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Title: An Analysis of the Chamber Concerto for 13 Instruments by Győrgy Ligeti

Author: Jane Dawson

A thesis submitted for the degree of Master of Arts at the University of Otago, Dunedin, New Zealand.

Date: February, 1986
This thesis is an analysis of Ligeti's Chamber Concerto for 13 instruments. It examines in detail the ordering of notes, particularly Ligeti's use of canon, and links the pitch organisation with other parameters, such as dynamics, instrumentation and rhythm, to demonstrate how musical textures are built up. The way in which these textures create the overall form of the piece is also discussed. The method used is a style of free, descriptive analysis, with the written notes linked to the aural effect of the music. The thesis is intended to be read in conjunction with the score.
I would like to thank John Barker for introducing me to Ligeti's music, and for his guidance and help with this thesis. I would also like to thank Robert Ibell for the hours he spent slaving over a typewriter.
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INTRODUCTION

Ligeti composed the Chamber Concerto during the period 1969-70. It is in four movements, and the duration of the whole is about 21 minutes. The work is written for 13 instrumentalists, although a total of 19 instruments are used: flute and piccolo, oboe and oboe d'amore and cor anglais, clarinet in Bb, bass clarinet and second clarinet in Bb, horn in F, tenor trombone, harpsichord and Hammond organ (or harmonium), piano and celeste, two violins, viola, cello, and double bass.

The first four chapters of this essay contain a detailed analysis of the Chamber Concerto, with one chapter covering each of four movements. The fifth chapter contains a summary of the main elements of composition, and the conclusion. Although musical examples are present to illustrate specific points, the analysis is intended to be read in conjunction with the score.

In this work I have chosen not to use conventional analytical formulae, since none of these apply particularly well to Ligeti's music. My method involved discovering patterns and connections between notes, and examining how the sounds produced by these patterns formed sections, and how the sections, in turn, influenced the form of each movement. Therefore I have not examined only the printed score — rather, I have provided a descriptive analysis, with reference to the overall sound and effect of the music.

There are two other matters which need to be clarified. Firstly, I have used the word 'cluster' to describe a chord which, when all the notes have been placed in as close a position as possible (this may involve octave displacement), contains intervals of one, two, or three semitones. The term 'chromatic cluster' I have used for chords which,
after the same process, contain only intervals of a semitone, i.e. between the highest and lowest notes of the chord, all notes in the chromatic range are used.

Secondly, in the hand-written musical examples I have made enharmonic changes for ease of reading. For example, in Canon 1, I have made all notes either flats or naturals, changing the $E_{b}$ to $G_{b}$ where necessary. Using flats or sharps consistently makes it easier to recognise patterns and changes to patterns, particularly in the canonic sections, where Ligeti has not always been consistent in his choice of accidentals. Also, in the examples with no rhythmic notation (i.e. only note heads), each accidental applies only to the note following it, so I have not used the sign $\overline{\text{ }}$ to cancel previous accidentals.
CHAPTER 1

The form of the first movement is a positive golden section\(^1\), which further subdivides into two subsidiary golden sections, the first positive and the second negative. The climax point of the main golden section is \(M\) (bar 38), which marks the first entry of the note \(E\)\(_b\) and a change of texture from polyphony within a range of less than an octave to sustained \(E\)\(_b\)s over six octaves. The first subsidiary golden section climaxes at \(H\) (bar 26) which marks the widening of the pitch range upwards to the note D. D then remains the highest pitch and eventually leads on to the \(E\)\(_b\)s at \(M\). The second subsidiary golden section is a negative one, and it peaks at \(O\) (bar 47), where the polyphonic movement of the first section returns after the sustained chords at \(M\). The whole form expresses growth (to \(M\)), stasis (from \(M\) to \(O\)) and decay (from \(O\)). I shall now examine in more depth the means used by Ligeti to create this form.

The movement opens with a four-voice pitch canon in flute, clarinet, bass clarinet, cello and double bass (the last two combining to form one voice). At the opening the effect is of a double canon, the flute and clarinet providing flowing counterpoint, while the bass clarinet and cello/double bass have more sustained canonic lines (see Example 1).

The four voices continue, with changes in instrumentation, until bar 6. Here the rate of movement in the wind section gradually

1. The term 'positive golden section' is used when the larger portion (.618 of the whole) comes before the smaller. A 'negative golden section' is when the reverse occurs.
slows, while in the upper strings it gradually speeds up. The density is increased by the addition of two more voices in bar 6 and the lines become rhythmically fragmented, with changes in articulation (legato-staccato-alla corda) and a momentary lift in dynamics (pp to m4 in violins and viola, bar 7). This brief burst of energy leads to the entry of the celeste (bar 7) and the resumption (in bar 8) of the more restrained canonic movement of the opening.

EXAMPLE 1
At the beginning of bar 8 there is a four-voice canon in the wind section, increased during that bar to six voices by the entry of the trombone and oboe. In bars 9 and 10, four of the canonic voices move from wind instruments to the upper four string parts, the remaining two parts dying away in bars 11 and 12. The flowing four-voice canonic movement continues in strings until bar 20.

The pitch range up to bar 11 has been confined to the five semitones (Gb-Bb) contained in the 40-note 'row' which is the source of the canonic material (see Example 2). In bar 11 the range is reduced to four semitones by the removal of the Gbs from the 'row' (I have called this Canon 1(a)), but increases to five semitones again with the addition of B in bar 14 (Canon 1(b)). The first appearance of B in the canonic parts is marked by the simultaneous entry of the horn with a sustained B, increasing the number of voices to five.

EXAMPLE 2

In bar 16 the range is further increased by the addition of C, replacing the note A in the 'row' until bar 18, where A returns. C then replaces A#. At bar 18 the structure is again a six-voice canon: four voices in the string parts, one voice formed by the horn, trom-
bone and celeste (and later harpsichord), and the sixth in the woodwind section. This structure continues to the end of bar 19, with the addition of piano (entering simultaneously with the harpsichord) halfway through that bar. Through bars 18-19 the notes in the woodwind line become gradually faster, giving the effect of a gradual accelerando, and there is a dynamic increase from ppp to ff and back again. The string parts gradually decrescendo to ppp.

The harpsichord and piano entries in the middle of bar 19 are what Ligeti calls "senza tempo cadenzas". These are played as fast as possible and are independent of each other. They continue throughout bar 20, forming a two-voice canon. They are joined by violins 1 and 2 in bar 21 and die away during bar 22 (they are unmeasured). All four parts are statements of Canon 1(c) (see Example 3). In bar 22 the flute, clarinet, and bass clarinet enter, also with Canon 1(c), but written in measured notation, rhythmically in unison but melodically in canon. In the middle of bar 22 the viola and cello enter with Canon 1(d) (without the note B - see Example 3), and halfway through the next bar violin 1 and 2 enter, also with Canon 1(d). Near the end of that bar (bar 23) the wind parts drop out, reducing the pitch cluster to four notes: G, A, B♭, and C. The canonic movement continues in the strings through to bar 27, although the viola and cello finish during bar 25. At the beginning of bar 25, the four notes of Canon 1(d) are sounded as a chord by the flute, clarinet, horn and double bass.

2. See Appendix 1 for Ligeti's explanation of the senza tempo cadenzas.
Bar 26 marks the entry of the first pitch material not derived from Canon 1. This material, Canon 2 (see Example 4), leads, through an increased rate of change of the pitch cluster, to [M] (bar 38).

The opening of Canon 2 describes a four-note pitch cluster (G–A–C–D), which is gradually widened by the addition of D, D♭ and A.

The canonic movement begins at the start of bar 26 in the harpsichord and piano and moves to wind and brass, but by the middle of bar 27 has become a three-voice canon between bass clarinet, harpsichord and piano, supported by a sustained chord in the lower strings and bass clarinet. During bar 28 the violins are added to the chord, so that by the end of that bar there is a six-note chord (G–A♭–D–C–CF–D).

EXAMPLE 5

In the middle of bar 29 the texture changes to a four-part senza tempo canon in the upper strings, but whereas the previous canonic parts had progressed to a point after the addition of the note A, the new parts start around the entry of the D, so that the cluster is reduced by one note (A) at the change in instrumentation (see Example 5). As the canon progresses the note A returns. By the middle of the long senza tempo bar (bar 30), B is also added, making
a full chromatic cluster between G and D. This is the widest range of pitch in Canon 2, and, just before $\text{L}$ (bar 31), the range starts to diminish with the removal of the note G. The process of removing the lowest pitch continues until only C$\sharp$ and D remain just before $\text{L}$ (bar 35).

During the section up to $\text{L}$ the four-part, muted string sound is varied by the use of colouring techniques, e.g. alla punta, sul ponticello, legato, and sul tasto. The wind and brass entries (bars 31-33) help to emphasise the upwardly contracting pitch range: the wind enter on a unison A$^\flat$, the brass enter on A, the wind re-enter on B$^\natural$, and they all finish on C or D$^\flat$. The pitch material is all derived from Canon 2 (see Example 6). An intensification of the sound is created at the end of bar 33 by a crescendo from pp-66 in the wind parts (which stop suddenly at the end of the bar) and shortly afterwards in the string parts, which immediately drop back to pp.

EXAMPLE 6
At O (bar 35) the string trills are all that remain of Canon 2, and the other instruments gradually die away until only violin 1 remains in bar 37 to lead the music through to M (bar 38). All the sounds heard so far have been chromatic or semi-chromatic clusters formed by moving chromatic parts within the range of a minor sixth (C♭-D). M marks the first entry of the note E♭, a widening of the range to six octaves, and a new texture of sustained notes. This 'chord' continues for the long senza tempo bar (bar 38; ca. 14") until N (bar 39) and through to bar 45, with remnants of it (in the cello and violin 1) carrying on until bars 48 and 50 respectively.

GRAPH 1
Pitches present in the range from E above Middle C to A, a tenth below Middle C, in bars 38 - 46 of Movement 1.

At N the organ enters with a series of chords, reinforced by notes in horn and trombone. By O (bar 47) the chords have covered the full chromatic spectrum in the octave around and below middle C (see Graph 1). One bar before O the organ chord is reinforced by the clarinet and bass clarinet and the note E becomes prominent in the piccolo, violin 2 and double bass (E♭ is still present in violin 1 and cello). Sustained notes continue in various
instruments until the end of bar 50, but [§] marks the return of semi- and demisemiquaver movement.

EXAMPLE 7

The passages in cor anglais, clarinet, bass clarinet, and viola at [§] independently describe the 12 notes of a chromatic octave, though there is no obvious pattern in the note order and there is no similarity between the parts. As can be seen in Example 7 the cor anglais states one set of 12 notes plus an extra F, the bass clarinet states two complete 12-note sets, and the clarinet states one and a half sets and the viola one set plus five notes. The cor anglais, clarinet and viola parts finish in the middle of bar 47, while the bass clarinet continues through into the following bar.

EXAMPLE 8
Meanwhile, halfway through bar 47 the piccolo enters with Canon 3 (see Example 8), and the celeste with further canonic material which covers a similar pitch range, but whose note order is sufficiently different to call it Canon 4 (see Example 9).

\[\text{Canon 4}\]

EXAMPLE 9

Towards the end of bar 47 the piccolo is joined in canon 3 by the clarinet and bass clarinet playing in unison octaves, and halfway through the following bar the celeste is joined by the organ, also playing Canon 4. At this point (midway through bar 48) the clarinet and bass clarinet parts are taken over by viola and cello. Towards the end of bar 48 the piccolo part finishes (it has been playing a \textit{senza tempo} figure). This leaves Canon 4 in the organ and celeste, Canon 3 in unison viola and cello, and sustained harmonics in violin 1 (playing high E\text{"}b), violin 2 (high E) and double bass (E).

