The texture of this section is too complex for the ear to hear any balancing patterns and the listener will probably be content to move from one moment to the next by grasping any shapes of figurations which catch his attention.

In 'Structures', as in all music, the listener must organise the notes into groups and patterns, and must find some relationship between one pattern and another if, he is to understand the music (7). Because, in much avant-garde music, the composer does not present easy patterns, the listener is forced to interpret the patterns as best he can. The above discussion of the opening passage of 'Structures' shows that the listener can understand the work by clinging to patterns and details which, as I have already said (8), occur by chance. I shall now show that similar patterns and shapes can be heard in music in which the events and the order of events are determined by chance.

(7) See Pgs.40-43

(8) See Pg#3.

2. Cage: Music of Changes Vol. IV.

The four volumes of Cage's 'Music of Changes' were written in 1951. Detailed descriptions of the procedures used in writing the work appear in Cage's 'Silence' (9) and the following paragraph gives only a brief resumé of these procedures.

A number of charts were drawn up, each of which consisted of sixty four elements. Eight charts were made for sounds, eight for durations, eight for dynamics, one for tempo and one chart which determined how many of the eight lines of each chart were to be used at any given moment. The charts themselves were partly determined by chance and were partly subjected to rational control; the sound charts, for example, were arranged so that the horizontal and vertical lines always presented all twelve notes of the chromatic scale and the duration charts were arranged in such a way that no chance operation would produce an unplayable result.

In the charts for sounds thirty two of the sixty four elements (the even numbers) were silences, the sounds themselves ranging from single notes to complex events. In the charts for dynamics only sixteen numbers produced a change of dynamics, the others maintained the previous dynamics. The chart for tempi had thirty two elements and thirty two blanks - the blanks maintaining the previous tempi. The elements within each chart were strictly determined, in the sense that they were exactly notated, but the formation of these elements, which elements appeared in the final composition and which charts were

(9) See 'Composition: to describe the process of composition used in 'Music of Changes' and 'Imaginary Landscape No. 4' (Silence Pg. 57-59) and 'Composition as Process' (Silence Pg. 18-34)

used at any given point were determined by chance operations - in the 'Music of Changes', by a method established in I-Ching (the 'Book of Changes') - that of tossing three coins six times. As Cage has said, "the note - to-note procedure, the method, is the function of chance operations" (10), but the fact that the elements are determined and that the sound chart included some complex structures means that it is possible for a recognisable musical event to appear a number of times in the course of the work.

The larger structure of the work was determined by a series of numbers (3, 5, $6\frac{3}{4}$, $6\frac{3}{4}$, 5, 3); this series was applied to the number of units within each section and the number of 4/4 bars within each section. Coin tossing decided which of the series was used at any one point.

Although the compositional method of 'Music of Changes' was subject to some rational control, I have chosen to examine the work because it is one of the few pieces produced by chance operations in which the final result is notated exactly; it is, thus, possible to discuss in detail, and with some sense of certainty, the music which the listener hears. I shall examine the opening section (b.1-30) of Vol. IV. The whole of this section is given on the example overleaf.

This section may be heard as falling into either two or three large units. The note C sharp, which appears 'forte' at b.2 and is sustained throughout the first 8 bars, reappears at b.9 (again 'forte') and is then released; the presence of the note C sharp throughout these opening bars suggests that they form one unit and the final 'forte' appearance of this note might be heard as marking the end of the unit. Bar 11 et seq., have a much slower harmonic rate and this might confirm the view

 (10) Cage: 'Silence' Pg. 20. 'Composition as Process I'

MUSIC OF CHANGES

John Cage

84

Musical notation for measures 1 and 2. Measure 1 contains a complex chordal structure with various accidentals. Measure 2 features a few notes with a fermata. The score includes a treble and bass clef, a brace, and various musical symbols like stems, beams, and accidentals.

Musical notation for measures 3 through 5. Measure 3 starts with a complex chord. Measure 4 has a tempo marking of 84 and an 'ACCEL.' instruction. Measure 5 continues the complex texture. The notation includes a treble and bass clef, a brace, and various musical symbols.

Musical notation for measures 6 through 8. Measure 6 has a complex chordal structure. Measure 7 is mostly empty with some notes. Measure 8 continues the texture. The notation includes a treble and bass clef, a brace, and various musical symbols.

Musical notation for measures 9 and 10. Measure 9 has a tempo marking of 112 and a 'RITARD.' instruction. Measure 10 is mostly empty with some notes. The notation includes a treble and bass clef, a brace, and various musical symbols.

Handwritten musical score for measures 11 and 12. The system consists of two staves. Measure 11 shows a complex chordal texture with many notes. Measure 12 is mostly empty, with some notes appearing in the second half. A dashed line is drawn below the staves.

Handwritten musical score for measures 13 and 14. The system consists of two staves. Measure 13 contains a few notes. Measure 14 contains several notes and rests. A dashed line is drawn below the staves.

Handwritten musical score for measures 15 and 16. The system consists of two staves. Measure 15 has a treble clef and contains several notes. Measure 16 has a treble clef and contains several notes. A large number "104" is written above the staff between measures 15 and 16. A dashed line is drawn below the staves.

Handwritten musical score for measures 17 and 18. The system consists of two staves. Measure 17 has a treble clef and contains several notes. Measure 18 has a treble clef and contains several notes. A dashed line is drawn below the staves.

Handwritten musical score for measures 19 and 20. The system consists of two staves. Measure 19 has a treble clef and contains several notes. Measure 20 has a treble clef and contains several notes. A dashed line is drawn below the staves.

FOREARM-ARPEGG.

SCRATCH STRINGS
LENTISSIMO
(PREFERABLY)

ACCEL.

21

22

23

24

ART-GLIK OF STRINGS
FUVENTIS, BEYOND DAMPERS

25

26

ACCEL.

27

28

29

30

that b.11 belongs to a different unit from the previous music.

The repetition, at b.15, of the piece's opening figuration:



Ex. 221.

might suggest the start of a new unit (perhaps some form of recapitulation) a view that might be further suggested by the repetition of a figuration from b.3 at b.17:



Ex. 222.

Such a reading of the section might lead the listener to hear it as having an ABA form - b.1 - 10; b.11 - 14; b.15 et seq.

However, the patterns used in b.11 - 14 continue to appear in b.15 et seq., and the similarities between the different events in these bars might lead the listener to hear b.11 et seq. as one unit. The held chord at b.11 leads to a held chord at b.12-13 which ends with a forte two note staccato chord at b.14. After a silence an arabesque-like figuration at b.15 (the repetition of the piece's opening figuration) ends with a short, forte C natural - the same note as appeared in the staccato

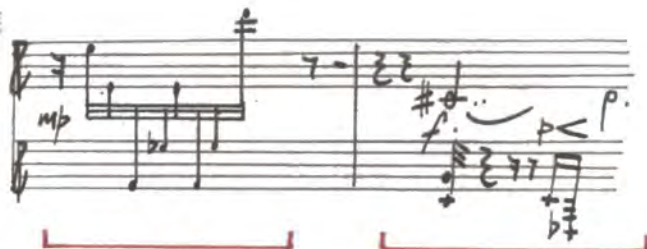
chord which ended the previous event at b.14. C natural also appears at b.16 (pizzicato), where it is linked to the arabesque-like figure at b.15 by a held harmonics chord. It is followed by rests. A further arabesque-like figuration at b.17 (the repetition of a figuration from b.3) is followed by a forte, two-note staccato chord at b.18 which also uses the note C natural, and C natural appears prominently throughout the passage which follows.

The similarity between these patterns - in which each event is terminated by a staccato, forte C natural (which gives a sense of continuity), and the contrast between the C natural which dominates the music from b.11 onwards and the C sharp which dominates the passage from b.1 - 11, might lead the listener to hear this section as falling into two, rather than three, units. In the following discussion I shall consider the section as falling into two units - b.1 - 10 and b.11 et seq.

b.1 - 10.

The first of these units might be heard as falling into two periods - b.1 - 6 and b.6 - 10 - linked to one another by the held chord which begins in b.5 and ends in b.8. Such a reading of the passage might be adopted because the arabesque-like figurations at the end of b.6 are reminiscent of those which opened the piece and because the middle of b.6 is one of the few points in the passage where no figurations are played. An alternative reading of the passage might regard the second period as beginning at b.5, on the grounds that b.5 is more clearly separated from b.4 (b.5 is separated from the previous bar by rests and the fact that it introduces a new pedal chord) than it is from b.6; but b.4 and 5 seem to have some patterns in common and, for this reason, I shall consider b.5 as being linked to b.4 and the second period as beginning at b.6.

The first two bars of the piece can be heard as two complementary gestures forming a single balancing structure:



Ex. 223.

Bars 3 and 4 might be heard as a similar structure, the end of which is marked by the forte figuration at the beginning of b.4. If b.6 is regarded as the beginning of a new period, the remainder of b.4 - b.6 might be heard as a cadential structure consisting of three similar figurations - the first, a figuration built of two ascending chords, the second, a similar figuration and the third a descending figuration:



Ex. 224.


That the second of these figurations is softer than the first and the third slower than the previous two further suggests that this structure is cadential, as might the fact that the last note of the structure (Ab) is the lowest note heard to this point. These three figures give a relaxed effect because they seem similar.

The first period can, thus, be heard as an antecedent - consequent construction followed by a cadential passage.

The second period (b.6 - 10) begins, like the first,

with an arabesque-like flourish. It ends with three isolated chords, the last of which has the note C sharp as its top note; the note which dominated the first period. The return to this note suggests that this is an important structural point. A long pause separates the first and second units.

b.11 et seq.

The second unit begins with a much slower and more relaxed harmonic rate than the first. It begins with a held chord preceded by a grace note; the rhythm seems to be extended in b.12 when another held chord appears preceded by a short preparatory chord:  This second chord is sustained until b.14 when it ends with a staccato forte chord, the top note of which is C natural. This structure is followed by another structure (an arabesque figuration which is a repetition of the opening of the piece) which also ends with a staccato C natural (b.15). This C natural is echoed by the pizzicato C natural in b.16. A further arabesque like figuration appears in b.17 (which is a repetition of a figuration from b.3); this leads to a chord which is followed (b.18) by another staccato forte chords in which the note C natural is prominent.

