The Modal-Harmonic Algorithm. Pattern and Transformation

DIANA-BEATRICE ANDRON
The Department of Composition and Musicology
The University of Arts “George Enescu”
Str. Horia, nr. 7-9, 700126, Iasi
ROMANIA
dianaandron2001@yahoo.com

Abstract: The present study is an attempt to demonstrate and stress upon the complexity characterizing the way in which Anatol Vieru – a representative composer for the Romanian musical vanguard – through the organization of the initial available sound material resources on principles of horizontal and/or vertical symmetry (typical to non-gravitational harmony), manages to create in Symphony no. 5 “Peste varfuri”, a cycle of 48 Variations reunited under the form of an original chaconne – a true model of the genre, starting from a modal-harmonic algorithm with polychordal structure – with double functionality: that of an unique generative source of the sound matter and also, of a perpetuum obsessively extended throughout the entire variational cycle.

Key-Words: variation, chaconne, modal-harmonic algorithm, Vieru, “the Sieve of Eratosthenes”, scordatura

Anatol Vieru’ Symphony no. 5, lyrics by Mihai Eminescu is, undoubtedly, a visionary work. It’s composition truly meant an act of courage for that time (1985), as it implemented an original modal concept – where the gravitational and the consonance became operational once more, after the outrageous vanguardist prohibitions –, and also used the chorus throughout the four parts of the symphony, which was an extremely rare, even hazardous phenomenon, after such experiences of the two predecessors, Beethoven and Mahler.

Following this idea, the main risk would have been linked to the fact that such symphonic approach may easily shift towards “oratory”; however this did not occur in Vieru’s case, as the composer knew how to convey to the chorus the organicity of a constitutive group, perfectly integrated in the orchestral whole.

1 The Modal – Harmonic Algorithm

To begin with, we must note that the entire construction of the Symphony is centered on a modal-harmonic algorithm defined by the fusion of the two traditional chord entities – the Major and the Minor – following an ordering principle inspired by “the Sieve of Eratosthenes”.

Thus, the correspondence that Vieru [1] established between the sequence of prime numbers and the cycle of fifths is the following:
- for minor chords: 2 = F; 3 = C etc… up to 37 = B flat/(enharmonic) A sharp;
- for major chords: 41 = F; 43 = C; 47 = G etc… up to 89 = B flat/(enharmonic) A sharp.

As a basic strategy, a rule is applied according to which the ordinal number of a quarter note must be decomposed into prime factors, the greatest prime factor turning into the determinant element of a certain chord. In order to be more explicit, a demonstration [2] of the author referring to quarter notes 98, 99 and 100 in the bar 25 of Part I is shown below:

98 = 2 x 7^2, the greatest prime factor is 7 = D  
99 = 3^3 x 11, the greatest prime factor is 11 = A  
100 = 2^2 x 5^2, the greatest prime factor is 5 = G

Our study holds considerations on Part III of Anatol Vieru’s Symphony, more appropriate in order to point out how this type of sound organization becomes an active principle in generating a variational hypercycle that follows the structuring pattern of the chaconne.

The modal-harmonic algorithm of this particular section of the symphony receives a special function, with a double meaning in the global dramaturgy of the work: on the one hand, the unique generative source of the sound matter, and, on the other hand the perpetuum obsessively extended to a 48-variation cycle under the form of an original Chaconne.

This harmonic incipit has a configuration essentially consisting of cumulative organization (union) – with intersections and differences in distinct degrees – of a finite class of major and minor chords filtered through “the Sieve of Eratosthenes” and brought into polychordal simultaneity (structures made up of layers permanently opposing the two states) based on...
principles of horizontal and/or vertical symmetry.

**Fig. 1** Modal-harmonic matrix, modules I-IV, bars 1-4

Paradoxically, even though the dual genesis of the polychords points to the consonant-triadic bi-stratification while their juxtaposition indicates “traditional” relations of second, third and fourth/fifth, the harmonic resultant does not validate a tonal-functional connotation (see Fig. 2).

The phenomenon is due to the non-gravitational harmony which generates the relation/integration of the chord entities on the fifths scale (A major+F minor=7Q, see Fig. 3) with the help of sufficiently large intervals but also, at the same time, a significant dissonant potential – note the axial oppositions of different chord components through augmented fourth and/or diminished octave (Fig. 3).