At \([\text{bar 49]}\) the instruments not already playing (i.e. piccolo, cor anglais, clarinet, bass clarinet, horn, trombone) enter on a series of accented unison octave chords, describing the six notes of Canon 3, though not in an order in which they appear in Canon 3 (D, E, G, F, E\text{"}b, D\text{"}). Violin 2 and double bass join in with the chords on the third note (G), leaving the violin 1 E\text{"}b as the only sustained tone. In the first two chords the notes are spread over a range of six octaves, with one instrument to each pitch. In the third
chord the range is increased to seven octaves, though with a gap between the top two pitches, and there is some doubling of instruments. As can be seen in Example 10 the doubling continues, but the range decreases to six, five, and finally four octaves. The end of the final chord marks the end of the sustained violin 1 E♭, a remnant of the octave unison Eb's at M.

EXAMPLE 10

The beginning of the final chord (D♯) also marks the entry of the bass clarinet and organ with Canon 3, both starting on D♯ but at different places in the canon. At the end of that bar (bar 50) the viola also drops out, so that going into Q (bar 51) there are only organ, bass clarinet and cello left, all playing in the lowest range of the latter two.

This three-voiced canon continues pp for five bars, until S (bar 56). Four more instruments enter at R (bar 54), all on the note E: the piano plays Canon 3 senza tempo, starting 6666 and getting gradually softer until it dies away in bar 56; the double bass plays, with similar dynamics, a line related to Canon 3 but containing only four notes (E-G), since the lower notes (D and E♭) lie below the normal range of a double bass (see Example 11); the trombone plays a sustained E in the same register as the bass clarinet/organ/cello canon, starting 66 and dying away at the beginning of the following bar;
and the clarinet enters with its lowest E (i.e. an octave above the trombone) which leads through into §.

EXAMPLE 11

The section from § to the end of the movement is also based on Canon 3, though the pitches of the canon undergo considerable mutation. At § the canon describes the chromatic cluster D-G, but gradually, as the higher notes (F, G♭, and G) move upwards and the lower notes (E, Eb, and D) move downwards, the range widens, and a hole appears in the middle of the cluster. By the end of bar 59 the upper notes are A, B♭, and B, and the lower notes are D, D♭, and C, and at the end of the movement the upper and lower notes have merged into the notes B and C respectively (see Chart 1).

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<td>Ab → A</td>
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<td>A → B♭</td>
<td>B♭ → B</td>
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<td>D</td>
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<td>C → C</td>
<td>C → C</td>
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CHART 1
Progress of pitches from § to the end of Movement 1
The mutation of Canon 3 is most obvious in the main statement which starts at $S$ and finishes, after three prime and two retrograde statements of the canon, at the end of the movement (see Example 12). The instrumentation of this line begins with the sustained E (from $R$) in the clarinet which is joined in bar 56 by the rest of the wind section and the viola, and gradually incorporates the other strings, harpsichord, brass, piano, and celeste, so that by the end all 13 instrumentalists have contributed to the line. Each instrument plays only a part of the canon, some as few as two, others as many as 16 notes. There is considerable overlapping of the instruments, though not always in the same octave, as the line is a continuous one.  

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EXAMPLE 12
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The instruments not immediately involved in playing the main statement play excerpts from the same canon (with the same pitch modifications) in either prime or retrograde form. These excerpts are

3. See Appendix 2.
sometimes only two or three notes long, though they can be up to ten notes, and sometimes several are joined to form a longer segment. For example, in bar 56 there is one subsidiary line which moves from violin 1, to the first five notes of violin 2, to the second entry of the cello, to the second violin 1 entry, while another line moves from the horn to the rest of the violin 2 entry, back to the horn, to the third cello entry, then to the trombone (see Example 13).

EXAMPLE 13

At $\text{[S]}$ (since some of the instruments from $\text{[R]}$ continue into bar 56) Canon 3 is present in four octaves: the octave from middle C upwards, and the three octaves below that. During that bar the piano dies away, taking with it the lowest two octaves and leaving a range of two octaves. At the beginning of the following bar (bar 57) the range is extended downwards one octave and, in the following beat, up an octave also, making a range of four octaves. At the end of bar 58 the range is again extended up and down to six octaves. This range continues into the following bar, but quickly reduces again, and is back to two octaves by the middle of that bar. These two octaves (the octave from middle C up, and the octave above that) continue, with
occasional extensions to the octave below, to the middle of bar 61, where the upper octave disappears, leaving only the final two notes: middle C and the B above.
CHAPTER 2

The second movement is the longest in the Chamber Concerto, and falls into two main sections of contrapuntal writing, each bounded by more sustained chordal sections. The opening eight-note chord is spread over nearly two octaves, from E below middle C to D an octave above middle C. It is a fairly evenly spaced chord, the notes being two, three or four semitones apart. This opening chord continues unchanged for nearly two bars, then a process of mutation begins as it gradually reduces to a range of just over an octave (G below Middle C to G# above) at [f (bar 13). The entries of the new notes are not metrical, and occur in all sustaining instruments (i.e. everything except Piano, harpsichord, and celeste). The entries are also distributed evenly over the chromatic range; that is, the first chord plus the first five entries makes a chromatic octave with the D repeated, the following 13 notes form another (with the G repeated), and the next 12 notes form a complete chromatic octave (see Example 14).

EXAMPLE 14

In bar 9 some of the notes from this last octave are sustained as a chord, and the next five entries are those notes being doubled
on the organ. By the end of bar 10 all instruments have died away except the organ, which carries on the process of reducing the range until \( C \) (bar 13). While this section is heard as a chordal texture, it also contains a linear element: as can be seen in Graph 2 there are eight lines, each moving by semitones up or down, and with one note frequently overlapping the next. The basic dynamic through to \( \text{C} \) is \( pp \), although instruments often start \( ppp \) and crescendo to \( mp \) or \( mf \), and all notes finish with the instruction \( \text{morendo al niente} \).

**GRAPH 2**

Pitch content of the first twelve bars of Movement 2

At the end of bar 12 the organ has arrived at an eight-note chord which it continues to hold until bar 17. The entry of the flute, clarinet, and bass clarinet on the last quaver of bar 12 doubles three of the notes in the chord (A, E, A\(^b\)) and leads into the next main section. Between \( C \) (bar 13) and \( P \) (bar 35) is the first of the canonic sections. As in the first movement, the canon is only one of pitch, a fact more pronounced in this section since each instrument
proceeds at a different metronome speed.

The canon begins in the clarinet at C at a speed of \( J = 92 \). In the following bar, at D (bar 14), the tempo changes to \( J = 84 \), but the clarinet continues at \( J = 92 \) through to bar 31. Also at D, the bass clarinet begins a statement of Canon 5 and, when the tempo changes at E (bar 15), continues at \( J = 84 \) through to the end of the section. This process is repeated for each instrument that enters with the canon (see Chart 2).

**CHART 2**

Main instrumental entries between bars 13 and 30 in Movement 2

<table>
<thead>
<tr>
<th>Bar Number</th>
<th>Metronome Marking</th>
<th>Main Instrument Entering</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 13</td>
<td>( J = 92 )</td>
<td>clarinet</td>
</tr>
<tr>
<td>D 14</td>
<td>( J = 84 )</td>
<td>bass clarinet</td>
</tr>
<tr>
<td>E 15</td>
<td>( J = 76 )</td>
<td>flute</td>
</tr>
<tr>
<td>F 16</td>
<td>( J = 100 )</td>
<td>piano</td>
</tr>
<tr>
<td>G 17</td>
<td>( J = 60 )</td>
<td>horn</td>
</tr>
<tr>
<td>H 18</td>
<td>( J = 80 )</td>
<td>organ</td>
</tr>
<tr>
<td>I 19</td>
<td>( J = 60 )</td>
<td>horn</td>
</tr>
<tr>
<td>J 20</td>
<td>( J = 66 )</td>
<td>oboe d'amore</td>
</tr>
<tr>
<td>K 21</td>
<td>( J = 54 )</td>
<td>trombone</td>
</tr>
<tr>
<td>22</td>
<td>( J = 54 )</td>
<td>trombone</td>
</tr>
<tr>
<td>23</td>
<td>( J = 54 )</td>
<td>trombone</td>
</tr>
<tr>
<td>L 24</td>
<td>senza tempo (ca. 13&quot; - 15&quot;)</td>
<td></td>
</tr>
<tr>
<td>M 25</td>
<td>( J = 60 )</td>
<td>oboe d'amore</td>
</tr>
<tr>
<td>26</td>
<td>( J = 54 )</td>
<td>horn, trombone</td>
</tr>
<tr>
<td>27</td>
<td>( J = 54 )</td>
<td>horn, trombone</td>
</tr>
<tr>
<td>N 28</td>
<td>senza tempo (ca. 13&quot; - 15&quot;)</td>
<td></td>
</tr>
<tr>
<td>O 29</td>
<td>( J = 54 )</td>
<td>horn</td>
</tr>
<tr>
<td>30</td>
<td>( J = 54 )</td>
<td>oboe d'amore, trombone</td>
</tr>
</tbody>
</table>
The main instruments stating the canon are clarinet, bass clarinet, flute, piano, and organ. Each of these instruments, except the flute, makes one complete statement of Canon 5, starting at the point marked in Example 15 and all finishing on the last note during bars 30-31. The flute plays a version of Canon 5 which omits all notes below middle C, since that is the lowest note in the flute's range. The oboe d'amore, horn and trombone play only segments from the canon, as marked in Example 15.

EXAMPLE 15
Each statement is preceded by a long note taken from the organ chord, i.e. the flute E and bass clarinet A from the end of bar 12 precede the canonic movements of those instruments, the organ chord (bars 13-17) precedes the canonic movement in that instrument (bar 18), and the piano C and horn F♯ enter during the bar before those instruments begin their statements of the canon (bars 15 and 16 respectively).

The canon describes a cluster which starts with the notes of the organ chord at C and gradually reduces in range until it becomes a three-note chord (middle C, D, and E) spanning a major third. Each part, as well as having its own metronome marking, has an individual, non-metrical rhythm pattern. The wind instruments have short rests (presumably for breathing), but the organ and piano play continuously.

The oboe d'amore, horn, and trombone work together as a trio of *concertino* parts against the accompaniment of the other parts. They keep a common metronome mark, and are the only instruments conducted throughout the section. Also, they are marked *mp*, *dolce*, whereas the accompanying instruments are marked *pp*, *non espressivo*, and Ligeti himself notes in the score that the three instruments "should stand out a little". As can be seen in Example 16 they also work together rhythmically, dovetailing at entries and with generally only one part moving at a time while the others sustain notes. The bars between the *concertino* entries (i.e. between L (bar 24) and M (bar 25), and between N (bar 28) and O (bar 29)) are marked 'senza tempo', ca. 13"-15".
During bar 31 (a pause bar) the accompanying instruments finish and die away, leaving the oboe d'amore, horn and trombone holding the notes middle C, D and E in close formation. This chord continues until the beginning of bar 33, when the trombone moves from C to C♯ to D, and the oboe d'amore from D to D♯, giving the chord D, D♯ and E for most of bar 34. During these two bars (33 and 34) there is also a great crescendo from mp-6-66 (666 in oboe d'amore) leading without break to the beginning of the next section at \[ \text{(D)} \] (bar 35).
Between \( \textbf{P} \) and \( \textbf{R} \) (bar 40) is the second chordal section. The first chord consists of the tritone \( B - F \) repeated over four octaves and held for ca. 10". This chord carries on into the next \textit{senza tempo} bar (ca. 8") where it is joined by three low \( B^b \)s in piano, trombone and bass clarinet. (The bass clarinet moves from the \( F \) below middle \( C \) to double the uppermost \( B^b \), a ninth below middle \( C \).) In contrast to the \textit{crescendo} up to \( \textbf{F} \), the chord at \( \textbf{P} \) (bar 35) is marked \( \textit{ppp} \) in all instruments. This dynamic continues for most of the section, the exception being in bar 36, where the piano \( B^b \)s are marked \( \textit{mf} \) (presumably because the sound dies away fairly quickly) and the bass clarinet is marked \( \textit{pp} \) (presumably to compensate for the lack of sustaining power in the piano).

