

Time and Music

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Abstract: The study attempts to demonstrate that time is not solely an intrinsic measure of music. Although it manifests itself directly through durations, rhythm and musical form, time has represented, to certain authors, a quality that can be modelled on three different levels: composition, performance and reception. The paper reveals ways of perceiving musical time, identifies particularities of various cultures, and underlines the active role of rests. Tracing the evolution of preoccupations toward these aspects, it examines compositions and writings of the 20th century, which manifest notably increased interest in the topic. By displaying musical examples, the study intends to illustrate various means by which composers have tried to deny or overcome limitations imposed by musical discursiveness.

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Time perception

In order to better understand the discursive character of temporal arts (poetry, music and dance), a few remarks on how humans relate to time and to unfolding events are necessary.

Husserl tried to explain awareness of passing time by moving away from the Newtonian description,¹ and by examining how a temporal object, which exists within a time period, is seen as a whole. First, he makes a distinction between non-temporal and temporal objects that manifest to awareness. The properties of external objects (first category) cannot be perceived simultaneously; conscience identifies partial, fragmentary aspects, always changing, and eventually synthesizes them as parts of a single object. Thus, the opposition between perception and its definite content is clear. The properties of objects that manifest to internal perception (second category), of temporal objects (sound, e.g.), do not appear in separate stages, but rather simultaneously. In order to become aware of time, the presence of two elements becomes necessary: the temporal measure of the object and the temporal extension of conscience. A temporal object possesses a temporal measure in the absence of which it cannot be perceived. However, conscience has its own temporality.

It is interesting to note that Husserl and Bergson used melody to exemplify the temporal representation of an object/phenomenon. Although individual sounds are clearly distinct from one another, certain properties make a melody perceptible as a

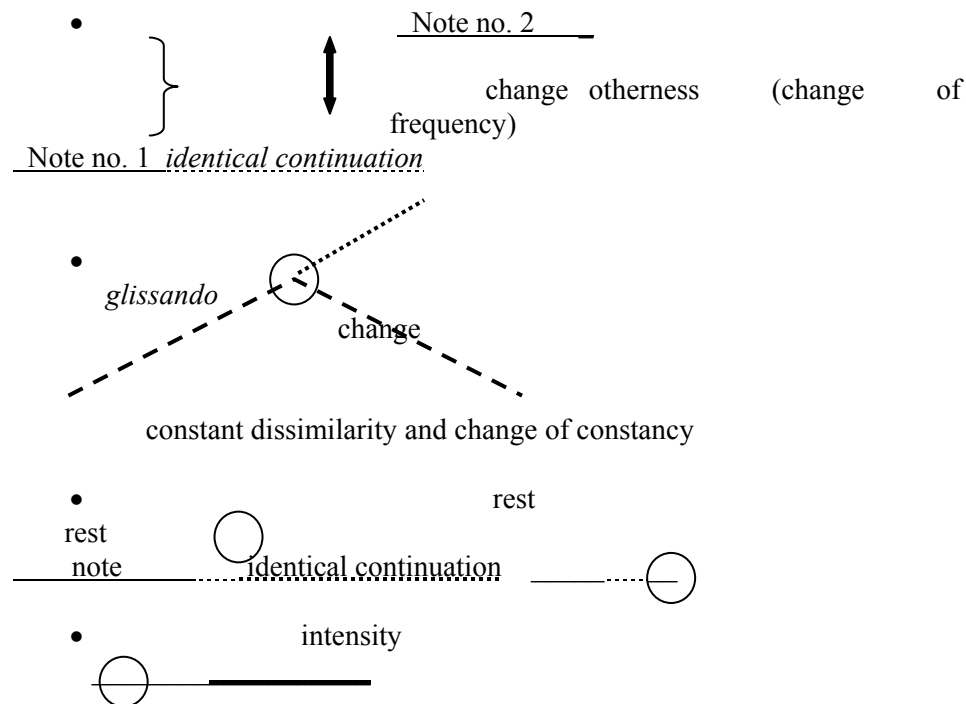
¹ Time – consisting of a juxtaposition of distinct present moments – after Michael R. Kelly, *Phenomenology and Time-Consciousness*, <http://www.iep.utm.edu/phe-time/>

unitary whole. Among parameters that make up the melody, pitch is the most obvious, helping to break it down into small components. Delineation of segments is favoured by “breaks”, discontinuities that appear at a particular level: frequency differences are perceived as leaps between pitches. The bigger they are, the easier to be noticed by an ordinary listener.

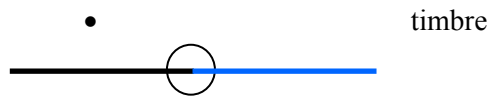
If melodies were made up of *glissandi* only, the articulation points would be placed according to changes in melody direction: upwards, downwards, or no change at all. Thus, it is not the leap that is important, but rather the modification of a parameter. As far as pitch is concerned, changes of frequency succession are primordial; at rhythmical level, changes of duration; at volume level, changes of intensity; at instrumentation level, changes of timbre. The bigger and more sudden these changes are, the stronger the probability that they define an articulation point.

Due to the human ear's ability to distinguish frequencies more easily than time intervals, pitch (including harmonic relationships) plays a primary role in the identification of melodic segments. The change is always related to an existing norm: it is dissimilar from what used to be. Pascal Bentoiu emphasizes the importance of modification within the limited perimeter of rhythmic segmentation: “Any succession of equal durations in a given melodic direction tends to form an indivisible rhythmical entity. Corollary: a break or change in the melody direction leads to the appearance of a different rhythmical entity, equal to the number of notes following the same direction, and beginning with the note that has marked the initial change of direction.”¹

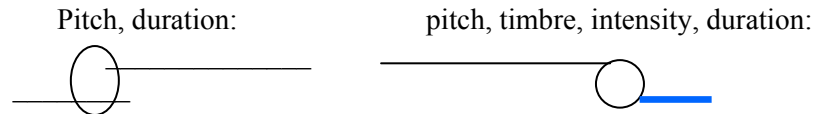
Here is a graphic illustration of change applied to various parameters:



¹ Pascal Bentoiu, *Musical Thinking*, (Bucharest: Editura Muzicală, 1975), 64.



The more parameters are simultaneously different, the clearer the case is:



If differences do not line up, various inconsistencies or complementarities appear. These, in turn, yield themselves to multiple interpretation possibilities, such as polyrhythmic, multi-meter, or multi-tempo occurrences.

Temporal reception of music is realized on two levels. The first one belongs to physical, periodical time, measurable by precise instruments, which unfolds inexorably from the past, through the present and to the future. This level is filtered through the psychological time at each stage of the opus' existence: author, performer, audience. The second one belongs to psychological time, subject to individual appreciation. It can be altered by contractions and expansions in relation to physical time. This very quality of musical time gives composers multiple exploration choices in the creation of their works.

Musical time incorporates physical time as a reference in compositional and performing activities. It is also influenced by psychological time and by various feelings and moods. Musical time is a result of specific strategies employed by the composer, while working with musical material, speed, intensity, density, etc. Compared with the other two types of time, musical time may be subjected to volitional operations, such as stagnation, deceleration or acceleration, replacement of successiveness with simultaneity. There are numerous cases in which physical time interferes with musical time and produces, in the listener's mind, a layered unfolding of the sounding events. In a particular musical context, with a given meter, any deviation leads to the perceptual coexistence of two different, opposing times: one belonging to metric constancy, generated by expectation, and the other belonging to musical reality. This way, a variety of musical procedures (which enrich the listening experience) are born: polyrhythm, multi-meter, multi-tempo.

A different kind of time can be observed during each of the three existence stages of a musical work (composer, performer, audience). The composer tries to preserve the projected configuration of the work through definite structures, by codifying in notation as many details as necessary for an accurate interpretation. In the case of a valid interpretation, the initial configuration is revitalized, and the work lives through its own performance and reception. The ideal of total identification between the initial and resulting configurations is almost impossible to reach; absolute identity is excluded as long as the composer and the receptor are two different subjects. This is what makes musical art such a lively, fresh and innovative phenomenon.

In conclusion, every work passes three existence stages: composer (the score containing the composer's ideas), performer and audience: compositional thinking, interpretative re-configuration and perceptual re-interpretation. During each of these

three stages, psychological time works as a filter in relation to the creation, with the possibility of aesthetically enhancing or harming it.

Cultural perspectives

“Is time representation influenced by geographic and cultural space? Are these particularities reflected in musical works? If yes, how? Are there musical works to which time represents more than just an immanent reality? Is musical time a parameter that can be shaped?” We started this study from these very questions. First, we need to clarify what the concept of time means to various particular peoples.

Joji Yuasa notes the monochronic aspect of Western music, which, by its design based on calculable beats, allows us to have a “temporal perspective of the past, present and future. This perspective assists us in predicting what is coming up in the musical unfolding.”¹ The author describes how Western music is “faithful to a strict vertical relationship”,² in the way of permanently relating to a certain beat unit.