During the following bars the structures are less clearly separated but the C natural, which punctuated the previous passage, is prominent throughout and because of this the passage from b.19 - 23 seems like an extension and a complex development of the figurations used in b.11 - 18. This passage seems to end at b.23 with a series of chords, all of which use the note A natural - the prominence given to this note gives an effect of very slow moving harmony and suggests a cadential relaxation.

Bars 24 and 25 present two short structures, linked by a held harmonics chord - the first ends with the note

C natural (which suggests a relevance to the earlier structures); the second is piano pianissimo throughout and ends with a three chord pattern which suggests a cadence point. After a long silence, b.26 presents a final short arabesque-like figure - a figure which has already appeared at b.3 and b.17 and which here seems to mark the end of the second unit. The two units seem to balance one another and form a section. The last chord of the section, at b.30, follows such a long time after the arabesque figuration at b.26 that, although it may be heard as the final chord of the section, it is more likely to be heard as belonging to the section which follows.

The second unit, thus, seems to have an interesting and rational shape - beginning with slow moving chords it presents a series of short, clearly defined patterns, the end of each being marked by a forte staccato C natural. After b.19 these patterns gradually become more complex, although they still seem relevant to what has gone before, and develop into a longer, more extended structure. This then dies away and gives place to a more fragmentary structure which prepares for the end of the section. The end is marked by the repetition of a figuration which has already featured prominently earlier in the section.

The second unit is differentiated from the first by its emphasis on the note C natural (as opposed to the C sharp which dominates the opening unit) but both units seem relevant to one another and, together, seem to have a satisfactory and meaningful overall shape. This overall shape is not the result of Cage's rhythmic structure, but is read into the work by the listener.

The texture of the 'Music of Changes' is less complex than that of Boulez's 'Structures' - in the 'Music of Changes' the listener is more concerned with forming the

isolated notes into comprehensible groups than with trying to absorb a great deal of information and grasping any figurations and motives which seem to suggest themselves - but in both works the patterns to which the listener clings and which he regards as significant are the products of chance.

I shall now examine two works (Stockhausen's 'Zeitmasse' and Berio's 'Sequenza I for solo flute') in which the patterns the listener hears and the way in which he understands the music seem to be carefully controlled by the composer.

3. Stockhausen:: Zeitmasse.

I have already discussed the overall formal design of 'Zeitmasse' (11) and I have said that thematic patterns play an important role in defining the formal design. Most of these patterns consist of 3 or 4 notes and use the intervals of either a semitone, a major 7th or minor 9th and the intervals of either a major 3rd, minor 3rd, major 6th or minor 6th. So much of the work uses patterns that are clearly similar to one another that the listener is willing to assume that the patterns that he cannot grasp are also relevant to what has gone before.

I shall examine the opening of the work in detail to show how Stockhausen exploits the three and four note patterns as a means of providing continuity and arousing the listener's interest. I shall consider the section from b.1 to b.20. This section is shown in full in the example overleaf.

During this examination I shall use the term 'structure' to describe a small unit or event, and the term 'period' to describe a larger unit built of two or more 'structures'.

(11) See Pgs. 191-266

Stockhausen: Zeitmasse

Ex. 225

$\text{♩} = 84$

beschleunigen $\text{♩} = 112$

beschleunigen

Handwritten musical score for the first system, featuring five staves: Oboe, Flute, Clarinet, Bassoon, and Bass. The music is in 4/4 time and includes dynamic markings such as *pp*, *mf*, *f*, and *ppp*. A five-measure phrase is bracketed in the Clarinet part.

Handwritten musical score for the second system, featuring five staves: Oboe, Flute, Clarinet, Bassoon, and Bass. The tempo is marked $\text{♩} = 132$ and includes the instruction "verlangsamen $\text{♩} = 84$ ". The music includes dynamic markings like *mp*, *p*, *pp*, *ppp*, and *ppp<mf*. A three-measure phrase is bracketed in the Clarinet part, and a five-measure phrase is bracketed in the Flute part.

Handwritten musical score for five staves (Ob., Fl., Cl., C., Bass) in common time. The tempo is marked *verlangsamen* and the metronome is set to $\text{♩} = 66$. The score is divided into three measures.

- Measure 1:**
 - Ob.: Rest.
 - Fl.: ff (fortissimo).
 - Cl.: mf (mezzo-forte).
 - C.: pp (pianissimo).
 - Bass: ppp (pianississimo).
- Measure 2:**
 - Ob.: $\text{mf} > \text{p}$ (mezzo-forte to piano), triplet of eighth notes.
 - Fl.: f (forte), triplet of eighth notes, ppp (pianississimo).
 - Cl.: f (forte), triplet of eighth notes.
 - C.: f (forte), triplet of eighth notes, ppp (pianississimo).
 - Bass: f (forte), triplet of eighth notes, p (piano).
- Measure 3:**
 - Ob.: Rest.
 - Fl.: pp (pianissimo).
 - Cl.: ppp (pianississimo), p (piano).
 - C.: p (piano).
 - Bass: pp (pianissimo).

Handwritten musical score for five staves (Ob., Fl., Cl., C., Bass) in common time. The tempo is marked *verlangsamen*. The score is divided into three measures.

- Measure 1:**
 - Ob.: Rest.
 - Fl.: Rest.
 - Cl.: p (piano), pp (pianissimo), ppp (pianississimo).
 - C.: ppp (pianississimo).
 - Bass: ppp (pianississimo).
- Measure 2:**
 - Ob.: Rest.
 - Fl.: sfz (sforzando), mf (mezzo-forte), f (forte), mf (mezzo-forte), pp (pianissimo), p (piano).
 - Cl.: sfz (sforzando), f (forte), sfz (sforzando).
 - C.: ppp (pianississimo), f (forte), pp (pianissimo).
 - Bass: ppp (pianississimo), pp (pianissimo).
- Measure 3:**
 - Ob.: Rest.
 - Fl.: sfz (sforzando).
 - Cl.: sfz (sforzando).
 - C.: sfz (sforzando).
 - Bass: sfz (sforzando).

$\text{♩} = 42$

beschleunigen

$\text{♩} = 84$

Verlangsamung

$\text{♩} = 66$

Ob.

F.

Cl.

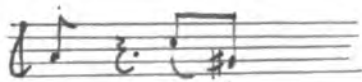
Cl.

Bass

Handwritten musical score for Clarinet in A (Cl.) and Bassoon (Bass). The score is divided into four measures. The first measure is marked with tempo $\text{♩} = 42$ and the instruction "beschleunigen". The second measure is marked with tempo $\text{♩} = 84$. The third measure is marked with "Verlangsamung". The fourth measure is marked with tempo $\text{♩} = 66$. The Clarinet part (Cl.) features a melodic line with slurs, accents, and dynamic markings such as *sfz*, *mf*, *p*, and *ppp*. The Bassoon part (Bass) features a bass line with dynamic markings *f*, *p*, and *ppp*. The score includes various musical notations like notes, rests, and slurs.

The following series of balancing structures can be heard in this section b.1 - 3; 3 - 4//4 - 6; 6 - 8//9 - 11; 12 - 15//16 - 20.

The first structure consists of a held chord (on the flute and cor anglais) above which the bassoon has a three note figure:



Ex. 226.

This figure is built of the intervals of a minor third (A-C) and a major third (C-Ab). The first and last notes are a semitone apart. A clarinet arabesque, which also ends with a falling minor third, leads to a faster cadential figure on all three instruments. The interval of a falling third (both major and minor) appears in the bassoon and the flute parts in these faster figurations:

Ex. 227.

The prominence given to these falling third draws attention to the similarity between these figurations and the opening bassoon pattern. The listener might hear two structures, separated by a short rest, in these four bars: the first would include a falling major third on the bassoon

and end with a falling minor third on the clarinet (b.1 & 2) and the second would also include a falling major third on the bassoon and end with a falling minor third on the flute (b.3). Because these two structures seem to balance and compliment one another the listener might expect the two to form a short period and to be followed by a second separate period. The second structure, however, is extended and the end of the first part is marked by a two note staccato chord on the clarinet and bassoon in b.4.

The next period begins at b.4 with a two note chord on the flute and the bassoon, the notes of which are a seventh apart as they were in the chord at the opening of the first period. This period uses the cor anglais for the first time, the introduction of a new instrument suggesting, to the listener, that a new group of structures has started. Instead of the flourish which might be expected to follow this two note chord (a flourish such as that which followed the two note chord in the previous phrase) a slight increase of movement - in which the figurations use the intervals of a third and a 7th - leads to a four part chord at b.6, the notes of which are withdrawn one by one:

The musical score consists of four staves: Flute (Fl.), Cor Anglais (C.A.), Clarinet (Cl.), and Bassoon (Bass.). The time signature is 7/8. The key signature has one flat (B-flat). The score includes various musical notations such as slurs, accents, and dynamic markings (ppp, pp, p). The Flute part starts with a half note followed by a quarter note, then a triplet of eighth notes, and ends with a sixteenth note. The Cor Anglais part features a triplet of eighth notes and a quarter note. The Clarinet part has a half note followed by a quarter note. The Bassoon part has a half note followed by a quarter note. The score concludes with a four-part chord at measure 6, where notes are withdrawn one by one.

Ex. 228.

A flourish at b.6 starts the second structure of this four bar period (b.4 - 8) and leads to a held three note chord. The lowest notes of this chord are a seventh apart and are the notes which started the first period of the piece (D & C sharp). The chord ends with the flute playing a falling major 6th, which might remind the listener of the falling third played by the flute at b.3. This second period is separated by rests from the following period.

