MUSIC OF NUMBERS
Music of Numbers

Nine Pieces for Two Players and Pianoforte

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For

Roseline Shapiro
The Pianoforte Cycle Described

Programme Notes in the Form of an Analysis.

The structure of this present work exploits the
setting of sonata-form dialectic cast within a twentieth century stylistic framework and is
built around the idea of organic thematic growth and synthesis. The preoccupation with musical
thematic synthesis looks towards its solution not through external programmatic sources only,
but through the means of its own musical idiom.

The present set of pieces in the form of a pianoforte cycle, combines the effect of sonata-
form growth of thematic material enclosed within the unity of a cyclic totality. The
programme of the work is based upon an association of Cabbalistic number mysticism with
Hegelian/sonata-form dialecticism: Thesis, Antithesis, Synthesis, as applied to the thematic
material. Outwardly each piece depicts the mystical qualities associated with a certain
number. The series of pieces as a whole are constructed within the framework of organic growth
depicted in the sonata-form principle. Although the work is based on 12-tone row schemes, the
sonata-form principle is transferred to the general development of themes despite the absence of
monotonicity on which the traditional concept of sonata-form has rested. While each
piece defines itself within the greater sphere of the cycle of nine pieces, the structure of
each piece reflects its position within the cycle itself as a whole. Each structure also
reflects, because of the properties of the relationships of the numbers to each other, the value
of that particular piece, in Numerological terms. Music of Numbers attempts to make its
technique, structure and expression a unified form. The serial technique is an expression
of the structure. The music strives to express the nature behind its pitch-structure/structural
relationships (not in an essentially rebarboreseque sense), which contain the essence of the
Hegelian/Cabalistic programme. Music of Numbers is the attempt at an exteriorization of
musical structure - the extrverted musical programming of serial-pitch orders in which the
music and its underlying structure become part of the same expression.

The overall and in-depth form scheme of this cycle is based on an intrinsic mystical law of
Nature. The formal scheme reflects the Numerological construction symbolized by the mystical
values which the thematic content expresses. It deals directly with the Tryptich Law of
mystical systems, specifically of the Mysticism of the Trilogy based upon an interpretation
of the great Sumerian/Hebrew system of Numerology - the mystical value of numbers.

The Seal of Solomon, the seven-pointed star, which if drawn consists of eight separate
chords traced from one tangent to the next, contains the nine numbers which are held to
constitute the basis of all calculations - the first nine digits of the abacus. In the most
ancient systems of occult law the abstract phenomenon of numbers has been impregnated with
mystical significance and meaning. The ancient sages of Egypt and Babylon, the Hindus, the
Chaldeans, Hebrew and Egyptian civilizations of antiquity, were the original
masters who systematized the occult or hidden meaning behind numbers - their values in
relation to human life and destiny. From the remotest era of arithmetical history the
hypothesis of counting vested a teleological belief in the values of the numbers 1 - 9, not
only as the basis of all numbers and calculations which follow from them, but as part of the
symbolic proof along with language, of the God-given gift of the ability to communicate

The number 1, present as the first value, represents the First Cause, Creator, Spirit.
After the number 5 all numbers become mere repetitions of the first nine, when 1 is
combined with the symbol of Infinity, 0, to repeat the abacus cycle again. Since 0 is not
a value or a number, therefore, the number 10 becomes a repetition of the number 1, based on
the system of Natural Addition (digital addition), adding from left to right, compound numbers
such as 11, 12, 14, 123 or 339 repeat the basic values of 2, 3, 5, 6 and 6.
The meaning of the lines of the star are that Life starts from the Sun, proceeds to the Moon, from there to Mars, Mars to Mercury, Mercury to Jupiter on to Venus, finally to Saturn (symbol of Death) from where it returns to the Sun, from whence it came.

THE MYSTICISM OF THE TRILOGY

Georg Wilhelm Friedrich Hegel's belief that all events of Life are subsistent upon a continual state of flux, a continual growth and change (evolution) as a result of opposing forces, conflicts (the Dialectical Unity of Opposites) is the basic foundation of his Absolutism. Events in history are readily analyzed into the order-of-event prototype which forces, conflicts (the Dialectical Unity of Opposites) is the basic foundation of his flux is also a valid premise for artistic expression. Hegel's concept of Thesis, Antithesis and Synthesis as a necessary foundation for ontology is the principle followed by form and thematic presence in this pianoforte work.

The construction principle of Music of Numbers is the juxtaposition of two thematic ideas of opposing dynamic qualities which develop into a synthetic whole by the progressive combination of its constituent elements into an organic unity. The structural foundation of the cycle is indeed an alliance between Eastern mysticism and an essentially Occidental dialecticism.

Inspired by what seems a universal feature of all organic growth, the present cycle of pieces are a celebration of a structural mode. This phenomenon (the dialectic Trilogy) forms the premise for a rich legacy of whom Beethoven is Western music's most obvious exponent; and when T. S. Eliot writes:

We shall not cease from exploration
And the end of our exploring
Will be to arrive where we started
And know the place for the first time.

(Little Gidding, Four Quartets)

In the end is our beginning...
In the beginning is our end...

(East Coker)

we are reminded of Beethoven's final autobiographical synthesis of a lifetime's work, his late period and the string quartets.

GENERAL STRATEGY

The cycle consists of nine separate pieces inter-related as far as thematic content, formal structure and time-duration proportion. There is a strong correlative bonding between major and minor structural levels, between thematic material and major/sub-structural events. The Numerological considerations govern the proportioning of Intervallic structure, row order, row transposition order, structures of form and the overall plan of the work. The ancient science of mystic number values and Hegelian dialecticism are here combined to form a correlative, homonymous hierarchy of structures that take the shape of a tier of levels from pitch arrangement to the form of each piece to their proportions and arrangement within the cyclic concept itself.

The form of each piece reflects its place within the Numerological system. Hence the first piece, 'Genesish', is mono-thematic and mono-formal, consisting of repetitions of the first of the juxtaposed themes. Piece 2 contains the thematic material in direct antithesis to the first piece. Piece 3 is the culmination of the first sub-set in the cycle, completing the first Trilogy and combining thematic and formal elements of the first two. The second piece is in a binary form, the third is tertiary. Piece 4 refers to the first piece but is divided into a quadruple format. Piece 5 is the most central in the cycle, and reflects its position by being symmetrical (looking in mirror fashion from the beginning towards the end of the cycle). It is built on a peculiar eleven-note row which reserves the twelfth note for a mysterious climax at its central point, signifying the midpoint in time (in terms of form structure, not time) in the entire work. Piece 6 presents a unified culmination of the thematic ideas developed so far in the cycle, its position reflects a parallel to Piece 3 which is the culminating point of the first Trilogy sub-set. Piece 7 is a perfect mirror-fashion palindrome in form, symbolizing the image of Infinity or mirror-form perfection, the circle, for which the value 7 stands. Piece 8 reflects the unknown quantity (based on tritonal relationships) and stands in a diametrical position to Piece 2, being based on the same thematic material as the earlier piece. Piece 9 is the summation of the work and the final fruition of its thematic material. It is divided into nine parts, each of these reflecting the events of each of the former pieces in the form of a precise recapitulation.

Each of the three sub-sets of three pieces of the cycle of nine pieces, are closely inter-related in that they present a sonata-form logic presentation of thematic material between them - i.e.: the first three pieces share two thematic subjects which are combined in the third; the second three pieces share the same thematic material in the manner it has grown since Piece 3, and so on. Music of Numbers is basically a structural expression through its thematic processes of the condition of the Numerological values.