The third chord, at \( \textbf{Q} \) (bar 37), keeps the notes of the previous chord but adds the note \( F^# \) in the horn and flute (the flute moves from the \( F \) it held in the previous chords). The next note to be added is \( A \), which enters in the cello and double bass harmonics during bar 38, and the final change is the \( F^# \)s in the flute and horn moving to \( G \)'s at the beginning of bar 39.

The effect of this section is of a pure tritone \( (B - F) \) gradually being clouded by the addition of surrounding notes, i.e. \( B \) moves to \( B^b \) and \( A \), and \( F \) moves to \( F^# \) and \( G \) (see Graph 3).

The second contrapuntal section begins on the last beat of bar 39 with a \( 44 \) chord which states the notes of the opening of Canon 6. As can be seen in Example 17 the canon begins with four statements of the notes \( A^b, B^b, C, D, E^b \), and each instrument begins on a different note. This canon is again one of pitch, but is unusual in that the canonic instruments are rhythmically in unison throughout. The canon starts two octaves above middle \( C \), with a range of a fifth and gradu-
ally moves downwards and widens in range until, by the end of the canon, the range is nearly two octaves (from B above middle C to D♭ below it). The texture also becomes much more open— at the end the intervals between notes are thirds, fourths, fifths, and sixths,
rather than the tones and semitones of the opening. The flute, oboe, and clarinet have occasional rests in their parts, presumably for breathing. In these rests the part merely omits one or more notes from the canon and continues in rhythm with the following note. The omitted notes are played by either piano or viola, entering in time but, in the case of single notes, continuing for longer than they would in the context of the canon (see Example 18).
The five main instruments playing Canon 6 at \( \text{[R]} \) (bar 40) are flute, oboe, clarinet, violin 1, and violin 2, with piano and viola as subsidiary instruments. In addition to playing the 'omitted' notes, the viola also fills out the missing notes in chords. These notes are the exact length of the chord, not elongated like the 'omitted' notes. For example, in the first chord (end of bar 39) each instrument plays a different note, i.e. it is a five-note chord. In the next chord (beginning at the very end of bar 40) the five
instruments only play a four-note chord, since the B♭ is doubled in the clarinet and violin 2, so the viola fills in the missing note (C) to make a five-note chord. The same thing happens to the chord in the middle of bar 42: clarinet and violin 2 both play the note C, so the viola fills in the missing B. However, in the following chord (beginning at the end of bar 43) each of the five instruments plays a different note, so the viola does not play at all (see Example 19).
At the end of bar 50 the rhythm becomes a constant pattern of sextuplet semiquavers. From this point on, there are groups of notes omitted, rather than single notes, with at least one note overlapping with the notes of the replaced instrument, e.g. in the first viola entry in bar 51, the first note, A, is played by both flute and viola, the next two notes are played by viola, and then the flute takes over again (see Example 20).

EXAMPLE 20

Sometimes there are more notes overlapped, e.g. the third and fourth beats of bar 52, where the first and last notes of the viola entry overlap with the oboe line (see Example 21).

EXAMPLE 21

The substitution of viola and piano for the three canonic wind instruments becomes more and more frequent during the seven bars after \[T\] (bar 51). At \[U\] (bar 57) the piano plays for the last time in the movement, and at the end of the following bar the cello joins the viola as a subsidiary canonic instrument. The viola meanwhile has been playing more and more constantly until, at the end of bar 59, it takes over the oboe's canonic line completely (the oboe is
silent for the rest of the movement). The cello plays the omitted notes from the clarinet part, and gradually takes over the clarinet line, with the clarinet playing smaller and smaller segments (see Example 22).

EXAMPLE 22

At U the constant rhythm begins to slow down and become less metrical. Four bars later, at V (bar 60), the music is marked allargando, and this continues for three bars until the meno mosso at W (bar 63).

GRAPH 4
Pitches present in instruments not playing Canon 6, in bars 39 – 69 of Movement 2
Throughout this second contrapuntal section, there is another group of instruments which does not play Canon 6. These instruments - horn, trombone, bass clarinet, double bass, cello (until the end of bar 58), and clarinet (from bar 62) - play sustained notes or slowly moving lines which provide a background harmony and fill out the texture. As can be seen in Graph 4 the notes are all below middle C and form three lines which move up and down by semitones, though with considerable overlapping of notes. These notes are mostly marked p, but there are occasional crescendi to f or ff.

The instruments playing Canon 6 are marked ff, con fuoco and at T (bar 51), tutta la forza. At bar 61 the canonic parts are marked diminuendo poco a poco, and six bars later, at the beginning of bar 67, they reach pp. This dynamic remains until the end of the movement, with the exception of the trombone entry (bar 68) and clarinet entry (bar 69), both of which are marked ppp. The string demisemiquavers sul ponticello between X (bar 69) and Y (bar 73) are marked mf but, as Ligeti points out in a footnote to the score, "mf sul ponticello sounds like pp".

The string demisemiquavers at X and the senza tempo chord at Y form a short bridge passage between the end of the second canonic section and the beginning of the third chordal section at Z (bar 74).

The canonic movement ends at X, but the harmony formed by the canon is continued until Y by the strings. In Graph 5, which shows the canonic parts in the three bars leading up to X and the string demisemiquavers between X and Y, five distinct lines can be seen: the high B; high E; B⁷ moving to A; G moving to G⁷, and then down by semitones to D⁷; and D moving down to A⁷. Each of these lines gives rise to one of the notes of the chord at Y, i.e. B, E, A, D, and A⁷.
Of the other three notes in the chord, the $E^\#$ has been sustained by the bass clarinet since bar 61, the $D^\#$ by the trombone since bar 68, and the $B^\#$ is the end of a short descending line in the double bass which entered with C in bar 68, moved to B in bar 70, and finally to $B^\#$ just before $\text{V}$.

GRAPH 5

Fitches present in canonic parts in bars 66 - 68, and the four upper string parts in bars 69 - 72 of Movement 2

The chord at $\text{V}$ (see Example 23) can be seen to be built of perfect fifths; the two lowest notes ($E^\#$ and $B^\#$) form a fifth, the two notes above ($D^\#$ and $A^\#$) form another, and the upper four notes ($D, A, E, B$) form a chain of fifths. This chord leads without a break to the following section.
The start of the final section is marked by a widening of the pitch range, from three and a half octaves at \[ Y \] (bar 73) to five and a half octaves at \[ Z \] (bar 74). The section begins with four *senza tempo* chords, the first ca. seven seconds, and the other three ca. five seconds long. The chords are again based on the interval of a perfect fifth. In the first chord, the lowest three notes (G, D, A) form two fifths and the rest of the notes form a pile of fifths from the low C\# to high D. The second chord has the same pile of fifths from C\# to D (with an enharmonic change from E\# to D\#) and the same bottom interval (G to D), but the next fifth up has changed from D-A to D\flat-A\sharp. For the third chord the range is reduced to just over four octaves: the top two notes (G and D) cease, leaving C as the top note in the pile of fifths, and the two fifths at the bottom of the chord become C-G and B-F\#. The lower C and G die away at the end of bar 76, leaving just one pile of fifths, from low B to high C, as the fourth chord (see Example 23).
In the fifth bar of this section, at \( \text{AA} \) (bar 78), the bars are again measured. Bar 78 starts with the notes of the previous bar but without the top and bottom notes (C and B respectively) and the low C#, and with the D# changed to an E. In this bar and the next there are not chords, but lines moving by semitone up or down. As can be seen in Example 24, the flute moves from E up to G, the clarinet from \( \text{Db} \) down to G, the viola harmonics from F up to G, the organ from G to G, and the bass clarinet from \( \text{F}^\# \) to G. In other words, from the chord at \( \text{AA} \) each instrument moves independently towards the note G, so that from the end of the following bar (bar 79) there are five G's in four different octaves. This octave unison chord continues through a long pause in bar 80, and the movement finishes with another long pause bar, this time silent, before moving straight on ('attacca') to the third movement.
The methods of composition Ligeti uses in the third movement, particularly of pitch organisation, are similar to those already described in the previous movements. The distinguishing feature of this movement is the use of repeated *staccato* notes — in fact, almost the entire movement is made up of such notes, the exceptions being the sustained notes in bars 8-11 and the trills at the end (bars 60-64). The notes are sometimes articulated continuously by one instrument, giving the effect of a sustained note (e.g. at \(\text{C}\) (bar 12)), some-

\[\text{EXAMPLE 25 (a)}\]
times by one instrument but separated by rests, giving a more open texture (e.g. at J (bar 46)), and sometimes by a series of instruments playing small groups of reiterated notes (e.g. at the opening – see Example 25).

EXAMPLE 25 (b)
Chart 4 shows the number of repetitions of each note by each instrument during the first 11 bars (the instruments are listed in order of entry). The groups of notes are separated by rests. The first note, E, introduces the movement and the new texture, and lasts for nearly one and a half bars before the canon moves on. As can be seen from Chart 4 each of the wind instruments plays three groups of E's, whereas those that enter later (i.e. piano and strings) play only one group of E's. The actual number of repetitions of each note is not signifi-
cant, but each group begins either with a $\text{ffpp}$ (wind and piano) or with a $\text{forte}$ note followed by piano notes (strings). The entries of the note groups are not metrical, so that the overall sound is of a reiterated-note pattern punctuated by sharp accents at irregular intervals.