So far the listener has heard two periods of four bars each, each period consisting of two small structures; in both periods the listener can hear the two structures as balancing each other. Four kinds of figuration have been established - the two and three note patterns, usually built of a seventh and a falling third (the flute's two note pattern at b.8 is a falling 6th but is reminiscent of the flute pattern at b.3, which is a third,) the separate staccato notes which appeared in the extension of the first period at b.3 and 4, the arabesque-like flourishes and the held chord. The two periods and the structures of each period are separated from one another by a rest and are distinguished by changes of tempo. The second period is also differentiated from the first by its use of cor anglais. In both periods the dynamics are predominantly 'p' or 'pp'.

Bars 9 - 12

The period from b.9 - 12 returns to the original metronome marking of crotchet = 84 (the period from b.5 - 8 was marked quaver = 132) and the shape of the period is similar to that of the opening period. A soft, held, three-note chord leads to a short fortissimo chord, followed by a falling two note figure on the cor anglais. Although this figure is separated by rests from the previous chord, and from what follows, the listener is likely to hear the figure as marking the end of the previous

structure, because it is reminiscent of the figures which seemed to mark the end of earlier structures (the cor anglais's figure descends a minor 6th and is particularly reminiscent of the flute's falling 6th which ended the second structure at b.8.):

Ex. 229.

The cor anglais figure is followed by arabesque-like flourishes on the flute, clarinet and bassoon.

Whereas clear two or three note patterns seemed to mark the end of the previous structures, the three note pattern which now appears on the cor anglais at b.12 - which the listener might expect to end the structure - leads to a section which is concerned with developing these two and three note patterns. A three note figure on the cor anglais, descending a major third and a major 6th, is answered by an ascending major 6th on the flute. Both figures begin on the same note. A four note chord is formed and, as the chord ends, the cor anglais announces another three note figure which again begins with a falling third but then rises a minor 9th. The figurations which follow seem to be variants of this pattern: the leap of a wide interval in the cor anglais figure (the rising minor 9th) is similar to the wide falling interval (a 7th) in the bassoon part; the three

note figure on cor anglais, which follows at b.14, rises a minor 7th and falls a minor ninth (the first and last notes are a minor third apart, which may be reminiscent of the falling minor third which began the previous cor anglais figure at b.13); the wide falling interval is similar to that in the previous bassoon figure. Other similar three note figures appear on the clarinet and the cor anglais at b.15. The following example shows the different figurations from b.12 - 15; patterns which seem similar in some way are indicated by arrows:

Ex. 230.

Up to this point the instruments have been playing in a central pitch area, the dynamics have been predominantly soft and the harmonic rate has been fairly slow and relaxed. Throughout, the structures have been clear in shape and easily perceptible. All the structures have formed periods which seemed to balance each other - b.1 - 4 and b.4 - 8 balance each other and b.4 - 8 balances regularly within itself (b.4 - 6 balancing b.7 - 8) - and b.9 - 11 seems to be about to form a similar balance with the structure beginning at b.12. A norm of pitch, movement, dynamics and balancing periods has, therefore, been established. At b.16, however, when the listener might anticipate a caesura at the end of the b.12 - 15 period,

the flute enters with a very fast, high and loud arabesque. Against this arabesque, the cor anglais has a three note figure similar to those of the previous section:

The musical score for Ex. 231 consists of two staves. The top staff is for the Flute (Fl.) and the bottom staff is for the Cor Anglais (C.A.). The Flute part begins with a sharp key signature and a 2/4 time signature. It features a series of rapid, high-pitched notes with various dynamic markings: *sfz*, *mf*, *ff*, *f*, *mp*, and *p*. There are slurs and accents over the notes, and some notes are marked with 'x' above them. The Cor Anglais part features a three-note figure with dynamic markings *sfz*, *f*, and *sfz*, and a 7th interval indicated by a '7' above the first note.

Ex. 231.

This flute entry is unexpected and breaks with the norms that have been established and which the listener has come to accept. As the arabesque is passed to the cor anglais, the clarinet and bassoon have falling 2 note figures (a 7th and a 9th). The bassoon hold the last note of its falling figure and this pedal note relaxes tension and prepares for the end of the first main section. The cor anglais plays three different figurations over this pedal note; these are shown in the following example. They seem similar to the previous two and three note patterns, (like them, they use the intervals of a minor 3rd, minor 6th and major 7th) but have four notes and might be heard as extensions of the earlier patterns:

The musical score for Ex. 232 shows a four-note figure on a single staff. The notes are connected by slurs, and red arrows above the staff indicate intervals: *min. 3rd*, *min 6th*, *maj 7th*, *min 3rd*, *maj 7*, and *min 3rd*. The key signature has one sharp (F#).

Ex. 232.

Although this first section presents a number of short periods (rather than moving in large developing blocks, as does most of the piece) it exemplifies the techniques

that Stockhausen employs in the simpler passages of 'Zeitmasse'. A close study of the passage from b.12 - 15 will show how carefully Stockhausen controls the associations which the listener is forced to make to relate one pattern to another.

The relevant passage is shown in the example below. In b.12 the cor anglais has a three note figure, descending a major third and a major sixth. The flute has a two note figure, ascending a major 6th. At the end of the bar the bassoon enters with a held A sharp. These patterns

The image shows a handwritten musical score for four instruments: Flute (Fl.), Cor Anglais (C.A.), Cor Anglais (Ce.), and Bassoon (Bssn.). The score is for measures 12 through 15, indicated by the 'b.12' marking at the top left. The Flute part begins with a two-note ascending figure (G4 to E5) marked with a 'p' dynamic. The Cor Anglais part has a three-note descending figure (G4 to E4) marked with a 'p' dynamic. The Bassoon part enters at the end of measure 12 with a held A sharp (A#4) marked with a 'pp' dynamic. The score includes various musical notations such as notes, rests, slurs, and dynamic markings (ppp, p, pp).

Ex. 233.

can be heard as answering and balancing each other. The rising sixth on the flute mirrors the falling 6th on the cor anglais and, perhaps more importantly, the rising 6th on the flute can be heard as a version of the cor anglais opening falling third, even though it is not a strict

inversion of that interval. The intervals which are really related - the two sixths - are probably less strong as an audible relationship than that formed by the 3rd and the 6th, because the Cor anglais' 3rd and the flute's 6th both start on the same note and because the cor anglais' falling 6th is slightly obscured by the flute entry. Moreover, the ear might relate the bassoon's A sharp to the two-note flute figure so that together the flute and bassoon parts form a three note pattern which seems similar to the cor anglais' three note pattern. In this way, the ear might ignore the intervallic inconsistencies in order to produce a more symmetrical balance between the two figurations - if the ear does do this it is because the earlier sections of the piece have led the listener to expect such balancing figurations.

The cor anglais' figure in b.13 can easily be heard as being similar to the cor anglais figure in b.12 because both begin with a descending 3rd (one major and one minor) and both have three notes; the cor anglais figure in b.14 can be heard as being similar to both the cor anglais figure at b.13 (both have three notes and include a descending minor 3rd and a leap of a 9th) and to the 2 note bassoon figure at b.14 (the descending 9th in the cor anglais seems similar to the descending 7th in the bassoon). The cor anglais and clarinet figures that follow can also be heard as being similar to what has gone before - because they are slower than the previous figurations, they might be considered to be augmentations of the earlier patterns and the cor anglais figure (which has 4 notes) might be regarded as an extension of the earlier three note figures.

Because the melodic patterns are short and relatively simple, the texture sparse and the rate of activity slow (so that the listener can perceive and has time to absorb the patterns) and because most of the patterns seem to

have some relevance to one another, the number of ways in which the listener can interpret the patterns in such a passage is limited and his response to the music is determined by the composer. The listener's interest is held by the variety of shapes and patterns and yet the music seems to have some kind of unity.

I have said that one of the main formal ideas of 'Zeitmasse' is the contrast between the two extremes of total movement (the 'Complexes') and total stasis (the held chord) (12), and I have shown how the whole work may be understood as moving between these two extremes (13). The way in which the thematic patterns help to define this movement may be made clear from a consideration of the passage beginning at b.131.

Bars 131 - 150.

The whole of this passage is shown overleaf. A sequence of chords ends at b.131 with the flute rising a minor 10th and the oboe a major 7th. The slight activity started by this movement gains impetus through a clarinet flourish (built of the intervals of a 7th - marked 'a' on the example on the previous page - and a minor 3rd, marked 'b'). The clarinet flourish has 4 notes and is answered by a four note figure on the flute (consisting of a rising and falling 7th.) After b.134 the four note figures give way to two note figures or to single notes, but the listener might feel an effect of continuity because, between them, these single notes form intervals similar to those used in the previous figurations (these figurations are indicated in the example on the ^{following} ~~previous~~ page.) At the end of b.135 single notes on the flute, oboe and clarinet coincide and lead, at b.137 to a short section of block movement.

(12) See Pg 12.

(13) See Pgs. 191-206

Ex. 234

Stockhausen: Zeitmasse

0121 133 134 135

pp mp f sfz

136 137 138

beschleunigen *verlangsamen*

pp f mf sfz

in Tempo *verlangsamen* *in Tempo* *langsamer*

143 144

pp mf ff sfz

145 146 147 148

Ob. sfz b mf pp

F. f mf f b fp

C. f fpp mf sfz b mf

149 150 151

Ob. mf pp

F. mp

C. pp

The separate units which make up this section become shorter and shorter and the section ends with single chords separated by rests. These chords are prefaced by gracenotes and the listener might hear them as diminutions of the short two note units which ended the passage of block movement at b.139. The single chords and their attendant gracenotes are extended to form legate figurations (b.142 et seq.) and the music moves more slowly as notes from these figurations are held longer (b.148 et seq.) until, finally, a three note chord is gradually formed (b.152).

This process, which sounds unnecessarily complicated to describe, forms, to the ear, a perceptible and interesting progression from a slow-moving chordal section to a section of fast, complicated movement, and back to a static chord.

4. Berio: Sequenza I for solo flute.

I shall consider the piece as falling into five sections:

Section 1: Pg. 1, staves 1 - 7

Section 2: Pg. 2, staves 1 - 9

Section 3: Pg. 2, staves 9 to Pg. 3, stave 3.

Section 4: Pg. 3, stave 4 to Pg. 4, stave 7.