The emphasis on silence is typical of many Asian regions. Silence may be viewed as an important moment that prepares the ensuing moment. Waiting and expecting is necessary prior to every meaningful activity. “In certain cultures, doing nothing is priceless. It is not regarded as interruption, but rather as a creative and productive impulse. The Japanese, for example, have great respect for the concept of *ma*, which represents space between objects or between actions. Westerners would refer to the gap between a table and a chair as being empty space; Japanese view it as space *full of nothing*.”³

The same aspects regarding time perception, rooted deeply in cultural heritage, are recognizable in Japanese music. In opposition to Western European music, which is based on mono-chronicity, traditional Japanese music (except for dance music) is based on non-countable time. Vertical synchronization through succession of beats is unnecessary, and each musical layer unfolds independently,⁴ creating its own path of evolution.⁵ Here we can identify a correspondence with the Romanian genres of *doina*, *bocet* (lament), and others that are based on a *rubato*-like rhythm. It is exactly the “event time” of Robert Levine,⁶ a kind of time that escapes any exact physical reference.

Musical art is an area where two types of information can reach the ear: sound and silence. We could speak of silence as absence of sound; however, silence is a direct participant in the musical act, bearing purpose and energy. We hold in mind Daniel Barenboim’s advice to listeners that they should pay adequate attention to rests. Silence prepares the appearance of sound, by accumulating energy. In order to be heard, sound needs continued sustaining, which is produced by energy release as well. A musical work is made up of sounds and rests, elements of equal importance, both incorporating meaning and artistic message. Barenboim argues that music involves not only sounding events, but also quiet moments. It completes itself by emerging from the initial silence and dying out into the final one, at the same time closing an existential cycle.

¹ Joji Yuasa, “Time in Music”, *Muzica Magazine*, 2 (1994): 88.

² *Ibid.*: 89.

³ Robert Levine, *A Geography of Time*, (New York: Basic Books, 1997), 43.

⁴ A subjective equivalent of “polymodular time”, proposed by Mihai Brediceanu.

⁵ Yuasa, *Time in Music*.

⁶ Levine, *A Geography of Time*, 81–100.

Apart from silence that frames a musical work, there are many other kinds of silence inside it, breaking off the diachronic unfolding of the music. This “emptiness in sound [...] may acquire two forms: a) as measurable quantity, expressed accordingly by means of music notation, within a given pattern (rest); b) as non-measurable quantity, resulting from specificities of sound producing”¹ (caesura or breath, which is necessary in singing and in playing wind instruments, with important role in phrasing, the placing of which is not always specified, and should not be mistaken for notated rests; various performance techniques related to vocal or instrumental performance: *hoquetus* – a popular technique during the 13th and 14th centuries, *staccato* – which, due to the speed, does not come across as real rest; or the delaying of an initial or final attack of a chord – not a notated effect, but rather the result of interpretation by the conductor, or of the necessity to synchronize an attack). Music signs that symbolize or depict such absences of sound are few: the rest, the caesura, and character directions such as *esitando*. Nevertheless, they cover a wide array of meanings, depending on their placement, on the preceding musical context, or on the type of instrument or voice involved in the performance.

The most direct manifestation of music temporality is duration, which can be identified both in the case of sound and of rest. To John Cage, silence (non-sound, seen not as a denial of sound, but rather as a complementary extension of it) can be measured only in the way of duration, meaning that the most important parameter of sound in relation to silence is duration itself.² It is well known that the composer had a predilection for pieces in which silence becomes an extensively utilized parameter (e.g. his famous 4'33'', conceived for any instrument or combination of instruments).

The increased interest that 20th century composers show in silence has been noted by Ulrich Dibelius, who concludes that rests have become “elements with equal rights in the sound-silence continuum”.³ The primary function of silence, whether introduced suddenly or gradually, is a rhetorical one. Thanks to it, music preceding the rest is emphasized, a surprise element is introduced, or an intensity build-up is realized.

The issue of sound and silence complementarities, where notes interrupt an existing silence, or where rests break off sound, represents a constant preoccupation for Anatol Vieru. In his works, he attempts to approach time from the outside, in close relationship with the concept of erosion, of multiple perforations. Thus, a piece of music is born through the mutual and complementary erosion between sound and absence of sound (rests). From this point of view, the work may be seen either as an interruption of silence by sound, or as an erosion of sound by rests. It also may represent polyphony of sounds and silence, where each element can be interpreted both as background and foreground, much like a game of intensity levels. Music “is audible – but invisible – time”⁴; however, despite its non-visibility, music often combines temporal and spatial aspects. In this respect, spatiality should not be looked at as simple stereophony. It is also present in the representation of intervals, the impression of

¹ Pascal Bentoiu, *Musical Thinking*, 48.

² After Carole Gubernikoff, “John Cage: Sonatas and Interludes for Prepared Piano. Music of Change”, *Muzica Magazine*, 2 (1994): 100.

³ After Valentina Sandu-Dediu, ““Silence” in Music: Comments on Studies by Ulrich Dibelius and Martin Zenck”, *Muzica Magazine*, 4 (1994): 18.

⁴ Anatol Vieru, *Words about Sounds*, (Bucharest: Editura Cartea Românească, 1994), 74.

continuous-discontinuous (as shown in the graphics above), and in the idea of reversibility.

Reversibility, in turn, can be realized by switching the order of movements, of themes or of sounds, a process that generates non-continuous reversibility, though the segments or sounds themselves are not retrograde. An accurate, continuous reversibility is possible only thanks to magnetic tape, and to reverse playback. This way, the reversible nature begins to extend to temporal arts.

Anatol Vieru follows up the idea of an interrelationship between time and space (one is explained through the other), and adapts it to music: “space perception grows in our consciousness with each and every small temporal *incident*.”¹ The time-space relationship sends us back to defining the two concepts, to the only possibility of explaining them, through each other: time is understood as an object’s property to successively occupy different spaces, and its impossibility to occupy them simultaneously. When several different objects exist at the same time, they are placed in different spaces.

Spatiality is, before everything else, present in this temporal art by means of graphic notation. In a music score, the horizontal axis suggests a timeline and the chronological unfolding of events (even though this representation works only while visually reading the score from beginning to end, without deviations). The vertical axis suggests the placement of pitches. Thus, at the score level, we can have references that indicate high or low, long or short, forward or backward (right or left). At the same time, spatial illustration is applied to intensity, giving the impression of closeness or of farness, and to timbre – richer or scarcer sonority (harmonic spectre). There are other aspects of music production that relate to spatiality, such as stereophony or other types of surrounding sound sources, including aspects related to the environment in which the musical work is being performed.

We cannot ignore the issues resulting from these relationships in music writing, approached historically through various techniques: polyphony, rhythmic augmentation or diminution, even rhythm/interval inversion or retrogradation.

The problem that might arise when music borrows procedures from spatial arts is the impossibility to identify certain configurations while listening. When techniques involve the shaping of spatial elements at notation level only, it is possible to forget that, by unfolding in time, spatiality generates “intervallic tension. For example, a rising major third is different from a falling major third. In the inversion of a theme, all intervallic tension is altered, creating a new melodic pattern. Its similarity to the initial theme can be observed only as an ordering of frozen musical spaces, not as a succession of intervallic tension, of resulting configuration.”²

From time overlapping events a vertical spatiality is born, and vice versa: in a musical fragment, appreciating space intervals is easier than appreciating time intervals. Therefore, composers create various temporal effects by means of spatiality (intervals, harmony, polyphony, form). Anatol Vieru underlines the importance of a musical fragment’s placement within the form of a composition (position in time), as its position determines a certain meaning.

¹ Ibid., 74

² Pascal Bentoiu, *Image and Meaning. Essay on Musical Phenomena*, (Bucharest: Editura Muzicală a Uniunii Compozitorilor, 1973), 31.

The author tries to give equal attention to sounds and rests, and to organically incorporate dynamics, thus making silence “visible”. The idea of sound “erosion”, according to which sounding material is carved out of quietness and vice versa, becomes a specific way of acknowledging time, with the help of basic dynamics: *forte*, *piano* and silence. New concepts are proposed, such as: “screen” – a block of sound that works like background noise, illuminated occasionally by short and violent “blinding flashes” – “ephemerides”; the “sieve” principle illustrates reversed proportionality between periodicity of events and their obviousness, associating small prime numbers (more frequent) with a vague character, and large prime numbers (less frequent) to more interesting sound events.

We notice, in Vieru’s theoretical and musical writings, a powerful image determination, both in the description of a followed objective (by the use of concepts that depict ideas upon which compositions are based), and in his intrinsic organization of musical material, through architectural symmetry and inherent exact calculation.

In conclusion, we can identify, in the 20th century European music, tendencies that reflect increased interest in silence. They manifest either as personal elements of style (as seen in Anatol Vieru’s case), or as a dichotomy between duration and non-duration (as seen in John Cage’s case).

A characteristic of Romanian spirituality is perhaps a constant retrospect to the past, supporting the idea of a circular representation of time. We consider time, as a cyclical phenomenon, to be a process of human consciousness, necessary to the understanding of linear evolution. In the absence of any reference to a past event, the structuring of received data would be impossible. The simple concept of measurement unit involves the existence of a reference standard, which precedes the object or phenomenon that is being measured. This cyclical understanding of time originates in the circular movement of the Earth and of other celestial bodies, a movement that allows recurrence of days, nights, moon phases and seasons.