**Fig. 2** The symmetric disposition within the four harmonic modules

Without further detailing the polychordal structure of the generating module of the Chaconne, we must stress upon the fact that these complex harmonic aggregates still lack the roughness or the harshness of heterogeneous constructions, which does not mean they do not hold a very important semantic tension (particularly in this section of the symphony). However, by masterfully cultivating relationships of harmonic scordatura (to offer a single explanation for the given phenomenon), Vieru’s modal combinatorics creates the sound image of deeply interiorized feelings, totally “consonant” with the lyricism retrieved from the verses of Mihai Eminescu’s poem Dintre sute de catarge (From Among Hundreds of Masts).

To support the last statement, in order to end these first observations on modal structure of the Chaconne, mention should be made that the generating base of the entire harmonic specter relies on a symmetric construction of palindromic type (Fig. 4) which results in a corresponding number of submodes (Fig. 5), as shown below – if decomposed for each polychord:

**Fig. 3** The position of the harmonic structures within the cycle of fifths

**Fig. 4** The palindrome-modal structure
2 Variational chronology

The exposure of the Theme in the Chaconne (which really is an isorhythmic harmonic module similar to classic chorus) coincides with Variation I. The sound matter is embedded in a strictly-determined temporal structure, having four bars in 3/2 time – a pattern that will reappear 48 times (the total number of variations) not once swerving from the original duration.

In accordance with the classic principle of basso ostinato variations, Anatol Vieru’s Chaconne preserves the two characteristic temporal levels: that of the constant – associated with the non-evolving-repetitive phenomenon (ostinato) and that of the variable – associated with the evolving-transformational phenomenon.

Another connection with the above-mentioned classical principle is drawing the attention on a complementary chaconne bass from the harmonic mass by means of symmetry with the help of a descent – a trait that can be observed in every every rendering of the original module.

Beyond the initial theme algorithm, what individualizes Vieru’s compositional concept is the range of instances (which could be referred to as “stylistic licenses” in connection with the Bachian model) to approach the two levels.

Thus, the state of the constant is preserved throughout the musical work both as a display of the original harmonic module and also as dissolution of the temporal level into disparate harmonic units (or treated in a punctualist manner by short values, interpolated by rests). Along the same line, the state of the variable is focused on temporality as concerns the rhythmic parameter (while the meter and the tempo remain constant) and on the arpeggiated figuration, following the line of the intonational parameter.

In an apparently paradoxical way, there is an intersection point of the constant with the variable, signifying a fusion of the two levels. Concretely speaking, the harmonic matrix, under the form of an isorhythmic block, will dissolve itself in horizontal, on exclusively figurative sound areas as shown throughout this analysis.

A first group belonging to the variational macrocycle consists in the display of the theme module for woodwind and brass instruments sections – corresponding to Variation I – and in its repetition just for brass players in Variations II and III (p. 49, bars 5-12). We could speak about a triple exposition, as this option is justified by the necessity to impregnate the whole sound environment of the Third Part with the ethos derived from the perpetuation of the available harmonic resources – structured in accordance with a major-minor dualism.

The second group belongs to Variations IV-VII (pp. 50-51, bars 13-28), revealing for the first time a picture of the two levels (the constant and the variable) synchronized, where the string instruments create a highly suggestive image, thoroughly exploited by the orchestral apparatus and by the mixed chorus alike.

In fact we are dealing with a type of arpeggiated figuration with double sense of the melodic gradient (ascensio-descensio) – this
rhetorical option having an onomatopoeic effect derived from the very phonetic instrumentalism enclosed in poetic text.

Variation VIII (p. 52, bars 29-32) has an unique character imprinted by the appearance of the chorus which will take over the arpeggated figurative level with the beginning verses of Eminescu’s poem. This protagonist is introduced to the Chaconne’s sonorous landscape with a remarkably discrete sonority reduced to a single layer of the harmonic module.

**Fig. 7 – Var. VIII, p. 52, bars 29-32**

Variation IX (p. 52, bars 33-36) already brings consistency to the harmonic structure by completing it with the second layer, entrusted to the woodwinds.

While the first three variational groups have in common the rhythmic unit of the theme module playing the role of a temporal reference, Var. X (pp. 52-53, bars 37-40, where a temporary removal of the chorus is noted) initiates the dissolution of the originally-compact structure which is achieved by abbreviating and dispersing the components belonging to the harmonic module with the help of interpolated rests. This is the moment where the entire level of the constant itself undergoes a transformational application.