The Themes

Permeating the cycle are three distinct thematic subjects which manifest themselves in various forms in each of the pieces they occur within. It is these themes which reflect the sonata-form dialectic, the first and second themes being in direct emotional opposition, while the third is the synthesis of their feeling. Each of the themes is based on a tone row, those themes are not stable melodic units as such, but rather the diversely changeable basic elements of the material. They are the essential aspects of certain elements in the cycle. The 'elements' are a restful one, an agitated one, and a synthesis of these two.

Each theme is more or less confined in frequency of occurrence to its corresponding sub-set of pieces - i.e.: the first theme occurs predominantly in the first three pieces, theme 2 in the second sub-set and theme 3 in the third. So in this way the progression of the themes throughout the cycle forms a type of sonata-form teleology. Theme 1 (held tones) and Theme 2 (fast passages) are diametrically opposed in feeling - Theme 3 is the dialectical synthesis of these. The two different themes presented in Group 1 - 2 - 3 undergo metamorphosis in 4 - 5 - 6 and present themselves in changed form teleologically in Group 7 - 8 - 9. Within the parameter of cyclic totality the theme of teleology (dialecticism) is expressed thematically in this way.

Of the three sub-sets themselves the dialectical pattern formulates again around their intrinsic arrangement. The first group (1, 2, 3) are enunciatory in style. Pieces 1 and 2 present the two conflicting themes for the first time, while Piece 3 presents their first organic combination. Group 4, 5, 6 are transitional pieces and have a more developed style of the thematic material - they form the developmental period of the work in which the most prominent thematic shaping takes place. This is the equivalent of the development section, which is usually the most elaborate operation within sonata-form. The last group presents the consummation of this trend of development, with the themes present in their final forms.

An examination of the fold-out diagram will reveal how the sonata-Trilogy logic has penetrated all layers of the structural rubric. (See first two diagrams following).
Theme 1 (because of its row construction) fits into Pieces 3 and 5, based on the same row. Its last appearance is in Piece 7, which is based on a different row. Theme 2 fits into Pieces 2 and 8, appearing continually for the last time in Piece 5 which is based on a different row to that of the theme. Theme 3 fits into Pieces 1 and 7, appearing for the last time in its final form in Piece 9, which is based on the same row. Theme 4 fits into Pieces 3 and 5, based on the same row. Theme 5 fits into Pieces 1 and 9, appearing for the last time in its final form in Piece 9, which is based on the same row. Theme 6 fits into Pieces 2 and 8, appearing continually for the last time in Piece 5 which is based on a different row to that of the theme. Theme 7 fits into Pieces 1 and 9, appearing for the last time in its final form in Piece 9, which is based on the same row. Theme 8 fits into Pieces 2 and 8, appearing continually for the last time in Piece 5 which is based on a different row to that of the theme. Theme 9 fits into Pieces 1 and 9, appearing for the last time in its final form in Piece 9, which is based on the same row. Thematic teleology is the basis of this plan, where although themes 1 and 2 combine in various juxtapositions in the third place of each set (pieces 3, 5, 8) it is only in the last piece (9) that the final synthetic form of these ideas (theme 3) appears. Each of the themes relates to the general nature of their corresponding pieces in each group respectively: I (4 - 7), 2 (5 - 8), 3 (6 - 9). Within the Tryptich scheme, of the nine pieces 1, 4 and 7 are enunciatory types, 2, 5, 8 are transitional/developmental and 3, 6, 9 present synthesized forms of previous material.

**Relationship of the Pieces to Each Other (Symmetrical)**

The formal layout of the pieces reveals certain Tryptich features: Pieces 1 and 9 are the opposite poles of the work and each reflect a similar simplicity of design. Piece 1 is mono-formal while Piece 9 comprises a set of variations on a theme. Piece 1 predicts in its thematic content (theme 1 with slight forewarnings of theme 2) the eventual outcome of the entire cycle, while each of the nine variations in the last piece is a miniature in the style of each of the nine pieces in turn. Pieces 2 (Moon) and 8 (Saturn) — also dyads around the central axis — reflect the same essential dark character and transitional nature. Pieces 3 and 7 are the longest of the pieces (6 min. - 7 min.) and contain mystic overtones; 2, 5, 8 are transitional/developmental and 3, 6, 9 present synthesized forms of previous material.

### Performance Timing

It is from the above described set of relationships that the timing procedures derive. The time-durations of the work mirror the numerological dialectic. The durations of each piece are indicated on a separate Performance Timing Chart. The time allocation for each piece, and indeed for the entire cycle may vary. An explanation of the timing is based on one of the above examples (see also the list of tables on the Performance Timing Charts).

<table>
<thead>
<tr>
<th>Total time</th>
<th>14' - 5</th>
<th>12' - 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piece No.</td>
<td>1 2 3 4</td>
<td>5 6 4 7</td>
</tr>
<tr>
<td>Duration</td>
<td>3 6 8 3</td>
<td>7 7 2 3</td>
</tr>
<tr>
<td>Total</td>
<td>3 9 15 6</td>
<td>18 35 27</td>
</tr>
<tr>
<td>Mystic No.</td>
<td>3 6 9 1</td>
<td>9 9 7 9</td>
</tr>
</tbody>
</table>

Each total represents the total time reached from the beginning of the cycle up to that point. The totals result according to the Numerological process of addition from left to right (digital addition).

In performance timing problems will arise. Since each piece has to be performed within certain time proportions to each other the only method of managing timing discrepancies which are bound to result from performance difficulties and other considerations is to perform the piece so as to make allowance for timing compensation. This can be achieved by varying the speeds of sections or passing passages through without adjustment of rubatos, either way, to accumulate or lose time. Passages where strict rhythm/tempo monitoring may relax are built into the structure of the piece (set chosen musical points), where variable speed passages, pauses, fermatas, etc. will allow for the recovery of time lost or gained. The list of variable tables of time values for the cycle are provided as a guide for practicable duration planning according to the capabilities of the performers. A typical timing problem follows:

Place 3 has to be 5' long. But it has worked out at 6' during performance. The problem is to transfer 1' of time (lost) from another piece to any other piece after Place 3 without upsetting the balance of the Mystic Numbers, which should relate dipolar pieces as follows:

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1        2        3        4        5        6        7        8        9
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Further in the symmetrical relationships of the pieces, the third, fifth and seventh movements form a progressive series of mirror-structured movements in which the seventh piece is a perfectly balanced palindrome in itself. (See diagram.)
The aim of these timing procedures is to maintain the dipolar mirror proportions between the pieces as another aspect of their structural symmetry — although, in the final instance, this particular aspect lays heavier emphasis on the Mystic Number symbolism than on the actual timing proportions themselves. Pieces 4 and 5 (Intermezzo) and pieces 1 and 9 (beginning–end) are related dipoles by the fact that they are of the same short duration.

The three groups of pieces have a time duration each of 14, 13 and 12 minutes which equal Numerologically the number progression 5, 4, 3. The number 3 is indicative of the Deity — so the Numerological designation of the third and last group of the cycle has the appropriate value – Dialectical Teleology. Furthermore, the total duration of the work as a whole (macrocosm) also expresses this value of Universality: 39 minutes = 12 = 3, 48 minutes = 12 = 3. Generally, as can be seen, the number 3 binds the whole together by its multiple presence.

**TONALITY**

Although in a dodecaphonics (dodeca-tonic) idiom, *Music of Numbers* contains at moments a considerable tonal complexity. The first piece in the cycle has an insistent cadential tendency towards E major (Theme I). Pieces 2 and 8 lapse into a sustained figure (on the notes A♭ – D♭) at times, strongly suggesting a B♭ minor tonality in places. Piece 3 lapses into periods in a definite C♯ minor/major tonality, especially at its conclusion. Piece 5 vindicates the programmatic mystery of the C♯ tonality by inducing a C♯ tonal centre through repetitive instances. The last movement of the cycle, Piece 9, concludes on an E major tonality. The relationship of these momentarily predominant tonalities produces a tritone with C♯ acting as the central symmetrical axis. This is a significant structural feature as C♯ also serves as the mystic symmetrical climax point in Place 5 and simultaneously of the entire cycle. Furthermore, the tritone plays an important part of the row structures and their order schemes.
Music of Numbers is based on pre-composed (serial) structures. The work as a whole employs the idea of mysticism of the Trilogy (Cabbala) as the formula for a series of matrixes on which the serial and formal structure of the work is based. This Tryptich idea generates a deterministic structure scheme on which falls the complete organization of the work into large and small cellular structures.

