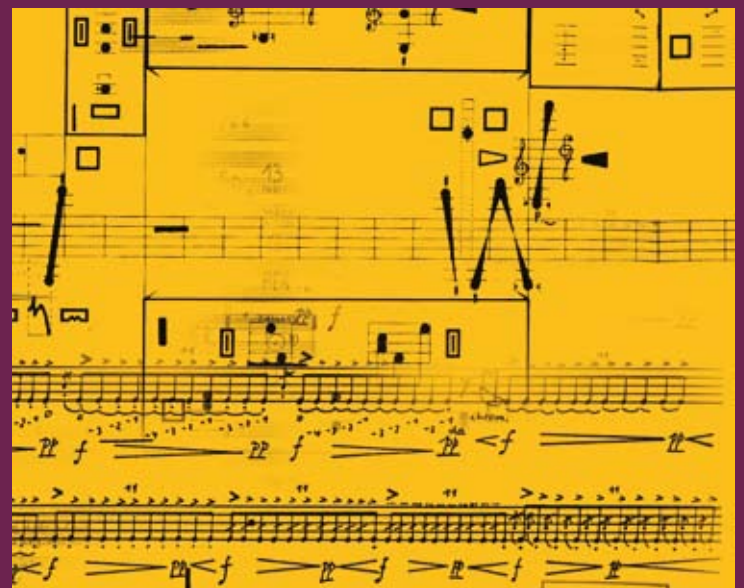


MUZIKOS KOMPONAVIMO PRINCIPAI: sonorizmas

XIV

PRINCIPLES OF MUSIC COMPOSING: Sonorism



Lietuvos muzikos ir teatro akademija
Lietuvos kompozitorių sąjunga

Lithuanian Academy of Music and Theatre
Lithuanian Composers' Union

14-oji tarptautinė
muzikos teorijos konferencija
Vilnius, 2014 spalio 13–15

14th International
Music Theory Conference
Vilnius, 13–15 October 2014

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KOMPONAVIMO
PRINCIPAI:**
sonorizmas

**PRINCIPLES
OF MUSIC
COMPOSING:**
Sonorism

XIV

Vilnius
Lietuvos muzikos ir teatro akademija
2014

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Pratarmė

Skaitytojui pateikiamas leidinys – tai mokslinių straipsnių rinktinė, sudaryta XIV tarptautinės muzikos teorijos konferencijos „Muzikos komponavimo principai: sonorizmas“ pranešimų pagrindu. Konferencija vyko 2014 m. spalio 13–15 d. Vilniuje. Ją rengė Lietuvos muzikos ir teatro akademija ir Lietuvos kompozitorių sąjunga.

Konferencijoje savo mokslines idėjas pristatė beveik dvi dešimtys muzikologų ir kompozitorių iš įvairių šalių – Lenkijos, Graikijos, Didžiosios Britanijos, Rusijos, Austrijos, Latvijos ir Lietuvos. Leidinyje spausdinami moksliniai straipsniai išdėstyti pagal tris potemes.

I potemė – „Teoriniai ir istoriniai sonorizmo aspektai“. Joje nuodugniau tyrinėjama sonorizmo prigimtis ir ištakos. Rimantas Janeliauskas iškelia idėją, kad įvairios sonorizmo atmainos (taip pat ir sekundos intervalo sonorizmas) atsiranda dėl sonantinio kompozitoriaus santykio su skambesiu. Ši mintis pagrįsta M. K. Čiurlionio, etnomuzikos ir XX a. muzikos kompozicijų analize. Baiba Jaunslavieta sonorinės medžiagos naudojimą kūrinyje greta nesonorinės traktuoja kaip skirtingų stilių dialogą arba konfrontaciją. Remdamasi šiuolaikiniais Latvijos kompozitorių kūriniais, muzikologė nustato tokios medžiagos sąveikų tipus, pagrindžia muzikos kompozicijų formą ir estetiką. Manos Panayiotakis išryškina mintį, kad sonorinį įspūdį gali sukelti faktūra, kuri iš esmės sudaroma remiantis garsų aukščių serijomis ir mikrochromatiniais intervalų santykiais, nors sonorikai tai nėra būdinga. Prie šios išvados mokslininkas prieina nagrinėdamas G. Ligeti mikropolifoniją (*Melodien*). Andriaus Maslekovo straipsnio aktualumas susijęs su tuo, kad sonorikoje vyraujantis tembro parametras nėra tokiu mastu diferencijuotas kaip ritmas ir garsų aukščiai toninėje muzikoje. Tad vertikaliosios ir horizontaliosios sonorų struktūros tampa labai svarbios apčiuopiant sonorikos komponavimo principą. Benas Lunnas plėtoja pagrindines skambesio plazmos (iš esmės sonorinio lauko) sąvokas (skambesio kompasas, globalusis šaltinis, aukštieji dažniai, spektrinis pulsas) ir aptaria šių sąvokų realizavimą H. Rădulescu kūrinyje. Rytis Ambrazevičius teigia, kad lietuviškų sutartinių sekundos yra kur kas artimesnės sonorizmui (psichoakustiniam šaižumui) nei disonanso pojūčiui, kylančiam dėl pačių sekundos tonų. Pasitelkęs psichoakustinę metodologiją, mokslininkas mėgina pagrįsti sutartinių (ir kitų kraštų diafonijų) sonorinių kirčių lauko apimtį.

