

Miloš Zatkalik

University of Arts, Faculty of Music, Department of Musicology, Belgrade
Univerza za umetnost, Fakulteta za glasbo, Oddelek za muzikologijo, Beograd

The Aggregate or Have the Notes Lost Orientation?

Mar so toni izgubili orientacijo?

Prejeto: 27. julija 2008
Sprejeto: 5. septembra 2008

Received: 27th July 2008
Accepted: 5th September 2008

Cljučne besede: agregat, iz(po)polnitev, funkcija, ciljna usmerjenost

Keywords: aggregate, completion, function, goal-directedness

IZVLEČEK

Agregat in proces njegove iz(po)polnitve podelujeta k cilju usmerjeno gibanje tako netonalnim kot tudi (ponavadi) neserialnim delom. S tem so razmejene njegove sintaktične in oblikovne enote, dane povezave med njimi, ali pa se artikulirajo potrebni vzorci napetosti in sprostitve. Proces iz(po)polnitve je ali sukcesiven ali simultan, včasih tudi porazdeljen med teksturne plasti z določenimi funkcijami.

ABSTRACT

The aggregate and the process of its completion introduce goal-directed motion into a non-tonal and (usually) non-serial work. This can delimit its syntactic or formal units, provide connection between them, or articulate its tension-release patterns. The completion process is either successive or simultaneous, sometimes divided between textural layers with distinct functions.

When we hear a dominant, at least two things happen as far as our reaction is concerned (of course, I have in mind those listeners – whether professional or amateur – whose musical experience is based on European tradition): a) we experience the feeling of tension, which means a state we cannot accept as lasting or definite, which in turn means that we are expecting the continuation of musical motion, and b) we feel that the continuing motion would be directed towards a goal, namely the tonic. This applies to the level of elementary syntactical units: an entity which may variously be called a musical sentence (in Schoenbergian terminology), a phrase etc. is practically by definition¹ a process which strives towards a goal; what that goal would be is something that we can predict with a considerable degree of certainty, moreover, we even have

¹ William Rothstein, *Phrase Rhythm in Tonal Music*, Schirmer Books, New York-London, 1989.

some expectations as to the point in time at which the goal should be reached. This applies also to the global level, the level of the entire composition: no matter how the composer may lead us through the piece, he or she will ultimately take us to the tonic. Generally speaking, tonal music is goal-oriented. Not a small number of theorists saw the principle purpose of music analysis exactly in this way: to demonstrate how music progresses towards that goal, how digressions during that process none the less contribute to the progress etc.

Let us not forget, it is tonal music we are talking about. Not every music is tonal. When we hear, for instance, the excerpt of *Offrandes* by Edgard Varese (Ex. 1, bars 1-8, percussion omitted) or the first of György Ligeti's Ten Pieces for Wind Quintet (Ex. 2) do we have any idea as to where the music is going? 'The pitches appear to have lost the sense of linear direction. <...> The pitches don't want to go anywhere. Each seems content to occupy its own private place, without producing any particular expectation of an eventual move to a different place <...> The pitches don't move. They are displaced by other pitches.'² This was said with reference to Varese, but is applicable to a great deal of non-tonal music.

The musical score for Edgard Varese's *Offrandes, Chanson de La-haut* is presented in a multi-staff format. The top staff is for Horn (Hb.), followed by Cor (fa), Trumpet (Tnp. ut), 1st Violin (1er V.), 2nd Violin (2me V.), Alto (A.), and Violoncello (V.C.). The score includes dynamic markings such as *p*, *sf*, *ppp*, *mp*, and *f*. The tempo is marked 'Lent' with a quarter note equal to 40, and 'Subitemant Tres vif' with a quarter note equal to 132. The score includes various musical notations such as accents, slurs, and articulation marks.

Example 1. Edgard Varese: *Offrandes, Chanson de La-haut*.

² Robert Morgan, 'Notes on Varese's Rhythm', in *New Worlds of Edgard Varese - A Symposium*, ed. Sherman van Solkema, City University of New York, 1979, pp. 9-10.

(G. Ligeti continued)

The musical score consists of two systems of staves, each containing five parts: Fl. Sol., C. Ing., Cl. Si b, Cor. Fa, and Fag. The first system covers measures 8, 9, and 10, while the second system covers measures 11 and 12. The Fl. Sol. part features prominent triplet markings and dynamic shifts between *pp* and *mf*. The C. Ing. part also uses triplets and dynamic markings. The Cl. Si b part includes quintuplet markings. The Cor. Fa and Fag. parts follow similar rhythmic patterns with dynamic markings. The score is written in a key signature of one flat and a 4/4 time signature.

Example 2b.