Due to the temporal nature of music, its structuring procedures involve, paradoxically, a return to what has been heard already. It is a process in which the stored past unfolds concomitantly with the manifest present, thanks to the human ability of discerning the three dimensions of time: past, present and future. The three types of relationships that may appear are: “sameness”, resemblance and “otherness”.

In music, “sameness” corresponds to repetition. However, we cannot speak of actual “sameness”, because only physical parameters (pitch, duration, loudness and timbre) remain unchanged. Those related to time cannot remain unaltered. Re-experiencing musically a past event is only possible due to our brain’s capacity to follow simultaneously the unfolding of two time-displaced musical events. Thus, we are able to identify the event that is being referenced, while its recurrence always generates additional emotional charge. The emotion can be either purely subjective – with a clear role in the articulation of the piece, or doubled by dramaturgical function. This referencing of the past is found in various musical idioms, such as recapitulative form, refrain form, or sonata form. Repetition creates reference points which became necessary especially when instrumental music separated from vocal music.

A particular case of repetition is quotation, referencing a fragment from a different work, or even a different composer. It works like a time bridge, by which past is brought to present, or physical present is abolished and replaced with non-historic

time. This would be the “non-temporal present” typical of rituals described by Mircea Eliade.¹

In the case of resemblance, fundamental characteristics of the past fragment are known, but the recurrence will bring new elements as well. In an ornamental variation, the hearing will try to identify the initial version. Therefore, the listener has to leave the physical and musical present, and oscillate on an axis of time, over the entire duration of the recurrence, trying to relate permanently to the initial version and to the whole.

In the case of “otherness”, two musical fragments may be different by means of contrast, or by a simple lack of similarity. The otherness principle contains the seed of musical development, and the conflict needed for shaping the musical work. Examples of complex contrasts exist between two sonata themes, two characters, or two movements of a composition. As stated before, change facilitates structuring and creates time references. Without change, it is impossible to notice the passing of time.

In all three cases, referencing the past creates certain expectations regarding the future musical unfolding. Whether confronted with an identical repetition, a varied repetition, a developing recurrence, or a relatively new fragment, the listener – in his or her attempt to anticipate the future – will relate to already known information, thus realizing a temporal connection of all the internal moments, which helps in the grasping of the whole.

Symmetry and retrogradation (the role of memory)

Although typical of spatial arts, certain forms of symmetry are found in music too. They are present at notation level, where they organize the placement of notes and of other musical signs, and at sound perception level, where – due to the ephemeral nature of sound – memory has an important role. There are symmetrical musical forms, which alternate sections (ABA, ABCBA, etc.), and internal symmetries through periodicity of measures (the majority of Classical structures).

Twentieth century composers, from Bartók, Stravinski and Messiaen to Aurel Stroe and Anatol Vieru, began exploring symmetry extensively, even when it only manifested at conceptual level.

The main difference between spatial and musical symmetry is given by the way in which we receive musical information in general: we keep in mind certain sound arrangements, melodic contours, relationships between notes, segments but not points in time. Existence of symmetry is closely related to retrogradation (reversal around a vertical axis): the second half represents the retrogradation of the first half. The limits of retrogradation are given by the temporal nature of musical unfolding. It is possible to read backwards, from the end to the beginning (right to left), but that would be just a reversal of words and letters. It is also possible to record a word and literally play it back: what we recognize is the retrograde sonority, but all meaning would be lost.

With the advent of serialism, retrogradation became a method for variation of pitch sets. It extended gradually to durations, where it is more difficult to identify. An attempt to justify the use of symmetry and retrogradation appears later in Anatol Vieru’s “blocks of sounds”, and in Aurel Stroe’s continuous becoming of a musical phrase.

¹ Mircea Eliade, *The Myth of the Eternal Return*, (Bucharest: Editura Univers Enciclopedic, 2008), 85.

Manifestation of time in music

Although, at a basic level, music is indissolubly linked to temporality through its unfolding nature, composers' interest in this particular aspect has evolved gradually. If we look at the music from a time perspective, we notice a more and more obvious presence of this dimension as we approach the 20th century, when it became a conscious and deliberately exploited parameter.

Pascal Bentoiu notes¹ that temporality of music is an important characteristic, which needs to be appreciated correctly. A clear distinction has to be made among the three levels at which music manifests itself: as written score, as live performance, and as reception by an audience – with all the reactions it triggers. When it comes to placing music in a real context, all three levels must be traced, for they exist “in a causative succession, not entirely determinative, in relation to one another”.²

In any attempt to shape time through music, the infiltration of subjective aspects at all three levels becomes an important factor, which adds up to modifications imposed by the coding-decoding process. Filtered through the psychological time, musical time will appear or not in accordance with the listener's time. There are many cases in which composers make use of technology in order to avoid the variables of interpretation. At the same time, in order to obtain a desired effect, they often resort to mathematical calculations, which yield various periodicities and eliminate undesired, accidental configurations. Differences among the three levels of musical manifestation occur as a result of the codification-decodification operations, which are typical of the transitions from the latent state of the score to the living performance, and eventually to the reception by an audience.

The first transition, from composer to performer, represents a depletion of the musical message through notation. Although notation has evolved significantly over time, and the variety of possible performance directions has increased, we must admit that “transcription” from a language to another involves losses of content. On the other hand, increased precision and detailing of notation has sometimes overfilled music scores, leading to poor results in performance, due to the difficulty of interpretation.

The performer receives the depleted, encrypted, essentialized information, and tries to decode it, at the same time completing it in order to pass it on to the audience. Thus, performance involves, to a certain extent, creation as well.

In the act of listening, musical structure actualizes and becomes “configuration”, through a psychological process of synthesis, as Pascal Bentoiu notes. The path recorded by memory is irreversible, full of meaning, and contains references among component elements. Depending on the listener's background, ability to make associations, to decode symbols and grasp configurations, the purpose of the musical work reveals itself, creating a connection between the communicated structure and the lived one.

While in the process of composition, the course and timeline of the work are determined, performance has the power to influence, to divert, to halt or enhance the musical becoming, as imagined by the composer. During the “translation” of music notation into actual sounding events, simple transformations may appear; however, there are two processes by which the performer interferes directly and undoubtedly with the temporal aspects of the work: improvisation and aleatoricism. These are instances in

¹ Bentoiu, *Image and Meaning*, 11.

² Ibid., 14.

which the interpreting artist becomes, to a certain extent, a participant in the process of creation.

From as far back in time as we can imagine, there has been a form of creation that does not distinguish between the time of creation and the time of performance; the two overlap, not allowing for any return, retouch or rectification. This particular creative situation is called *improvisation*.

The procedure highlights the performer's technical and artistic proficiency, and has known – over time – various ways of manifestation, some of which have become fundamental stylistic traits to certain genres and forms. Thus, we have:

- improvisation on plainchant (*cantus firmus*) during the Middle Ages and Renaissance period;
- improvisation on harmonic *ostinato* in the case of vocal or instrumental music from the Renaissance and the Baroque era;
- improvisation as means of variation in the case of fragment repetition (most often, in the form of ornamentation);
- accompaniment realized on figured bass (especially in church music);
- virtuosity cadenzas of instrumental concertos, as clearly set-apart improvisational moments;
- vocal cadenzas of operatic arias;
- improvisation viewed as freedom (mostly rhythmical), in the case of *secco* recitatives, which contributes to the perception of time flexibility within a work;
- freedom of musical form that developed during the Romantic era, as a consequence of improvised concerts given by composer-virtuosos (e.g. Franz Liszt); genres such as the Prelude, Fantasia, Impromptu, etc.;
- improvisation as a fundamental characteristic of *jazz*;
- improvisation that is incorporated in works by 20th century composers, as a result of vague performance directions, or in the case of conceptual works – based on suggestive texts or images.

Improvisation is, therefore, a succession of decisions, a process that requires the performer to superimpose several time perceptions, an interweaving of the past, the present and the future. The actual musical unfolding is created by an anticipation of future sound gestures, which flow from foregoing, archived information, and which allows for a variety of combinatory possibilities. Thus, an experienced improviser will oscillate between the actual musical unfolding and a diversity of possible continuation options, which are present in his or her mind, but which disappear and renew themselves with each decision taken.

Aleatoricism manifests in music as a method of composition that involves either elements of hazard or ways of structuring a work. In some instances, aspects of musical interpretation are vaguely suggested or left to chance, a fact that leads to differences of configuration from one performance to another. As far as time is concerned, it is interesting to note the aleatoric elements that occur during performance, as well as the strategy that composers adopt in structuring works with various levels of indeterminacy. Ștefan Niculescu notices the likeness in thinking that characterizes musical works of the 1970s: “abandonment of any convention”.¹ The rules were replaced by the arbitrary,

¹ Ștefan Niculescu, “A New ‘Spirit of Time’ in Music”, *Muzica Magazine*, 9 (1986): 13.

while a permanent quest for novelty favoured “both the disappearance of the score and of the musical work. [...] This apparently unlimited freedom represented in fact a cancellation of freedom itself, because, in such cases, performers became victims of their own unconscious automatisms.”¹

Emerging during the middle of the 20th century, this stylistic approach reflects a shift in the composers’ interest from detail to global. In the case of musical textures that prevent identification of details, if internal variations lead to a desired result, or at least to a very similar one, the composer indicates only the general characteristics of the work. Thus, the author only determines the general framework, a sort of “macro-time”,² as named by Max Stern. The framework may be suggested by space notation, by image, or by reference to universal time: seconds. What makes such a form different from others is the fact that the overall form does not arise from actual musical unfolding, but is rather pre-determined.