Section 5: Pg. 4, stave 7 to the end.

I shall deal with the first section only. The first section falls into two groups of three phrases each. Since no bar lines are printed in the score (14) I shall define the position of each phrase by its stave number. The first section is shown in full in the example overleaf. The first section may be defined thus:

 (14) Suivini Zerboni Edition



Ex 235.

SEQUENZA

PER FLAUTO SOLO

LUCIANO BERIO
(1958)

Group A

Phase 1

70 M.M.

ffz — ff — ff — mf — ff > mf — p

Phase 2

ff — ffz — mf — f — ff — ff

Phase 3

ff-pp — ppp — mf — pp ff — mf — ff

Group B

Phase 1

p — pp — ff — mf — p — ffz — ffz

Phase 2

ff — mf — p — f — mf — f — mf — p — f — mf

Phase 3

f — p — f — ff — ff

p — ff — f — ffz

First Section:

Group A:

First phrase - Stave 1 (separated from 2nd phrase by a short break)

Second phrase - Stave 2 and 1st note of stave 3.
(A pause on a held note separating this phrase from phrase 3.)

Third phrase - Staves 3 and 4 (except for last 3 notes of stave 4.)

Group B:

First phrase - Stave 4 (last 3 notes) and first half of stave 5.

Second phrase - Stave 5 and first half of stave 6
(Differentiated by phrasing from 1st phrase and separated from 3rd by a short rest)

Third phrase - Stave 6 (second half) and stave 7.
This stave is followed by a break.

When comparing phrases I shall refer to each phrase by a letter and a figure; the letter indicates the Group, the figure the phrase - A/2, for example, refers to the second phrase of Group A. I shall refer to the cells within each phrase by two letters and a figure - A/2/b, for example, refers to cell b of the second phrase of Group A.

Group A. Phrase 1. (A/1)

The first phrase is shown in the following examples:

a) Phrase Construction

The phrase is built of 5 cells, the last of which is slower and more relaxed than the others and suggests a cadence. I shall call these cells a, b, c, d and e. The first cell (a) is of three notes, the second of 4 notes, the third of 3 notes and the fourth of four notes (15). This suggests a 2 + 2 cell balance, the last cell (e) acting as a cadential extension. Throughout the phrase, and throughout the piece, the intervals of a tone and a semitone play a prominent role in suggesting relationships between figurations; the intervals are easily perceived and draw attention to themselves. In the present phrase the semitone A - G sharp at the beginning of cells a and b, and the whole tones F sharp - E and B - A at the beginning of cells c and e have such an effect and suggest these cells are relevant to one another. The rest of the phrase uses larger intervals but the interval of a whole tone appears at the end of cell b and the end of cell e.

b) Interrelation of cells

The suggested 2 + 2 balance of cells a & b and cells c & d is reflected in their harmonic structure, cells a & b sharing the same notes and cells c and d also sharing the same notes:

(15) When discussing the construction of phrases I shall not consider gracenotes as important elements because they do not affect the overall construction of a phrase in any essential way; I shall, however, consider gracenotes when discussing the interrelation of cells because they can suggest important motivic differences or similarities between one cell and another.



Ex. 237.

Cell e is differentiated from these four cells because it uses notes not previously employed.

The two groups of cells (a & b, c & d) seem linked because the highest note of cell b (a note which does not appear in cell a) appears as the grace note which begins cell c and the ear is, thus, carried forward from cell b to cell c. Both cell b and cell c begin with grace notes - the opening of cell c suggests that it is going to be similar to cell b; in fact it is more similar to cell a.

c) Definition of Voices

The following diagram shows how three different voices are defined by pitch during the first phrase:



Ex. 238.

Each of the three voices descends, usually by steps of a whole tone or a semitone. The upper voice (A), for example, descends F sharp - E - D - C sharp - B - A. A feature of these different voices is that they seem to reflect one another. The descending whole tone B - A

in voice A, for example is mirrored by the ascending whole tone Eb - F in voice C, giving an effect of related contrapuntal parts, This effect appears constantly throughout the piece.

Group A. Phrase 2. (A/2)

The second phrase is shown below:

Ex. 239.

a) Phrase Construction.

The phrase has two halves, each of which has three cells. The first half of the phrase ascends in pitch, the second half gradually descends. The first half consists of a two note cell prefaced by two gracenotes (a) and two three note cells (b and c); the second half consists of a three note cell (d) and two two note cells (e & f.). Cells a, b and c all have similar contours and the first cell of the second half (cell d) seems to invert this contour.

b) Interrelation of cells within the phrase.

The two three note cells (b and c) have similar contours and cell c defines a harmony similar to that defined by cell b:

Ex. 240.

The two cells also include similar figures - a descending semitone (B - Bb) appearing in cell b and another (E - Eb) in cell c. Cell d ends with a falling 9th and cells e and f are also built of falling 9th. Moreover the last

note of cell c is a ninth above the first note of cell d. The consistent wide, falling intervals in this second half of the phrase gives a relaxed effect. The semitone movement which appears in cell b and cell c (the last two cells of the first half of the phrase reappears between cells e and f (the last two cells of the second half of the phrase) which begin and end a semitone apart. In cells b and c the semitones descend, in cells e and f they ascend:



Ex. 241.

c) Links with previous phrases

Because the whole tone G - A of cell A/2/a is at the same pitch as the tone B - A of cell A/1/e, and the whole tone G sharp - F sharp of A/2/a at the same pitch as the whole tone Eb - F of A/1/e (and because the whole tone figures in A/2/a are only a tone below and a semitone above the same figures in A/1/e), there seems to be a link between the two phrases:



Ex. 242.

The A natural of cell A/2/a eventually rises to B natural at the beginning of cell A/2/b, providing a further link with the previous phrase:



Ex. 243.

In addition, cell A/2/a defines a similar harmonic field to that defined by cell A/1/a:



Ex. 244.

d) Definition of Voices

The following diagram shows the different voices defined by pitch in this phrase:



Ex. 245.

The strong rising shape of the first half of the phrase maintains the stepwise movement, but contrasts with the falling shape of phrase A/1. The stepwise movement disappears during the second half of the phrase. The mirroring of figures between the different voices (which appeared in cell A/1/c) reappears at the beginning (A/2/a) and end (A/2/e & f) of this phrase:



Ex. 246.

Group A. Phrase e. (A/3)

The third phrase is shown below. I have divided the complex second half of the phrase into three cells (c, d and e) because the notes D - E - C sharp of cell d are close together and suggest a separate cell, the first and third notes of which (like those of cell c) are a semitone apart. The ear probably hears the six notes of c and d as two separate cells and the rest of the figuration (the four grace notes and the two notes which make up cell e) as another cell:



Ex. 247.

a) Phrase Construction.

Phrase 3, like the two previous phrases, is built of two balancing sections. The first half consists of two cells (a and b); cell a has four notes (the 3rd

preceded by a gracenote) and cell b has three notes (the first preceded by a gracenote arabesque). The second half is built of two three-note cells (c & d) and a two note cell (cell e); cell e is preceded by a gracenote arabesque. A final cell (f), which is slower than the previous cells, ends the phrase. The construction of this phrase is more complex than that of the previous phrases.

b) Interrelation of cells within the phrase

The second half of the phrase (cell c) begins a minor third above the last note of the first half of the phrase. The last note of the first half (Eb in cell b) links the two parts of the phrase; its pitch area has not been used earlier in the first half of the phrase but becomes important in the second half.

The sequence of cells which opens the second half of the phrase (cells c, d and e) begins on F sharp; this same note begins cell f, the last cell of the phrase, and seems to provide a link between the two parts of the second half of the phrase. Cell b ends a minor third below the first note of cell c and cell e ends a tone below the first note of cell f; because the intervals are small the ear can link the end of one cell and the beginning of the next.

c) Links with the previous phrases

Cell A/3/a begins on the note on which the last phrase ended and rises a tone, from E to F sharp. The last note of cell A/3/a is isolated from the other notes and is a tone below the first main note (Bb) of cell A/3/b - the ear is thus carried forward from the end of the previous phrase.

Cell A/3/b has a similar contour to cell A/2/d and both have the interval of a fifth between their first and third notes:

The association of voices through parallel movement is particularly noticeable in this third phrase. The rising minor third Bb - Db in cell b is paralleled in the lower voice by the rising minor third Eb - F sharp between cells b and c: the parallel movement between the gracenotes of the arabesque figurations can be seen in the following example:



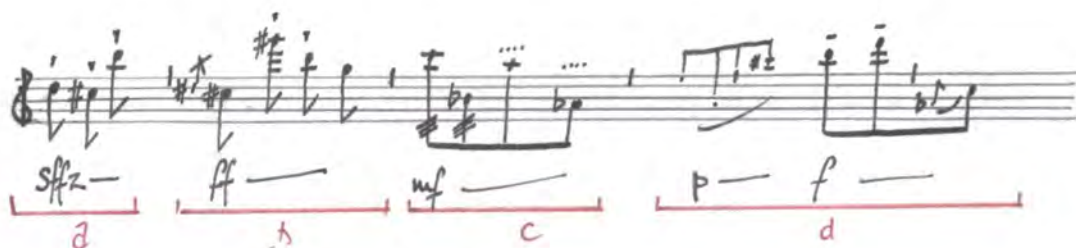
Ex. 251.

Second Group: Group B

First phrase. (B/1)

a) Phrase Construction

The first phrase of the second group is shown below:



Ex. 252.

The second Group begins as a repeat of the opening of the first Group. The cell balance is reminiscent of that of phrase A/1; the phrase has two halves of two cells each (a, b, c, d). Cell a has three notes and cell b has four, cell c has four notes and cell d three.

Cell c is preceded by a gracenote; cell d is preceded by a gracenote arabesque and has a gracenote before its third note. There is no cadential cell as there was in Phrase A/1.

b) Interrelation between cells within the phrase

Cells a and b maintain the interrelation of harmony which appeared in the first two cells of A/1;



Ex. 253.