(G. Ligeti end)

13 14 15

Fl. Sol. *mf* *pp* *morendo al niente*

C. Ing. *mf* *pp* *morendo al niente*

Cl. Si b *pp* *mf* *pp sempre*

Cor. Fa *mf* *pp sempre*

Fag. *pp* *mf* *pp sempre*

Poco più mosso

16 17 18 19

Fl. Sol. ^{*)} (*d = 48*) *sub. fff ten., tutta la forza* *fff ten., simile* *fff ten., sim.*

C. Ing. ^{*)} *sub. fff ten., tutta la forza* *fff ten., simile* *fff*

Cl. Si b ^{**) (***))} *sub. fff ten., tutta la forza* *fff ten., sim.*

Cor. Fa ^{***))} *sub. ff ten.* *ff ten., simile*

Fag. ^{**) (***))} *sub. fff ten., tutta la forza* *fff ten., simile*

Example 2c.

Example 2a, b, c. György Ligeti: *Ten Pieces for Wind Quintet, No. 1.*

If music appears not to be directed towards any particular goal, if the intervals have the potential to go anywhere, and if we agree with Jonathan Bernard (again talking about Varese) that the most important analytical considerations are point-to-point-connections,³ is there room then for larger structural processes? In other words, the issue to be raised here is: whether the non-tonal composer is capable of projecting

³ Jonathan Bernard: 'Pitch/Register in the Music of Edgard Varese', *Music Theory Spectrum*, No. 3, 1981, p. 3.

meaningful expectations and goals, of setting up a process which would unfold over a larger time-span?

Let us have a closer look at Varese's piece. It is easy to see that for several reasons *Subitement tres vif* marks the beginning of a new formal division. We can demonstrate that the unit which precedes it draws its formal coherence from the pitch organization. 10 out of 12 pitch classes have been employed by bar 3. At bar 5, the total chromatic, or the aggregate⁴ is all but complete, with only one tone (*F*) missing. Inasmuch as we feel that the 12-tone collection is a whole, the absence of a single tone should be experienced as a gap to be filled, as a kind of tension the release of which is brought about by the appearance of the hitherto absent tone (in this example: French horn, bar 6). Notwithstanding the above quoted opinion about the absence of linear direction, that tone is, after all, made into a kind of goal, and once it has been reached the unit has come to an end.

A very similar process unfolds in Ligeti's example.⁵ The key event, actually the climax of the piece is obviously in bar 16 (significantly enough, close to the golden section): the appearance of *C#* unison. And again, the previous 15 bars employ 11 pitch classes, the single one missing is that same *C#*. Can we say that the *C#* is the goal the music is expected to reach? Very probably yes.

This is hardly a revelation of any kind. Aggregates have long been known and discussed. It was already Webern who remarked: '... I had the feeling that when all 12 tones are exhausted, the piece has come to an end.'⁶ The idea of the aggregate and the process of its completion provides the basis for combinatoriality,⁷ indeed for 12-tone composition in general (even if the two phenomena generally remain distinct). In a certain sense it corresponds with some facets of Allen Forte's set theory, to be precise: that part of it which deals with complementation. This particular set contains these particular pitch classes, that is, one possible selection from the total chromatic. However, such a set, besides containing the given pitch classes and possessing given characteristics implies at the same time the missing pitch classes. It is precisely through this complement relation, the relation between what is used and what is left out, that some important analytical insights are gained.

A Gestalt-Psychology perspective on the phenomenon of the aggregate is also conceivable. Namely, with certain simplification, the European tonal system basically counts on 12 chromatic pitch classes, which are felt to constitute a whole. The absence of a pitch class is, as we have said, perceived as a gap in the system, and the situation is analogous to the often quoted Gestalt example of a circle from which a segment has been cut off and which we perceive not as a curve *sui generis*, but as an incomplete circle, which produces visual tension to be released by the (mentally construed) completion of the circle. The underlying idea can be summed up as: what is there is sometimes almost as important as what is not there.

⁴ The aggregate as used in this paper means an unordered 12-tone set, and is practically synonymous with the *total chromatic*. This definition of the aggregate, though widely accepted, is not universal. For different usage of this term see Nikša Gligo, *Pojmovni vodič kroz glazbu 20. stoljeća*, Muzički informativni centar KDZ, Matica hrvatska, Zagreb, 1996, pp. 2-3 and 51-53.

⁵ The differences between the two will be pointed out later.

⁶ Quoted according to: Stefan Kostka, *Materials and Techniques of Twentieth-Century Music*, Prentice Hall, Englewood Cliffs, New Jersey, 1990; p. 198.