Variation XI (p. 53, bars 41-44) is edifying as concerns the rhythmic organization based on the principle of bilateral symmetry of palindromic type.

The procedure is applied either on micro-temporal segments (as it happens in Fig. 8) or on larger structures (as is the case, for instance, in Var. XIX).

The excerpt from Var. XI shows a palindrome structure of type AB/BA, with an eighth rest axis within which the unveiling of a phenomenon characteristic for the entire temporal conception of the Chaconne can be noticed under the form of a binary-ternary juxtaposition with significant contribution to the frequent generation of hemiola structures.

**Fig. 8 – Var. XI, p. 53, bars 41-42 (chorus)**

As we may notice, the rhythmic unit A has a binary character and the rhythmic unit B is organized by ternary values, while it suggests an exceptional division of duplet in proportion of 2:3. Based on this alternation, we observe the occurrence of asymmetrical, vertical-isorhythmic, isochronal or complementary chains, fitting the syllabic structure of the verse where the rests act like real caesura elements in the delimitation of incisions.

If we marked the real metric controlling the rhythmic groups derived from the desymmetrization of the temporal flow, then the more or less dissimulated action of a horizontal, alternatively-symmetrical polymer would be clearly revealed.

Starting with Variation XIII (bar 50), the same perpetuation pattern of the theme module through the dispersive character initiated in Variation X can be seen.

Throughout Var. XIII-XVI (pp. 54-57, bars 49-64), the ostinato level (the level of the constant) is maintained by woodwinds – dispersive, quasi-punctualist manner that in Variation X is sustained by chordophones.

This background reveals an emancipation of the harmonic figuration which (given the elimination of the chorus) develops a superior level of agglomeration under the form of a sixteenth note continuum written for chordophones.

Consequently, Var. XIII – XVI mark another chapter of the cycle which stands out because of the transparency noticed in the bi-stratification of the levels (quasi-punctualism versus sound continuum).

Stepping forward, the segment covered by Var. XVII-XX (pp. 57-60, bars 65-80) promotes the exclusive chorus development occasionally accompanied by short pizzicato interventions played by strings, maracas tremolo and onomatopoeic effects produced with the help of the “wind machine”.

Exclusivity also acts at the level of isorhythmic writing whose purpose is that of providing unity and consistency to the collective character in the variational approach. Thus, the analogy between
the syllabic structure of the verse and the rhythmic structure of the figurative arpeggiated model, on the one hand, and also the disjunctive juxtaposition of the incisions – with the help of interpolated rests, on the other hand, are preserved.

Unlike other moments, Var. XVII and XVIII stimulate a change in the fluidity of the melodic thread up to a densification noticeable on the rhythmic level (achieved through sixteenth note contribution).

Contrastingly, Var. XIX-XX bring forward the desymmetrization phenomenon by employing the earlier-mentioned dual groups of binary/ternary type, the entire procedure culminating with a broken melodic flux caused by the dispersion of the rhythmic order with the help of rests.

Furthermore, Variation XIX – which presents an extension of the palindrome at the level of symmetrical juxtaposition of seven rhythmic formulae (in the following succession: A B C D C B A – where D is the axis-formula) – is representative for the symmetry concept widely extended throughout the opus.

Regarding the configuration of the sound matter, a special remark must be made as concerns the new figurative instance extracted from the matrix structure, the descant type of detachment in the part of the soprano sustaining the proliferation of a melodic profile through the ascensio-descensio complementarity.

Another sound mark of the mentioned group sends to the timbre range and consists of special emission techniques which imply whispering, murmuring and the quasi-parlando sound.

**Fig. 9 – Var. XIX-XX, p. 59, bars 73-77**

[We can observe the markers of symmetric correspondence relations along with the structure of every rhythmic term and the derivation structure achieved by the augmentation of some formulae (3-beat quadruplet – B) and then the binary / exceptionally-ternary (quadruplet) alternation and the axis-formula.]

**Variation XXI** (p. 60, bars 81-84) reaches an abyssal threshold, a rupture in the variational chronology now marked by the occurrence of a space swallowed by rest.

The exclusiveness of the moment not only induces a contrasting effect but also an anticipative one as well, because on the background of maximal rarefaction, the new grouping formed of Var. XXII-XXV (pp. 61-62, bars 85-100) revives the incipient level of the Chaconne through the exposition of harmonic/thematic choral in accordance with the initial bi-stratification.