Cells c and d do not correspond to cells c and d of phrase A/1 and do not maintain the earlier harmonic relationship. Instead cell b of this phrase (B/1/b) is associated, through pitch, with cell c:



Ex. 254.

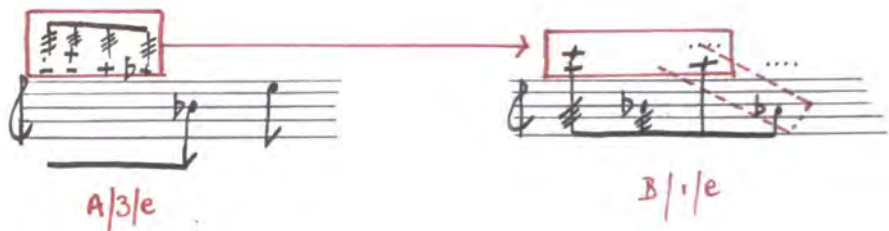
The descending minor third C - A of cell B/1/c reappears a tone higher in B/1/d:



Ex. 255.

c) Links with previous phrases

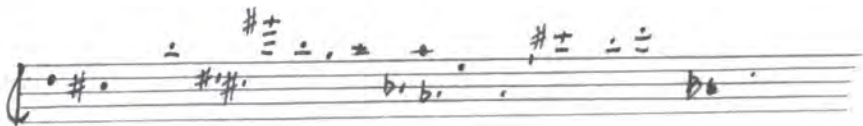
The similarity to A/1/ has already been mentioned. Cell B/1/c refers back to the gracenote figure which precedes cell e of the previous phrase (A/3/e) through its fluttertonguing and its harmonic area (although the Ab may not be heard as part of the harmonic area since its appearance in B/1/c is at a different pitch from its appearance in A/3/c):



Ex. 256.

d) Differentiation of Voices

The stepwise movement of voices in this phrase is much less clear than in any of the previous phrases:



Ex. 257.

The parallel movement of parts is particularly noticeable in the final cell d:



Ex. 258.

Phrase 2. (B/2)a) Phrase construction

The second phrase of the second Group is shown below:

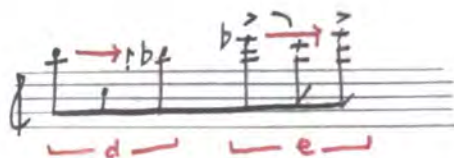
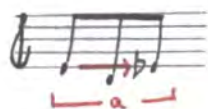


Ex. 259.

In this series of five cells (a, b, c, d, and e) cells a, b and c form the first half and cells d and e the second half of the phrase. The first three cells are separated from the last two cells by phrasing. All the cells have three notes though cells b, c and d also include a gracenote and cell e is preceded by a gracenote arabesque. The position of the gracenote is different in each cell. Each cell in the phrase is at a higher pitch than that before it. The increase of tension during this phrase prepares for the small climax in the next.

b) Interrelation of cells within the phrase

The first and third notes of cells a, d and e are a semitone apart. In cell e the semitone (which descends in cells a and d) ascends:



Ex. 260.

effects) but it is probable that the listener will lose interest after a short while because the music seems too unpredictable and seems to lack continuity. It seems likely that the chief interest in such works is that which springs from the patterns that the listener himself reads into them. If these patterns are in no way determined by the composer one might question whether such works have any value apart from their attraction as a mental exercise for the listener.

The associations that are formed in 'Sequenza' and in 'Zeitmasse' are both more intricate and more interesting than those of 'Structures'. In both the composer determines the way in which the listener interprets the patterns and uses the listener's associations to point and clarify the formal shape of the piece - each separate element seems to be part of a larger unit, the larger unit part of a phrase, the phrase part of a group of phrase, and so on. Thus, a sense of continuity and cohesion is achieved. The listener feels that each detail is part of something larger and he is able to see the relationships between the details and the larger structures to which they belong. The Gestalt theorists considered meaning to be the result of the observer's insight into whole - part relationships of this kind.

The listener's subjective interpretation of the patterns in 'Zeitmasse' and 'Sequenza' plays a larger role in his understanding of the music than in Webern because the musical material of these works is more complicated and the details less clearly perceptible (and less likely to be taken on trust) than in Webern's music. But both 'Zeitmasse' and 'Sequenza' show that it is possible for a composer, using a complex musical language, to determine the way in which the listener understands and

responds to a work and for a composer to exploit the uncertainty which the listener can feel in non-tonal music.

In the following chapter I shall consider chance music and its relation to the general problems of post-Webernian music in greater detail.

VIII. The Problems of Formal Design in
Post-Webernian Music

1. Chance music.

a) Music composed using chance techniques

The work of John Cage is the best known example of music in which the results are determined by chance operations such as coin tossing or the filling in of imperfections in the manuscript paper.

Cage's pieces, and their method of composition, are the outcome of his philosophical beliefs. He attempts to prevent his own subjective preferences affecting the work, and to simply let sounds exist:

"Not an attempt to understand something that is being said .. just attention to the activity of sounds."(1)

Cage does not intend any sense of development or continuity to be felt in his work and he criticises the European composers' interest in continuity:

"There is in all this activity an element of tradition ... which is expressed in each work as an interest in continuity, whether in terms of discourse or organisation". (2)

He does not call the results of his applications of chance procedures 'music':

"One may give up the desire to control sounds, clear his mind of music and set about discovering means to let sounds be themselves". (3)

nor has he any pretensions to the title of composer:

- (1) Cage. 'Silence'. 'Experimental Music' Pg. 10
 (2) Cage Ibid. Pg. 74-75. 'A History of Experimental Music in the USA'.
 (3) Cage. Ibid. Pg. 8. 'Experimental Music'.

"Thus, finally nothing has been determined by the notation in so far as performance time is concerned. And as concerns timbre, next to nothing. This is especially true where P is interpreted as meaning a plucked muted string and M a muted plucked string. Nor, indeed, have the points on the strings where these latter operations are to be made been indicated ... and placement (customarily different) of the instruments (how many?) ... all these elements, evidently of paramount importance, point the question: What has been composed?" (4)

It is important to recognise that, despite the logic with which he pursues his policy of non-involvement, Cage's objective cannot be realised. He wishes the listener to hear each sound as a discrete, unrelated object but the mind is unable to do so - 'the mind tends to impose patterns upon even a random series of stimuli'.

(5) The listener will hear patterns in any music and, as I have said, it seems likely that the only interest in chance music springs from the patterns which the listener reads into music - "Hearing sounds which are just sounds immediately sets the theorising mind to theorising" (6) - and although he criticises the European composers for their interest in continuity, he admits that the very act of playing one note after another results in some kind of progression or continuity - "It was argued from a rational point of view that, no matter what, there is continuity. This is again a matter of disinterest and acceptance" (7), - but Cage does not accept the listener's tendency to impose patterns upon the music as the necessity it, in fact, is. The listener acquainted with

(4) Cage. 'To describe the process of composition used in 'Music for Piano 21 - 52'. Die Reihe. Vol. 3. Pg. 44.

(5) See Cohen 'Subjective Probability'

(6) Cage. 'Silence' Pg. 10 'Experimental Music'

(7) Cage. Ibid. Pg. 132. 'A lecture on something'.

post-Webernian music has become so accustomed to struggling with the material presented to him that it is almost impossible for a composer to present a sequence of notes that the listener cannot form into some kind of comprehensible pattern.

In the present study the work of John Cage is important because of the light it throws on the music of the avant-garde composers. I have said that some avant-garde procedures serve only to ensure that the resulting music seems random (9): Cage's work shows that an impression of randomness can be achieved by truly random methods. Cage is aware that random methods might produce a sequence of notes that does not sound random, and he has declared his willingness to accept such a sequence:

"Dissonance and noise are welcome in this music. But so is the V7 chord if it happens to put in an appearance." (10)

In practice, however, the appearance of V7 chord in his music is unlikely; it is just as likely, and as unlikely, to put in a chance appearance in his work as it is in that of the serial composers.

Intentionally or unintentionally, Cage's music demonstrates that music which sounds as logical as serial music can be produced by chance.

b) Music in which chance elements enter into the performance

Music in which chance elements enter, not into the composition of a work but into its performance, can be divided into two groups: that in which the general characteristics (such as dynamics, texture and rate of activity) of the different sections are determined but

(8) See D. O. Hebb's 'The Organisation of Behaviour'

(9) See Pgs. 137-164

(10) Cage. Ibid. Pg. 11. 'Experimental Music'

in which the details (such as note order) are left to chance, and that in which the sections and the details of the sections are determined but the order of the sections is, within certain limits, left to the discretion of the performer.

The composer of the first group - in which the order and general shape of the sections but not the details are determined - is able to notate the exact length of each section and to ensure that the sections contrast with each other or are juxtaposed in a way that will give some formal shape. In very complex passages - passages in which no details but only the general features are grasped by the listener - the composer can determine those features that are grasped by the listener and can leave the details to chance. Nothing would be gained by his writing out the whole passage. But in simpler sections - those in which each event is clearly perceptible - the composer is unable to predict the tonal and rhythmic associations which will inevitably appear if the details are left to chance. I have shown (11) that these associations can be crucial in determining the way in which a listener responds to a work and in such music the composer is unable to control these associations as he might. Avant-garde music is frequently accused of lacking subtlety (12) and this type of chance music avoids the necessity of finding an answer to this accusation.

The composer of the second group - in which the details and shape of each section are determined but not the order of the sections - can predict the various possible arrangements of sections and can ensure that all the possible juxtapositions are to some extent satisfactory. He can also ensure that associations,

(11) See Pgs. 213-228

(12) See, for example, the quotations from Ruwet on Pgs. 156+263

of the kind found in Berio's 'Sequenza' exist, between the different sections. The resulting formal design can, therefore, seem to have some significance. (13)

The importance of chance music in which the order of sections is not determined is that it emphasises the arbitrary nature of the formal structure of much avant-garde music.