CHART 3
Numbers of repetitions of the notes in Canon 7 in each instrument at the opening of Movement 3

<table>
<thead>
<tr>
<th></th>
<th>E</th>
<th>F</th>
<th>E♭</th>
<th>D</th>
<th>F♯</th>
<th>E</th>
<th>C#</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flute</td>
<td>12</td>
<td>16</td>
<td>6</td>
<td>7</td>
<td>4</td>
<td>15</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>Oboe</td>
<td>8</td>
<td>13</td>
<td>4</td>
<td>10</td>
<td>9</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clarinet 1</td>
<td>10</td>
<td>15</td>
<td>8</td>
<td>12</td>
<td>11</td>
<td>13</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>Clarinet 2</td>
<td>14</td>
<td>18</td>
<td>5</td>
<td>9</td>
<td>16</td>
<td>17</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>Horn</td>
<td>11</td>
<td>7</td>
<td>20</td>
<td>14</td>
<td>16</td>
<td>19</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Trombone</td>
<td>9</td>
<td>6</td>
<td>19</td>
<td>5</td>
<td>8</td>
<td>12</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Piano</td>
<td>19</td>
<td>20</td>
<td>8</td>
<td>15</td>
<td>18</td>
<td>17</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Violin 1</td>
<td>8</td>
<td>6</td>
<td>7</td>
<td>9</td>
<td>12</td>
<td>11</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>Violin 2</td>
<td>10</td>
<td>5</td>
<td>9</td>
<td>15</td>
<td>14</td>
<td>12</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>Viola</td>
<td>6</td>
<td>10</td>
<td>18</td>
<td>13</td>
<td>16</td>
<td>15</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Cello</td>
<td>12</td>
<td>5</td>
<td>4</td>
<td>11</td>
<td>13</td>
<td>10</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Harpsichord</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>35</td>
<td></td>
</tr>
</tbody>
</table>

The movement opens with a pitch canon in the wind instruments (see Example 26). The canon begins on the note E above middle C, and moves outwards to the F♯ above and C below. The wind instruments begin the canonic movement, and are joined by the piano at the end of bar 2. The groups of notes played by each instrument overlap, so that there is a continuous pattern of demisemiquavers.
The rhythm becomes more complex at the end of bar 3 with the introduction of nontuplets in the flute. These are taken up by the clarinet 1 (beginning of bar 4), then by the oboe, clarinet 2, trombone and so on, so that while the demisemiquavers continue, the nontuplets form another continuous layer of repeated notes. Halfway through bar 4 the flute introduces septuplets, and this forms another continuous line through the instruments, and another rhythmic layer. The strings enter at the end of bar 4 and the beginning of bar 5 with sextuplets and quintuplets. These form two further rhythmic layers, though the quintuplet line is not continuous (see Graph 6).

**GRAPH 6**

Distribution of the various divisions of the crotchet beat (from triplets to nontuplets) in the first eleven bars of Movement 3

The wind instruments finish in bars 5-6, and the demisemiquavers continue in the piano. The nontuplets finish at the end of the harpsichord entry (bars 5-6). This leaves the piano and four upper strings
and the rhythmic ratio 5:6:7:8. Just before the piano finishes (half-way through bar 7) the double bass enters with the first of the sustained notes - a muted harmonic on the D above middle C. This entry coincides with the last note of a group of D's played by the viola. The next two sustained notes follow this pattern also: the beginning of the F# in clarinet 1 (bar 8) coincides with the last F# in the viola grouping, and the E in clarinet 2 (bar 9) with the final viola E. The fourth sustained note, C, in the flute coincides with the beginning of the repeated C's in violin 2.

The repeated note patterns end at the beginning of bar 11 with the notes C (violin 2) and C# (viola and cello). The sustained notes form a chord of three whole-tones (C-D-E-F#), and continue without break to C (bar 12).

The effect of this section is of a pulsating sound, punctuated by irregular accents, which starts with a unison and moves chromatically outwards to form a chord spanning the interval of a tritone (C-F#). The chromaticism gradually disappears until the chord that is left is formed by whole-tone intervals (bar 11 - see Graph 7).

GRAPH 7
Pitch content of the first eleven bars of Movement 3
At the whole orchestra except the double bass enters with the note A♭, spread over four octaves, again articulated by reiterated notes but now in a *senza tempo* pattern (see Example 25(a)). Instructions in the score say that the notes are to be played "medium fast, *staccatissimo leggero* (*pizzicato* in strings), very distinctly articulated: no flutter-tonguing, but always distinct strokes in the individual parts (the concurrence of the parts creates a 'granulated' continuum)". The A♭'s continue for ca. seven seconds, then the clarinet 1 moves from high A♭ to G (beginning of bar 13). In bar 14 the high A♭'s in piano and violin 1 also move down to G, and in the following bar the A♭'s an octave lower in the harpsichord and violin 2 move down a semitone to the G above middle C. In bar 16 the low A♭'s in cello and piano move up a semitone to A♭. This process continues, with the A♭'s
in the two higher octaves moving gradually downwards and the lower A♭s moving upwards by semitones, with the exception of clarinet 2, which begins on the A♭ below middle C and moves downwards. Each instrument moves at a different rate, and the four A♭s continue in flute, oboe, trombone and the left hand of the harpsichord until bar 28, where the instruments begin independently moving up or down (see Graph 8).

At \( \text{E} \) (bar 32) the music returns to measured notation with the entry of the double bass, playing very sharply accented fortissimo pizzicato notes. During the next two bars the rest of the strings finish their senza tempo patterns and begin playing measured pizzicato notes. These pizzicati are marked with various instructions to indicate their character: the first group in each instrument is marked sul ponticello, in relieve and "vigorously 'torn'" (in the cello), and the second group with the sign \( \checkmark \), which indicates a 'Bartok pizzicato' (lift the string and let it snap against the fingerboard). Although the notation is measured, the string lines are sometimes independent of the beat, e.g. violin 2 and viola begin in bar 34 at \( \text{J} = 60 \) and, when the beat changes in the following bar to \( \text{J} = 72 \), both remain playing at \( \text{J} = 60 \). The speed of the repeated notes is much slower than the senza tempo patterns, which gives the pizzicati more impact. Also the pizzicati are marked \( \text{ff} \), while the senza tempo notes are \( \text{p} \).

The notes in strings form a pattern of chromatic movement, using ten notes from the initial double bass B upwards to E♭ and downwards to F♯, though this is obscured by the fact that the notes are spread over three and a half octaves (see Graph 9).
When the strings begin the pizzicato notes, the other instruments are still playing the senza tempo patterns. These gradually die away: the harpsichord finishes in bar 34, the trombone and piano in bar 37, and the horn and woodwind in bars 38-39.
During bar 38 (\[G\]) the harpsichord, then the piano, enter, each playing a ten-note cluster. The harpsichord plays a cluster from the C\# above middle C to the F above, and the piano plays a cluster from the C\# an octave above middle C to the A\# above, giving a chromatic cluster a major ninth wide. Both instruments play in measured notation at \(\text{J} = 66\), the harpsichord playing quintuplets and the piano sextuplets. All other instruments finish playing during bars 38-39, leaving only the two rhythmic layers of harpsichord and piano. Both of these instruments also finish at the end of bar 40, but connect without a break with the string entry in the following bar.

At \(\text{bar 41}\) (bar 41) the four upper strings enter with pianissimo arpeggiated pizzicati. Each instrument plays three notes: the outer two are open strings a ninth apart, and the middle note is a glissando.

In the violins and viola the glissando moves from a semitone above the central string to a semitone below the upper open string; e.g. in violin 1 the open strings used are D and E, so the glissando note moves from A\# (the central string is A) to D\# (a semitone below the E string – see Example 27).

\[\text{H}\] senza tempo, ca. 9\"

\[\text{EXAMPLE 27}\]
In the cello the glissando moves in the opposite direction, i.e. the open strings are G and A, so the glissando note starts at G♯ (just below the A string) and moves to D♯ (just above the central D string). The reason for this is perhaps that the violin 2 is using strings of the same pitch but an octave higher, and Ligeti may be trying to avoid the need for the two instruments to coordinate their glissandi. The sound is also made more complex by having simultaneous movement in opposite directions.

By the end of bar 41 (a senza tempo bar, ca. nine seconds) the instruments have finished their glissandi. They continue playing the three-note arpeggiated chords into the next section, still playing senza tempo. At bar 42 (bar 42) horn, trombone, piano and double bass enter with staccatissimo low B♭s (two octaves below middle C). Each instrument plays in a different metrical pattern, and the notes are separated by rest (see Example 28). This produces an open, layered sound with each instrument heard as a different tone colour, but all combining to form a rhythmic pattern which shifts in and out of focus.

This texture - the four upper strings playing senza tempo arpeggiated pizzicato chords, the other four instruments playing staccatissi-
Simile low B⁰s - continues for the next 6 bars. After four bars, at [J] (bar 46), the rest of the chamber orchestra enters, with an extension of the horn/trombone/piano/double bass pattern. The metres used are the same as in the low B⁰s, i.e. triplets, semiquavers, quintuplets and septuplets, but the low B⁰s continue at a speed of \( \text{\text{\textit{\textnormal{\textdagger}}} = 60} \) while the other instruments enter at \( \text{\text{\textit{\textnormal{\textdagger}}} = 80} \) (see Example 25(b)).

The new notes at [J] form a chromatic cluster extending over a minor sixth (from B-G), two octaves above middle C. The individual instrumental lines can be heard as metrical patterns, but all combine to produce a kaleidoscopic effect of shifting colours. The new cluster dominates the texture at this point: the parts are marked \textit{fortissimo} in contrast to the low B⁰ piano and the \textit{pianissimo} in the arpeggiated strings.

Two bars later, at [K] (bar 48) the viola and cello begin upwards glissandi: the two lower notes of the cello move upwards until they 'disappear' in the upper register, and the viola middle note \( \text{C}\# \) moves to the \( \text{F}\# \) above. During the following two bars the \textit{senza tempo pizzicati} in the upper four strings die away.

Also at [K] a \textit{rallentando} begins, ending at [L] (bar 50) where the tempo is \( \text{\text{\textit{\textnormal{\textdagger}}} = 60} \). The \textit{rallentando} actually only applies to the oboe, clarinet 1 and harpsichord, as the piccolo and clarinet 2 remain at \( \text{\text{\textit{\textnormal{\textdagger}}} = 80} \), the horn, trombone, piano and double bass are still playing at \( \text{\text{\textit{\textnormal{\textdagger}}} = 60} \), and the other strings are playing \textit{senza tempo}.

At [L] the violins, having finished their \textit{senza tempo} patterns, enter with high \( \text{G}\# \) (violin 2) and \( \text{A} \) (violin 1), played as \textit{fortissimo} "torn" \textit{pizzicato}. Violin 1 plays semiquavers and violin 2 triplet quavers, and the notes are not separated by rests. These two notes extend the chromatic cluster to a minor seventh (B-A). Bar 50 ([L]) is
marked \( J = 60 \), and in the following two bars there is another rallentando. This again only affects the oboe, clarinet 1 and harpsichord, since the violins remain at \( J = 60 \). At \( \text{M} \) (bar 53) the tempo reaches \( J = 40 \) and the viola and cello enter. The viola note (E) duplicates the E in clarinet 2, and the cello C duplicates the harpsichord C, but the instruments are not in rhythmic unison. The viola and cello also play
fortissimo "torn" pizzicati, and, like the violins, the notes are not separated by rests. The viola plays quintuplets and the cello plays triplets.

The rhythmic texture at [M] is the densest of this section with each of the 13 instruments playing a different metrical pattern (see Example 29). In the following bar (bar 54) Ligeti starts to reduce the density. The low B's cease first - trombone, horn then piano in bar 54, and double bass in bar 55. In bars 55-58 the high chromatic cluster is gradually reduced to the notes G♯ and A in the violins, starting with the lowest note (B) and gradually eliminating the notes upwards from there, except that the viola E and cello C remain.

The last note (the piccolo G) finishes halfway through bar 58, leaving the pizzicato strings - violin 1 playing A, violin 2 G♯, viola E, and cello C. These instruments continue for the next one and a half bars, then join without a break to [N].

The final section, from [N] (bar 60) to the end, consists of three extended trills punctuated by irregular, short, accented notes. The trills are played pianissimo, and form a small chromatic cluster an octave above middle C: clarinet 2 plays B-C, clarinet 1 plays C♯-D♯, and piccolo plays D-E♭. The punctuating notes are marked ♩♩ and are very short. Each consists of the notes E♭ and D♭ (the same pitch as the trill notes), with the exception of the last one in bar 61 and the first in bar 62, both of which also contain D♯ played by double bass.

As can be seen in Example 30, the punctuations are spaced gradually further apart from each other, giving the effect of a rallentando.
The last entry, in celeste, coincides with the end of all three trills. The movement finishes with three bars of silence.