II potemė – „Sonorizmas akustinėje muzikoje“. Autoriai čia gvildena labiau praktinius sonorikos taikymo aspektus. Kalliopi Stiga, tyrinėdama graikų kompozitorių kūrinius, pateikia įdomių ir vertingų sonorinės muzikos charakteristikų. Charris Efthimiou, lygindamas kai kurių roko grupių albumus (*Slayer*, *Metallica*, 1983–1986), atskleidžia jų spalvinį dizainą sonorikos, tembro ir ritmo atžvilgiais. Muzikologės Martos Szokos akiratyje plyti platus šiuolaikinių kūrinių vargonams spektras. Tyrinėtoją domina turtingos registruotės galimybės, kurias suteikia klasterių atlikimas vargonais. Apžvelgdama XX a. lenkų kompozitorių kūrybą, Ewa Kowalska-Zajac atskleidžia programinės muzikos idėjos tęstinumą sonoristinėmis priemonėmis. Kompozitorius Mārtiņš Viļums, komentuodamas savo kūrinį „Tvyjōraan“, įvardija jo naudojamus skambesio perspalvinimo principus, t. y. mikrointonavimą ir artikuliaciją, taikomą drauge su metro ritmo autonomija ir pan.

III potemė – „Sonorizmas elektroninėje muzikoje“. Pasitelkdamas akusmatiskumo sąvoką, Jonas Jurkūnas mėgina nusakyti naują muzikos meno situaciją, susijusią su elektroninės muzikos plėtra. Kompozitorių domina naujojo fenomeno dedamosios – sonorika ir pulsas. Antonas Rovneris pristato pirminius elektroninės-sonorinės muzikos Rusijoje faktus: ANS sintezatorių (1938) ir jam daugiausia sukūrusio kompozitoriaus S. Kreiči kūrinius. Sonorizmo reiškinys elektroninėje muzikoje, pasak muzikologės Justinos Humieckos-Jakubowskos, pasiteisino pirmiausia dėl atsivėrusių beribių sonologinių transformacijų, kuriomis meistriškai pasinaudojo žymūs XX a. kompozitoriai K. Stockhausen, L. Nono, L. Berio, G. Ligeti ir I. Xenakis.

Tikimės, kad keturioliktasis „Muzikos komponavimo principų“ tomas sulauks gausaus skaitytojų būrio ir bus naudingas kiekvienam besidominčiam muzikos sonorizmu. Redakcinė kolegija tikisi skaitytojų dėmesio tiek Lietuvoje, tiek užsienyje. Būsime dėkingi už visas pastabas ir atsiliepimus apie leidinį. Rengėjų vardu dėkoju visiems prisidėjusiems prie šio leidinio rengimo ir leidybos.

Prof. Dr. Rimantas Janeliauskas

Foreword

This publication is a collection of scientific articles compiled on the basis of the papers delivered at the 14th international conference “Principles of Music Composing: Sonorism”. The conference was held in Vilnius on 13–15 October 2014. It was organised by the Lithuanian Academy of Music and Theatre and the Lithuanian Composers’ Union.

About twenty musicologists and composers from Poland, Greece, Great Britain, Russia, Austria, Latvia and Lithuania participated in the conference and presented their scientific ideas. The articles in this collection are divided into three subthemes.