⁷ Among many studies: Daniel Starr & Robert Morris, 'A General Theory of Combinatoriality and the Aggregate' *Perspectives of New Music*, Vol. 16, No. 1, pp. 3-35 (Part I), and Vol. 16, No.2, pp. 50-84 (Part II).

The aggregate has been the object of some serious and extensive scholarly work. In that context, aggregate partitioning received particular attention in non-serial atonal works (Varese, for instance⁸), especially in pieces which employ the total chromatic with some consistency (Lutoslawski,⁹ George Crumb¹⁰...). So frequently occurring and so well documented is the process of aggregate completion, that it regularly features in undergraduate textbooks dealing with atonal (post-tonal, non-tonal) music.¹¹ None the less, some aspects seem to be lacking, or rather some aspects, albeit sporadically mentioned in various studies, have not been systematically treated. I am referring primarily to the following two:

1. The functions of the aggregate
2. The process of its completion

In addition, I will briefly address the question of how the aggregate behaves in a context which is to a certain degree 'foreign' (serial, tonal), and finally indicate some shortcomings and limitations of the study of the aggregate.

1. Functions of the Aggregate

Even though the distinction between the categories I am proposing cannot be completely clear-cut and in some instances they will overlap, there are several relatively distinguishable areas of aggregate functions:

- 1.1. Closural
 - 1.1.1. Syntactic
 - 1.1.2. Large-scale formal
- 1.2. Non-closural (transitional, connecting)
- 1.3. Dramatic/expressive
- 1.4. Idiosyncratic

1.1. Closural function means that 12-pitch collections are manipulated in such a way as to contribute to the delimitation of segments within a composition.

1.1.1. In the first example offered in this paper – Varese *Offrandes* – we have observed a process whereby the composer withholds a single pitch class, making its ultimate appearance a structural event, a gesture which signals the end of a syntactic unit (a phrase? a sentence?). By suppressing the given pitch class the composer implies the closure, and by finally supplying it, the closure is realized. The closure can also be implied but not realized

⁸ Larry Stempel: 'Varese's 'Awkwardness' and the Symmetry in the Frame of 12 Tones: An Analytic Approach', *The Musical Quarterly*, No. 65/2, 1979, pp. 148-166.

⁹ Michael Leslie Klein: 'A Theoretical Study of the Late Music of Witold Lutoslawski: New Interactions of Pitch, Rhythm & Form'; State University of New York, University Microfilms, Ann Arbor, Michigan, 1995; Mirjana Veselinović: *Svaralačka prisutnost evropske avangarde u nas*, Univerzitet umetnosti, Beograd, 1983, pp. 236-248; Nancy Woo: 'Witold Lutoslawski's Mi-Parti A Musical Essay in Sound Textures', http://www.usc.edu/dept/polish_music/harley/nancy.html.

¹⁰ Ciro G. Scotto, 'Transformational Networks, Transpositional Combination, and Aggregate Partitions in Processional by George Crumb', *Musical Theory Online*, http://www.societymusictheory.org/mto/issues/mto.02.8.3/mto.02.8.3.scotto_frames.html

¹¹ Particularly in the context of 12-tone music: Joseph Strauss, *Introduction to Post-Tonal Theory*, Prentice Hall, Englewood Cliffs, New Jersey, 2000; Stefan Kostka, op. cit.; Joel Lester, *Analytic Approaches to Twentieth-Century Music*, W. W. Norton & Comp., New York, London, 1989.

within the given section. In Ex. 3 (Varese *Density 21.5*, bars 1-19), a plausible segmentation based on a number of surface features might draw a boundary between bars 17 and 18, as indicated in the example. Again, 11 pitch classes are contained in the first section. The one missing is the B which initiates the next section, but remains completely absent from the first. One might speculate about these two excerpts as exemplifying a kind of analogy with tonic and dominant cadences, namely, in the former (*Offrandes*), the aggregate completion closes the section, in the latter the section ends with the aggregate almost, but not quite complete, leaving the listener with a sense of deficiency or inconclusiveness, hence of tension, which is to be resolved not in this, but in the next section.¹²

Example 3. Edgard Varese: *Density 21.5*.

1.1.2. In this function, aggregate completion is again of structural importance, only this time it plays a role in the construction of larger formal divisions or perhaps entire compositions. It could have been subsumed under the previous heading, but I felt it was necessary to draw special attention to the fact that aggregate completion can be more than just a purely local affair: it also functions on a larger scale. An obvious way in which this function is accomplished is when the boundary of a syntactic unit simply coincides

¹² Note, however, that the pitch we are waiting for in *Offrandes* is not necessarily the same as the focal intonation – D in this case. The referential pitch class and the goal of the process are separated. In that sense it is entirely different from the concept of tonic.

with a boundary between larger formal divisions. Admittedly, such cases do not add anything new to our picture of the aggregate: the same procedure as in the previous function is merely transferred to a higher hierarchical level, upgraded, as it were.