Symmetrical structural ordering occurs at all levels - from the arrangement and relationships of the pieces to each other around a central cyclic core, to the structure of each piece itself and the transposition orderings of the rows into symmetrical sub-systems revolving around an axis within each piece - to the very structure of the rows themselves as 12-, 11-, or 10-tone palindromes. The basic symmetrical flow is a multi-structural series of levels aligned to the essential symmetry of ternary/sonata form: A - B - A.

This intrinsic symmetry coincides with the choice of symmetrical forms: for the key places (Nos. 3, 5, 7) and of the symbolic values of balanced form associated with these numbers.

To limit the profusion of row variants, the five rows forming the basis for the work have been constructed as 12-note and 11-note palindromes, whose construction falls symmetrically around tritonal axis.

Row A

Row B

Row C

Row D

Row E

The interval of the tritone plays an important part in the work generally. The rows themselves display a complex of tritonal properties.

A)
THE ROWS.

Row A is structured so that it is mirrored symmetrically about a central axis, in such a way that the second half of the row is the retrograde-inversion of the first six notes. Also, the retrograde of the row is the same as its inversion, and the retrograde-inversion the equivalent of the original version. In this way, out of the forty-eight transpositions of each version normally available, only twenty-four are left. Row A has certain peculiar properties which are exploited in Piece 7 (see notes for that piece).

Similarly Row B is structured so that the second tetrachord is the retrograde-inversion of the first. In this case there is no retrograde version of the rows, as such, thus twenty-four possibilities are left.

Row C is an eleven-note row (as are Rows D and E), symmetrical about a central note as the axis. The row is similar in perspective to the first two rows, and has only twenty-four transpositions. The original (prime) and retrograde versions of the row are the same as the retrograde-inversion and inversion forms respectively.

The structural formats of Rows D and E are similar to the above. For illustration see fold-out Diagram and Row Transposition Sheet.

As can be seen from the ensuing diagram, the symmetricality of the rows is another facet in the matrix of symmetrical structures which constitute the cycle.
THE PIECES IN GENERAL

Each of the pieces is constructed as a mirror form. The sonata-form logic is expressed within each piece as various forms of Tryptich-paired sub-sections of row orderings. Pieces 1 - 3 form a tryptic progression, as do 4 - 6 and 7 - 9; so that each set of three pieces expresses the same logic. However, each set also forms the separate buttress of a three-part logic. The difference between sets 1 - 3, 4 - 5 and 7 - 9 is that of general thematic style and treatment of the thematic material. The first three pieces present the themes in a fragmented way - the second develop them with involved thematic investigation, and the last three pieces are of a static nature and, like pieces 1 - 3, present the material part logic. The difference between sets I - 3, 4 - 6 and 7 - 9 is that of general thematic form a tritonal progression, as do...
A study of the row relationships within Piece 4 may be had from the list of row
pairing procedures diagrammed in the table below.

**Form Scheme Workings**

```
<table>
<thead>
<tr>
<th>TRITONE SCHEME</th>
<th>WORKINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>'O' versions stationed tritonal apart</td>
<td>Each row related a tritone apart has each common form</td>
</tr>
</tbody>
</table>
```

**PIECE 4**

The four rows with G as centre note, missing note and note as part of the
tritone centre scheme of row are all situated a minor 3rd apart.

Because of its peculiar structure Piece 4 has the following characteristics. The centre
of each system becomes the focal point of musical interest. (See fold-out diagram). The
first half of the piece consists of split la - Ib '0' and 'R' versions of a row
transposition converging from each end onto a middle In which only one transposition (No. III)
finds itself adjacent as O and R. Each of these two row systems comprising 22 rows in all
are similarly placed around a central axis involving the one only occurrence of the 12th
diametrically opposed, the distance between the concentrically placed transposition halves
increases from the centre of each system outwards.

**PIECE 5**

Piece 5 being the centre of the work and its structural pivot point is the
nucleus of the developmental process of the piece. Piece 5 combines all the elements of
the first half of the cycle (Pieces 1 - 4) in a terse developmental process building up
to the central C# climax of the piece. This mysterious C# central point Is the
moment after which the piece transforms the materials and process of its first part into
the beginnings of what is to follow in Pieces 6 - 9.

Piece 5 also reflects in its two halves the material of the pieces adjacent to it.

In other words the first part of the piece deals predominantly with Theme 1 (as it appeared
in Piece 1), the second part with Theme 2, the third part Themes 2 and 1 in combination,
and the fourth parts being the final part of the piece (coupled to the fifth
part) on the opposite pole of the central axis and closely adjacent to the pieces ensuing.

For the first part of the piece Theme 1 predominates - the other ideas are presented in
a fragmentary fashion, Part 2 is reached after the first divisionary period of tritonal
material based on C#. Here Themes 1 and 2 combine in a terse working-out which leads to
a secondary climax onto another C# dominant chord at the end of Part 2a.

Part 2b commences with a predominantly Theme 2 development which breaks down into a
kaleidoscope of Theme 1 - 2 fragments with Theme 3 sixths interwoven. The various timbral-
textural varied sections of Part 2 climax onto C# after a short silence. Part 2b presents a break-down of the thematic motor before the central section of the piece, after which they build up again and re-emerge as Theme 3 in Part 1b.

The four rows which are available as ten-tone palindromes with both C# and G missing from their structure are these transpositions:

A demonstration of the symmetricality of these rows (as was explained in the notes to Piece 3) and of the asymmetricality of the other transpositions is illustrated below. The logic behind the choice of the above four transpositions of Row C as the axial and polar points of each row order structural section (see Structure Chart for Piece 5) is explained in the notes to Piece 3. These 10 - note symmetrical rows are the only transpositions placed around the central C# climax, this adjacency symbolizing the multiple axial function of the central section which they attend. Also the occurrence of these balanced rows (in a piece based on asymmetrical rows) at axial positions and at its centre symbolizes the use of symmetrical structure in the work generally.

PIECE 6

Piece 5 reverses the row structure ordering in Piece 4, so that they are also adjacent with tritonal correspondences, but in the order of retrogradation. In this way Piece 6 becomes the rectopolar or dipolar member of Piece 4 because of its structure.

(See fold-out Diagram for synopsis of structural Form Scheme.)
Pieces 4 and 5 Considered Together

The structure of the rows and of these two pieces reflect the various levels of the integral structural symmetry of the work as a whole. The manner in which Pieces 4 and 5 relate to each other and to Piece 5, (as polar points and symmetrical axes) is mirrored microcosmically by the fashion in which the 12-tone rows for these pieces are structured, and themselves related to each other:

PIECE 7

Piece 7 is based on variable hexachordal segments and row-derived symmetrical cell motifs. The six-tone segments are paired about the tritone (0 - R, 1 - R, 0 - RI etc.) so as to form complete 12-tone formats from the pairs. Towards the centre of the piece 12-tone cycle repetition does not break down when smaller segmental units (three notes, two notes) are used - 12-tone integrity is maintained throughout.

The piece starts with complete 12-tone row structures based on the hexachordal segments of the original A row. Towards the centre of the piece the larger than smaller symmetrical component units of the row are extracted for a hybrid type of 12-tone row treatment.