Subtheme I “Theoretical and Historical Aspects of Sonorism”. The authors in their works thoroughly analyse the origin and sources of sonorism. Rimantas Janeliauskas raises the idea that diverse varieties of sonorism (among them those of a second interval) emerge due to the composer’s relationship with sounding. This idea is based on the analysis of M. K. Čiurlionis’ works, ethnomusic and 20th-century compositions. Baiba Jaunslaviete interprets the employment of sonoristic beside a non-sonoristic material in her work as a dialogue between different styles or confrontation. Basing her analysis on the works by contemporary Latvian composers, the musicologist establishes types of interaction of such material and bases the form and aesthetics of compositions. Manos Panayiotakis clears up the idea that a sonoristic impression can be produced by the texture which is principally formed on the basis of the pitch series and the microchromatic relations of intervals which are usually non-characteristic. The musicologist makes this conclusion analyzing Ligeti’s micropolyphony (*Melodien*). The topicality of the work by Andrius Maslekovas is connected with the fact that the parameter of timbre, dominating in sonoric structures, has not been investigated on the same scale as rhythm and the height of sounds in tonal music. Therefore, vertical and horizontal sonoric structures become very important, feeling the principle of sonoric composing. Ben Lunn elaborates the basic conceptions of sound plasma (principally of the sonoric field), i. e. the sound compass, global sources, the high frequency and a spectrum pulse. Besides, he discusses realization of these concepts in H. Rădulescu work (op. 16, 1972). Rytis Ambrazevičius states that the seconds of Lithuanian *sutartinės* are closer to sonorism (psychoacoustic roughness) than a sensory dissonance sensation, emerging due to the tones of seconds. On the basis of psychoacoustic methodology, the musicologist makes an attempt to base the volume of the field of sonoric stresses of *sutartinės* (also the margins of other diaphones).

Subtheme II “Sonorism in Acoustic Music”. Musicologists are more concerned with the practical aspects of sonoric applications. Kalliopi Stiga, analyzing the works by Greek composers, presents interesting and valuable characteristics of sonoric music. Charris Efthimiou, comparing the albums of some rock music groups (Slayer, Metallica, 1983–1986) brings out their colourful musical design in respect of sonorics, timbre, and rhythm. The musicologist Marta Szoka embraces a wide specter of contemporary works for organ. The researcher is interested in rich register possibilities which can be offered by a cluster technique for organ. Surveying the creative work of the 20th century Polish composers, Ewa Kowalska-Zajac observes the continuation of a program music idea by way of sonoristic means. The composer Mārtiņš Viļums, commenting on his work (“Tvyjōraan”), discloses his employed recolouring principles of sounding, i.e. microintonation and articulation applied together with metrorhythmical autonomy, and the like.

Subtheme III “Sonorism in Electronic Music”. Musicologists interpret this theme from different angles. Jonas Jurkūnas, employing the concept of acousmaticity, makes an attempt to characterize a new situation in the art of music, related to the expansion of an electronic music. The composer is interested in the dimensions of the new phenomenon, i.e. sonorics and pulse. Anton Rovner presents some primary facts of electronic-sonoric music in Russia: the ANS synthesizer (1938) and the composer G. Kreichi’s works. In the opinion of the musicologist Justina Humięcka-Jakubowska, the sonorism phenomenon in electronics answered the purpose first of all due to the disclosing themselves infinite sonological transformations, masterfully employed by the 20th century composers K. Stockhausen, L. Nono, L. Berio, G. Ligeti, and I. Xenakis.

We hope that Volume XIV of “Principles of Music Composing” will be popular with the readers and will attract all those who are interested in the sonorism of music elsewhere. All comment and criticism are welcome. On the organizers’ behalf I thank all who contributed to the preparation and publication of this volume.

Prof. Dr. Rimantas Janeliauskas

Translated by Laima Zabulienė

1

TEORINIAI IR ISTORINIAI
SONORIZMO ASPEKTAI

THEORETICAL AND HISTORICAL
ASPECTS OF SONORISM

Sonorism of the Second Interval in the Analysis of Lithuanian Ethnomusic and the Compositions by M. K. Čiurlionis and 20th-Century Composers

Annotation

The article is concerned with the analysis of M. K. Čiurlionis' ethno and the 20th century musical episodes from the aspect of sonorism. It is stated that various manifestations of sonorism arise from the composer's sonantic relationship with sounding. The final conclusion: M. K. Čiurlionis' later period music discloses sonantic positions between sonorism at a second and a dissonant tonality.

Keywords: a sonantic relationship, a sonant, a sonoric field, a sonor, a sonoric density, intensivity, sonorism at a second, a tonicity relationship, a dissonant tonality.