Starting from **Variation XXVI** a new apotheotic moment of the cycle is prepared through the engagement of three timbral compartments: woodwinds, chorus and strings.

Thus, **Var. XXVI, XXVII and XXVIII** (pp. 62-63, bars 101-112) preserve the temporal level of the constant by unfolding the harmonic choral now divided between woodwinds and strings. The intervention of the chorus on this background is marked by the well-known figurative arpeggiated formulations, at first isorhythmic yet presenting a polyphonic-imitative nuance (Var. XXVI-XXVII), then varied through syncope chains, while preserving the imitative tendency (Var. XXVIII).

Making its debut with a polyrhythmic canonico stretto, **Variation XXVIII** introduces, at the same time, a new stage of the arpeggio figuration as phenomenon linked to harmonic block dissolution, the woodwinds moving gradually through the rarefied, isorhythmic phase towards the densely-figurative one, in an attempt to take over the flexuous waving dynamics of the previously-announced level from the chorus – the next variation (var. XXIX, pp. 63-64, bars 113-116) symbolizes the culminating point of the movement from verticality to horizontality.

**Var. XXX-XXXXII** (pp. 64-66, bars 117-128) assumes once more the role of progressive isorhythmic restriction in the movement up to a new threshold of rarefaction (half notes intercalated with corresponding rests), Var. XXXII having the value of yet another anticipative moment for a long presence of the harmonic continuum stage which will persist throughout **Var. XXXIII-XLVIII**.

**The last 15 Variations** (XXXIII-XLVIII, pp. 66-74, bars 129-192) bring the chorus into the spotlight again, along with the obsessive invocation – vânturile, valurile – by reactivating the movement from the explicit pronunciation of the words to their dissolution into phonemes with onomatopoeic character.
We find ourselves in another spiral of variational evolution, with a debut in the rarefaction zone, materialized under the form of a long harmonic pedal spanning along Var. XXXIII- XXXXIII, with a single change of chord, in Var. XXXVI.

In this context, the last variational group initiates yet another spatial-temporal continuum of harmonic essence, individualized now by the polyphonic attacks.

This harmonic stasis slightly syncopated (rhythmmed) through the dispersive distribution of the sound impulses over the choral apparatus forms the sonorous magma available for future transformations. At this point, the choir only emits vowels, entering thus in resonance with the amorphous, yet unarticulated state of the sonority.

Up to Variation XLII (inclusively), the harmonic blocks, delimited as temporal incisions of variable extension (length) are defined as a succession of three harmonic structures:

- The first one is a structure containing two chordal layers – C sharp minor + E major – extended from Var. XXXIII to Var. XXXVI, with a come-back to Var. XXXXVI, XLII
- The second structure is the juxtaposition result of A major + D sharp minor, which generates, overall, a major chord with major seventh, covering Var. XXXVI-XXXVIII
- The third structure is basically a transposition of the second one – B major + D sharp minor (or B major with major seventh) – and can be noticed in Var. XL only.

The last group, containing Var. XLII-XLVIII, has a particular aspect, conferred by the original manner in which the fusion of the horizontal with the vertical occurs, the figurative, arpeggiated melodic line being accompanied through repeated attacks by the entire choral apparatus.

In this case also, the harmonic movement can be reduced to three structures, alternated by the principle of scordatura and associated to tighter and tighter temporal incisions.

Each incision has a double determination: a harmonic one and a rhythmical one, the principle of rhythmic alternation consisting of the juxtaposition of two basic segments – 5/4 and 8/4, respectively – these surfaces presenting a correspondence with Fibonacci’s Numbers, where the segment of five quarter notes has, in its turn, an inner structure of 2 + 3 (see Fig. 11).

The asymmetry derives from the indivisible structure of standard values for each segment individually, which generates a temporal area of bichronal type (characterized by only two different pulsations – the quarter note and the half note).

Mention must be made, in the end of our study, that the discussed approach is not singular in Anatol Vieru’s work. On the contrary, it belongs to a triad formed by Symphonies IV, V and VI, Symphony no. VI “Exodus” presenting even an unusual Chaccone.

If we take into consideration other creations of the same type, we can appreciate the fact that basso ostinato variations in general and the Chaccone in particular mark a relevant sequence in Anatol Vieru’s compositional concept, which rightfully allows it to aspire to the condition of a true model of the genre.