The construction of a large work by the juxtaposition of blocks is typical of much post-Webernian music, although it is not peculiar to avant-garde music - examples can be found in the music of Stravinsky, Debussy and Messiaen. But Stravinsky's use of juxtaposed blocks, in a work such as the 'Symphonies of Wind Instruments' or the 'Rite of Spring', is very different from that of the avant-garde composers. In my discussion of hypothesis theory (14), I said that any event suggests certain possibilities of continuation and the mind sets up hypotheses about what will follow on the basis of these possibilities. In music the relevance that an event appears to have to those that precede it depends upon the nature of the musical material and the listener's knowledge of the grammar. The nature of the material in Stravinsky's music - where the chords, melodies and rhythmic patterns are reminiscent of traditional music, where tonality and metre still exist and where every event is clearly perceptible - is such that it suggests a very definite kind of continuation; the musical material of

(13) Although, of course, the composer can also ensure that such associations do not occur; if the composer is seeking to avoid giving an effect of logic and order by ensuring that none exists within the different sections then the order of the sections might be of little importance since arbitrary arrangement of sections will sound as illogical as any other.

(14) See Pg.46

avant-garde music, on the other hand, seems so imprecise that it suggests no very definite kind of continuation and, in many cases, any one of a large number of events could follow and seem relevant to what went before.

In the opening section of the 'Rite of Spring' Stravinsky alternates blocks of simple material (such as the opening bassoon solo) and complex blocks built of overlapping ostinati. The complex blocks gradually increase in both length and complexity. The alternation of these blocks defines a very precise formal design - a movement away from the simplicity of the opening towards the complex climatic passage at the end of the first section. Such a formal design would be impossible in an avant-garde work because the complexity of the musical material would make the clarity of the formal design appear naïve.

Attempts have been made to overcome the fragmentary nature of block construction in avant-garde music (Stockhausen's 'Zeitmasse' is an example of such an attempt) but in few avant-garde works does the listener feel that the music has a reason for continuing. In a traditional work tonality provides a reason for the music's continuing; there is no equivalent motivational force in avant-garde music.

Stockhausen's 'Zeitmasse' is one of the few avant-garde works in which the listener can feel the presence of some motivational force. Because Stockhausen chooses total movement and non-movement as his extremes in 'Zeitmasse' the piece seems to have a developmental, dynamic tendency. Stockhausen's 'Klavierstück I', on the other hand, seems to illustrate very clearly both the use of block form and the absence of any motivational force.

Karlheinz Füssel has said, presumably with Group form of the Stockhausen 'Klavierstücke' in mind:

"Already in his first published works .. he (Stockhausen) was thinking in terms not of conventional musical material but of sound complexes: complexes which, because of their structures, are not fully perceptible to the ear, are by their very nature, autonomous and much less concerned with perceptible relationships than, say, the thematic material of Webern. In other words, the detailed structure of this music becomes less and less important the more pedantically it is worked out.

The listener is no longer in a position to integrate the details into a whole." (15)

The same point has been made by Nicholas Ruwet. Using b.6 of the Klavierstück I as an example, Ruwet argues that the value relationships are not perceived because the safety margin is too narrow:

"It follows that as soon as the desired relationships are not perceived, music has entered the region of the undistinguishable - the kingdom of the more or less. The relationships which can still be perceived are too rough, too summary to constitute a language." (16)

This conclusion must also be drawn from my previous study of the 'Klavierstück' (17) for although Stockhausen admits that the listener hears and understands the Group structure in terms of general characteristics rather than details (indeed, the whole idea of 'Group form' is based upon this fact,) the listener hears the complex passages in a much more general way that Stockhausen is prepared to admit. This leads to the seemingly paradoxical, but familiar, observation on avant-garde music - "In the composer's plan this music is basically very intricate, but as soon as it is performed it appears unsubtle." (18)

(15) Fussel, in 'Twentieth Century Music; a Symposium' (ed. Myers) Pg. 125

(16) Ruwet 'Contradictions within the serial language'. Pg. 75.

(17) See Pgs. 217-218

(18) Ruwet. Ibid. Pg. 65

Even if the proportion row of the first Group Complex of the Klavierstück were perceptible, (19) it is doubtful whether it would have any real formal value, for it has no long-term structural function and the relationships and lengths which form the proportion row do not change or develop.

Despite Stockhausen's claim that, in the Klavierstück, 'time is realised in as active a way as to conform to our image of it', the piece seems static because there is no sense of development or of movement from one point to another. The listener can see no reason why an event should occur at one point rather than another. The order of groups - which group precedes and which follows which - has no significance; the order does not return and the listener is not led to expect any particular relationship or order of groups.

The opening of Webern's First Cantata presents two groups of contrasting material (20), both with different tempi, instrumentation and thematic characteristics. During the course of the movement the differences between the two groups are gradually broken down and, at the end of the movement, the two groups exchange instrumentation. In this movement, as in the first movement of the Symphony Op. 21, the composer achieves a process of development and change which seems to give the music a reason for having continued. This process also provides a reason for the appearance of a specific section in a specific place - each section constitutes a link in the process of change.

It might be argued that even in these works of Webern, the process of development is arbitrary, since it is a process which has validity only for the duration

(19) See Pg. 210

(20) See Pgs. 103-108

of a single movement. Nevertheless, the process - which is the basic formal design of the movement - seems to give the music a sense of motivation.

György Ligeti has objected (21) to music in which the order of sections is left to the discretion of the performer on the grounds that "the unequivocal direction of flow is lost and entropy increases." To make this objection is to assume that there is, in avant-garde music, some motivational force which gives an "unequivocal direction of flow"²². There is little basis for such an assumption. That a compositional process of change and development is possible in nontonal music is shown by the Webern 'Cantata' and 'Symphony', but in both these works the process depends upon the existence of clearly-defined, perceptible norms - in the Cantata, the difference between groups of clearly-characterised thematic material; in the Symphony, upon the regularities of rhythm, pulse and phrase structure. It may be that such a process cannot be achieved in most avant-garde music because of the complexity of the material and the lack of clearly defined limits.

Boulez has said: "If there is not, in effect, a general logic of succession, (of rows) one comes to the useless paradox of an infrastructural hierarchy, the superstructure of which presents an indifferent anarchy"²². This statement is an exact description of the relation between cause and effect in avant-garde music.

The reason for the 'unsubtlety' which Ruwet observes in this music, is that the listener cannot exactly perceive the relationships which the music presents. Temporary standards or norms can be established in avant-garde music - norms of pitch, thematic groupings, texture and so on - and the listener can experience some

(21) Ligeti. Die Reihe Vol. 4. Pg. 65.

(22) Boulez "Eventuellement ..." Pg. 125.

degrees of expectation and surprise on these basis of these norms.

In some sections of 'Zeitmasse' Stockhausen establishes a certain order of events and exploits the listener's expectations by altering the order and length of these events (23); thus the listener might be led to expect a certain event to follow another, and he might be surprised if this event does not occur.

But the listener's expectations, and therefore his surprise, can only work on a very simple level (as in the above example) in this music; he has not sufficient information about the music's grammar for him to have expectations of a very definite or complex nature. There can be none of the harmonic and rhythmic subtleties, the exploitation of delicate ambiguities, that are found in the music of the classical composers.

In a traditional work the listener can assign a degree of relative importance to every note and rhythm. This is not possible in post-Webernian music because there are no general terms of reference. The twelve note row was intended to provide such terms of reference but does not do so. Even when, as in the works of Webern, the row ensures the thematic and harmonic homogeneity of a work, the row is not perceptible as a regulating instrument. The listener is not aware of the row but only of those aspects of the row that the composer decides to enhance. Such aspects could exist without the use of a note row.

Because the listener cannot exactly perceive complex patterns without the aid of clear terms of reference, the ear can only identify simple rhythms and small intervals exactly in nontonal music. A piece may imply its own criteria but these do not extend to cover every interval,

every rhythm, every single note. The listener cannot know why one note appears rather than another - the terms of reference are neither well enough known nor so clearly defined. Thus, even in a work like the Berio 'Sequenza', where the listener's associations and response to the music are controlled with the greatest of care, the nature of the associations formed and the limits defined by the piece sound arbitrary because they relate to no permanent and generally-accepted standards; that such associations can be ensured in music in which the order of sections is left to chance emphasises their arbitrary nature.

Although the absence of absolute terms of reference is responsible for the listener's feeling that the music lacks subtlety, it is also responsible for the listener's involvement in the music. The shapes and patterns presented by avant-garde music are often too complex to be perceived exactly, but the listener is forced to try to hear the shapes and patterns in order to understand the music. This demands a degree of activity and involvement on the part of the listener that can easily be absent when listening to more traditional music.

If the avant-garde composer wishes to write a piece which both involves the listener in this way and communicates a meaningful musical idea, he must find some way of encouraging and exploiting the listener's sense of uncertainty whilst, at the same time, determining the kind of patterns that this uncertainty forces the listener to form. Many of the works discussed in earlier chapters shown that uncertainty need not exclude controls.

It is important to recognise that the weakness of avant-garde music - its lack of 'subtlety' - and its strength - the way in which it can involve the listener -

both spring from the same source: the uncertainty caused by the lack of absolute terms of reference. If avant-garde music were to evolve terms of reference comparable to those of tonality, the music would probably no longer sound unsubtle. (24) At the same time, the evolution of such terms would so reduce the apparent imprecision of the material that the listener would no longer need to be so mentally active. The development of such terms of reference, however, seems unlikely.