Introduction

The topicality of the chosen theme has been prompted by the very period of time, to be more exact, by man's new relationship with the environment and the world, and simultaneously with the composer's relationship with a sound. In the previous epochs, particularly in those of tonal music, up to the middle of the 20th century, much attention was paid to the parameters of the sound height and rhythm. Nowadays, the content of the composer's activities is concentrated on timbre and dynamic aspects of expression. Various non-ordinary playing techniques, strokes and dynamic articulations are thoroughly marked. In a word, all that which makes the essence of a sonoric work.

The composer's relationship with sounding, cardinally witnessing some changes gets synchronized with the changes in the spaces of culture – surrounding environment, a total urbanization, its produced noise, and new technologies. It is the latter which create instruments due to which the origin of the sound is better pronounced and governed. These achievements are spontaneously used by the composers perfecting the principles of timbre synthesis in electronic music.

Thus, sonorism is a token and topicality of the period.

The topicality of the theme dictates the principal goal of the work, i.e. to widen the conception of sonorism, associating it with the changes in the composer's outlook on a sound. Here, we shall make an attempt to throw some light on those new composing qualities and principles, which in their essence differ from traditional ones. We shall also compare examples of sonoric and tonal music and try to establish their differences and analogies. At last, we shall analyze how a newly-born relationship with sounding can adjust the knowing and hearing of the music characteristic of earlier epochs.

The object of research are some extracts from the music by the Lithuanian talented composer and painter M. K. Čiurlionis as well as some examples of ethnomusic and some extracts of the 20th-century sonorous compositions.

Theoretical Section

The first interest in sonorism music reaches the first decades of the 20th century. Henry Cowell seems to be the first who undertook the analysis of thick sonors at seconds and suggested calling them *a cluster*. Cowell's attempts were followed by a great number of instructive books on contemporary harmony and technique of composing, expanding the theory of clusters (L. Dallin, V. Persichetti, H. Hanson, D. Cope, J. Cholopov, C. Kohoutek, W. Gieseler, B. Schaffer, J. Schillinger and others).¹

A wider interest in sonorism was taken in the second half of the 20th century. A sonorism conception and notion emerge (J. Chomski), the types of sonoric texture and the intensivity of a sonorous field were analyzed (A. Макашгин), and attempts were made to formalize sonoric operations (I. Xenakis), to establish the means of sound and timbre synthesis (E. R. Miranda), etc.²

When analyzing the new outlook, it is expedient to define the composer's relationship with sounding on the whole. The sounding itself, prior to writing music, is latent and does not yield to a direct observation.

¹ See Bibliography: Dallin L. 1984, Persichetti V. 1961, Hanson H. 1960, Cope D. 1991, Cholopov J. 1976, Короутек Ц. 1976, Gieseler W. 1975, Schäffer B. 1976, Schillinger J. 1946.

² See also: Chomiński J. 1968, Макашгин A. 1992, Xenakis I. 1971, Miranda E. R. 1998.

However, its significance is great for a future piece of music. It is due to this relationship that a composer's subconsciousness, a hearing intuition and imagination are coded. The born relationship with sounding in a creative process leads the composer subconsciously along the roads of artistic searching and discoveries. This kind of relationship is sure to give a composer an opportunity to see his mistakes and corrects both the whole work and its details. It is an original censor who determines what should not be done and predicts what should be done.

The relationships with sounding are very personal, intimate, determined by genetic, hearing factors or the factors of environment. In this work we shall compare the relationships of two types, i.e. sonantic, related to sonorism, and tonal, typical of tonal music.

Due to the fact that today more interest is taken in the field of sounding and its features than the fixed tones as before, therefore, the new relationship with sounding should be called sonantic. Due to the sonantic relationship with sounding, a composer can discover original methods for the composing of sonoric music. A consequent avoidance of tonal accuracy in respect of the sound height and rhythm is typical of them. Soon, any tones or their prototypes lose their role, and it is operated by a continuous field of sounding. Now the composers focus on the timbre and dynamic intensity of a sonorous field and the density of sonors. This kind of density becomes maximally uninterrupted systematically employing an intensive microchromatics and glissando means of playing.

A sonorous field can be reduced and the intensity of sonors made smaller. The reduction gives a possibility to mutate the sonorants of different intensity, i. e. a sonorous vertical can become a hardly heard line of the horizontal and the like.

It has been mentioned that due to the influence of a sonantic relationship with sounding, a composer is first of all interested in the timbre and dynamic side. In its turn, a rhythmic and sound height profile remains mostly resultative different from rhythmic periods in tonal music.