EXAMPLE 30

Unlike the previous movements, the third movement does not have an obvious outer form. It relies on rhythmic and textural development to sustain the interest and forward movement. The music moves easily from one section to the next, giving the impression that this movement has been through-composed.
The fourth movement opens with a short introductory section played by the clarinets, and later by the strings, which finishes at the beginning of bar 7. The two clarinets play legato and in rhythmical unison for the first five bars, describing the six-note chromatic cluster from D–G in the octave below middle C (see Example 31). There is no discernable pattern or repetition in the clarinet lines, but the notes of the cluster are distributed evenly through the parts and the lines are organised so that the instruments never play a unison note.

The cluster begins to change almost immediately; two notes are added in the first two bars (G♯ in the third beat of bar 1, and A at
the beginning of bar 2). The last D is heard at the beginning of bar 2, and gradually the notes G, F♯, D♯, and F also disappear, so that halfway through bar 4 there are only the notes E, G♯, and A left. The G♯ is also removed in the first beat of bar 5, leaving the perfect fourth E–A.

The viola and cello take over these notes in the third beat of bar 5, the viola continuing the demisemiquaver rhythm and the cello playing sextuplets. The double bass enters at the end of that bar with the same E, as a sustained harmonic, and in the following bar the violins enter, playing A and B♭ in nontuplets. This has the effect of clouding the perfect fourth. The clarinets re-enter at the end of bar 6, again with the notes E–A.

Bar 7 is the transition from the introductory section to the first main section. At the end of the first beat the two clarinets start an upwards run, and in the following beat the violins do the same. At the end of the second beat the celeste also begins two upward runs, one in each hand (see Example 32). These runs do not coincide in any instruments, and they are irregular and non-repetitive. They are mostly composed of tones and semitones except for the left hand of the celeste, which contains larger intervals (major seconds and minor thirds). The viola and cello also begin runs at the end of the first beat and beginning of the second beat respectively, but these runs move downwards. The sustained E in the double bass dies away during the second beat. The effect of these runs is of an opening out of the sound, from the narrow pitch range of the introductory section down just over an octave and up about two and a half octaves.
The upward runs finish together in the fourth beat of bar 7, and the final notes coincide with the first notes of the piccolo, oboe and harpsichord entries in timing and pitch. The two downward runs finish earlier, in the second and third beats.

The rest of the movement is divided into two parts: the first part gradually winding up to the climax at $\frac{8}{4}$ (bar 31), where the music drops about six octaves in pitch, and the second part moving grad-
ually back up to the central pitch range. The first part can also be divided into three subsidiary sections, beginning at \( B \) (bar 8), \( I \) (bar 15), and \( P \) (bar 24).

The first section begins in the last beat of bar 7, with piccolo, oboe and harpsichord playing *staccato* notes which delineate the chord \( D-F\#-A-Bb-D\#-F \) (the lowest note, \( D \), is a ninth above middle C). The instruments play in rhythmical unison - sextuplets in bar 7, then quintuplets followed by semiquavers, triplets and quavers in bar 8 (\( B \)) - but avoid playing in unison of pitch. The line in the right hand of the harpsichord uses all notes of the chord except the lowest, and in the left hand all except the highest, presumably for ease of playing since the timbre will be the same whichever hand plays the notes.

This idea is tossed between instruments and groups of instruments for the next six bars, with the entries overlapping. Each entry is only about a bar long, until the end of bar 10 and beginning of bar 11, where the entries in clarinets and violins become much longer. Instruments which enter together play the same rhythmic pattern, i.e. if they are playing in measured notation the instruments play in rhythmic unison, otherwise both play *senza tempo* patterns. Almost all entries are marked *staccato*, the exceptions being the violins in bar 8 (marked *con sordini, sul tasto, alla punta*), the clarinets in bar 10 (marked *legato*), celeste in bar 11 (*legato*) and harpsichord and piano in bar 13 (*legato*). There is no discernable pattern in the arrangement of the notes, but all notes of the chord are fairly evenly represented through the lines.

The chord at \( B \) (bar 8) begins to change halfway through that bar. The highest note, \( F \), remains and the other notes gradually move
upwards by semitone. This process is speeded up in bar 14, a senza tempo bar. The harpsichord and piano enter with senza tempo patterns at the end of bar 13, overlapping with the two clarinets (which finish at the end of the bar) and the two violins (which are playing senza tempo patterns and finish early in bar 14). The chord described by the harpsichord and piano lines contracts rapidly up towards the F, until both instruments are playing an E-F trill (about halfway through the bar - see Graph 10).

GRAPH 10
Pitches present between the end of bar 7 and bar 14 of Movement 4

The trills lead to the next section at I (bar 15), with the trill in the harpsichord finishing on the F, and the piano on the F♯ above. F♯ is also the first note of the piccolo and bass clarinet entries at I, the piccolo playing in the same register as the piano, and the bass clarinet playing four octaves lower. The two instruments
continue playing four octaves apart for the first four bars of the section (see Example 33).

EXAMPLE 33

This musical idea is reminiscent of the clarinet passage at the opening, except that here the piccolo and bass clarinet are playing in four octave unison throughout. There is again no discernable pattern to the pitch arrangement, but this time the distribution of notes is very uneven, with the highest and lowest notes being favoured (see Chart 4).

The passage at I begins with the cluster F♯-G-G♯, which expands outwards almost immediately: the note F is added in the second beat of the bar, and A in the last beat. Gradually, over the next three bars, the notes E, D♯, A♯ and D are added, so that from the middle of bar 18 there are two chromatic clusters (D–A♯) four octaves apart.
CHART 4
Numbers of repetitions of each pitch used in the principal line
in bars 15 - 23 of Movement 4

<table>
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<tr>
<th>PITCH</th>
<th>BAR NUMBER</th>
<th>6.15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
<th>23</th>
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<td>3</td>
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<td>2</td>
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<td>2</td>
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The piccolo and bass clarinet parts finish in the last beat of bar 18. For the last eight notes they are joined by the clarinet 1, following the piccolo/bass clarinet line, but a semitone lower and playing in the octave above middle C, i.e. halfway between the piccolo and bass clarinet. The three instruments finish together, and the last note of the piccolo and bass clarinet line, the principal line, is the first note of the violin 1 and cello entry. The violin 1 takes over in the register in which the piccolo has been playing, and the cello in the bass clarinet's register (see Example 34).

Violin 1 and cello finish in the second beat of bar 19, and are joined for the last ten notes by violin 2 and viola, both following the principal line: violin 2 plays a tone below the principal line and is pitched an octave lower than violin 1, and viola plays a semitone below the principal line and is pitched an octave higher than the cello.
In the second beat of bar 19 the piano takes over the principal line from violin 1 and cello, and a beat later it passes back to piccolo and bass clarinet. Each changeover involves an overlap of one note. This pattern continues for the next four bars, though there are several changes: at the end of the first beat of bar 20 the principal line moves from piccolo and bass clarinet to violin 1 and cello again, but this time the piano joins in (with the notes of the principal

1. See Appendix 3.
line) for the last seven notes of the piccolo/bass clarinet entry and plays through to the end of the violin/cello entry, i.e. the piano overlaps with both entries. The piano also extends the range by two octaves, since the right hand plays an octave above the piccolo/violin 1 line and the left hand plays an octave below the bass clarinet/cello line.

Four instruments join the violin 1/cello line in the second beat of bar 20. All follow the principal line, but the bass clarinet plays a tone lower, clarinet 1 two tones lower, oboe three tones lower, and piccolo four tones lower, and these subsidiary lines are arranged evenly in register between the principal lines.

The next instrument to take over the principal line is the harpsichord, and, while the left hand takes over in the same register as the cello, the right hand takes over an octave below the violin 1. However, the harpsichord is using the 16', 8' and 4' stops which means that the upper octave will sound as well.

Four subsidiary lines join the harpsichord at the end of bar 20: violin 1 plays a tone above the principal line, cello a tone below, viola a fifth above and violin 2 a fifth below. In the following entry the subsidiary lines enter at the same time as the principal line (now in piccolo, bass clarinet and double bass). The double bass entry here has the notes D and D♯ translated up an octave, since these notes would otherwise be below the range of a normal double bass. The principal line moves next, without an overlapping note, to the four upper strings, in unison in the octave above middle C and playing ***marcatissimo***. Previous entries have all been marked *p* or *pp*, except the harpsichord in bar 20 which is marked *f*. The unison strings play only six notes, and then the line is passed back to the left hand of
the harpsichord and the dynamic returns to $p$.

In bar 22 the principal line moves to piccolo and the left hand of the piano, to double bass, and to bass clarinet. In the following bar it moves to cello and finally to the piano at the end of bar 23.

The principal line extends right through this section, and, in fact, all the other material is directly related to it since the subsidiary lines consist of the same pattern of intervals translated up or down a semitone, tone, three semitones, two, three or four tones, or a perfect fifth. This gives the section a unified sound, in spite of the rapid changes in instrumentation, register, and (from bar 21) articulation and dynamics.

The cluster described by the principal line remains the same (i.e. a chromatic cluster from $D$-$A\#$) from halfway through bar 18 until bar 23 (see Example 35), though with the subsidiary lines the whole chromatic spectrum is covered for most of the section. The cluster starts to reduce rapidly from the second beat of bar 23; then during bar 24 the notes $B$, $D\flat$, and finally $C$, are added until the only notes left are $D\flat$ and $C$. At this point the piano left hand is playing the principal line and the right hand is playing the subsidiary line which is a fifth above. It is also about a bar into the next section, which begins at $P$ (bar 24). When the tempo changes at $P$ to $=72$, the piano remains at the old tempo of $=80$. Halfway through the third beat of bar 22 the horn enters imperceptibly with a sustained $D\flat$, a semitone above middle $C$. This leads, with a crescendo in bar 23, to emerge $p$, dolce espressivo at $P$. 
The section from P to R (bar 30) consists of a melodic line which starts in the horn and moves to the piccolo, reinforced at times by entries from other instruments, and accompanied by loud, frenetic piano chords.

When the piano has finished playing the principal and subsidiary lines (from the previous section) in bar 25, it immediately begins a stringendo which takes it, by leaps of a seventh, from two octaves
below middle C up to four octaves above middle C, and a crescendo which takes it from pp to ff in a very short space of time (see Example 36).

The piano then stays in the register two to four octaves above middle C, and plays "as though crazy", following the instructions "Piano cadenza: at all times with exaggerated force and haste. Do not play at a steady speed;
little hesitations can occur ad lib. within the general "Prestissimo possible" (but no rallentando!), 

right through this section. The left and right hands alternate, the left hand playing slightly lower pitches than the right, and each chord consists of two to five notes in close position. The actual pitches do not seem to follow a pattern, but rather the piano produces harsh, hammered sounds which gradually move upwards in pitch.

The melodic line in the horn (bars 24-25) covers almost the entire chromatic spectrum, the omitted notes being G[♮] and G which are the first two notes of the piccolo entry (bar 25 — see Example 37).

---

**EXAMPLE 37**

The horn is joined by the viola for the last three notes of bar 24, violin 2 a note later, and violin 1 the note after that. Each instrument plays only three notes, all doubling the horn at pitch, and each instrument independently plays a crescendo from pp to mp (viola and violin 2) and mp (violin 1) and back to p. The horn also has a crescendo to mp and decrescendo, beginning just before the viola entry. These overlapping crescendi/decrescendi produce an intense, expressive sound.
At the beginning of bar 25 the oboe enters, doubling the horn, followed a note later by the clarinet 1 playing an A♭. This A♭ is the last note of the horn, and at the end of that note the piccolo and cello enter with the note G♭, a twelfth above middle C. From this point on the piccolo becomes the main melody instrument, and the entries in all other instruments (apart, of course, from the piano) double the piccolo part at pitch.