If the hypothetical method suggested in this thesis is a true description of the way in which the listener understands avant-garde music, then it seems likely that avant-garde music can only evolve through a deeper understanding of auditory perception. I have previously suggested that some avant-garde technical procedures serve only to ensure that the music sounds spontaneous; it is difficult to know whether these procedures are intentionally employed to produce such an impression. If a row, or any other technical procedure, does not produce a perceptible effect it is because the procedures are not used in a way that will enable them to have an audible effect. The lack of such usage might be due to a deliberate desire on the part of the composer to produce

(24) Marshall McLuhan has divided different media into 'hot' and 'cool' media, upon the basis of the degree of involvement they demand from their audience. 'Hot' media are those which seek to inform and which provide a large amount of data (thus demanding little audience participation); 'cool' media are those of low definition which leave the listener or user much more to do for himself. 'Cool' media thus demand participation and ensure a high degree of audience involvement. McLuhan would, presumably, consider avant-garde music to be a 'cool' medium. See McLuhan 'Understanding Media'

a completely random-sounding music. The only other possible explanation is that the avant-garde composers think it unnecessary to use the procedures in a way that will ensure they have an audible effect because, like Schoenberg, they believe that the row has a logic of its own, a logic which exists independently of the way in which the musical figurations derived from it are projected in the composition. The published writings of the avant-garde composers are concerned with describing ever more complicated methods of handling the various rows. Unless one dismisses these writings as a hoax, it seems that the composers do believe the technical procedures to be audible. Many of Boulez's comments in 'Eventuellement ...' suggest that this is the correct explanation and that the composers hope that the techniques will, in some way, make their presence felt and give the music an intellectual validity apart from that which the listener hears in performance. Cage's work exposes the intellectual pretensions of such techniques and casts doubts upon the claims made for all sophisticated row techniques since, and including, those of Schoenberg.

The act of listening to music is at the same time more simple and more complex than most avant-garde articles suggest: more simple in that the ear is unaware of the numerical and mathematical paraphernalia which the articles describe, more complex in that the brain, in its attempts to understand, forms patterns and associations (the detailed formation of which is not yet understood) of an extremely complicated and subtle kind.

The formal problems facing post-Webernian music cannot be divorced from the workings of auditory perception. It must be recognised that what a thing provably 'is' is not necessarily the same as what it 'appears' to be. It has always been assumed that an event in music seems to be what it is, but this is no longer necessarily true.

Much present day writing on and discussion of music ignores the audible effect of the things with which it deals and concerns itself with the mathematical and numerical paraphernalia. Some examination of post-Webernian music from the point of view of phenomenology is necessary and its starting point must be the listener. - not because the listener can accurately describe what he perceives but because no one else can describe it at all.

APPENDIX

Stockhausen: Texte zur elektrenischen und instrumentalen Musik. Band I. Pg. 63 - 74. (DuMont. Cologne 1963.)
Group Composition: Klavierstück I. A Guide for the Listener
 (Dec. 1955. Text of an evening broadcast on NDR.)

Using the first of the Klavierstücke of 1952 as an example, I should like to show how it is possible for you to become acquainted with the new musical language. First of all, please listen to the whole of the First Klavierstück without any guidance; without any guidance because when you hear the whole piece again at the end of the programme, you will be able to compare the two impressions.

Example: KLAVIERSTÜCK I.

This piece is composed with 'groups'. We find such 'Group Composition' evermore frequently in the works of young musicians and so the following example of the aural-picture can be of general use. By 'Groups' is meant a determined number of notes which, through related proportions, are joined together to form an overall ordered quality of experience. The different groups in the composition have different proportional characteristics, different structures, but when one understands the different characteristics of the groups, they are related when one compares one group to another in a scale of relationships. The chosen example is built out of six group forms, and we shall now hear these particular groups.

The first group of 10 entries (1) has a direction of

(1) Stockhausen throughout uses this term to mean a note for a group of notes, struck at a point: thus, a 4 note chord will constitute 4 notes but only one 'entry' since all the notes are struck simultaneously.

motion ascending from the lowest to highest areas, in moderately large intervals.

Example: Bar 1.

Two intervals, however, fall. The first articulates the whole Group into two subordinate groups of 5 and 7 notes. Here is the first subordinate group:

Example: Bar 1. First 5 notes.

and here, the second subordinate group:

Example: Bar 1. Last 7 notes.

The second falling interval, in the middle pitch area, meets a rising interval (although it will again descend) and continues the upwards motion tendency. Thus it again articulates the second subordinate group.

Example: Bar 1. 2nd Half.

In the first subordinate group the notes are strongly contrasted through their different intensities, whereas as in the second subordinate group the intensities are similar.

Example: Bar 1.

Correspondingly the notes in the first subordinate group last different lengths of time; those of the second subordinate group, however, are either closely related or last the same length of time. Twice in the second subordinate group are two notes played together.

Example: Bar 1.

The group receives its individual tone through the indicated pedal. Rhythmically this means that the notes are played one after another but end together through the release of the pedal. The speed of the group is fairly fast and accelerates in the second subordinate group. The whole lasts $5/4$.

Example: Bar 1.

We have heard the first Group as a whole and in particular we have heard its characteristics. Let us compare this with the 2nd Group of 5 entries. Here the direction of motion is falling, the intervals are very large, only the last interval ascends and points to the following group.

Example: Bar 2.

The two note chord at the beginning is heard throughout while the other four entries are played against it: which entries are marked off from each other by the wide intervals and rests. The pedal is here omitted. The pitch area is even larger than that of the first group.

Example: Bar 2.

The general intensity range of this group is still larger than that of Group 1. The entries follow somewhat more slowly after each other but the individual duration of each entry is shorter and now all are of different lengths. The total duration of the Group: 2/4
 Example: Bar 2.

The first and second Groups are now perceptible as a single formal unit: rising and falling motion form: the notes played separately but sounding together and ending together through the pedal: then the held chord and the single notes set against it.
 Example: Bars 1 and 2.

The two note chord of the second Group can be heard as the destination of the rising first group as well as the start of the falling second Group. In this way both Groups have joined together.
 Example: Bar 1 with the 2 note chord of Bar 2.
 or Example: Bar 2.

Because of the simultaneously struck notes the number of entries in the two Groups are in the ratio 10:5 but the number of notes played is in the ratio 12:7 (**) - twice in both Groups there occur 2 simultaneously struck notes - towards the end of the first and at the beginning of the second.
 Example: Bars 1 and 2.

Through the different total durations of both Groups and the difference in the number of entries and notes, one hears - independent of tempo - a slow rising and a quick falling, which is braked by the last interval. And the Group forms are: pedalled, then single notes against the held chord.
 Example: Bars 1 and 2.

We shall not go further into the more subtle connections in both Groups - which intervals, which intensities and temporal differences occur). As far as the characteristics (which have already been made known) of each Group are concerned, it is already clear that they can be meaningful, in the first instance, in relation to one another and in the successive durations. We compare them and experience them within their context. Firstly, we have heard the whole, then considered specific features, and, finally, heard these features again within the whole.

**) This is emphasised by italics and word order in the German.

Our attention is now directed - to how we are listening; and to this we shall pay great attention. If, however, the undivided whole is to affect our sensibility the listening must not dwell too much on the by now familiar details. It is one of the first criteria of quality if, in a musical event, individual feature does not become so strong in the foreground that others are thrust back. Now please listen again to the First Group's joining up (with the second) as a whole without listening particularly to individual features.

Example: Bars 1 and 2.

This is very typical of present day musical language: no melody with accompaniment, no Haupt- and Nebenstimme, no theme and no transitions; also no harmonic connections of a more complicated or a more simple kind as tensions and relaxations nor any syncopated rhythms which would be resolved in a regular manner.

We are listening much more to the whole, and retain a comprehensive impression in which the details are so equally strongly kept apart that no associations emerge which are stronger than any others. (Thus, for example, among other things, the large intervals and the difference of the elements within such a short time space.)

We call that "Structural Composing and Hearing". - the manner in which the notes are combined and how they appear in groups stays in the memory: less so do the specific details, the particular intervals or the particular durations. As much as possible, all the compositional elements should take an equal part in the formal process and nothing be predominant - neither melody which we can sing, nor rhythm which we can tap or intensity about which we can say that it was just loud or soft, for, indeed, in the examples which we have heard it does not remain the same for a long time. Thus both intervals and chords are held in abeyance by a related degree of effect. In this way the complete structural image is the better impressed upon our perception as a structural

image. The following example may help to make this more comprehensible: if we examine a stone close to us, then we can see many details - lines, strata and folds in typical proportion. (One knows of attempts to make this structure even more perceptible, in which one places a sheet of paper on the stone and then rubs it with a pencil until the paper is black and the many lines of the stone's structure are transferred onto the paper). If we look at the stone as a whole however, and it was thus that we first perceived it, we shall describe it not as the sum of the pointillistic details, although they will be collectively in our image of it as a stone and not as something cut from wood. We shall also neither say that this or that structural characteristic is particularly important nor shall we describe the lines in order to comprehend the stone as an entity.

Nevertheless the connection between Structure and Gestalt interest us - and indeed is of interest generally today. We have gained a quite new relationship to the phenomena and, as is well known, this amongst other things was the starting point for electronic music. To come back to the musical structure - the merest connections of elements are, when taken together, of importance but we grasp these elements in toto, as a quality. And in our experience we distinguish modifications of the structure in such different groups of elements without usually being able to say what, specifically, has been altered. We manifestly experience the contours of the Groups sensibly: they have different lengths, different motion patterns, different densities and speeds; different sound forms.

Let us continue our examination of the groups in the chosen Klavierstück. The third Group is a single continuously loud two note chord of a twelfth. It lasts for $3/4$.

Example: Bar 3.

This two-note chord is separated from the previous Group by a rest, though the motion of the second group is continued after this rest.

Example: End of Bar 2 - Bar 3.

The strong variation of motion in the first two Groups is brought to a halt by the static third Group. The three Groups in relation to each other:

Example: Bars 1, 2 and 3.

The third Group is connected to the fourth by a legato:

Example: Bar 3 - Beginning of Bar 4.

In the fourth Group, which has six entries and nine notes (3 times are two notes played simultaneously)

Example: Bar 4.

The motion lines are combined: rising - falling - rising - rising to the upper register, and at the same time falling - rising - falling in the lower register, both in large intervals.

Example: Bar 4.

The result is two directions of movement getting further and further apart from the middle register. The Group form is the isolated single notes. They are of different intensities, are very clearly divided into pitch registers, and are of different durations.

Example: Bar 4.

Of the nine notes 4 are pp, 3 are p, 1 mf and 1 ff, the softer notes predominating; the speed is relatively quick but towards the end the Group slows down somewhat. The duration of the fourth Group is $3/8$.

Example: Bar 4.