One should not ignore works in which the composer indicates, more or less precisely, a timeline for aleatoric elements. This procedure reveals an intention of determinacy, albeit partial, toward internal temporal relationships among segments of the work. As such, in the case of controlled aleatoricism, the author establishes the structure of the piece and how it is articulated, reflecting a clear intention with regard to balancing the musical unfolding. The performers, including players, singers and conductors, will only contribute by providing elements of musical language, or – in the case these too are specified – by organizing them.

There are, however, cases in which aleatoricism extends to the structural makeup of a musical work. The concept of “open work” reflects this very freedom in the configuration of a piece, extending to entire movements or sections, and generating a “changing” form. These compositional choices may give the impression of passivity on the part of composers, especially when randomness covers a majority of musical parameters, as it is the case with music derived from imagery. Such a compositional strategy may result in sequential structures, giving the work an uneven, unity-lacking character. Max Stern³ indicates that well-determined character and careful structuring may nevertheless be realised within an aleatoric work, even though it won’t manifest at all three levels of the work’s temporal existence. In the case of such a work, time itself becomes a parameter that can be shaped independently during the compositional or the performance process.

An interesting phenomenon appears when aleatoricism is associated with ephemeral, evanescent musical unfolding – these being inherent characteristics of musical art. How much of a process can be deemed as aleatoric, as long as performance requires practice and rehearsal? When particular performance versions are chosen, aleatoricism represents the relating of those versions to the level of freedom allowed by the composer. It is possible, obviously, that experienced performers realize in concert an entirely spontaneous version of an aleatoric moment. However, the reception of a work requires an actual performance; thus, the listener’s psychological time relates to an already existing temporal construct, with which it either resonates or not. This is the reason why aleatoricism (at all three temporal levels) is probably very rarely found: the

¹ Ibid.: 13.

² Max Stern, “Organizing Procedures Involving Indeterminacy and Improvisation”, *Muzica Magazine*, 2 (1994): 91.

³ Ibid.: 97.

composer cannot completely renounce his or her own temporal projection of the piece, which belongs to the work's message.

The easiest to notice link between time and music is the duration of the work (continuous musical unfolding). It establishes the temporal nature of this art, along with rhythm, *tempo* and form. At duration level, there are works that explore the extremes, especially in the usage of very long notes. It is possible to have sounds that extend in time beyond what can be assigned a single duration, thus stretching the limits of human perception. This type of approach leads to shifting the focus from relationships among notes (and a global view of them) to a microscopic investigation of individual sounds.

Over the 20th century, rhythm has diversified more dramatically compared to past centuries. This development is owed to several factors, some of which have been previously stated:

- influence of traditional music, which infuse variety and freshness through asymmetrical patterns;
- usage of smaller and smaller note values;
- rapid technical development, with computers and software entering the musical art, and introducing rhythmical patterns never heard of before;
- the employment of rhythmic serialism and of mathematically calculated patterns led to structures that are difficult to identify;
- increased freedom of composition and performance, which is reflected in a complete indifference toward durations and rhythms, and may result in random outcomes.

Meter, initially a simple organizer of rhythm and vertical synchronization, became gradually subject to modification, too. From the basic duration awareness of *musica mensuralis*, it has come a long way to establishing rhythmical structures that work against it (syncopations, hemiolas, rests, ties). Metrical grouping procedures develop a great deal during the 20th century: mixed meter and multi-meter are more frequent.

Tempo, as indicated performance speed for durations in relation to a time unit, sustained major modifications over the course of history, in close relationship with the development of music notation. *Tempo* appears in various forms:

- by deducing it from the way meter is marked (a correlation of time units or beats with knowledge of style, genre, medium or instrumentation) – when specific tempo directions are missing;
- by association with certain dance patterns, the speed and character of which are well known;
- by usage of performance directions (expression, character), usually in Italian;
- by marking the number of beats per minute – once the metronome was invented (at the beginning of the 19th century), an invention that increased precision and unity of *tempo* directions.

Compositions of the past century alternate between marking precisely the performance speed and indicating the total duration of a fragment, or establishing the convergence points of compositional elements (polyphonic lines). Freedom of *tempo* is acknowledged as well. While previously it has manifested through cadences and recitatives, once fully acknowledged, it materializes in rhythmical phenomena of the *rubato* type. As far as superimposition of musical events is concerned, the new concept

of “polymodular time”¹ is born. In Romania, composer Mihai Brediceanu is particularly interested in this concept.

The concept of time is encountered at the advanced level of musical form, too. “By mastering form, the artist masters the flow of affects, organizing musical structure, thus filtering form-creation through the soul.”² Musical form has always mirrored the coexistence of measured time and free-flowing time. Until recently, tropes, cadences, and alternation of recitatives and arias were the only ways of interrupting structured musical unfolding. During the 20th century, however, asymmetrical patterns, non-developing music and open works appear. The mental representation of musical form originates from relating sounds of the present with those of the past, a process that is possible thanks to memory. When any kind of periodicity is identified, these relationships extend to possible future sounds, by anticipating repetitive or contrasting musical events.

Musical form does not involve time awareness in its conceptual realization; the “time of form” has a bi-vectorial nature. However, a form that is encrypted in the score only manifests potential temporality, taking first and foremost a spatial appearance. The temporal nature of form is perceived only in performance, a process that ensures coherence of language and comprehensibility of message. Form, on the other hand, is shaped by various musical syntaxes that compose it, which Adrian Iorgulescu calls “time structures”. The four time structures are monody, polyphony, homophony and heterophony. Each of them generates a different organization of the musical time, as follows:

- monody represents the horizontal arrangement of a succession of sounds, in a single voice, which contributes to melodic design, bearer of expression and meaning;
- polyphony combines horizontal temporal unfolding, resulting from melodic individuality, with vertical structures, derived from harmonic instances; it is a combination of temporal succession and simultaneity;
- in the case of homophony, “musical unfolding appears as a homogenous structure, realized through multiplication of the same temporal reality, as a melody of sounding simultaneities”;³
- heterophony, as oscillation between unison and polyphony, organizes musical time through a lack of rhythmic resemblance between melodic layers; in this final case, time structure is not constant – we witness the coexistence of different versions of the same temporal form.

We can certainly speak of the continuous-discontinuous opposition when it comes to musical unfolding. A good example is the classical sonata, with its periodicities and symmetries, where motifs, phrases and periods represent junctions of the continuous musical unfolding. Different instances of the continuous-discontinuous opposition may represent stylistic traits (e.g. Wagnerian “infinite melody”).

Uniformity and contrast are two old compositional procedures that ensure the coherence of a piece. Musical works (except for the very short ones) cannot capture the

¹ A type of musical time organization in which polyphonic lines are measured using different time units.

² Adrian Iorgulescu, “Composition, as Temporal Creation”, *Muzica Magazine*, 1 (1991): 141.

³ *Ibid.*: 208.

listener's attention if they are shaped as a continuous flow and evade logical unfolding. Similarly, a literary text that lacks punctuation or intonation is difficult to follow.

Pascal Benteoiu notes that, in "modern times",¹ a tendency toward discontinuity applied to every musical parameter is present (he reckons that it represents a reaction to the romantic large-scale development aesthetics). We must admit, nevertheless, that contemporary music manifests a tendency toward exploring this very relationship of the continuous and discontinuous. There are works (perhaps born as a reaction to the time when music was too fragmented) which attempt, at least at one of the musical levels, to create an indivisible entity.

At the opposite end, there are works created on the basis of what Stockhausen calls "moment-form".² This concept implies that each moment is autonomous, has equal importance, independently of what has been or what will come, excluding the ideas of beginning and end, much like envisioning eternity in every instant. Separated by discontinuities, fragments that make up the work are homogenous in character, consistent internally, but do not suggest linear-temporal unfolding. "Moment-form" excludes any narrative, any type of gradual accumulation or becoming, any form of climax. Stockhausen stresses the idea of the moment's eternity by indicating a distinction between starting and beginning, between stopping and ending; the start and the stop only exist for practical reasons.³ Cut-off stops are preferred to artificial endings.

Myriam Marbé calls such works "samples" of music, in the case of which "an initial score is a mere nucleus, like a pebble cast into a pond, creating ripples that spread toward infinity. The end of the score does not mean that music ceases to exist; it represents an invitation to new replays, albeit in our imagination only."⁴

The only principle that relates separate moments in such a form is proportion, which ensures the work's coherence. Determining beforehand what the various relationships between the fragments of the whole will look like represents, in most cases, the starting point of the creative process.