There are, however, other situations, somewhat more complex. A case in point is *Le merle noir* for flute and piano by Olivier Messiaen. The piece is written in barform (A A₁ B), with the first two sections further divided into six subsections. Ex. 4 reproduces the respective second subsections. The first leaves out the pitch class *Bb*, and the second makes it up by presenting it in a very emphatic way. Thus, the absence of *Bb* in the first section provides additional motivation for repeating this 'bird cadenza' in the second; the appearance of that note in the second section effectively blocks further development in that direction, and this in turn essentially defines the overall formal construction.¹³

Un peu vif, avec fantaisie

analogous passage from section A1

Example 4. Olivier Messiaen: *Le merle noir*.

In the first movement of Lutoslawski's Second Symphony the aggregate defines the overall structure in a twofold way. Firstly, it supports the differentiation between the

¹³ I owe this analysis to Roger Nichols, 'Messiaen's *Le merle noir* - The case of a blackbird in a historical pie', *The Musical Times*, Vol. 129, No. 1750, Dec. 1988, p. 649.

two types of sections¹⁴ which alternate throughout the movement (producing a pattern of A B A₁ B₁ A₂ B₂ etc.). The A sections employ the total chromatic, sections labeled as B contain an all-combinatorial hexachord (012678). Secondly, the pitch organization of the piece allows for variation and even directed motion. The variety between the aggregate sections is provided by different aggregate partitioning; the hexachordal sections are arranged in such a way that each subsequent appearance is transposed a semitone upward in the first six appearances, and afterwards a semitone downwards. This creates directed motion towards three goals:

- B₄ (rehearsal number 25), when all 12 pitch classes have been used in hexachordal section; this is an instance of the aggregate being completed over a large time-span;
- B₆ (No. 47) which exhausts all possible different transpositions of the hexachord, after that point the transposing process starts going backward, as it were;
- B₁₁ (end of the movement); significantly enough, Lutoslawski did not close the circle by finishing with a B₁₂ (return to the original transposition), thus leaving the movement open in a way.

Unlike the first goal, the second and third do not represent aggregate completion in the accepted sense. Yet the two processes share a common underlying idea: motion towards the point where the full spectrum of available resources has been used.

1.2. There are specific situations in which aggregate completion serves as a connection between adjacent segments, rather than a closure. This happens when:

- two adjacent segments containing a 12-pitch collection share a common pitch class or classes at the boundary region;
- the concluding and initial subsets of two adjacent aggregate sections themselves add up to an aggregate.

Both situations are frequently mentioned in association with hexachordal combinatoriality, which is sometimes seen as a means of phrase connection, or a way of progressing from one series-form to another.¹⁵ The connecting function of the aggregate can again be observed on various structural levels: connection between small syntactic units, connection between large sections of the global form... Furthermore, one will have noticed that this same function is accomplished by completely opposite means: through the sharing of common pitches between the adjacent sections, and through the absence thereof.

1.3. Instead of being a syntactic/formal boundary, aggregate completion may have a role in articulating the dynamic profile of music, its progressive or recessive tendencies, ebbs and flows; most typically, it creates and/or supports the climax of a given composition. We have seen this in Ligeti, Ex. 2. We can also see that, for instance, further in *Offrandes*, following the portion presented in Ex. 1. Namely, Ex. 5 presents the point at rehearsal number 5, when the aggregate appears within a single bar, the soprano reaches a very prominent G# which is in polar relation to the focal intonation D, the point of the golden section coincides with

¹⁴ There is no need to discuss here the obvious differences in timbre and texture.

¹⁵ As in Strauss, *op. cit.*, p. 187-188; Lester, *op. cit.*, p. 211. It should also be noted that the applicability of this device is not limited to its connecting functions: it can be used both small-scale and large-scale, in ways similar to the ones described in 1.1.1. and 1.1.2.

aggregate completion, the volume is *ff*, the texture very dense: several factors collaborate to bring out that particular moment and the subsequent three bars as the high point of the piece.¹⁶ Therefore, if on the one hand aggregate completion can define the form of a composition, on the other, as the generator of tension, climax and release it discloses something that we might call the dramatic structure and expressive potential of the piece.

5 Animé à tempo

sans sourd.

sans sourd.

très declamé

gliss.

sans sourd.

sans sourd.

sans sourd.

sans sourd.

L.V.

Example 5. Edgard Varese: *Offrandes, Chanson de La-haut*.

¹⁶ Functions actually coincide in this case, as the moment of aggregate completion also signals the end of a syntactic unit. Incidentally, other examples are also to be found in *Offrandes*, like the bar 12 of its second part (*Le croix du sud*) which constitutes a local climax.