We can already speak in general terms about the whole passage from what has been shown up to now. Thus far there are no sort of harmonic or melodic cadential formations. The harmonic and melodic remain in a state of suspension because of the permanent application of related proportions - without the resort of the contrasts of simple and complicated structures in the sense of the earlier consonance and dissonance and without symmetries in respect of the attraction of asymmetrical deviations. The same is true of the rhythm. This avoids any lasting metrical symmetry (periodic bar structures and repeats) so that - as has already been said - no individualistic

form structure and characteristics render themselves prominent: no things which are accompanied or lead into one another but everything leads to everything else and the rhythm is permanently in flux. In this way the time is realised in as actively a way as to conform to our image of time - without the desire to dwell on the transient or on the fine passages, without especially favoured high or low spots.

Permanent Transition - measured structures - Group form: three concepts which are helpful in understanding the music of today.

The fifth group surprises to begin with through its held two note chords, in the lower area, as if it had something to do with the second or third Group.

Example: Bar 5.

but what follows shows firstly how very much this long held, low two note chord (with a narrow pitch span) bring into being the great speed in the high register and a broad pitch area. The two note chord remains held.

Example: Bar 6.

To begin with the direction of movement is uncertain. Through the high speed of the notes, which are now almost uniformly short and uniformly loud but change their pitch irregularly, this group crystallises, much more than the Groups hitherto, into the overall impression of a swarm of notes. If one listens carefully one can certainly perceive until approximately the middle of the group of these 26 notes, three occasions of rising and two of falling in the high register whilst in the low register a note is played here and there.

Example: Bars 5 and 6.

Within the *ff* the smallest differences of intensity, as well as the irregular subordinate Groups of similar direction, counteract the regularity of the time intervals. The duration of the Group is $\frac{4}{4}$.

The sixth Group follows with the form: sustained chord (here the interval of a major third, *pp*, in the middle register) and besides *12 ff* entries regularly spaced in time. Towards the end these are twice displaced when a two note chord and a four note chord appear in the place of the single notes.

Example: Bar 7.

As a continuation of the falling tendency which was already begun twice at the end of the previous Group, this Group reaches into the lowest register and, indeed, the last two note chord gives the highest notes to this point as though it already belonged to the following Group.

Example: Bar 7.

The Group lasts for $6/4$. In context we now hear Group 5 with its irregular quick changes and Group 6 with its more regular slower changes: -

Example: Bars 5 - 7.

So far we have a First Group Complex of 6 Groups which, because of the rest at the beginning of Group 3, can be heard as two sections of two and four Groups. Please pay attention when the whole Group Complex is played to the way in which the single Groups are linked to one another, and pay attention to whether they are made mutually clearer by the momentarily changed form and allow themselves to be heard together as a whole construction, as an overall ordered structure in which the groups now gain a meaning only as parts in the Complex and it becomes a structure wherewith we try to experience an overall impression:

Example: Bars 1 - 7.

A comparison of the Group lengths gives the proportions: Group 1: $5/4$; Group 2: $2/4(3/4)$; Group 3: $3/4(2/4)$; Group 4: $3/8$; Group 5: $4/4$ and Group 6: $6/4$; thus giving the approximate duration proportions 5:2:3:1:4:6. Elements in Groups (which are in part differentiated by Subordinate Groups), Groups into Main Groups and Main Groups into Group Complexes. The structural unit above this brings us to the overall structure of the work which is composed of six Group Complexes.

To understand this we shall hear the Groups which make up the Second Group Complex.

The Second Complex begins with the Group form - held note, and, in addition, single notes or two note chords of regular durational entries and with an intensity of *mf* which stays the same.

Example: Bar 8.

Thus this seventh corresponds with the previous sixth Group in form. Time and intensity proportions are related. How different however is the outward form: please compare the two corresponding Groups, immediately

one after the other:-

Example: Bar 7

and then

Example: Bar 8.

Motion tendency and area distribution of the notes, however, remind one of the fourth Group of the First Complex -

Example: Bar 4

and then

Example: Bar 8 from the third entry.

The average intensity of *mf* corresponds with the First Group, and, finally, the overall duration of 3 crotchets with the Third Group.

What does this mean, "Groups corresponding with each other"? It does not mean a repeat of a previous Group in the sense of a thematic correlation, nor does it mean a variation (in the sense of a variation of Gestalt) nor a development. Rather it means a correspondance in the way of structural connection of elements temporally (in our example the important thing is the regular time intervals) and spatially (typically in our example the important thing is the connection of held notes or chords and single entries following one after another). Other characteristics, on the other hand, may correspond ambiguously with those of Groups already heard (in the example the motion tendency and pitch area with Group 4, average intensity with Group 1, average speed with Group 2, and the total duration with Group 3).

The joining of the first Group of the Second Complex (which we have heard) and the last Group of the First Complex does not form a caesura or a great contrast, but on the contrary, both Groups are closely linked with each other by reason of the corresponding form; thus, there does not arise in the large form a possible symmetry of 6 to 6 groups. Let us hear both Groups.

Example: Bars 7 and 8.

Now follows a single held chord -

Example: Bar 9.

this corresponding with the third Groups:

Example: Bar 3.

The two note chord has become a four note chord spread over a larger area: the single notes are, as in the First Group, of different loudness, and this Groupform is preceded, as was the First Group, by a rest.

Example: End of Bar 8 - Bar 9.

As the Third Group was connected with the following Group -

Example: Bar 3 - beginning of 4.

so is now the Eighth Group itself extended by two notes:

Example: Bars 9 and 10.

Yet it is more separated and because of this the following Ninth Group appears more surprising:

Example: Bar 11.

The chord develops thus: the notes begin together with different intensities and are held for different lengths of time - the chord breaks up. This Group corresponds with the First Group - in the First Group the notes are neither struck together nor end at different times but are played one after another and, through the pedal, and together. This is now done in reverse. Let us now compare Groups 1 and 9 which in overall duration complement each other. The notes played at different times, ending together:

Example: Bar 1.

Played together and ending at different times:

Example: Bar 11.

The relationship of intensity, time and complete duration are reminiscent of the previously-heard Group forms only if listened to with careful attention; by this we experience the surprising new form although the proportions of its elements are related to earlier Group structures. It is important that we are aware of the different grades of structural transformation - at one point were the degrees of relationship very high, then less clear and, in the last example, they were very low. Again, as has so often been said before, not the same thing in another light, (that is, closed forms always lit differently, varied) but rather always another thing in the same light (that is to say new Group forms with related proportions).

To seek the related in the so apparently varied or, to put it another way, to experience the different in the structural relationships, is one of the main concerns of structural composition. Let us now compare the remaining Groups of the Second Complex with the remaining Groups of the First.

Group 10, single notes strongly characterised by different intensities and durations, motion tendency - falling-rising:
 Example: Bar 12.

this Group corresponds with the Fourth Group:
 Example: Bar 4.

The contrapuntal notes in the lower register of Group Four are now omitted. The single notes are still strongly marked out by the rests between them.
 Example: Bar 12.

Group 11 corresponds with the previously heard Fifth Group:
 Example: Bars 5 and 6.

in its average intensity of ff, its regular quick time sequence and its very irregular pitch distribution of the notes or the two note chords, although there is now no held two note chord in the lower register:
 Example: Bar 13.

And finally Group 2 corresponds in form (a held note or chord and against that are played single notes of different intensities and durations, separated by rests):
 Example: Bar 2.

to Group 12, although Group 12 is only half the length and is here, by the difference of intensities, further divided into two subordinate Groups (very loud - very soft). The motion tendency is the same, the areas are different.
 Example: Bar 14.

So far we have only compared the First and Second Group Complex. If, on listening, such music succeeds in adjusting itself to the structural peculiarities - and I am thinking in the first instance of how it ignores the traditional concepts of form - then a first step forward has been made. Let us therefore compare once again the corresponding Groups and endeavour to perceive

their degree of relationship. Note also how the order of succession of Groups has been changed in the Second Complex.

Group 7, which is the first Group of the second Complex
 Example: Bar 8.

recalls Group 6
 Example: Bar 7.

Group 8
 Example: Bars 9 and 10
 Recalls Group 3
 Example: Bar 3.

Group 9
 Example: Bar 11
 recalls Group 1
 Example: Bar 1.

Group 10
 Example: Bar 12
 recalls Group 4
 Example: Bar 4.

Group 11
 Example: Bar 13
 recalls Group 5
 Example: Bars 5 and 6.

and Group 12
 Example: Bar 14
 recalls Group 2
 Example: Bar 2.

New forms - related proportions of different strengths:
 The composing - to return to the point - is valid on a small scale just as on a large. At the end you will be able to compare how the shown single Groups are related proportionally to each other, and how a Group generates a new Group in a different place so that all the single are merged into one whole, into one Structure. We will now hear both Group Complexes in their context:

Example: Bars 1 - 14.

You will shortly hear, when the whole piece is played, how this Klavierstück is further composed in another 4

subsequent Group Complexes and how it continually renews itself, and indeed how the relationship of all the new things can be traced to that which is already known. Moreover the different Klavierstücke I - IV are conceived as a yet higher structural unity in which every single piece signifies the same as a Group Complex within a piece, a Group within a Complex, an element within a Group.

Example: the whole of Klavierstück I.

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Abbreviations:

B.J.P.	British Journal of Psychology.
D.R.	Die Reihe. (Universal Edition/Theodor Presser)
G.B.	Gravesaner Blätter. (Ars Viva Verlag-Hermann Scherchen-Mainz)
J.E.P.	Journal of Experimental Psychology
J.M.T.	Journal of Music Theory. (Yale School of Music)
M.	Melos. (Der Melos Verlag. Mainz)
M. & L.	Music and Letters.
M.R.	Music Review.
M.T.	Musical Times.
Mo.Mus.Rec.	Monthly Music Record.
Rev. Mus.	Revue Musicale. (Richard Masse, Paris)
Perspectives.	Perspectives of New Music. (Princeton University Press)
S.A.	Scientific American.
Score.	Score and I.M.A. Magazine.

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