The G♭ lasts from the second beat of bar 25 to the third beat of bar 26, and the oboe, clarinet 1 and cello each play non-coinciding crescendi (to fff) and decrescendi. The piccolo also plays a crescendo, but later than the other instruments, and does not decrescendo again so that it emerges as the most prominent sound at the end of the G♭. The piccolo melody continues until halfway through bar 29, with the wind and strings doubling occasionally for one or two notes at a time. The doubled notes are those from G (two and a half octaves above middle C) downwards, and Ligeti obviously has a good reason for doing this: the notes in that part of the piccolo range are quite weak, whereas those in the upper register are very penetrating, so the doubling serves to make the melodic line more evenly heard. There are two exceptions: in the last beat of bar 28 the E♭ is not doubled, but it is marked subito mp after a crescendo to fff; and the very last note of the piccolo, which is marked p at the end of a decrescendo.

The doubling of some notes also adds to the intensity and expression of this section, as do the modes of attack (fff, or a rapid crescendo within one note) and the quick changes of dynamics in the piccolo part (rapid crescendi, ffp, subito ff, etc.).

The actual pitches of the piccolo can be seen to be a repeated
pattern when confined within an octave, also covering the entire chromatic spectrum, except that the first statement of the pattern has the eleventh note as another D, rather than as an F (see Example 38).

![Example 38](image)

The piccolo finishes halfway through bar 29 with a final, rapid burst into the top octave. The piano, meanwhile, is playing another *stringendo*, and "hammering like a madman". The pitch has gradually risen until, in the *senza tempo* bar (bar 30), the notes used are A, B♭, B and C four octaves above middle C. This is the climax point of the movement: the music has wound gradually upwards in pitch and intensity until **S**, where the pitch suddenly drops six and a half octaves but the intensity continues. The music then begins to wind upwards in pitch again and to relax.

At **S** (bar 31) the trombone sustains its pedal F for two and a half bars, playing *p, dolce* and eventually dying away to nothing. Meanwhile the double bass, at **S**, is playing ***666***, "as though crazy" and making a "scratching noise". The double bass line describes a chromatic cluster from E-A in the same low register as the trombone, the sound again being reminiscent of the patterns in the clarinets at the beginning of the movement, and in piccolo and bass clarinet at **I** (bar 15). However, whereas these previous examples were marked *legato* and played as even demisemiquavers, every note in the double bass part at **S** is marked with an accent, and the rhythm alternates between five, six and seven notes per beat (see Example 39).
The cluster gradually begins to move upwards by semitone. At the beginning of bar 33 the note E is eliminated and A# added, and at the end of that bar the last F is heard and B is added. At \( \text{T} \) (bar 33) the piano enters, describing the same cluster as the double bass but not following the same note order, and playing ppp, staccatissimo leggiero with a slow crescendo over the next three bars. The rhythm is also different but linked to the double bass: in bar 33 the two instruments alternate playing sextuplets and septuplets, so that they are never playing in rhythmic unison, and from bar 34 onwards the piano plays one more note per beat than the double bass (i.e. when the double bass plays quintuplets, the piano plays sextuplets etc.).

In bar 34 the double bass begins a decrescendo which takes it from \( \text{fff} \) to ppp seven bars later. In the same bar the piano begins a crescendo which continues for the next three bars, arriving "like a sudden explosion" at \( \text{fff} \) when the piano part finishes (bar 36). The last two notes of the piano (E and F) are also played by the trombone (\( \text{F} \)) and bass clarinet (ppp). The trombone plays only these two notes, but the bass clarinet continues the line from the piano with a poco crescendo. Meanwhile, at the beginning of bar 36, the cello enters, also playing ppp, poco crescendo. The cluster has moved
upwards so that it now lies within the cello range, i.e. the lowest note is now the C two octaves below middle C.

None of the three instruments (bass clarinet, cello and double bass) plays the same note pattern or the same rhythm; in fact the rhythm patterns are again organised so that the instruments never play in rhythmical unison. In bar 37 the cello and, shortly afterwards, the bass clarinet, reach the peak of their crescendi (m₄) so that from bar 38 onwards there is an overall decrescendo.

At the beginning of bar 37 the chromatic cluster has reached its highest and widest point, spanning the tritone C♯-G. Halfway through the first beat of bar 37 the note D is eliminated, and later in the bar the F♯ also disappears. The cluster gradually becomes less dense until, by the second beat of bar 40, only the notes C♯ and G remain, accompanied by a sustained E in trombone.

The trombone dies away in the third beat of bar 40, and the double bass in the first beat of the following bar, leaving the bass clarinet and cello playing C♯ and G, still using different metrical patterns. The bass clarinet dies away at the end of the bar, but the cello leads into the next section. Halfway through the last beat of bar 41 the cello part moves from C♯ to C and begins an arpeggiated pattern. It is joined by the viola at the end of bar 41, violin 2 in the first beat of bar 42, and violin 1 in the following beat.

Each instrument plays a different pitch order, though all play arpeggiated string-crossing patterns. In bar 42 and the first beat of bar 43 the instruments play septuplets, demisemiquavers or nontuplets, but from the second beat of bar 43 they work in pairs and alternate between demisemiquavers and nontuplets, so that when violin 1 and viola play demisemiquavers, violin 2 and cello play nontuplets and
vice versa. The actual pitches in this section fall into four groupings, each of which makes up a line. As can be seen in Graph 11, each line may contain three or four pitches at once, and the lines move gradually upwards until $\text{X}$ (bar 46).

**GRAPH 11**

Pitch content of the violin, viola and cello parts, bars 42 - 52 of Movement 4
From the end of bar 45 the four upper strings are joined by sustained notes in the wind, double bass and organ. The beginning of each of these sustained notes coincides with the appearance of that note in one of the arpeggiated patterns. The entry of the sustained notes also marks the more static nature of bar 46 (see Graph 11) where the string-crossing patterns continue as before, but the movement of pitch in the four lines is greatly reduced.

The range up to this point has been about two octaves. In bar 47 the range expands, with the two upper lines in violin 1 moving upwards (C-C#-D etc. and E-F-F# etc.) while all other lines move downwards. By bar 49 the pitch movement has again become static, this time with a range of about five octaves. Many of the notes in the string parts are open strings, e.g. G and D in violin 1, G,D and A in violin 2, and C, G and D in viola. The double bass enters at the end of bar 48, adding the notes B♭ and F. The only moving lines in the string section at this point are in the violins, the highest line being doubled first by the flute (F and G♭) and then by the organ (G). The string parts continue into the next section at [i1 (bar 50). Halfway through that bar the range is reduced to approximately three octaves by the double bass line moving gradually upwards and the violin lines dropping to an octave above middle C. The organ continues the violin 1 line to the high A, however, and this is sustained until bar 54.

The string range continues to reduce until, in bar 52, it becomes an octave: the cello plays a sustained A just below middle C, the double bass a sustained A an octave higher, and the violins and viola play trills from A - B♭ in the same register as the double bass. The organ also plays sustained notes: A below middle C, E a tritone above and A three octaves above.
The new section begins halfway through bar 49 with the clarinet and bass clarinet entries. The clarinet begins on the E below middle C and the bass clarinet on the F below that. In bar 50 the flute enters on middle C and the oboe on the E above shortly after. Each instrument plays a *senza tempo* pattern, *prestissimo possibile*, legato, and enters imperceptibly, with a slight *crescendo* to *pp*.

The note order in the *senza tempo* patterns is different in each instrument, but once again the notes used are the same in all parts, i.e. they form overall clusters. Each instrument begins with the full chromatic spectrum: the clarinet and bass clarinet each play three statements of twelve chromatic notes, the flute plays two, and the oboe one statement (see Example 40). After these statements notes begin to disappear from the cluster; first G, then F, then B. The spread of notes through the instruments remains even, although the cluster is diminishing.

\[\text{EXAMPLE 40}\]
The instrumental lines move rapidly upwards from the initial statements and settle one and a half to two and a half octaves above middle C by the end of bar 51. At this point there are only three instruments playing the *senza tempo* patterns, the double bass having finished in bar 51.

The oboe finishes its *senza tempo* pattern at the beginning of bar 53 (AA) and sustains its last note, D♯, through into the following bar. Bar 53 is a *senza tempo* bar and its duration "depends on the oboist's breath capacity".
The cluster described by flute and clarinet continues to be reduced, until only the notes D and E remain, and both instruments die away during bar 53. When the flute and clarinet have finished, the sound for the rest of the bar consists of the A - B♭ trills in violins and viola, sustained A's in three octaves (the A below middle C in cello and organ, A above middle C in double bass, and two octaves above that in the organ) and, making a tritone from the A's, B♭ in organ (just above middle C) and the high D♯ in the oboe. All instruments are marked pp except the oboe, which gradually becomes prominent through a crescendo to f, then leads into the next bar with a crescendo molto to fff.

The first note of bar 54 (B♭) is the D♯, tied over as the first note of a sextuplet. The oboe continues in sextuplets, doubled by flute and clarinet except on the low E, and the bass clarinet for the A♯ and E only.

All these instruments are marked fff and āeroçè (see Example 41). There are no repeated pitches in this section and, like the piccolo melody in Example 38, this is seen more obviously when the notes are confined within an octave (see Example 42).

The sustained notes in organ, cello and double bass finish in the first two beats of bar 54, and the trills in violins and viola resolve onto the note C♭ on the second half of the second beat, immediately after the unison woodwind line has finished. This C♭ is doubled at pitch by the B in the trombone, which also enters on the second half of the second beat. The trombone then plays a glissando for a dotted quaver, finishing on the F above. This F links with the flute entry which forms the final musical idea.
The flute plays the notes F (an eleventh above middle C) and E (a third above middle C) in a *senza tempo* pattern, with a slur from the lower to the upper note each time. This idea is thrown between
the flute, celeste, organ and clarinet, with the short *senza tempo* patterns overlapping. Each instrument plays only two pitches, forming the interval of a ninth or tenth (see Example 43). The clarinet finishes during the first beat of bar 55, and the rest of the bar (*senza tempo*, ca. 15 seconds) is silent.

![Example 43]

These last two bars conclude the movement: the music has gradually relaxed from the climax point at $S$ (bar 31), but the rapid changes in sound of bars 54-55 helps to break down the strong feeling of continuity which Ligeti had created in this movement.
CHAPTER 5

The overall form of the Chamber Concerto is based on a manipulation of sounds; sometimes chords based on a single interval, sometimes clusters of notes. In an article in 1958, Ligeti said that he thought it would be "worthwhile to try and achieve a compositional design of the process of change", and this is obviously an idea he has developed since then. It is, of course, not a new idea - much of the interest in a Beethoven symphony comes from the process of changing from one harmonic area to another - but Ligeti is not using traditional harmonic language, and therefore must create his own musical language in which the change is obvious.

The basis of Ligeti's language is his use of pitch, though other parameters (e.g. rhythm, dynamics) add to the sense of change. In the Chamber Concerto there are two main types of sound: the cluster (a chord of two or more notes which, when placed in close position, form major or minor seconds, or occasionally major or minor thirds), and the 'pure' interval (in the Chamber Concerto this may be an octave, fifth, tritone or fourth) either on its own or used to form a chord. Both of these sounds can be expressed as a polyphonic texture, as sustained chords, or as a combination of the two.