To express the mystic value of the number 7, Prisms is construed as a perfectly formed mirror piece, its first half reversible about a central axis, in time and as a structure.

The first version of Piece 7 breaks down and reveals the inherent row mirror-structure even more directly in the music than the second, as though breaking down the components of white light through a prism. It is "prismated" in that the musical material itself reveals the mirror symmetries of the row structures on which it is based.

The two groups (row "a" and "b") half related in pairs are a tritone apart. Each different group pair equals a separate 12-tone row. The first notes of each pair of each transposition order (i.e., rows 1 - 5 and 7 - 12) form each of the two whole-tone scales for each separate group. Thus the two groups converge on two whole-tone scales in the centre of the piece, as illustrated below:

Like the breakdown of white light Piece 7 is a series of variations on the principle motif, revealing it in its different constituent colours or modes.

The symmetrical figure at the centre of each row is cut in half and points towards the centre part of the place which is built up exclusively around it. The first half is mirrored by the second set of first hexachords, which pair off by the tri-tone (to create 12-tone structures) are mirrored by set of second hexachords similarly arranged on the other side of the central pivot section. The rows thus converge and are fragmented gradually onto a central point from whence they diverge and re-assemble into the complete row A-derived hexachordal row forms again.

The different mirror permutations are arranged, in both versions of the piece, in concentric sub-structures. Refer to the Row Order Construction Sheets for a full illustration of this.

Generally the row structures and orders in the piece reflect two principles:

(a) Mirrored around a central note-axis or
(b) Mirrored transpositionally around the tri-tone
(c) Displays a complete 4 hexachordal mirror-structure scheme.

COMBINATORIALITY

Like the breakdown of white light Piece 7 is a series of variations on the principle motif, revealing it in its different constituent colours or modes.
ROW SEGMENT COMBINATORIAL POSSIBILITIES

Possibilities:

\[ \begin{align*}
\text{O} & \rightarrow, \text{I} \rightarrow, \text{R} \leftarrow, \text{RI} \leftarrow = 6 \text{ note segment} \\
\text{O} & \rightarrow \text{R} \leftarrow \text{O} \leftarrow \text{RI} \leftarrow \text{I} \leftarrow \\
\text{O} & \rightarrow \text{RI} \leftarrow \text{O} \leftarrow \text{RI} \leftarrow \text{I} \leftarrow \\
\end{align*} \]

COMBINATORIAL RELATIONSHIPS OF SEGMENTS

\[ \begin{align*}
\text{ORI} & \rightarrow \text{RI} \rightarrow \text{I} \rightarrow \text{O} \rightarrow \text{RI} \rightarrow \\
\text{O} & \rightarrow \text{RI} \rightarrow \text{O} \rightarrow \text{RI} \rightarrow \text{I} \rightarrow \\
\end{align*} \]
A complete synopsis of the row construction procedures used in Piece 7 follows:

Arrangement of variable row halves (hexachordal segments)

<table>
<thead>
<tr>
<th>All 0</th>
<th>All R</th>
<th>RO</th>
<th>RO</th>
<th>RO</th>
<th>RO</th>
<th>All R</th>
<th>R</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a – 6a</td>
<td>12b – 7b</td>
<td>12b – 7b</td>
<td>6b – 1b</td>
<td>7b – 12b</td>
<td>1a – 6a</td>
<td>7b – 12b</td>
<td>R</td>
<td>O</td>
</tr>
<tr>
<td>12a – 7a</td>
<td>6b – 1b</td>
<td>MID SECTION OF PIECE</td>
<td>1b – 6b</td>
<td>7a – 12a</td>
<td>12b – 7b</td>
<td>R</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>R</td>
<td>R</td>
<td>RO</td>
<td>RO</td>
<td>RO</td>
<td>OR</td>
<td>OR</td>
<td>OR</td>
<td>R</td>
</tr>
<tr>
<td>5a – 1a</td>
<td>12a – 7a</td>
<td>1a – 5a</td>
<td>7a – 12a</td>
<td>7a – 12a</td>
<td>6b – 1b</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
</tbody>
</table>

**HEXACHORDAL SEGMENTS:**

**TRITONE PAIRING (in 12-tone stricture)**

Tri-tone

MID-SECTION

Structures derived from middle symmetrical motif of Row A

Row A

**SEGMENTATION OF ROW**

**TETRACHORDAL SEGMENTS:**

Employment of Figure "A" within 12-tone stricture

**TRANSPOSITIONS:**

1 2 3 4 5 6 7
TETRACHORDAL SEGMENTS:

PAIRING:

DERIVATION OF WHOLE-TONE SCALE FROM FIRST KNOTES OF ROW HALVES AS PAIRED IN TRITONES

PAIRING:

WHOLE-TONE SCALE

WHOLE-TONE SCALE

BOTH OUTER AND INNER NOTES OF ROW ONLY: ORDERED SO THAT FIRST NOTE OF EACH TRANSPOSITION SPELLS ROW "A".

TETRACHORDAL SEGMENTS:

WHOLE TONE SCALE

CONSTRUCTIONS USING MIDDLE 2-NOTE UNIT OF ROW

CYCLE 1

12 TONES

12 TONES

PIECE 8

Row B has certain tritonal properties:

As can be seen the tritones occur concentrically within the row. This forms the basis from which the logic of the structure of Piece 8 (and earlier of Piece 2 based on Row B) is derived. The mid-section, for instance, is based entirely on tritonal segmentation.

As can be seen in the Illustration above the sequence of diminished chords resulting in retrogradable about a central axis, as is the order of inner and outer number combinations. Each bar also represents the outer and middle two notes of a row which coincidentally spells out the row transposition order based on the spelling of the original row. The piece is based on this row transposition:

This symbolizes the fact that the C# - G complex functions primarily in the centre of Piece 8, and not at the outer ends of systems as it does in the reciprocally related movement, Piece 2. Examination of the Row Order Construction Sheet for Piece 8 will reveal the exclusive use of the significant C# - G tritone as a constructional measure for the central section of the piece.

Piece 2 combines both rows in their G - R and 1 - IR versions. In Piece 8 the rows with first and last notes C# - G are central in each row order system, while those with central notes 6 - 7 as C# - G are at the outer ends of each system. Piece 2 follows an opposite plan, being reciprocally related and based on:
PIECE 9

Piece 9 is constructed from a perpetual sequence of a five-note pattern derived from Row A and arranged so that after twelve repetitions of the five-note unit the cycle begins again, covering five repetitions of a twelve-note cycle (sixty notes) in which no pitch class is repeated, thus forming five separate 12-tone rows. This entire cycle repeated nine times constitutes the formal scheme of Piece 9.

There are a number of features in this structure from which each section of the piece derives enabling it to be modelled more or less on the structure of the corresponding piece which it miniatures.

(a) The five-note pattern, if continued at regular intervals, eventually returns to the start of the sixty-note cycle. It begins on a pentachordal segment starting on C#:

(b) From this cycle can be derived the series of twelve transpositions of the prime version of the row present in an overlapping fashion within the greater sixty-note series.

CONTINUOUS SEGMENT: OVERLAPPING ROWS

An anagram of the digital-tryptichal aspect of Piece 9’s construction scheme follows:

Stated as the constructional principle, segmental row-ordering for the last piece in the scale thus symbolizes the state of continuity out of which the dialectic reasoning and mirror-symmetrical structuring form themselves. The synopsis of the last movement structure presented above is meant to reveal the feeling of continuity and symmetrical balance that this pianoforte cycle tries to attain in respect to its programme.