1.4. A composer sometimes assumes a highly personal attitude towards a given procedure, phenomenon etc. The following statement by Messiaen reveals just such an attitude: '<...> you play all the notes at once and there are no colors. You get grey or black – colours are absent. To produce colours you must suppress something. For example, if you're wearing, say, a yellow-orange sweater, that colour absorbs certain rays and reflects others. It's the same with a chord: if you have 11 notes out of the 12, or ten of the 12, that produces a colour.'¹⁷ This approximately translates as 'the aggregate implied, but not realized,' but with a specific function we haven't envisaged in our classification of functions. Being so individual, this frame of mind may not have the necessary level of objectivity to be included in this study, but I am doing it because Messiaen is far from being isolated in his equating pitch combination and color. And it is not only impressionism that I have in mind: the above statement, for instance, coincides very neatly with the way Lutoslawski understood his 12-tone constructions, only he looked for colors in the various ways the aggregate is partitioned.¹⁸

2. The Process of Aggregate Completion

When focusing on the very process of aggregate treatment, we are dealing with a range of questions such as: how are new pitches introduced and deployed, is the repetition of pitches possible, how are the pitches distributed among various lines/timbres/registers (aggregate partition), what is the rate of aggregate completion, what amount of emphasis is allotted to the completing pitch etc. While we cannot treat all of them in this paper, there are several types and subtypes of situations that I intend to examine, and they can be classified in the following way:

- 2.1. Linear aggregate completion
 - 2.1.1. conspicuous completion (completion as an event)
 - 2.1.2. completion inconspicuous
- 2.2. Non-linear aggregate completion
 - 2.2.1. simultaneous or near-simultaneous aggregates
 - 2.2.2. aggregate completion by the juxtaposition of textural layers (differentiation of texture with respect to function)

2.1. Linear completion

In the first type, the completion is a process unfolding in time, new pitch classes are introduced – over a longer or shorter time-span, successively but sometimes also simultaneously, some of them possibly repeated along the way – until all 12 have been used. This process can be accomplished in a twofold manner:

2.1.1. The composer may withhold a single tone which is thereby experienced as missing, its appearance is a conspicuous event and the completion of the 12-tone aggregate is perceived as an arrival. The reader may have noticed that all examples hitherto quoted, save for the last one, are of this type. Such a choice is not accidental: it

¹⁷ Quoted from: Roger Nichols, *op. cit.*, p. 649.

¹⁸ Cf. Klein, *op. cit.*, particularly p. 28.

is precisely this manner of aggregate completion that offers the clearest view of what I believe to be the greatest asset of the aggregate, i.e. its potential for establishing a kind of directed motion. It should be noted that the completion is a major event regardless of its surface salience: the very prominent C# in Ligeti (Ex. 2), and the barely noticeable F in Varese (Ex. 1) both perform their completing roles successfully.

2.1.2. On the other hand, the appearance of the twelfth pitch class may not be an event at all, which typically happens when pitches are frequently repeated and/or when all of them have appeared relatively early on in a given portion of music. To go back to the distinction we have offered with respect to aggregate functions: in 2.1.1. the missing pitch is implied and subsequently may, or may not be realized. Now, the pitch is not even implied. The analytical relevance of this situation is certainly limited to local events: only when we perceive that the total chromatic is used with some consistency within small-scale syntactic units we are justified in claiming that the aggregate is a structural device.¹⁹ Apart from well known cases in Webern, another good specimen of this type is the already discussed first movement of Lutoslawski's Second Symphony. Within the A sections of the piece, aggregates complete relatively quickly, and for the rest of the section all 12 pitch classes are present. The emphasis is not on the process of completion, but on the distribution of pitches among various registers and timbres, namely, aggregate partitioning. Finally, I would like to mention the Violin Sonata of the Serbian composer Ljubica Marić. Again, aggregate completion does not convey the sense of arrival, but it can be noted that the small-scale units regularly contain complete aggregates.²⁰

Somewhere in-between are the following two types of situations:

- not only the aggregate as a whole unfolds in time, with successive entrance of different pitches, but the very moment of its completion is itself extended into a process unfolding in time: Violin Sonata by Croatian/Serbian composer Josip Slavenski starts with six bars of introduction containing eight pitch classes, excluding A, Eb, Ab and B; these four notes appear in bars 11, 23, 39 and 54, respectively, each time at an important structural point within the first subject of the sonata form;²¹
- the aggregate is completed not by a single pitch but by a collection of pitches; an extreme case is when an almost simultaneously presented aggregate (see next paragraph) serves as a closure of the ongoing aggregate completion process (the instances of this can be found in Ljubica Marić's Violin Sonata).