Speaking from an opposite point of view, Stravinsky considers that, despite the "immediate effect produced by contrasts"⁵ (what could be tempting to many composers), contrast itself "diffuses attention".⁶ He admits his own preference for propinquity: "variation is only valid when it pursues similarity",⁷ because contrast is far too often obvious, accessible, efficient and spectacular; similarity ensures unity, while coherence must be sought, worked hard and secured in order for it to produce constant results. Thus, variation represents the procedure that maintains live interest in a work, without jeopardizing its unity; moreover, when employed adequately, it enhances the work's coherence.

¹ Benteoiu, *Image and Meaning*, 53.

² *Texte zur elektronischen und instrumentalen Musik*, after Jonathan D. Kramer, "Moment Form in Twentieth Century Music", *The Musical Quarterly*, 64, No. 2 (1978): 179.

³ *Ibid.*: 180.

⁴ Laura Manolache, "Myriam Marbé: On Her Own Music and More": *Muzica Magazine*, 3 (1996): 84.

⁵ Igor Stravinsky, *Poetics of music*, (Bucharest: Editura Muzicală a Uniunii Compozitorilor din RSR, 1967), 34.

⁶ *Ibid.*, 34.

⁷ *Ibid.*, 34.

On the other hand, compositions that exclude the idea of becoming generate – in the mind of listeners – a predilection for focusing on present moments, which cannot be anticipated, as they are neither the consequence of previous moments, nor the cause of future ones. This creates the impression of departure from time, which permits the contemplation of an ever changing present. In this case, the listener's mind can only relate segments to the whole by retrospection, at different moments throughout the work or after it has ended, which requires constantly recalling the work's structure.

Concerning musical works that are designed to suggest the idea of non-temporality, Corneliu Dan Georgescu speaks of modifications that music triggers at psychological level. Repetitive, non-developmental music creates a time-freezing effect. Georgescu states that this kind of music shapes a relatively monotonous atmosphere, suitable for contemplation, meditation, dreaming, and for straying from physical time, from any of its references. The only reference left is music itself. The return to reality involves an impression of time expansion or absolute time freezing.

The evolution of music notation¹ has witnessed many subtle changes in musical thinking, which should not be considered unimportant. Over the 20th century, three main directions of notation development were apparent:

- a more and more precise codification of compositional intentions, by specialized graphics covering all parameters, and leaving less room for interpretation;
- an increase in the number and variety of utilized signs, which has led to a loss of the universal nature of music notation; in addition, the appearance of very detailed performance directions and images requires the use of a score *legend*;
- a tendency to borrow imagery and graphic suggestions from visual arts; these may only sketch the musical contour, determining a more active and creative involvement on the part of performers.

Despite the fact that 20th century music operates with temporal structures, certain composers have attempted to suggest spatiality through their musical works. Technology has prompted the appearance of new acoustic effects, which have been capable of enriching the relationship between music and space, introducing the idea of space–time continuum to the art of sounds.

Gradual acknowledgement of musical time

Early on, the temporal nature of music was only identified at the basic level of obvious musical parameters: duration, rhythm, *tempo* and form.

During the Antiquity, musical-theoretical thinking began to develop, and particular attention was given to speech and to the concept of rhythm. Aristotle (384–322 BC) considered that time exists only where there is change or movement, although it does not identify with these. If the human mind does not change or does not perceive change, the passing of time goes unnoticed. To the Greek thinker, time can be defined by the number of movements in relation to “before” and “after”, by the number of changes.² Time was, therefore, understood as a unit for quantitative measurement of movement, of change, through which time itself could be measured. In the Aristotelian view, although limited in number, time is infinite in extension.

¹ From a temporal point of view, evolution from *neumes* (with no reference to duration) to rhythmic modes and *mensural* notation is convincing.

² Aristotle, *The Physics*, (Bucharest: Editura Științifică, 1966), Book IV, Chapter II 219a.

In Aristotle's time, rhythmical systems were derived from speech. The importance of temporal structuring of an art work, be it poetry or music, is apparent from the increased interest invested in the metrical foot of the verse – which is a bearer of meaning. Thus, various “temporal structures” received a well-defined function, which needed to be mastered by authors. In his *Poetics*, Aristotle spoke about a “proper meter”: the *iamb* for satire and comedy (adequate for dialogues); triple iambic meter was used in tragic poetry, while triple *trochaic* meter, with its dance-like character, was used for action; hexameter, with its heroic nature, was considered more suitable for epic poems and legends; finally, the *pyrrhic* meter was employed to suggest war and agitated situations.¹

Aristoxenus named the smallest determinable time unit: *chronos prōtos*,² which had relative value, depending on the speed of performance. Rhythm was formed on the basis of addition, so as to be perceivable by senses. To Aristoxenus, rhythm was an organized movement of actions and phenomena, “an ordering determined by time units”.³ To Plato, in turn, rhythm represented “order within movement” (*The Laws*, 665a).

Aristotle viewed the continuity principle as a basis for the realization of a good tragedy; actions and events must follow one another naturally: “It makes a great difference whether what happens is caused by the preceding action or just follows it.”⁴

St. Augustine (354–430) approached the concept of time in a way that combines philosophical reasoning with religious belief. His attempt at understanding time proceeded from a simple, eloquent confession: “What is time? If no one asks me, I know; if I wish to explain to him who asks, I do not know.”⁵ Augustine took the syllogism regarding the nature of time from Aristotle: time is made up of “passing”, “being” and “becoming”. What *used to be* has passed and is no more, while what *will be* is still to come. He explained that living the past and the future, their existence, are actions occurring in the present: the present of the past is memory, the present of the present is sight, and the present of the future is expectation.

During the first centuries of Christianity, music was influenced by Hebraic synagogue singing, from which it borrowed psalmody (with its *parlando-rubato* rhythm) and hymn (*giusto*-syllabic), and to which it attached new spiritual songs (with a combination of *rubato* and *giusto*). Initially, rhythm and meter were determined by prosody. The hymn appears as a freer form, influenced by Hebraic music, and incorporating popular melodies. Ambrosian hymns⁶ stood out due to their use of duple iambic meter, without over-shading prosody. Although Christian singing diversified

¹ Claudio Monteverdi will be inspired by this metrical foot in devising a new performance technique, through orchestral instruments: *tremolo* – a very fast repetition of the same note.

² After the entry *Rhythm* of *The New Grove Dictionary of Music and Musicians*, ed. by Stanley Sadie, (London: Macmillan Publishers Ltd, 1980), 811.

³ Matila Ghyka, *Aesthetics and Art Theory*, (Bucharest: Editura Științifică și Enciclopedică, 1981), 108.

⁴ Aristotle, *Poetics*, (Bucharest: Editura Iri, 1998), 78.

⁵ St. Augustine, “Confessions XI, XIV, 17”, in *Opera Omnia*, vol. VII/2, (Cluj-Napoca: Editura Dacia, 2004).

⁶ Their name derives from St. Ambrose (4th century), bishop of Milan, who contributed to the organizing of liturgical songs; oriental elements began to infiltrate in Christian music.

over the following centuries, its rhythmical variety disappeared during the Middle Ages. It was due, in part, to the transition from neumatic to rhombic notation, by which note values became homogenized and depended on textual stresses.

The supremacy of the church commanded people to make sustained efforts of self-betterment, by which to aspire toward perfection. In this context, the papacy imposed an official musical style called *cantus planus*, which only provided the vehicle for pious communication with the divinity, excluding all aesthetical virtues. This style was defined by primarily stepwise melodic motion, very few leaps, and avoidance of chromaticism or ornaments. Rhythm was simplified drastically, as well. It utilized a very small collection of different durations, which unfolded in calm, even *tempo*. The consequence of this reform was a depletion of rhythm in medieval music. The text generated accents, while melodic contour determined phrasing.

During the Middle Ages, the organ became a privileged instrument of cult and of the sacred. It was suited to accompany soloists and vocal ensembles, thanks to its ability of providing harmonic support (also due to resonating natural harmonics, which were enhanced by cathedral acoustics). Organ continued to be used in the religious service due to its variety of registers and polyphonic possibilities. What set the organ apart from other keyboard instruments was its ability to sustain sounds as long as the keys were depressed. Despite its lack of a wide expressive palette, this instrument, with its impressive yet sometimes delicate appearance, represents a true musical counterpart to the imposing, decorative gothic style. As a reaction to the strictness of rules imposed by the Church, the so-called tropes emerged. They were additions to the standard liturgical songs, containing either fragments of text or text with music (rarely only music). With the help of tropes, the original melodies were enriched and modified. These additions would later individualize into fully-fledged pieces (e.g. liturgical dramas). The process of *troping* may be viewed as a temporary immobilisation of the melodic unfolding, a temporal dilation of the musical act, which allowed the emergence of new music in its midst, like time within time.

In the secular musical productions of troubadours, trouvères, minnesingers and jugglers, beside free-form songs (ballads, epic poems), an important part was played by symmetrical structures, such as strophic or rondo forms (based on periodicity and repetition).