Each of the nine sections of Piece 9 is meant to represent in miniature a reminiscence of each of the 9 pieces of the cycle in turn. Piece 9, the culminating movement, is meant to present an overview in miniature of the entire cycle and its logical and balance in itself. Each of the nine sections models the ordering of its 12 pentachords in a fashion corresponding to the structure of the piece it corresponds to in number and feeling. The last section of this piece consists of three repetitions of the sixty-note cycle (five rows) making fifteen rows in all, symbolizing the Trilogy - three times five equals sixty; sixty notes times three equals 180 notes equals 9 (digital addition). Nine is three times three - the ultimate tryptichal balance. The last section of Piece 9 is meant to be the final statement of balance and numerological value in the cycle, and besides the fact that it points back to the beginning of the work (consisting simply of repetitions of a theme as does Piece 1) it carries the final statement of the thematic progress throughout the entire cycle.
Row Transposition Tables

Row A

\[
\begin{array}{cccc}
1 & A & B & B \\
2 & A & B & B \\
3 & A & B & B \\
4 & A & B & B \\
5 & A & B & B \\
6 & A & B & B \\
7 & A & B & B \\
8 & A & B & B \\
9 & A & B & B \\
10 & A & B & B \\
11 & A & B & B \\
12 & A & B & B \\
\end{array}
\]

Row B

\[
\begin{array}{cccc}
1 & A & B & B \\
2 & A & B & B \\
3 & A & B & B \\
4 & A & B & B \\
5 & A & B & B \\
6 & A & B & B \\
7 & A & B & B \\
8 & A & B & B \\
9 & A & B & B \\
10 & A & B & B \\
11 & A & B & B \\
12 & A & B & B \\
\end{array}
\]
Row E  \( o = R \)

\[ \begin{array}{c|c|c}
1 & A & B \\
2 & B & A \\
3 & & \\
4 & & \\
5 & & \\
6 & & \\
7 & & \\
8 & & \\
9 & & \\
10 & & \\
\end{array} \]
Row Order Construction Sheets

Row A

Row B

Part 1

A. Transposition Order Spells "0" Row

B. Transposition Order Spells "1" Row

C. Derived from Row "0" Concentric Row "1" Inner to Outer Notes

N.B. When theme 1 appears it may or may not have a full or part connection with the row structure. It is used at any moment.
Part 2

Central System

Row 60

repeated three times

Row 0* special row with 0g-0 as center or under-center note of row.

Overlap and evenly interconnected 67 121

Row overlap

Overlap with previous row

30 110 100 80 70 • 60 120 70

20 60 50 90

Concentric row spells "O" version inner to outer notes

Row overlap

Overlap with previous row

91 51 41 21 11 121 110 50

60 50 70 60 100 110 30 91

51 41 21 11 121 110

Row 0 transpose order spells "I" row

Row overlap

Overlap with previous row

31 71 81 61 101 11 121 61

51 41 21 11 91

Row 0 transpose order spells "O" row
Part 1

Row C

Row transposition order with row "O"

All "D" versions

Special row (in) omitted since only eleven transpositions are needed.

Part 2

Synaptic figure notes: Rows in pairs; related a prime apart. Transposition order of rows spells row. Rows which relate directly by tritones begin and end on same two notes in inverse fashion: 7, 12, 11, 10, 9, 8, 7, 6, 5, 4.

Rows are paired a tritones apart.

Part 3

Condensed reversed order recapitulation of Part 1/8
Row C

Missed note, contrary CF is omitted from each row until its separate, limited occurrence at the structural centre of the piece. The trichordal relationship between missing and middle note, first and last notes of the row is exploited.

Part 2

Each row pair treated as a separate module.
Part 3

Row C

Row B

Row A

Part 4

Part 5

Derived by combining row sets from Part 3 - Parts 1a-2a -> 2a Part 5

All +12 transpositions.
Row E

1

2 (chordal)

3 (glissando; e pizzicato)

30 17 1 0 5 0 1 0 8 0 1 2 0

4 (glissando arco)

9 0 6 0 9 1 2 1 8 2 8

5 (pizzicato)

6 (chordal)

5 R 1 R 7 R 1 1 R 3 R

Row A

\[ o = R_1 \]

\[ j = R \]

Segment Contrapuntal Varieties

Part 1

First version
Part 1

**Prefix:**

```
\[ \text{Row A} \]
```

**First and Last Notes of Rows**

The distance between each row relates to the distance between paired tetrachords in Part 2.

The same relation as the middle four notes of Row A. Transposition order spells Row A.

**First Five Notes of Row A in Continuous Sequence. Forms Five 12-Tone Rows.**

Part 2

**Row Seques Paired By The Tritone.**

```
\[ \text{Row A} \]
```

Part 3

**Component Units of the Row Using row segments to form continuous patterns with 12-tone control.**

```
\[ \text{Row A} \]
```

*Second Version*
Part 4

A. CYCLE OF SECONDS/THIRDS BASED ON MIDDLE FOUR NOTES OF ROW.

WHOLE TONE SCHEME Paired inner and outer notes of row. Transposition order spells 'O' row.

B. FIRST NOTES OF TETRACHORD

D. 6 TONE ROW/12-TONE ROW

Overlap with Part 5

Part 4'

A. FIRST AND LAST NOTES OF EACH TETRACHORD

C. TWO INNER AND OUTER NOTES OF ROW

WHOLE-TONE SCALE
Part 5

Part 6

Part 7

Suffix:
Order of transpositions. First notes spell row "O". Last notes spell row "R".

OUTER AND MIDDLE NOTES OF ROW OR BY CONCENTRIC METHOD - NOTES 1-IX, 2-II, 3-X, 6-V, 5-V, 6-V.
7

8. CPR + G emphasized. Notes enclosed by them are isolated: i.e., 5+3+7, 7+3, 25=7

9. COOA

Ian Solomon
Durban, 1981.
**Performance Instructions and Explanations of Musical Nomenclature**

The present cycle of piano pieces may be performed on one piano, four hands simultaneously, or on two separate instruments simultaneously.

Because the position of metal beams on grand piano frameworks are not standardised, the performance requirements for this work may alter slightly from instrument to instrument. The metal crossbeam arrangement of each individual piano will decide which notes are accessible for execution interior of the instrument. Unless construction arrangement of an upright frame piano permits, it will be found that the present work is only feasible on one or two grand/baby-grand pianofortes. The cycle as it stands will be playable on most Steinway and Kawai grand/baby-grand pianofortes. Generally 90% of the notes will be available on other makes of pianoforte. If, in the case of certain strings not being available for special effects, alternative methods of execution of special effects (such as pizzicato, harmonics) will have to be considered. Alternative means to consider of special effects called for are listed with the explanation of each effect. For instance, if a metal beam hampers production of a harmonic on a second partial, then the same harmonic must be re-considered as a fifth or third partial on the next best available string. While certain of the strings may be inaccessible for effects which require the portion of the string behind the dampers to be touched, all of the strings can be reached from the front of the dampers near the tuning pins.

**Strings Available for Octave Harmonics**

---

**Notation:**

All notes to be read as if unless indicated otherwise as $b$ or $$. The $H$ symbol is used only to cancel a previous $b$ or $g$ on the same scale or one immediately (five or six) above or below. A tie carries over an accidental. This method should eliminate any doubt as to whether a note is either $b$ or $g$ whilst avoiding a cluttered notation.