2.2. *Non-linear completion*

2.2.1. As opposed to the above, the pitches making up the aggregate may appear simultaneously, or nearly simultaneously. Note that I am allowing for a degree of imprecision in my definition, hence the qualification 'nearly'. Strict simultaneity would reduce this category virtually to 12-tone clusters, whereas my intention is to

¹⁹ If we search for aggregates on a large scale, not to mention the global level, we are almost bound to find them.

²⁰ It can also be noted that the period of aggregate completion varies, with an overall tendency to grow progressively smaller during the first portion of the piece: from 5-6 bars, to 3-4, to 2 and finally one. Generally speaking, the rate of aggregate completion, the manipulation of time-spans over which aggregates are completed, may prove to be of considerable analytical consequence.

²¹ More substantial research is yet to be done related to this mode of aggregate completion. At this time I will venture an informed guess that for this procedure to be workable, the missing collection must be considerably smaller than the principal one, and its members should appear at important strategic points.

accommodate a broader range of situations in which the emphasis is not on the progress towards completion, but on the density of texture, even if all 12 pitch classes are not literally present at the same time. Ex. 5 is a case in point. We have already discussed the aggregate in this example with respect to its function, indeed the double function it performs. Now, we can see *how* this aggregate has been constructed.

2.2.2. In contradistinction to general considerations of aggregate partitioning – pertinent though they are to this question, but basically outside the scope of this paper – this subcategory is meant to include such textural differentiation within the aggregate wherein different textural layers perform distinct *functions*. Typically, the aggregate is divided into two subsets differentiated as melody and accompaniment, as demonstrated by familiar textbook examples of Schoenberg's String Quartets Nos. 3 and 4.²²

A case apart, though related to the question of textural differentiation, are complex textures where only one, or several but not all layers participate in aggregate completion, in whatever way the process of completion is carried out, and whatever its function. In Ex. 6: V movement of the Second Symphony by Alfred Schnittke, the aggregate is confined to oboe d'amore and clarinets (excerpt written in C). The oboe theme clearly exemplifies linear completion, implied and ultimately realized with the final A#, serving an unequivocal closural syntactic function. All other instruments are completely independent in this respect: the three clarinets together make up a 12-note collection on their own; the remaining forces play no part in aggregate completion.

Certainly, there are numerous instances not readily classifiable with respect to the categories herein proposed. This is particularly noticeable when aggregates are found within the context of a dissimilar pitch organization, namely, a) aggregates in serial music, and b) aggregates within a tonal (even modal) context, and for that matter any context which is characterized by an appreciable degree of the heteronomy of pitch organization.²³

Apart from the already mentioned hexachordal combinations (and apart from the trivial observation that a 12-note row is itself a specific form of an aggregate) a 12-note row may be handled with a degree of freedom so that it becomes difficult to distinguish between series-based and aggregate-based music. Already Schoenberg and Berg are liable to produce situations of that type;²⁴ so is, for instance, Pierre Boulez in his Sonatine for Flute and Piano with its inconsistent use of the series, permutations of pitches within the series etc.; up to a point, whenever a series is used vertically, the exact order of pitches is impossible to decide, and unless the order is clarified by foregoing or subsequent passages, it verges on the aggregate.

²² Strauss, *op. cit.*, 82-83; Lester, *op. cit.*, 178-180. Predictably, the subsets involved are complement-related.

²³ As in the Slavenski example where the pitch organization strategies involve centrality, arguably tonality, folklore-based scales, and as we have seen, aggregates.

²⁴ Apparently, it is rather typical of Webern to treat aggregates in a kind of proto-serial manner. In this sense, aggregate strategies may seem to be a stage in the development of proper dodecaphonic writing. 'One day Schoenberg intuitively discovers the law that underlies the 12-tone composition. An inevitable development of the law was that one gave the succession of 12 notes a particular order.' See: John Peyser: *To Boulez and Beyond – Music in Europe Since the 'Rite Of Spring'*, Billboard Books, Watson Guptill Publications, New York, 1999, p. 60.

1 Andante

Oboe d'amore *mp*

Fag. *p*
(Cl. b., Ch. b. as written, C. fag. octave lower)

Cl. basso
C. fag.
Ch. basso *p*

Ch. *ppp* *2 soli*

3

4

Ob. dam. *pp sub.*

Cl. in Sib. *pp*

Cl. in Sib. *pp*

Cl. in Sib. *pp*

Fag. *pp sub.*

Cl. basso
C. fag.
Ch. basso *pp sub.*

Tbn. *pp*

Cl. basso - Arpe (sound as written)

Example 6. Alfred Schnittke: *Second Symphony*, movement V.