The sustained chords can be formed by sustained notes (e.g. Movement 1, bar 38\textsuperscript{M}; Movement 2, bar 35\textsuperscript{P}; Movement 2, bar 74\textsuperscript{Z}), very slowly moving lines (e.g. opening of Movement 2; Movement 2, bar 78\textsuperscript{AA}), reiterated notes (e.g. Movement 3, bar 12\textsuperscript{C}; Movement 3, bar 46\textsuperscript{J}),

or oscillating patterns (e.g. Movement 4, bars 5-6; Movement 4, bar 42).

The polyphonic textures are formed by canonic movement (canon of pitch only) in the first three movements, and by less organised sequences in the fourth movement. The polyphonic lines in the fourth movement, like the canons in the earlier movements, are a means of articulating a cluster or chord, and unison notes are avoided, although there is seemingly no pattern to the organisation of the individual lines.

At times the two textures are combined (i.e. polyphonic texture is accompanied by sustained notes) either with the sustained notes stating the same chord as the polyphony (e.g. Movement 1, bar 25; Movement 4, bar 46) or with the polyphony as one layer and the sustained notes forming another (e.g. Movement 1, bar 47).

There are also two major examples of textures which do not fit any of the above descriptions: the first is at (bar 40) in Movement 2, where the canonic parts play in rhythmical unison, making a homophonic texture accompanied by a separate layer of sustained notes; and the second is in the fourth movement at (bar 24) where the texture is a single melodic line (with occasional unison doublings) accompanied by rapidly shifting chord clusters.

This is the basic compositional material which Ligeti uses to express his musical forms. The pitch material never stays static for very long (the longest period occurs in *senza tempo* bars which have chords ca. 14" long, e.g. in Movement 1, bar 38), and this creates a feeling of movement in the music. Other parameters also contribute to the process of change within the form: these are pitch, density, range, rhythm, metre, dynamics, mode of attack, instrumentation, and timbre.
Pitch, Density, and Range

The most obvious sense of change occurs when the pitch shifts from a narrow range to a wider range or vice versa, e.g. at the opening of Movement 3, the pitch moves from a unison E to a chord with a range of a tritone\(^2\), and in Movement 4 the entries in the piccolo and bass clarinet at |bar 15| move from F, F\# and G to a span of a minor sixth\(^3\). Conversely, in Movement 1 the pitch moves from a range of a fifth (G-D) in bar 30, upwards to a range of a semitone (C\#-D) at bar 35\(^4\), and in Movement 2 the opening chord, with a range of a tone less than two octaves, moves inwards until it spans a tone at the end of bar 34\(^5\).

Another obvious pitch change occurs when a 'pure' interval is 'clouded' by the gradual introduction of notes other than those forming the interval, e.g. at |M| (bar 38) in Movement 1\(^6\) and |C| (bar 12) in Movement 3\(^7\) beginning with unison octaves, and in bar 35 in Movement 2\(^8\) beginning with a chord made of tritones.

The next main type of pitch change is when a cluster moves upwards or downwards as a band of sound, i.e. it keeps a similar range (e.g. in Movement 4, bar 31 |S|).

The density (number of parts sounding simultaneously) contributes to the patterns formed by the alteration of pitch range (as shown in the

2. See Graph 7.
3. See Example 35.
4. See Example 5.
5. See Graph 2.
6. See Graph 1.
7. See Graph 8.
8. See Graph 3.
graphs in Appendix 4), but does not always coincide exactly with the increase and decrease in range. Movement 3 begins with the note E stated by the flute and clarinet, joined during the next two beats by the other four wind instruments. At the end of the second bar the piano also enters and at the end of bar 4 and during bar 5 the four upper strings and harpsichord enter, giving a greater density. However, from the beginning of bar 5 the wind instruments and harpsichord finish one by one, so that by the middle of bar 6 only the four strings and piano are left. In bar 10 there are seven parts; four consisting of sustained notes and three consisting of reiterated notes, and in the following bar the reiterated notes finish, leaving only the sustained notes. Therefore, while the pitch range increases from a unison to a tritone, the density increases until about halfway through the section, then decreases to the end.

Where the pitch range reduces to a small interval, the density usually reduces to match it, e.g. at [L] (bar 35) in Movement 1 the range has reduced to a C#-D trill, and between [L] and [M] (bars 35-38) the density is reduced from the four unison strings to violin 1 alone. Density can also be used as a parameter that is not linked to an expanding or reducing range, e.g. at [S] (bar 31) in Movement 4 there is one sustained note and one canonic line. At [T] (bar 33) the sustained note dies away and another canonic line enters, and at [U] (bar 36) yet another canonic line enters. Four bars later (bars 39-40) another sustained note enters, so that there are three canonic lines and one sustained note. While the density has been increasing, the pitch range has remained constant, though the cluster has moved upwards in pitch.

Density is combined with register to produce a feeling of rapid change in Movement 4 at [K] (bar 19), where the principal line moves in four octave unison, with extra parts added at irregular intervals and in
varying registers. Halfway through the section (at \( M \), bar 21) the principal line itself undergoes various register changes (see Appendix 3).

Rhythm and Metre

The most obvious way in which rhythm affects the sense of movement within a section is when it produces a feeling of speeding up or slowing down, e.g. at \( K \) (bar 33) in Movement 1, the wind have a gradual, written out \textit{accelerando}. In the first beat the instruments play semiquavers, quintuplets and sextuplets (i.e. they play in the proportion 4:5:6), in the second beat they play in the proportion 5:6:7, and in the third beat 6:7:8.

The converse occurs in Movement 2 at \( U \) (bar 57), where the pattern of sextuplets gradually moves to quintuplets, semiquavers and so on, until the rate of movement is very slow just before \( X \) (bar 69). There is another written-out \textit{rallentando} at the end of Movement 3 (\( N \), bar 60), where the trills are punctuated by short, accented entries which occur further and further apart\(^9\).

Another way in which the rhythm contributes to the feeling of movement is in the sections in the third movement, where the reiterated notes make a shifting pattern which moves in and out of focus, e.g. at \( J \) (bar 46) nine instruments have short, accented notes, each with a different rhythm, while the four upper strings have arpeggiated patterns\(^{10}\).

Metre is not obvious in Ligeti's music. In fact he makes an effort to disguise any metre by eliminating any sense of beat, e.g. in the

\(^{9}\) See Example 30.

\(^{10}\) See Example 25(b).
canonic section at the opening of Movement 1 there is a great variety of note values, and notes are frequently tied over from one beat or bar to the next. Also, Movement 3 opens with regular, repeated demisemiquavers, but a sense of metre is avoided by the use of irregular, unmetrical accents. In Movement 4 there is the instruction at the beginning to "play very evenly; do not observe bar subdivisions".

One use Ligeti does make of metre is when parts proceed at different metronome speeds, e.g. the first canonic section in Movement 2 (\[\text{§}\], bar 13). This helps to separate the strands of sound.

Dynamics and Mode of Attack

In many places in the Chamber Concerto, Ligeti specifies that the instruments should be equal in dynamics, e.g. in Movement 2 at \[\text{P}\] (bar 35) ("the instruments entering.....must be absolutely balanced in their dynamics: \text{ppp} is equal in all instruments"), and at bar 5 in Movement 4 ("Dynamic balance: Vla, Vc. \text{pp} = \text{Clar.1, Clar.2 pp.} The two strings continue the clarinet parts without a break, so that only the tone colour changes, but not the volume").

However, there are places where certain instruments are more important than others, notably in Movement 2 at \[\text{C}\] (bar 13), where Ligeti states in a footnote: "Dynamic balance: \text{pp} is absolutely equal in Fl., Clar., Clar. basso, Org., Pf. (all these instruments stay in the background). NB. The piano should play a subjective \text{p} so that it sounds the same as \text{pp} in the other instruments. The other three instruments (Ob. d'am., Cor., Trbn) should stand out a little (\text{mp} is equal in Ob. d'am.,

11. See Example 1.

12. See Example 25(c).
Cor., Trbn)). Also, in Movement 4 at AA (bar 53), the oboe gradually dominates the sound since it is marked with a crescendo from pp-fff, while all the other sustained instruments are marked pp (sempre).

Dynamics also produce a feeling of change when instruments alter their dynamics together, giving an overall crescendo (e.g. in Movement 2, bars 33-34) or decrescendo (e.g. in Movement 4 from the end of bar 37 to bar 41), or when instruments play non-coinciding crescendi/decrescendi, giving an expressive intensity (e.g. Movement 1, bars 56-61 S 13, and Movement 4, bars 24-29 P).

Dynamics and mode of attack are combined to produce two of Ligeti's most common sounds: the instructions "attack imperceptibly" and "morendo al niente", combined with crescendi and decrescendi respectively, give the effect of notes appearing from nowhere and disappearing to nothing, since there is no clearly perceived beginning or ending point for such notes.

The mode of attack can also help to separate layers of sound (e.g. Movement 3, bar 32 E where the rapid staccato 'senza tempo' patterns are contrasted with slower, accented, repeated notes), or to articulate a chord or cluster (e.g. Movement 3, bars 1-9, where the reiterated notes are punctuated by sfp or fp accents at the beginning of each entry, and Movement 3, bars 60-64, where the continuous trills in the piccolo and clarinet are punctuated by the same notes played as sfff accents by other instruments).

Instrumentation and Timbre

Instrumentation is an important part of Ligeti's composition - shifting instrumental colour is an obvious way of maintaining interest.

13. See Appendix 2.
and a feeling of forward movement. On a small scale, canonic lines can pass freely from one instrument to another, and, on a larger scale, Ligeti often uses instruments in families (i.e. wind, strings), and either the music moves from one family to the other (e.g. the first eight bars of Movement 3, which move gradually from wind to strings) or the families contrast to form different layers (e.g. Movement 1, bar 31 \( J \), where the wind impose a new layer on top of the string sound).

Individual instruments also form layers of colour, most obviously in Movement 3 at \( I \) (bar 42)\(^{14}\), where the different instrumental colours help to separate the rhythmic layers of the low Bs. There are also many examples of rapid changes in instrumentation, often associated with a rapid change in other parameters (e.g. Movement 1, bar 56 \( S \)\(^{15}\) and Movement 4, bar 18 \( J \)\(^{16}\).

Ligeti makes use of changes in individual instrumental timbre (such as con sordini in strings and brass, sul tasto, and sul ponticello in strings) throughout the Chamber Concerto. These different timbres are used either as another instrumental colour for a short section (e.g. Movement 1, bar 56 \( S \), where each instrument plays short groups of notes, and the strings move regularly from sul ponticello to ordinario and back), or as a gradually developing change in the sound (e.g. in Movement 1, the long four-part string section between \( I \) (bar 29) and \( M \) (bar 38), where the strings move gradually from ordinario to sul ponticello, to sul tasto and back to sul ponticello, and in Movement 4 from \( W \) (bar 42) to \( V \) (bar 49), where the four upper strings move gradually from sul tasto to sul ponticello and back to ordinario.


15. See Appendix 2.

16. See Appendix 3.
Use of Canon

Ligeti's use of canon is restricted to the organisation of pitch, i.e. the canons do not control rhythmic organisation. The most intricately organised canonic section is the opening of the first movement, where the canonic material is treated almost as a serial row and used in prime and retrograde form.