All notational symbols have been preselected to coincide with an interpretation within the traditional manner, to offset accumulating a confusing plethora of special symbolic indications. All purely keyboard/pedal sounds (modal ordinary) played by the keyboard executant and special effects obtained by manipulating the inside of the piano (by the second performer or assistant) are notated on a separate pair of pianoforte systems each, so that they may be clearly distinguishable apart in the score by sight. In performance, however, it will be seen that not all of the special effects notated on the piano assistant's staff (marked "framebox") will be manageable by him alone, or all at once within a given space of time. Performance situations will arise where the keyboard player will have to compromise his sitting position at the keyboard in order to execute some of the special effects himself interior of the pianoforte, simply because of impracticable physical demands on the second player. Often these effects will have been intended for the keyboard executant to perform because of the greater ease for him at his position to co-ordinate the effect alone, at moments when he needn't give full attention to the keyboard - i.e: harmonics, sordente effects. In view of this, the present format of notation was preferred because it was thought to be easier for the keyboard performer to ring in red ink any of the moments he had to perform from the second (the top) staff than both players having to hunt out the special notation for these effects amidst the conventional pianoforte notation. If the performers decided that they wished to change the order of a formally assigned performance duty this scoring allows that freedom.

Bar-lines are placed at strategic points to facilitate ease of reading. Large and double bar-lines delineate major structural sections (see explanation of construction details of the cycle).

**Performance:**

Each of the performers should wear a black full-face mask. The work deals in the impersonal forces of History and the Supernatural. It is meant to be the expression of a type of Ritual Magic. The masks are intended to de-personalize the performance so that the performers (like the Shaman) and the performance project only the programmatic mystery behind the music.

The accessibility of each string inside the pianoforte will be made easier if the performers label each string by affixing its letter name to the head of each damper in a fashion enabling both executants to read them from their respective positions at the piano.

Players One and Two co-ordinate and share the tasks necessary for the rendition of certain effects such as $\uparrow \downarrow$, for instance, where the first player would mute the required strings by hand before player Two struck the keyboard or changed pedal.

During the entire performance the keyboard player is required to remain at the traditional sitting position before the keyboard unless he is needed to manipulate the pianoforte interior, in which case he will find that most of the intended effects can be managed if he simply rises from the piano stool. Often, in simultaneous renderings of keyboard and special effects, (see notes on Notation/Presentation above) he will have to
The pianist may have to use clamps on some part of the piano rim to support a light orchestral music stand for his score. The second performer could do the same. The only other alternative to suspending the scores somehow from some overhead projection or simply standing them from the floor would be to retain the piano lid and clamping the music stands from this. The disadvantage is that the full-stick piano lid may still obstruct easy access to the frameboard.

The pianist may have to move around the bell-the pianoftote as he is required to produce certain effects to be co-ordinated to the special effects in turn, base, if his reach from any one position Is limited. Difficulties will arise if there are simultaneously extreme bass, which the pianist will very often be required to help. The pianist will have to move around the bell-circumference of the pianoforte as he is required to manipulate the keyboard and strings in this manner from a semi-crouched position, such as will be demanded in the playing of harmonics or staccato and 'modo ordinario' at the same time.

The second performer will have to position himself in a diagonally opposed standing position to the pianist, allowing him access to the area from the vicinity of the dampers to the middle of the longest string. He may find that he will have to move around the bell-the pianoftote as he is required to produce certain effects in turn, base, if his reach from any one position Is limited. Difficulties will arise if there are simultaneously extreme bass, which the pianist will very often be required to help. The pianist will have to move around the bell-circumference of the pianoforte as he is required to manipulate the keyboard and strings in this manner from a semi-crouched position, such as will be demanded in the playing of harmonics or staccato and 'modo ordinario' at the same time.

Although the performers should aim at a performance of each piece to coincide with its allotted time span within the prescribed set of time proportions between each piece in the cycle, approximations within the first minute in a complete performance of the cycle of nine pieces will be sufficient. The timing marks are meant to be a guide. Each bar does not have to adhere strictly to its specified time. Interpretation of the more difficult rhythmic and time complexities is at the discretion of the performer. Compensation for time lost or gained in judging the duration of sections during performance of a piece should be absorbed as part of the governing process of interpretation of the ensuing events.

Generally the notation is orthochronic, but a compromise between that and notation in terms of time—proportionality has been made in the score.

---

**SIXTH MOVEMENT**

---

**Boxes indicate material which can be played in free time over a specific time lapse, which the arrows indicate.**

**SPECIAL AIDS:**

1. Two glass rods of approximately 9" length, or a suitable number of aspirays—needed for certain parts of the work to create a gamelin effect, alteration of piano timbre.

2. A metal chisel to produce glissandi harmonics on the strings.

3. For facility during performance a number of the special effects may be prepared beforehand using artificial aids.

Plasticine or rubber strips may be used to "prepare" certain notes by insertion on/between strings if it is decided that certain of the stopped-note effects are too difficult to cope with all at once in performance. By placing plasticine near the hammers (behind the dampers) a xylophone-harmonium type of effect is achieved. By placing plasticine on half-nodes a marimba-like quality of tone combined with one (octave) harmonics is achieved. On most pianofortes from C' upwards, it will be found necessary to place the plasticine nearer the rear pins (away from the dampers) to retain any semblance of resonant tone. A more resonant tone can be achieved by placing the plasticine in front of the dampers—equivalent to *\( \frac{1}{4} \)" (see notes on symbology below).

Generally, if it will help eliminate any performance difficulties, there is no objection to using artificial aids for the special effects, as long as the same result is achieved.

4. Wooden mallets or wood blocks.

**AMPLIFICATION:**

The present pianoforte cycle "Music of Numbers" may be performed with or without sound amplification. If performed with amplification, contact microphones relaying the sound to an amplifier and four speaker system is to be preferred. If so desired the range of pianoforte timbres in this work may be experimented with and substantially altered by electronic means according to various dictates of taste by ring modulation, amplification and filtration. However, if the original piano effects are altered in certain ways the plan of modifications must remain faithful by adhering to the consistency of timbral hierarchy in the score. For instance the bass drum-like sound from the second piece in the cycle:

---

**Reverb**
may be made to sound more spatially contingent and sinister by
the use of a reverberation unit.
The choice of modifying equipment and its arrangement is
left to the experience and discretion of the performer.

ON THE STRINGS:
THE

Notation Symbology

ON THE STRINGS:

Pluck strings. Pluck with
fingernail or with plectrum;
where not specified, at the
discretion of the performer.

In most cases pluck two strings from a twin-string or three-
string note, where ease of execution permits. 1 indicates one
string to be plucked and 3 the three strings of the same
pitch simultaneously. The performer’s judgment will decide how
many strings should be employed in the execution of various
dynamic intensities.

The position for plucking the strings in front of (near pins)
or behind the dampers is indicated as F and B respectively.
In the course of the performance pluck strings to the rear of the
dampers normally unless F is indicated. Pluck as near the
middle of each string as is possible.

Scrape string (if copper wire wound) with plectrum or fingernail).
release finger immediately afterwards and allow to resonate
for the duration of the note value. If the particular string
(pitch) specified for this treatment is not copper - wired
on particular make of pianoforte, strum two or three strings of
that pitch and allow to resonate. Scrape strings in direction
of keyboard generally, unless performer’s position makes scraping
in opposite direction easier. It should be noted that depending
on which part of the string’s length is scraped, direction to
and from the pins induces a change of timbre.

Scrape diagonally across strings -
mixture of scraping and harp effect.

(A) Hit string with fingernail
or light plastic/metallic
object.

(b) Hit string firmly with metallic
or wooden object (mallets).

A result of the distortion incurred by attacking the strings, especially with
an assortment of foreign objects, is the alteration of the original pitches.

P represents a note of indefinite pitch.

Silently depressed note.
HARMONICS:

Harmonics sound an octave higher than written. All harmonics to be executed as 2nd partials unless circumstances will not allow, or otherwise indicated. The written note indicates the string on which harmonic is to be played. Depress pedal prior to stopping string (half-way for 5th harmonics) with finger tip. Strike note in conventional way on keyboard and release finger from stopped string the instant the hammer has set the string in vibration. This will allow the harmonic to resonate freely over the depressed pedal. This technique may require practice before proper application allows the harmonic to ring with a sustained resonance. Alternatively the harmonic may be allowed to ring without the aid of the pedal simply by keeping the key depressed until the sound dies away.