A further step away from the serial and towards aggregate strategies has been taken by Shostakovich and several other Soviet composers (Volkonsky, Pärt, Slonimsky, Karaev), with their use of multiple rows, the alternation of serial, freely atonal and tonal passages etc.²⁵

Even more intriguing is the aggregate found in tonal music (Beethoven, Ninth Symphony, I movement: all 12 pitch classes exist within the first subject; Mozart, G minor Symphony, Finale, the beginning of the development section contains 11 pitch classes, the only one missing is *G*). In so far as we have to negotiate two totally different (mutually exclusive?) modes of pitch organization, the presence of the aggregate may be deemed accidental, as it were, something which is simply the realization of an unlikely possibility of the given system, and only under specific conditions. None the less, we cannot altogether exclude the perceptual effects of such situations, so from that vantage point looking for aggregates in Mozart (however incongruous with the system they might be) is not necessarily a meaningless exercise. Even more meaningful it becomes

²⁵ For an extensive discussion of 'twelve-toneness' in Soviet music, its functions and effects, see Peter J. Schmelz, 'Shostakovich's 'Twelve-Tone' Compositions and the Politics and Practice of Soviet Serialism etc.', in: Laurel E. Fay, ed., *Shostakovich and His World*, Princeton University Press, Princeton & Oxford, 2004, pp. 303-355.

in the highly chromaticized late romantic harmonic language of Liszt and Wagner, for instance.²⁶

A mindful reader will have noticed that I also mentioned modal music. Instances of this hardly abound, Gesualdo da Venosa being one of very few, if not the only composer that could be of some interest in this respect. Yet, it ought not to pass unnoticed that the madrigal *Moro lasso* from his Sixth Book, employs 11 out of 12 pitches at the beginning, and likewise in the last three bars. Even if large-scale tonal process do play an important role in Gesualdo's works, it is certainly his exploitation of the expressive potentials of dense chromaticism, unusual voice leading and chord connections that make a more striking feature of his music. And that provides a more fertile ground for aggregate strategies.

Although the importance of the aggregate as the generator of tension, as a way of establishing a certain degree of the orientation of pitches – for all practical purposes lost with the recession of harmonic functionality – is well understood and well described, I must warn about its limitations, about several problematic aspects, including problems which arise from the observations and conclusions presented in this paper:

1. Goal-directedness is by no means obligatory in non-tonal music, as it is in music based on tonality. On the contrary, circularity, stasis, timelessness, (perhaps originating in the most ancient archetypal layers of music) have won their rights particularly in 20th-century music to represent some of the most essential effects music can produce. Hence the limited scope of the use of aggregate completion as the generator of directed motion.

2. There are many instances in which aggregate completion is achieved over a very long time-span, pitches are frequently repeated, the moment of completion is rendered so as to pass practically unnoticed, and consequently the whole process is blurred to the point where its relevance becomes doubtful.²⁷ Fortunately perhaps, the question of relevance can sometimes be put to a good analytical use, so as to point out the complexity or ambiguity of the passage under consideration. Ex. 7 presents the beginning of *Le retour des Zephyres/Zefiro torna* for flute, violin and piano, a composition by the Serbian composer Vlastimir Trajković. Bar 1 is transposed by a tritone in bar 2, and together they add up to an aggregate. Let us then make a working hypothesis that the two bars form a closed syntactic unit. However, as the piece progresses, we can hardly find further evidence to substantiate this claim. In this composition, aggregate completion is simply not on the agenda. Would it be analytically meaningful enough to claim

²⁶ Research in that direction has been presented on conferences: Robert Gauldin, 'Major Thirds, Augmented Triads, and Aggregate Completion in Liszt's 1839 *Concertos symphoniques*', Music Theory Society of New York State Annual Meeting, Columbia University and Barnard College, 27-28 April 2002; Monahan Seth, 'Exploring the Relation of Aggregate Completion and Pitch-Class Displacement to Local Harmonic Propulsion in Wagner's Parsifal,' Twenty-Eighth Annual Meeting of the Society for Music Theory, Boston/Cambridge, Massachusetts, November 2005. I have no information, however, that the papers have been published. See also Miloš Zatkalik, "Kroćenje mehaničkog čudovišta ili koliko je važan bas", (Taming of the Mechanical Monster or How Important Is the Bass), *Vlado Milošević Days, Proceedings from the Conference*, Banjaluka, April 2007, for the discussion on how aggregate completion serves to highlight tonal relations in Shostakovich's Eighth Symphony, III movement.