The melodic material for Canon 1 derives from a 40-note canonic 'row' (see Example 2). The row contains eight repetitions of each of the five notes in the cluster (G♭-B♭), although the first two (sometimes the first three) notes are optional (e.g. at the opening the bass clarinet begins on note one, cello on note two, flute on note three, and clarinet on note four). The distribution of the notes is not regular; the row can be divided into eight groups of five notes, and of the eight groupings, four are aberrant (see Chart 5).

<table>
<thead>
<tr>
<th>GROUPING</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A , Ab , G♭ , B♭ , G</td>
</tr>
<tr>
<td>2</td>
<td>B♭ , Ab , A , G♭ , A (2 x A, no G)</td>
</tr>
<tr>
<td>3</td>
<td>G , Ab , G♭ , G , A (2 x G, no B♭)</td>
</tr>
<tr>
<td>4</td>
<td>Ab , B♭ , G♭ , Ab , G (2 x Ab, no A)</td>
</tr>
<tr>
<td>5</td>
<td>G♭ , B♭ , A , B♭ , G (2 x B♭, no Ab)</td>
</tr>
<tr>
<td>6</td>
<td>A , G♭ , G , B♭ , Ab</td>
</tr>
<tr>
<td>7</td>
<td>A , G , Ab , B♭ , G♭</td>
</tr>
<tr>
<td>8</td>
<td>Ab , G , G♭ , A , B♭</td>
</tr>
</tbody>
</table>

The canonic lines move continuously along the note row; the last note of the prime form is the first note of the retrograde form, and vice-versa. As changes in the pitch cluster occur these are absorbed into the
row. When Gb drops out at bar 11 it is simply left out of the row, and when B is added at bar 14 it goes into the row at the places where Gb was.

Where a note has been left out of the row, and where the notes either side of the omitted note are the same, then the following note is also omitted, so that no note is repeated (e.g. B-Gb-B-C becomes B-C when Gb is omitted). When the range is extended further at bar 16, the note C replaces first the note A, then (from bar 18) the note Ab in the row. These mutations of the basic material do not occur at a specific point in the row, rather each voice alters its own line at the place in the bar where the pitch range is changed. Thus it is evident that the pitch cluster is the ruling factor, and the polyphony is a way of structuring the sound of that cluster.

The music for the first 26 bars of Movement 1 is provided by Canon 1 in its various forms, shaped by the other parameters previously discussed. Each voice of the canon can move freely between instruments. The first example of this is at the very opening where the cello and double bass harmonics combine to form one voice. Another example is in bar 4: at the beginning of the bar the clarinet has a line which moves to the horn halfway through the bar, but at the end of that bar it has another line which it has taken over from the bass clarinet. Instruments can double (providing another instrumental colour) e.g. the flute line moves to unison oboe and bass clarinet in bar 5, and the clarinet moves to unison flute and horn in bar 6. Where the density starts increasing (at the beginning of bar 6) the first 'new' canonic line in the viola is also a continuation of the note A in violin 1 from bar 5 - the voice divides to create a new line. The fourth viola entry in bar 6, however, is the beginning of another new voice with no previous connections (it begins on note 35 of Canon 1).

The celeste entry in bar 7 is the first material which does not
fit directly into the row. This may mean that it does not derive from the row, although this seems unlikely. Assuming that it is connected, there are two possible explanations for the obscurity of its origins. Firstly, it may be a combination of two or more canonic lines, since two (three, if one includes violin 1) lines finish at the beginning of the celeste passage, and one new one overlaps with the end. Secondly, the way the celeste part is written, with G and A in the right hand, and G, A♭ and B in the left hand, means that any lines it does not contain are likely to be distorted, either by altering the note order, or the notes themselves. This becomes clearer when compared with the celeste passage at bar 18.

In bars 9-10, the change from a wind canon to a predominantly string canon is gradual and subtle. The points of change in each canonic line from wind instrument to string instrument are staggered, and at these points the parts are dove-tailed. For example, the last note of the oboe (A) is attacked simultaneously with the first note of violin 1 (also A), and the oboe has a *decrescendo* to *ppp*, while the violin has a *crescendo* from *ppp* to *p*.

The horn entry (bar 14) begins another statement of the canon 'row', beginning on note 20 of the retrograde form of Canon 1(b), but quickly moving to Canon 1(c). This voice follows the *senza tempo* patterns in celeste, trombone, horn (bars 18-19) and finally harpsichord (bars 19-21). The way the row is used in the celeste here is interesting: since the right hand notes (B and C) and the left hand notes (B♭, A, G) are struck simultaneously, it follows that every four notes must contain a B and a C. This is not necessarily the case in the row, so Ligeti makes some adjustments. As can be seen from Example 44, there are three types of
alteration:

1. note order - two adjacent notes can be exchanged;
2. pitch - a note can be changed;
3. a note can be added, presumably to make the number of right and left hand notes even. (In Example 44 the pairing of the notes indicates notes which are sounded simultaneously. The order of notes within pairs was determined by Canon 1(c).)

EXAMPLE 44

The wind entry (end of bar 17) provides a sixth voice in the canon, again starting with 1(b) and moving quickly to 1(c). This is also a composite voice, with each of the wind instruments playing a five or six note section of the row, and overlapping by between one and four (usually three) notes with the previous and following instruments, the overall effect being of a continuous unison statement of the row.

At the end of bar 19 all six canonic parts finish, but the harpsi-
chord and piano enter half-way through bar 19, so the canonic movement is continued in those two instruments.

This is the most complex of the canonic sections. Canon 2 (Movement 1), Canons 5 and 6 (Movement 2) and Canon 7 (Movement 3) are stated in only one direction (i.e. not in retrograde), and Canons 3 and 4 (Movement 1), which occur in both prime and retrograde forms, are not as highly organised as Canon 1, with its changes of pitch, extended canonic lines, and dovetailing of instruments and parts.

Conclusion

The form of the Chamber Concerto as a whole derives from the contrast in style of the four movements. The ordering of the movements can be seen to have a basis in the traditional symphonic structure—a serious, formal first movement; a long, more slowly moving second movement; a capricious third movement which relies on rhythmic interest; and a faster, lighter fourth movement—though this is probably the result of Ligeti's musical feeling for this particular piece, rather than any deliberate use of traditional form. Ligeti's use of the name 'Chamber Concerto' could also be seen as a backward glance, but he deals with this aspect himself in the sleeve notes to a recording of the Chamber Concerto:

"The title 'Concerto' indicates that all thirteen instrumental parts are written for virtuosoi of equal ability, and there is therefore no division into 'soli' and 'tutti' as in the traditional concerto. Instead, different groups of soloists alternate, though the polyphonic texture is always very clear."

17. Ligeti, György. Sleeve notes to recording of Chamber Concerto, Melodien, Double Concerto. Decca HEAD 12.
In an interview in 1974, Ligeti described the process he goes through when composing a piece of music. He begins by imagining the piece from beginning to end and repeats it many times. The next step is to draw it in his own form of graphic notation, indicating the textures to be used. In this step, the "real construction of the score", the piece can undergo considerable change as the first idea is altered to fit Ligeti's 'plans', and the plans in turn are altered to fit the piece. At some point in this step he fixes the highest and lowest points of clusters, the intervals, and other focal points in the piece. He then writes the piece out in musical notation.

From the listener's point of view, however, Ligeti's method of composing and even his intentions are irrelevant. The listener hears a series of textures - cluster chords, webs of sound, 'pure' intervals - which change gradually as they move from one focal point to the next, or which are contrasted or blended.

The way in which these textures are formed has been described in this analysis, and the patterns of notes, particularly in the canonic sections, have been shown to be carefully organised and controlled. However, it is evident from the analysis that the notes are organised, not because the note order itself is important, but because it creates the textures which in turn illuminate the form. This gives the music a feeling of cohesiveness, satisfying to the ear of the listener.


Ligeti, György. Sleeve notes to recording of Chamber Concerto, Melodien, Double Concerto. Decca HEAD 12.


Reiprach, Bruce. "Transformation of coloration and density in György Ligeti's Lontano." Perspectives of New Music, Spring/Summer 1978:
167-180.


Ligeti uses the term 'senza tempo' throughout the Chamber Concerto, and provides the following explanations of the two forms of 'senza tempo' pattern:

1. (for short note-groupings)

* • = "senza tempo" patterns within the metrical order. The entrances of the patterns are metrical fixed; in each instance the rest(s) show(s) where the pattern begins; triplet or quintuplet markings refer to the rest(s) plus the first tone of the pattern. After attacking, the patterns are played as fast as possible, independent of the metre. The rests in brackets - e.g. (• • •) - are not to be taken in consideration when playing; they indicate the imaginary remainder of the crotchet duration, the patterns being notated as though they had no duration. If a pattern cannot be accommodated within a beat, it may extend into the next beat at the cost of the following non-bracketed rest; the bar line may also be crossed if necessary. This does not mean, however, that the entrance of the next pattern may be shifted; the rests may be reduced, but the patterns must enter at the prescribed point.

2. (for longer note-groupings)

• • • • • • • • • • = longer "senza tempo" cadenzas. The entrances of the cadenzas are metrical fixed (see "senza tempo" patterns, footnote, p. 7). After attacking, the cadenzas are played as fast as possible, independent of the metre and the bar lines. The rests in brackets - e.g. (• • • • • • •) - are not to be taken in consideration when playing; they indicate the imaginary remaining duration of the bars, the cadenzas being notated as though they had no duration. When a cadenza is finished, the player waits for the beginning of the next bar; from that point on, the previously suspended metre is resumed.

NB. When cadenzas begin simultaneously in two or more instruments, only the attack is simultaneous after that, the cadenzas are individual, each instrument playing its notes independently as fast as possible, and finishing independently. In this way, little time-shifts can occur; the notation in the score is only an indication, and the individual cadenzas may end a bit earlier or later. Although the duration is individual, the dynamics must be adjusted to match; the pp in the simultaneously beginning cadenzas must be at the same dynamic level in the instrumental parts running parallel to each other.
APPENDIX 2

The section from bar 56 to the end of Movement 1 consists of a principal line (a statement of Canon 3 which gradually mutates), accompanied by several subsidiary lines. Appendix 2 is a facsimile of the score in those seven bars, with the principal line highlighted.
APPENDIX 2 continued

rallentando

Fl.

Cor.

Cl.

Cl. basso.

Cor.

Tron.

Clavi.

Celesta.

Pf.

Vn. 1.

Vn. 2.

Vio.

Ve.

Cb.

solo in Obbl. d'arpegg.
APPENDIX 3

The section between bars 15 and 24 in Movement 4 consists of a principal line accompanied by various subsidiary lines. In the first three bars (bars 15 - 17) the only instruments playing are the piccolo and bass clarinet, both of which play the principal line in four-octave unison. The next six bars (bars 18 - 23) are shown in Appendix 3, with the principal line highlighted. At the end of bar 23 the principal line continues in the left hand of the piano for another bar and a half.
APPENDIX 3 continued
APPENDIX 3 continued
Appendix 4 contains graphs of the pitch content of the four movements. An attempt has been made in the graphs to preserve the relative length of bars, so that when a bar of $\frac{4}{4}$ at $\text{♩} = 60$ is the basic unit, then a 'senza tempo' bar of ca. 12" will be given three units, whereas two bars of $\frac{2}{4}$ will share a unit. This attempt at relativity is necessarily approximate, given the small scale of the graphs. Each graph, as a whole, provides a valuable picture of the direction of movement in pitch, and the overall form of the movements.
APPENDIX 4 continued

Pitch graph of Movement 1
Pitch graph of Movement 2
APPENDIX 4 continued

Pitch graph of Movement 3
APPENDIX 4 continued

Pitch graph of Movement 4