Simply stopping the string and keeping the finger in place after this has been set in vibration produces an effect similar to \( \frac{1}{2} \) with the harmonic present in a muffled fashion.

Any harmonic not playable from the half-node because framework beams render it inaccessible may be played as a quarter-node harmonic on a string two octaves below the harmonic required, or as a 3rd partial (two-thirds of the string distance) a perfect twelfth below the harmonic desired.

\[ \begin{align*}
\begin{array}{c}
\text{Harmonics:} \\
\begin{array}{c}
\text{Harmonics sound an octave higher than written. All harmonics to be executed as } 2\text{nd partials unless circumstances will not allow, or otherwise indicated. The written note indicates the string on which harmonic is to be played. Depress pedal prior to stopping string (half-way for 5th harmonics) with finger tip. Strike note in conventional way on keyboard and release finger from stopped string the instant the hammer has set the string in vibration. This will allow the harmonic to resonate freely over the depressed pedal. This technique may require practice before proper application allows the harmonic to ring with a sustained resonance. Alternatively the harmonic may be allowed to ring without the aid of the pedal simply by keeping the key depressed until the sound dies away.} \\
\text{Simply stopping the string and keeping the finger in place after this has been set in vibration produces an effect similar to } \frac{1}{2} \text{ with the harmonic present in a muffled fashion.} \\
\text{Any harmonic not playable from the half-node because framework beams render it inaccessible may be played as a quarter-node harmonic on a string two octaves below the harmonic required, or as a 3rd partial (two-thirds of the string distance) a perfect twelfth below the harmonic desired.} \\
\end{array}
\end{array}
\end{align*} \]

For 5th partials stopping the string at the nodes nearest to the centre of the string produces the clearer-sounding harmonic.

Thus:

\[ \begin{align*}
\begin{array}{c}
\text{For 5th partials stopping the string at the nodes nearest to the centre of the string produces the clearer-sounding harmonic.} \\
\text{Thus:} \\
\end{array}
\end{align*} \]
Depress damper pedal prior to striking notes to aid the effect. Mute near centre of string.

(a) and (b) indicate how this effect is notated for single, held notes and chords.

(c) as applied to a succession of single notes individually.

(d) a chain of chords.

(e) a chord with one note played normally.

(d) a chord with one note played normally.

In cases where the following effect is not performable:

the following method will guarantee the same results. (See notes on Pedalling).

Hand-mute strings directly after they are struck by the hammer. Keep hand on string for a short while - about half the length, or less, of the note value. The table of nomenclature applies the same as above.

If the last two related methods above are not manageable, the alternative suggested below will approximate the required result.

(a) Hand-mute string at specified point in time.
(b) Mute string with hand/finger and quickly release again to allow string to resonate further. May be used in conjunction with the damper pedal to create an echo effect. If a fair level of volume is to be sustained after the string is hand-dampened, then dampen string nearer the tuning pins.
GLISSANDO ON STRINGS:

(a) Depress pedal, mute string with finger (before striking keyboard note) an inch to half-an-inch from pins to allow note to half resonate. A dark, semi-sustained tone is the result.

(b) Depress pedal, mute string near pins (fingers against pins) before striking keyboard note. A muffled but fully sustained, resonant sound results.

Slurs and dotted lines as illustrated above indicate that notes are to sound for as long as possible, dying out of their own accord unless some notated termination is indicated. Beams are used as indications of a prolonged tie over, in lieu of tie-slurs (in places).

GLISSANDO ON PIANOFORTE STRINGS:

(a) Black note cluster
(b) White note cluster
(c) Chromatic cluster

Glissando with metal chisel: Lightly poise a metal chisel on string(s). After string is set in vibration by hammer (or other specified method) apply the chisel in a sweeping motion across string to produce a glissando of the fundamental's upper partials. In the example the upper note indicates the topmost pitch from which the glissando should descend.

Duration of the glissando indicated by the value of the note preceding it, until the next value which then terminates it. Thus the first glissando (a) is to be taken in time at the discretion of the performer, and terminates on a note struck by keyboard action. The second glissando (b) lasts for the duration of a crotchet and then trails off into nothingness (a controlled decay into silence) after reaching the region of E. The next two examples (c) and (d) present glissandi played as quick as possible, both terminating on a 'pizzicato' note. The last two examples (e) and (f) present glissandi being sustained after arbitrary time or the pedal.

It is essential to depress the damper pedal in the execution of all glissandi during the time the finger(s) sweeps the strings.

NOTE CLUSTERS:

On Keyboard:
(a) Black note cluster
(b) White note cluster
(c) Chromatic cluster

On Frameboard:
Chromatic cluster on strings
PEDALLING:
The following effects apply mostly to the damper pedal ($P_1$), which is indicated at the beginning of each movement and then taken for granted. Other pedallings are specifically indicated each time.

- $P_1$: right (damper) pedal
- $P_2$: middle (sostenuto) pedal
- $P_3$: left (una corda) pedal

- $\uparrow$ Full sustain
- $\frac{1}{2} \uparrow$ Half sustain

- $\uparrow \downarrow$ Depress fully, bring up to half-way, depress fully, release.
- $\uparrow \uparrow \downarrow$ Depress swiftly
- $\downarrow \downarrow$ Depress gradually
- $\downarrow$ Depress very gradually

- $\uparrow \uparrow \downarrow$ Release swiftly
- $\downarrow \downarrow$ Release gradually
- $\downarrow$ Release very gradually

- $\uparrow \downarrow \downarrow$ Depress only after keyboard attack and keys are lifted - to sustain the 'echo' of overtones alone.

- $\uparrow \uparrow$ Pedal depressed on attack. Lifted to allow sound to diminish, and depressed immediately after to recapture diminished string vibration before sound has completely decayed.

Rapid depress-release movement, usually with a single sustained sound to create a smorzato/smorzando effect.

ARTICULATIONS:

- $\uparrow$ Short pause
- $\downarrow$ Pause
- $\uparrow \uparrow$ Long pause

FINAL REMARKS ON NOTATION

Effects manageable by the keyboard executant are notated on his staff system, and in the case of effects relying on the coordination/cooperation of both performers, the notational preference is for notation on the frameboard staves except where the keyboard player should have monopoly of an effect for performance reasons, or simply where ease of reading is considered. Generally, whenever a special effect can be more easily performed by the keyboard player than by the other executant, it will be notated on the keyboard staff system.
Because the duration of each piece can vary according to performance circumstances (rests, choice of speeds, speed changes) the eventual time proportions of the pieces will vary. Set out below is a list of tables governing a few of the more general possibilities that would arise from live performance.

The tables derive a mystical symbol for each of the pieces according to their time-value in relation to the rest of the work. In each instance the mystical numbers derived reflect the relationships of the pieces to each other. The same basic relationship of numbers carries through each of the tables. That is, pieces 1 and 9, 2 and 8 relate to each other (beginning/end - transitional pieces), and 3 - 5 - 7 which are the palindromic set forming a progression of mirror-structured pieces up to piece 7, which is a perfect mirror structure itself.

During a performance of the entire cycle the periods of silence between the pieces must also be taken into account as part of the total time span. The periods of indicated silence separating the movements can be shortened between pieces 1 and 2, 5 and 6, and lengthened as required between the others.

As can be seen from the timing tables, dependent on duration variability, the total length of the cycle may vary from 39 to 48 to 57 minutes in duration. Each of these durations reflect the same value numerologically (by digital addition) of the mystical trilogy:

- 39 = 12 - 3
- 48 = 12 - 3
- 57 = 12 - 3
- 66 = 12 - 3

A performance lasting beyond the duration of 66 minutes is not feasible.