With the advent of polyphonic style, notation began to develop. It would gradually reflect the development of rhythm, as well. Initially, rhythm was not encrypted in the note signs, but rather depended on prosody. Sometimes, movement patterns (*modi*) were indicated by the shape of ligatures. The modal system included six rhythmic modes, of which the first four were frequently utilized. Their connection to classical Greek poetry is suggested by their names: *trochee*, *iamb*, *dactyl*, *anapaest*, *molossus* and *tribrach*. Although derived from classical meter, the *longa* note value was not always equal to two *brevis* notes, but sometimes to three. In turn, the *brevis* note could represent two basic units rather than just one. Moreover, the binary rhythms of classical Antiquity were transposed to an exclusively ternary-principled meter, which originated from the symbolism and perfection of the number 3.

A major advance in the use of durations and rhythmical formulas was made through the appearance of proportionally related note values during the Ars Nova. It was possible thanks to *mensural* notation, in which the shape of notes indicated their duration too. The relationship between two neighbouring durations could be binary

(imperfect division) or ternary (perfect division), and could be applied at the *modus*, *tempus* and *prolatio* levels. Binary or ternary division was inferred from context, or indicated by colour: a red-coloured note meant the transition from one type of division to the other.

Isorhythm (a repeated rhythmical pattern, especially in the tenor voice) had a great contribution to the development of musical art during the Ars Nova. By combining isorhythm and polyphony, larger-scale works (with multiple texts) were created; these were sometimes so complex, that they became incomprehensible.

Black notation of the Ars Nova evolved into *white notation* during the middle of the 15th century. In the case of latter, colouring indicated the transition from perfect to imperfect division (a long duration would consist of two short durations, instead of three). These transformations, along with the appearance of smaller and smaller rhythmical divisions, led to a diminishing basic duration: gradually, from *brevis* to *semi-brevis*, to half-note, and eventually to quarter-note. Paradoxically, this evolution involved a constant increase in the length of the basic duration; for example, the absolute value of *semi-brevis* was different, depending on which duration was considered basic, *brevis* or *semi-brevis*. Thus, any note value of that period had a shorter actual duration than its contemporary transcription.

In an initial phase, when polyphony was still indifferent to strict barlines, vertical relationships of various stresses (melodic, harmonic) generated polymetry – a true rhythmical mosaic. There were three types of vertical coordination: isorhythm (sameness of rhythmic durations for all voices), complementary rhythm (in the case of imitation), and polyrhythm (in the case of duple or triple counterpoint).

Typical of early Renaissance polyphony (15th century) was the *mensural canon* (*prolatio canon*), in which a melody was imitated by other voices, using proportionally different durations (*prolatio*); this technique was difficult to realize in composition. Moreover, the relationships among voices were not restricted to basic augmentation or diminution; sometimes, several versions using different meters were superimposed (e.g. 2/2, 3/2, 6/4 and 9/4 in *Missa prolationum* by Johannes Ockeghem, where all sections are based on this principle). Scores only consisted of a primary melody, indications for *prolatio*, moments of entry for all voices and the respective intervals. The outcome of these techniques may be seen as a true precursor of 19th and 20th century polyrhythm and polymodular time.

Vocal polyphony of the Renaissance was mainly governed by two principles: the law of consonance and, strictly related, *musica mensuralis*. Any change of harmony according to placement of barlines – anticipation, suspension, resolution – was determined in relation to the strong beat (first after a barline), a practice that led to musicians becoming aware of the temporal relationships within a work.

The barline appeared as a consequence of the need to organize polyphony and placement of different voices in time. However, the polyphonic music of the Renaissance only began to be notated using actual measures once general scores for accompanying keyboard instruments appeared (1501). In instrumental parts, barlines started being utilized only at the beginning of the 17th century. This was the era when rhythm knew a dramatic development. Barlines appeared at periodic time intervals, always preceding strong beats (middle of 17th century), while prosodic accents tended to be sidelined. There were early signs of departure from the supremacy of metric accents,

through hemiolas (the impression of rhythmical delay) and syncopations (concealing the strong beats); at the same time, binary rhythm began to become prevalent.

Along with the development of the tonal-functional system, came precise norms in the succession of harmonies, with implications in the alternation of tension and release (strong beats and weak beats).

Rhythm witnessed a diversification of note values, through the introduction of smaller durations, going as far as the thirty-second note. The complex quantitative and qualitative structuring of durations within measures led to the appearance of rhythmical formulas characteristic to different types of meter. Meter itself began to represent placement of accents at periodic time intervals. The *tempo*, which determines speed of succession for the beat units, was gradually indicated by composers. At the beginning, it appeared as character directions, and later on as metronome directions.

The increased importance that rhythm received at the end of the 16th century became obvious in the dances of the period (*basse dance*, *pavane*, *allemande*, *courante*), which are recognizable due to particular rhythmical patterns. Even though proper dances and suites have been absent from musical works after the Baroque era, their typical rhythms have evolved to become autonomous: concepts such as *Sicilian rhythm* are still in use today.

The French overture (often present as an opening movement in a Suite) distinguishes itself through the use of dotted rhythm in the first section, and the *fugato* writing in the middle section. Notation became more precise over time; nevertheless, there are cases of partly different interpretations for the notation of a certain period: dotted rhythms of the French overture – played as double-dotted, interchange of dotted and triplet rhythms, variable duration of grace notes (short or long appoggiaturas), or uneven performance of graphically equal durations (*notes inégales*).

In theory, *semi-brevis* remained the basic rhythmical unit from around 1540 until early in the 17th century; in practice, however, *minima* tended to progressively replace it. As a counterbalance to the complexity of the divisionary rhythmical system, *rubato*-like rhythm continued to develop, especially in the framework of recitatives, improvisatory forms and instrumental cadenzas.

The forms and genres that developed greatly during the Baroque illustrate the composers' intense preoccupation with the overall structure of the works. A new and complex genre emerged at the beginning of the 17th century: opera. Seeking to revive the Antiquity's ultimate form of artistic manifestation, the opera went back to the ancient Greek tragedy. The ideal of an indestructible bond between words and music, as manifested typically in all the Greek artistic forms, determined a transition from the dense, overcharged counterpointal style of the Renaissance to the supple, accessible accompanied monody of the Baroque. Thus, *dramma per musica* would be based on two principal types of musical unfolding: the recitative (used to suggest the epic, the passing of time and action, condensed events) and the aria (consisting of lyrical elements, allowing for a halt in the passing of time, and for contemplation or analysis of the events and the characters' inner feelings).

The important developments that instruments were subjected to during the Baroque era resulted in a dramatic evolution of instrumental technique, which extended into the area of vocal technique as well. The appearance of instrumental genres determined substantial evolution in terms of musical form, which – in the absence of sung text – needed other structuring pillars. Thus, various kinds of musical groupings

were born, such as figures, motives, phrases, all of which developed independently of limitations imposed by the human voice (breathing, length of phrases, ambitus). As a consequence, diverse symmetrical structures appeared, facilitating reception and memorization. Musical structures and forms characteristic to instrumental genres began adhering to one of the four main construction principles. These were: the strophic principle (*da capo* aria, fantasia, ricercar, toccata, and prelude); the refrain principle (rondo) – reliving the past; the variation principle (passacaglia and chaconne) – distorted recollection of the past; the expository archetype principle (fugue) – re-creation and transformation of the past. Retrospection is characteristic, in one way or another, to all of these principles, underlying otherness (strophic), sameness (refrain), likeness (variation), or similitude (expository archetype).

The Classical era was a period that promoted order, formalism and clarity, concepts inspired by the principles of Newtonian physics. In a time of scientific advance, especially in relation to the physical world, the philosophical ideology of the Enlightenment was, too, anchored in the laws of nature.

Immanuel Kant (1724–1804) argued that time represents a prerequisite for perceiving, by intuition, any natural object. Space and time are concepts fundamentally necessary to knowledge. They contribute to the representation and systematization of sensations: time is “the subjective condition under which all our intuitions can manifest”.¹ Time determines, in our inner state, relations of simultaneity or successiveness. However, time is closely linked to space: the concepts of change and movement can only be explained through time. Change is a “connection of contradictorily opposed predicates”.² The existence and non-existence of one and the same object, occupying the same space, can only be conceived in time.

The classical era was a time when periodicity and symmetry reached their summit. They were reflected in all musical forms that developed during this period: homophonic writing gained momentum, without completely eliminating polyphony, though. Dance-like melodies became prevalent, while the sonata form crystallized. The three-movement structure was slowly defined as its standard, with the four-movement being reserved for the quartet and the symphony. Clarity, balance and symmetry, on the other hand, were reflected in the limited metric variety: mainly 2/4, 3/4, 4/4 and 6/8. Measures and barlines got to determine and delineate morphologic elements of form: motives, phrases and periods.

The orchestra grew in size and ambitus, with the woodwinds section acting like an independent body. The Mannheim School was renowned for its technical innovations with respect to orchestral writing. Among these, special importance (in terms of temporality) was given to the introduction of a “Grand Pause”³ – a sudden interruption in the music, which was invested with a particular dramatic role.