²⁷ Paradoxically perhaps, such dubious or 'nearly relevant' situations are quite typical of the most frequently mentioned composer in this paper, Edgard Varese. Gail Dixon, 'Some Principles of Structural Coherence in Varese's *Ameriques*', *Current Musicology*, 48, 1991, pp. 27-41, makes no mention of aggregates. Likewise, Morgan, op. cit. admits that in Varese 'the partition of pitch space, symmetrical relations and balancing plays a much more decisive role than the 12-tone closure. However, sometimes it is the avoidance of such a closure that plays a role.'

that only on this particular occasion the structure is determined by the aggregate? Be that as it may, bar 3 seems to override the presumed boundary, as it makes obvious the well-rehearsed procedure of stating an initial phrase, proceeding with its transposed repetition, followed by continuation in which the initial idea is further developed: this rhymes very well with Schoenberg's definition of the sentence.²⁸ Moreover, it may as well turn out that neither of the alternative interpretations gets to the point, as they don't take into account the fact that the bars in question contain pitch-class sets which would play an important role throughout the piece. Once this fact has been established, the whole analytical procedure will proceed along rather different tracks. Have we lost the aggregate somewhere along the way?²⁹

Example 7. Vlastimir Trajković: *Povratak Zefira / Le retour des Zephyres*.

3. Even if we do establish the relevance of the aggregate strategy, we ought to be aware that it has never been employed with consistency remotely approaching the one of functional tonality.

²⁸ As found, for instance, in: Arnold Schoenberg, *Fundamentals of Musical Composition*, edited by Gerald Strang and Leonard Stein; Faber and Faber, London, 1973, pp. 20-21, 58.

²⁹ (Proceedings from the Annual Conference of Department of Music Theory, Faculty of Music, Belgrade). Ivana Stamatović, Miloš Zatkalik: 'Epistemologija muzičke analize - uvodna razmatranja' (Epistemology of Music Analysis - Introductory Considerations), *Muzička teorija i analiza - zbornik radova sa Četvrtog godišnjeg skupa Katedre za muzičku teoriju 'Muzička teorija i analiza'*.

4. The question I have intentionally left out is the one of perceptibility. Do we here these processes? Or are they perhaps conceptual, rather than perceptual? Obviously, we do not hear them in the same way we hear and recognize tonal functions. But then, if the composer withholds a pitch, perhaps we intuitively sense that something is missing. At any rate, since I know of no research on the perception of aggregates I indicate this as a possible field for experimental work.

The aggregate is, therefore, not a kind of surrogate tonality, nor a strategy which could account for the underlying structure of non-tonal music in general, yet it does offer a range of structural, expressive and coloristic possibilities. By studying them, we may hope to gain some essential insights into the way music – and perhaps our mind as well – functions.

POVZETEK

Skupek neurejenih dvanajstih tonov ali agregat rabi kot okvir za organiziranje tonskih višin v precejšnjem številu skladb, še zlasti tistih, ki niso vpete v tonalni sistem niti v dvanajsttonske serije, pa čeprav se pri slednjih včasih zdi, da gre za heksakordno kombinatoriko. Sestavek izhaja iz podmene, da se skupek dvanajstih skupin oziroma razredov tonskih višin razume kot celota; vendar: če ukinemo eno skupino (ali celo več), slednja oziroma slednje postanejo nekakšen cilj, h kateremu je čutiti, da glasba teži, in to v sistemu, ki navidez shaja brez usmerjenega gibanja.

Medtem ko so nekateri aspekti agregata dobro raziskani, bi bilo treba sistematično preučiti njegove funkcije znotraj določene skladbe, kakor tudi različne poti iz(po)polnitve agregata. Sestavek obdeluje vrsto okoliščin v skladbah, ki so jih napisali

Edgard Varese, György Ligeti, Olivier Messiaen, Alfred Schnittke, Ljubica Marić, Josip Slavenski in Vlastimir Trajković, in skuša ponuditi taksonomijo agregatnih funkcij in iz(po)polnitvenih procesov. Kar zadeva prve, je bilo možno odkriti dvanajsttonske skupke, ki rabijo strukturalnim – zaključevalnim in povezovalnim – namenom kakor tudi ekspresivno-dramatskim diljem. Pri procesualnih vprašanih se je vzpostavila osnovna distinkcija med agregatom, ki se odvija v času, in takšnim, pri katerem se (skoraj) vse tonske višine pojavijo (skoraj) istočasno, včasih porazdeljene med jasno ločljivimi teksturnimi plastmi. Ponujena taksonomija želi biti fleksibilna, da bi tako mogla pokriti vso raznovrstnost agregatnih pojavljanj.

Upoštevani so tudi agregati v »tujih« (tonalnih, serialnih) kontekstih ter, končno, tudi vprašanje analitične relevantnosti agregatnih strategij.