Each of the possibilities tabled below, if adhered to as close as possible, will maintain the order of Numerological proportions and balance between the pieces, which should be the aim of performance timing in the present work.
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- MUSIC OF NUMBERS -
The sounds should generally (within phrases and through obvious breaks in continuity) merge with each other, preceding sounds being allowed to expire gradually even after their indicated time value (where pedalling directions permit) so that sound aggregates and time spans overlap. The build-up of sustained tone is thinned out between phrases or disconnected events by more half-pedalling activity.

Slow Tranquil *(\( \dot{d} = 60 \))

\[ \text{Frameboard} \]
\[ \text{Keyboard} \]

Theme 1
The sounds should generally (within phrases or obvious breaks in continuity) merge with each other, preceding sounds being allowed to expire gradually even after their indicated time value (where pedalling directions permit) so that sound and time spans overlap—the build-up of sustained tone being thinned out between phrases or disconnected events by more half-pedalling activity.
2 MOONSHADOW

Agi tato (♩ ~144)

Frameboard

Keyboard

Placido

Impetuoso
Modo Calmato

Theme 1

Theme 2

Theme 1

Theme 2

Theme 1

Theme 2

Theme 1

Theme 2

Theme 1

Theme 2
Subito Sciolto, liberamente e Animato

dolce

poco a poco

molto crescendo

simile

poco a poco

Impe
poco piu agitato

\( \text{Presto} \quad \)  \( \text{PP leggero} \)

\( \text{(J. \approx 120)} \)

poco a poco crescendo

\( \text{(J. \approx 80)} \)

molto

\( \text{(J. \approx 100)} \)
(Quasi Jade)

Agitato

Impetuoso

una corde
poco a poco più agitato

* The following passage, owing to its performance difficulty and the limitations of legibility in an printed stave, cannot be performed with precision or regularity to the extent of the text. The values written should be regarded as approximate, from which

** The object of pedalling in this passage (inclusive until the next barline) is to sustain the echo effects so that there
deviance should not be too great. This passage is thus suitable for a variety of interpretations. As a result, the above non-metred, unbarred passage is meant to serve as a close model around which various modifications in time can be constructed. The passage must, however, perform, always retain the effect of a climactic build-up of agitation and tension by isolated events which, eventually occurring within shorter spaces of time, become more connected together until a climactic (daemonic) build of events is reached.

** is a continual build-up of echo-overlapped (sustained) sound from each preceding event into the next. The purpose is to accumulate a fairly large amount of reverberation from conglutinated sound delay as the passage continues towards its apex.

(sempre forte e fortissimo)
The use of white note heads on these next two pages does not indicate time value but is for distinguishing the trilled notes more clearly.
Feroce
ad lib.
Capriccioso ($\sim 144$)

Tranquillo

Misterioso ($\sim 80$) ($\sim 100$) poco a poco agitato
crescendo molto e accelerando

semper Pedale

Con forza Diabolico* (\( \approx 120 \))

alla campanello

legato e leggiero poco a poco languido

* For alternative version see page 29.
Misterioso (\( \dot{\text{p}} \sim 80 \))

Molto Agitato (\( \dot{\text{p}} \sim 108 \))
Ossia

Meditativo (p ~ 80) (p ~ 108) (p ~ 100)

tenuto

Calmato e 22
Alternative version for page 23

Con Forza
AMETHYST:
NIGHT MUSIC

Misura ad libitum (♩ ~120)

Frameboard

Keyboard
Misterioso (\( \dot{\text{q}} \approx 100 \))

* Stop strings with fingers at behind dampers and graphic with ruler or plummet
** Harmonics on stopped notes
*** Cover all strings with hands or strips of plastering

Piano: 0.5 sec. or longer

Senza Pedal

Strike metal frame with mallet head

Keyboard player silences strings with hand

Faintly slow
"Tranquillo (rythme mécanique)"

- Slide finger gradually along strings from pins to compass.
- To create a 'chamber effect.'
Misura ad libitum e Tranquillo

Tranquillo
4 *NEBULAE*

**Tranquillo** *(d ~ 100)*

- Use metal chisel for glissandi—slide along all three vibrating strings.

---

*Frameboard*

- *Keyboard*

- *P* 3 

- *P* 3

- *P* 3

---

*Presto*

- *leggiero*

---

*Remarks:

- Give c.g. an accenture feeling.

---

*The rhythmic effect (like the sound hazard of a spinning coin) is to sashay around the pianos.*
* Place plectrume strap on B-E string and have strings between bowman and the 1 and 2. Effect similar to J.

** Remove plectrume strap.

---
The arpeggio action here may be played during the duration of the second measure or immediately after as an accompaniment. By the commencement of the following bars...
5 EXODUS

Calmato (♩ ~ 80)

Con Espressione Variato (♩ ~ 100)

Frameboard

Keyboard
Espressivo come prima
Allargando ma Brillante
Con Spirito

Poco Meno Mosso (p ~ 60) e Misterioso

ZPHYNX (Calmato)
Poco Meno Mosso  ($ \sim 70$)

TACET 15''
6 NOCTURNE

Tranquillo (L~80)

Frameboard

molto P delicato quasi una sospirando

Keyboard

(4) (L~100)

P

(4)

PP

(3)

(9) (L~80)
Tempo Ad libitum

(4)

(6)

(7)

A Tempo (\(\sim 80\))

(8)

(7)

(8) (\(\sim 100\))

(5)
THEME AND VARIATIONS. Based on a sense of logical musical procedure, certain of the structures in this piece may be omitted for timing purposes. Each complete structural sub-unit is contained within double bar-lines. Choice of omission is limited to retention of the paired structure in the reverse section of the piece.
Calmato

Con Animato (♩~160)

Meno Animato (♩~138)

Tranquillo Sonore (♩~120)
Delicato (♩ ~ 96)
Con Espressione (♩~120)

Meno Mosso (♩~96)
Piangevole (\( \text{I} \sim 108 \))

Ad libitum (\( \text{I} \sim 95 \))
Delicato (♩=60)  

A Tempo (♩=96)  

Tranquillo Sonore (♩=120)
Molto

Meno Mosso (♩~66 e sostenuto)

Moto come sopra (♩~160)
Tranquillo Sonore (♩ ~ 120)

Delicato (♩ ~ 96)
Dolcemente

Deciso come sopra

Moderato (d ~ 96)
Con amore (♩~96)
THEME AND VARIATIONS. Based on a sense of logical musical procedure, certain of the structures in this piece may be omitted for timing purposes. Each complete structural sub-unit is contained within double bar-lines. Choice of omission is limited to retention of the paired structure in the reverse section of the piece.

Sostenuto ($\text{\textbackslash \textasciitilde95}$)

Frameboard

Keyboard
Meno Mosso e Calmato (≥ 80)

Piu Mosso (≥ 108)
Tranquillo (\( \dot{\text{q}} \sim 80 \))

Poco a poco crescendo

diminuendo

simile

Tempo Prima (\( \dot{\text{q}} \sim 95 \))

16 8 +16

6 8
Con Appassionato Diabolico (\( \dot{p} \sim 120 \))

Frameboard

Keyboard

\[ \text{Misterioso} \]

\[ \text{Capriccioso} \]

*Half-pedal suggested only to clear sound of the pedal (chiefly lower ones) while the crescendo mented of the preceding passage is obtained.*
Gentle scraping sound. Use backwards scraping motion with edge of fingertips.

Notas (pitches) articulated so as not to be too individually prominent. Other strings in the near vicinity of those indicated can be scraped simultaneously in similar fashion. The performer, however, must adhere to the given tessitura for this effect.
Leviticus
Andante Molto Tranquillo (♩ ~ 60)
Deuteronomy
Molto Tranquillo