The *fortepiano* slowly replaced the harpsichord; however, the sound of the new instrument could not be sustained for long, vanishing rather soon after being played. A new accompanying technique, which came to compensate for this deficiency, soon appeared: the *Alberti bass*. It was probably derived from harpsichord technique, and

¹ Immanuel Kant, *Critique of Pure Reason*, (Bucharest: Editura Științifică, 1969), 76.

² Ibid., 75.

³ Rooted in the rhetorical device called *abruptio*.

ensured harmonic support as well as a light texture through chord roll-out, which was characteristic to the period when accompaniment patterns highlighted metrical structure.

Beethoven was the first composer whose scores contained *tempo* directions expressed through metronomic references. These provided increased precision and objectivity compared to the usual character directions. Nevertheless, Beethoven noted that metronome directions are not able to suggest the inner feeling with respect to the musical unfolding, which has its own subjective *tempo*.

The musical thinking of romantic composers liberated itself from the constraints of metric and rhythmic periodicity, in order to make way for expression of feelings. Gradually, periodic stresses were eluded by the use of cleverly placed rests or ties, by the employment of a wider range of irrational rhythms (tuplets), by the introduction of non-periodic accents, and by incorporating folklore-inspired rhythms. Besides the alternation of contrasting tempi, composers left room for dramatic short-range speed fluctuations, with consequences on music terminology.

Due to ever-increasing complexity of musical works during the late Romanticism, it was acutely necessary that a specialized musician coordinate ensemble performances; therefore, the professional conductor appeared. Conducting technique was based on keeping meter and time, which increased awareness of temporal relationships found in music. It is clear that, over time, there have been various changes in the three-level music “creation” hierarchy: composer, performer (conductor) and, later, audience.

The avoidance of traditional classical meter was one of the factors that led to Wagner’s “endless melody”. Other factors were the avoidance of dominant-tonic resolution, a lack of periodical structuring, and a more fluid articulation of musical unfolding. All these resulted in great formal freedom. On the other hand, composers explored the extremes in terms of duration of works – from miniatures to monumental genres, such as the tone poem and the opera. Existing genres tended to become more flexible as well, by expanding their component segments or movements. In order to compensate for the extreme length of their musical works, which required logic and coherence, composers came up with new strategies, such as cyclicity, thematic hegemony, leitmotifs (musical characters), and the adoption of folkloric elements.

During the 20th century, time – whether viewed in its three forms (past, present, future), or in relation to human life – captured the attention of various thinkers more strongly than ever.

Initiating a new approach to philosophy (phenomenology), Edmund Husserl (1859–1938) analyzed time through a series of lectures called *On the Phenomenology of the Consciousness of Internal Time*. His approach originated from an attempt to comprehend perception of temporal succession, which would involve simultaneously the perception of present actions and the recollection of past ones. However, the recollection of a past action does not actually exist, so it needs to be constantly recreated. Husserl argued that the recollection of an event is intrinsically related to imagination, which creates it. He went further than St. Augustine, by stating that remembrance of past actions is not simultaneous, but rather represents a temporal extension of the conscience of those actions. Temporal relationships among past actions remain unchanged, although they would always be viewed from the perspective of an ever-changing “now”. Past actions are “present” in the recollection of the recent past, and they continually move away from the reference point (“now”), preserving a constant relationship with

surrounding events. Such assertions go beyond defining time as a simple succession of “present” moments, to a certain extent blurring the distinction between past and present, or present and future. If the recent past persists in memory, then it is not truly past.

Henri Bergson (1859–1941) laid out the concept of time in close correlation with that of space: past moments are assigned points in space, in order to establish more concrete relationships among them, and between them and the present moment. Although we speak of time as if it were a homogenous medium where stages of our consciousness were placed next to each other, much like in space, Bergson made a distinction between pure duration (typical to subjectivity) and time (which is totally different: it is space). Pure duration (subjective time), which can be comprehended immediately, represents the only real time.

In his *Being and Time*, Martin Heidegger (1889–1976) approached the issue of temporality as a condition of existence. Nothing can “be” without taking form in time. The *Dasein* (now-and-here being), grounding existence in the concept of “being present in the world”, is always centred on the present. Time itself is understood through the present: future represents what is not yet present, and past represents what is not present anymore.

All these theoretical and philosophical views of time are reflected in the various ways time is approached in music. 20th century music proceeded from freedom within a normed framework, to complete denial of the norms. In addition to escaping the old system of pitch organization, the 20th century saw a revolution of rhythm as well.

Composers who had not abandoned the tonal-functional system explored its limits, though: they utilized the same means but broke the rules. The role of barlines and measures was abolished, through diverse rhythmical superimpositions, intense use of irrational rhythms, and introduction of asymmetrical patterns. Classical notation remained a vehicle of clarity, to which composers adhered only with the purpose of preserving certain references and relationships. Besides the *giusto* rhythms, *rubato*-like moments were exploited more intensely. The alternation of dense and rarefied rhythms provided an impression of free time distortion.

Composers of the Second Viennese School, through introduction of atonality, the twelve-tone and serial systems, paved the way for integral serialism (Boulez, 1954). During the mid-20th century, as a consequence of musical over-determinism and over-charging, detail lost ground, and stochastic calculation was born (Xenakis noted that similar results may be achieved by using probability methods). Composers gradually abandoned their absolute authority and creative responsibility, re-evaluating their rapport with the performers and audiences, respectively. Authors began allowing performers to enjoy freedom of initiative, which led to the disappearance of concrete score directions, and further on to total aleatoricism. Thus, it became possible for two performances of the same musical work to sound differently. Whether aleatoricism was applied to notation (to sound properties) and internal processes, or to formal structure and instrumentation, it determined a shift of focus from details to the whole of the work. Mathematical calculation penetrate music (common in Antiquity, too), at a more complex level – contributing to the structural pre-determination. In order to avoid any fortuitous symmetry, in many cases the base for calculation of durations was represented by prime numbers, the Fibonacci numbers, or other particular mathematical relationships among note values.

Thanks to the rapid technological advance, computers entered the musical scene, while electronic techniques turned the concept of musical time upside down. Like other musical parameters, rhythms could be mathematically or probabilistically calculated, in a process that replaced musical thinking itself. Creation of new rhythmical patterns became an extremely easy task. Besides assisting in the compositional process, the computer began replacing the other aspect of the musical art, performance. Reproduction of music by the machine eliminated human interference and ensured invariable performance outcomes. “Single-use” musical works appeared soon, in the form of pieces meant to be presented only once.¹ Research led to new and paradoxical acoustic effects, such as sounds that seemed to rise and fall in pitch at the same time, or rhythms that seemed to speed up and slow down at the same time.²

In the first version of his *Kontakte* (1959–1960), Stockhausen broadened possibilities of rhythmical treatment, as well as ways to perceive musical time. Thus, a sound event may unfold over a virtually infinite time span; this had been considered impossible due to physiological limitations. Through probing into the microstructure of sound, Stockhausen directed his attention to concepts of “here” and “now”.

The open work was then attained, when composers only indicated constructional principles, leaving syntax up to performers. In *Moments*, Stockhausen avoided a strictly determined succession of musical events, where each moment would flow as a consequence of the preceding one. Thus, the focus falls on present moments, resulting from an intersection of vertical structures and horizontal timing; “eternity does not begin at the end of time, but is attainable in every moment.”³ Even though each moment may have variable duration (the work is mobile, time units being left up to the conductor), Stockhausen’s composition strategy reflects his desire to preserve a certain level of determination in the handling of time.

As a reaction to the extreme overcharging typical of some musical currents, minimalist techniques appeared during the 1960s. They manifested as a return to the archetypal origins of music. The two tendencies (repetitive-transformational and non-evolutional) shed new light on the temporality of musical art. In their works, minimalist composers approached time span as an indivisible and immobile whole, which the listener can examine from different angles. Time was viewed as a phenomenon that could be explored from the inside, using an imaginary time microscope that would reveal tiny transformations of a continuous, ever-changing present.

Taking into account psychological processes that influence time perception, composers have tried to overcome limits imposed on music by its discursive nature. Some have tried to make silence audible, to halt the passing of time, or to make it reversible. Most of these have been mere attempts, musical illusions, which become valid only in the presence of extra-musical theoretical explanation. However, the exploration of temporality has contributed to the advent of new compositional

¹ See works by Lucian Mețianu, written with the help of the computer, on the basis of a particular algorithm for each listener; these works are meant to be listened to once and then destroyed.

² Dominique et Jean-Yves Bosseur, *Revolutions musicales. La musique contemporaine depuis 1945*, Minerve, Paris, 1986, 215.

³ After Bosseur, *Revolutions musicales...*, 66.

techniques, and to the conscious investigation of time, as an intrinsic dimension to the art of sounds.

Aurel Stroe - *Harmony*

We return to our initial questions: “Are there musical works in which time represents more than just an immanent reality? Is musical time a parameter that can be shaped?” The answer is clear: yes. Many composers have shown interest in this direction and have tried, in various ways, to surpass constraints that time imposes on music. Therefore, we propose – in order to illustrate such preoccupations – an analytical incursion into *Concert Music for Piano, Percussion and Brass Instruments* by Romanian composer Aurel Stroe.

Aurel Stroe’s preoccupation with temporality was based on his previous studies in mathematics and computer-assisted music. This fusion between music and mathematics was reflected in his theoretical writings, in which he proposed new concepts, such as “morphogenetic music or the theory of “composition class”. Stroe explored temporality differently from one work to another: as a journey through a space profile in *Arcade (Archways)*, as reconstruction of time in *În vis desfacem timpurile suprapuse (The Dream Unfolds the Interwoven Times)*, or time freezing in *Laude I (Praises I)*, etc.

Concert Music for Piano, Percussion and Brass Instruments, written in 1964, is structured in four movements. An unusual aspect is that the second and fourth movements are perfectly identical. They are based upon a single chord, which confers them a minimalist character, at the same time reflecting the author’s concern for expressiveness of all musical parameters. In this case, **harmony** – which gives the title of the two movements – creates the framework within which time placement becomes noticeable.

The ten parts that contribute to the creation of this chord (a compact brass section of 4 trumpets, 4 French horns in pairs of *unisoni* and 4 trombones) cover the near-complete chromatic scale, through successive entries (only G and B flat are missing). The only parameter that changes is intensity, as a dense polyphony of attacks lacking vertical synch generates a sort of sound “magma” that develops into a central climax.

Irinel Anghel¹ speaks of a tendency typical of several works by Aurel Stroe: that of non-evolutional music, of an unfolding lacking pulsation, and of frozen time perception as a result. The impression of minimal motion is created, resembling a giant breathing lung. It is a sort of slow process of sound becoming, which covers the distance from *pianissimo* to *fortissimo* and back.

The climax is placed exactly at the point of symmetry (measure 12 of 23). The symmetry of dynamics is added to a rhythmical mirror-like symmetry. The first half of this movement is generated by an algorithm utilizing five note values only. As in *Arcade*, composed only two years earlier, the composer’s mathematical thinking is based on the sequence of Fibonacci numbers (5, 8, 13, 21, 34), assigning the unit (1) to the sixteenth-note value.

¹ Irinel Anghel, *Orientations, Tendencies and Currents of Romanian Music from the Second Half of the 20th Century*, Editura Muzicală a Uniunii Compozitorilor și Muzicologilor din România, Bucharest, 1997, 38.

Symmetry is realized in nine of the ten parts, around “pivot” durations, while in the third trombone part the symmetry point appears between durations. The preoccupation with formality is evident from the presence of these “pivot” durations, conceived on the basis of three-element symmetrical groupings, juxtaposed. The rhythmical analogy to Messiaen’s limited transposition modes becomes apparent.

Below is a chart¹ that illustrates this polyphony of attacks, showcasing durations (made up of sixteenth-note values) that are grouped by instrument and measure number.

The algorithm upon which the choice of durations was based resulted from three repetitions of the numeric formula 4:4:6, with the last repetition being incomplete. Thus, the mirror-wise symmetrical row of numbers is 4:4:6:4:4:6:4:4. These digits reflect differences amounting in note values (1 being the sixteenth) among “pivot” durations; the third trombone makes an exception, its symmetry not developing between durations:

4:	4:	6:	4:	4:	6:	4:	4
4	8	12	18	22	26	32	40

Legend: “pivot” durations:



¹ For a clearer depiction, the position of French Horns (which represent the vertical point of symmetry) appears in a frame.



In this case, symmetry, a feature that was frequently utilized in Baroque music, is applied to durations. Its use is clearly illustrated in the table below. The initial rest has its symmetrical counterpart at the very end; furthermore, the importance given to moments of silence is noticeable toward the end of the movement, where four sixteenth-rests are added to each part. In the context of traditional meter (4/4), the addition of rests does not throw off the balance of symmetry, but rather ensures a synchronized ending for all instruments, perfectly integrating into the overall structure of the work:

7	34	13	21	05	08	08	34	05	21	13	26	13	21	05	34	08	08	05	21	13	34	7 + 4
9	21	05	08	34	13	13	05	08	34	21	22	21	34	08	05	13	13	34	08	05	21	9 + 4
18	08	34	13	21	05	21	05	08	13	34	04	34	13	08	05	21	05	21	13	34	08	18 + 4
16	13	21	05	34	08	05	34	21	13	08	08	08	13	21	34	05	08	34	05	21	13	16 + 4
2	08	05	34	13	21	21	13	34	08	05	36	05	08	34	13	21	21	13	34	05	08	2 + 4
4	34	21	05	08	13	13	21	34	05	08	32	08	05	34	21	13	13	08	05	21	34	4 + 4
14	05	08	34	13	21	34	13	05	08	21	12	21	08	05	13	34	21	13	34	08	05	14 + 4
	13	34	21	08	05	34	08	21	05	13	40	13	05	21	08	34	05	08	21	34	13	+ 4
20	05	08	13	21	34	05	08	13	21	34		34	21	13	08	05	34	21	13	08	05	20 + 4
11	21	13	08	05	34	08	21	13	34	05	18	05	34	13	21	08	34	05	08	13	21	11 + 4

Apparently inexplicable to the analyst is the appearance of four sixteenth-rests as “pivot” durations in the 3rd trumpet part (measure number 12). An explanation would become possible from a psychology of perception perspective. The intensity of a sustained note (in this case, a chord) begins decaying right after its initial attack (*ff*); due to the rest, a complex cluster (covering nearly two octaves) is depleted of one element, the return of which reinforces the original loudness level; then, a final *decrescendo* to the end becomes possible.

Each instrument plays a sequence of ten durations (attacks) up to the point of symmetry. These durations are broken down into two identical groups of five that repeat twice in both halves of the piece.

The same two-element constant symmetry is found vertically, as well: pairs of instruments successively play the same duration (even though delayed by the initial rests), until the vertical structure of the chord completes. By assigning numbers from 1 to 5 to each of the five durations, and by ignoring rests as well as the central duration, each half of *Harmony* will look like the following matrix:

$$\begin{aligned}
 5 &= 1 \\
 8 &= 2 \\
 13 &= 3 \\
 21 &= 4 \\
 34 &= 5
 \end{aligned}$$

5	3	4	1	2	2	5	1	4	3
4	1	2	5	3	3	1	2	5	4
2	5	3	4	1	4	1	2	3	5
3	4	1	5	2	1	5	4	3	2
2	1	5	3	4	4	3	5	2	1
5	4	1	2	3	3	4	5	1	2
1	2	5	3	4	5	3	1	2	4
3	5	4	2	1	5	2	4	1	3
1	2	3	4	5	1	2	3	4	5
4	3	2	1	5	2	4	3	5	1

Horizontally, a structure composed of two 5-duration sequences becomes apparent.

A few symmetry relationships (mirror-image or translational), along with ordering of elements through permutation operations can be found here too, though without resulting from any uniform algorithm. We can, nevertheless, speak of a rhythmical series of five durations, in compliance with the principle of not repeating one element until the entire series has been exhausted.

In fact, in this work, the author uses for the first time the PRAT automation, a “composition machine that assigns duration to notes, by employing certain procedures”.¹ The process creates an impression of “seeming passage of time”,² in the perception of which memory plays an important role. The memory of present cannot record uniform events, and therefore involuntary memory remains the only active one. The “machine” generates a sort of virtual time that extends from minus to plus infinity, of which we only experience a segment.

So far, it looks like a modern, conceptual composition, realised by *avant-garde* means in relation to its time. Just as any new perspective that becomes clearer and more easily comprehensible through contrast, this work contains innovative ideas regarding temporality, presented in the framework of traditional concepts:

TRADITIONAL

MODERN

harmony (chord)	→	<i>cluster</i> (near total chromatic)
meter (4/4)	→	lack of basic pulse
symmetry	→	mirror-image symmetry of an entire movement
rhythmic complementarity	→	rhythmic „series”, Fibonacci numbers
rhythmic variety	→	minimalism
complete measures	→	importance of rests (silence)
traditional dynamics	→	a single dynamic gesture, symmetrical
dynamic progression	→	perception of temporal immobility
natural sound, no effects	→	a single, transforming chord
<i>non vibrato</i>	→	polyphony of attacks
traditional ensemble	→	use of PRAT machine

¹ Horia Şurianu, “Aurel Stroe – Profile (I)”, *Muzica Magazine*, 7 (1981), 42.

² *Ibid.*, 42.

This piece is a typical example of conceptual music, in which the composer begins with abstract structures, *hors-temps*, based on mathematical models and logical inference (proportion, symmetry), and projects them onto a sounding space, within a temporal framework. The strategy for presentation of this chord creates the impression of careful, out-of-context study (as in an experiment, with focus shifting permanently among harmonics). The exploration is done from many different angles, as if under ever-changing lighting circumstances. We can draw an analogy between this impression and the Bergsonian concept of “spatial time”, according to which perception (as opposed to memory) is a process that isolates an event from its temporal context and analyzes all its objective properties. The concept of space is easier to comprehend than the concept of time; similarly, the spatial nature of harmony represents here an adequate means for creating new temporal perspectives.