In sonorics, one can often find two durations, i.e. long values, the duration of which is marked by time seconds and their parts. The relationship of such values and their mutual proportions are usually relative. They are rather resultative because the durations of values are determined by the sonorism geneses, i.e. the needs of the timbre and sound expression. Relatively short values are analogically used beside long ones. In its turn, a rhythmic regularity is not typical of a sonorous work. The results of the relationship are also noticed on the plane of heights. In the formation of sonorics, the height of sounds is not a constructively decisive factor in respect of a compositional whole. In sonorism practice, it always remains conditional, depending on the profile of the work, its intensity and density.

It is proper to compare a sonantic relationship with a traditionally polished tonal relationship. Due to the influence of a tonal relationship with sounding, a composer operates tones like physical parts of sounding (bodies, objects). It would logically follow that intervals, accords and bigger elements of compositions, sections, parts, are also "materially" perceived. In a tonal composition, it is mostly focused on a concrete height of tones, and here rather much has been done, starting with the strengthening of the twelve-note temperation (Bach) and finishing with the realizations of the twelve-note series (Schönberg). At the same time, the metre rhythmical systems were from the baroque motorics of sequences to polyrhythmic aperiodic intersections (Ives, Stravinsky). The height and rhythm in a tonal composition manifest themselves by way of a maximal precision (like a tuning-fork, metronome). Other sound parameters, those of sound intensity and timbre, are usually in the background, at least in respect of a compositional formation. Therefore, a composer and performer orient themselves to relatively marked signs of the dynamics of works, and a timbre case of the work sometimes appears earlier, finishing the work in a clavier shape.

The comparison of tonal and sonoric music contexts discloses an alternative character of their formation and perception. The context of a tonal music usually arises rhythmically and tonally, linking separate tones in their bigger groups (intervals, accords, modus, etc.) until the whole work is finished. In other words, tonal elements are inductively connected into the whole. In its turn, a sonor field is often reduced. Its characteristic density and the thickness of sounding are damped down up to the limit of vanishing. A deductive tendency of the expansion of a sonoric field is coded by the origin of a sonantic relationship with sounding.

The question can arise: is a sonorically purified composition possible? It is evident that many sonoric textures cannot do without vivid rhythmic accents, a fragmental regulation as well as a bare unison, etc. A sonoric field reduced up to the limit often splits into solitary discrete elements which start to become alike tonal ones. The sense of the reduced elements is often taken for the one of the former sonoric context. On the other hand, starting a sonoric work with minimal, discrete elements of sounding, it can be similar to tonal

for some time (moreover without listening to the work to the end) and only later, with the vivid sounding of sonorics, they can be consciously perceived as the manifestations of an integral sonoric work. It could follow that the elements and even episodes structurally close to tonal music, can be due to the influence of a sonantic relationship, perceived as sonoric or limiting sonor, i.e. as the elements remaining in the sonor whole of the work. In its turn, quasi-sonoric accords can sound in a tonal composition (as can be heard in some of D. Scarlatti's sonatas). The latter, in the aspect of a tonal hearing, are merely certain variants or substitutes of tonal intervals and chords.

This purity discourse of sonoric and tonal composition enables one to state that the unity of the composition from the inside is coded and governed by the composer's discovered relationship with sounding. It is the direction of the sonantic relationship that enables a composer to discover optimal principles and means of the creation of sonor music irrespective of the possible structural similarity of sounds, also employed in tonal music.

Historical Aspect

A sonantic and tonal relationship with sounding would change one another in the process of a historical evolution. For example, a prehistory (fire myths) convincingly witness for the benefit of a sonantic relationship. A primitive syncretic group of people would make a sonorous noise by all possible ways in order to frighten a beast. One can suppose that it was made antiphonically, dividing into it two or more smaller groups. The hunting experiences would syncretically continue in a pagan ritual.

A sonantic relationship with a sounding has survived in Lithuanian ethno *sutartinės*. It is witnessed by constantly sounding seconds. The instruments (*skudučiai*, *daudytės*) on which they were performed show that the intervals at seconds could be big and small as well as neutral. In spite of an instrumental practice, eventually helping to consolidate tonicity, still the intervals at seconds are principally sonors, manifesting themselves as a certain intensive, dense sounding (or field).

In an agricultural area (images of the world tree) a sonoric sounding gives up its place to the tonicity of monodies. Oppositions of tones at a second are typical of archaic Lithuanian monodies. Thus monodies get wider as if an oppositional binary ornament. The tonicity is also characteristic of the whole area of a pentatonic monody and the melopoea of ancient Greece.

In the period of the Middle Ages and the Renaissance, a sonantic idea of sounding unfolds itself echoing the needs of theocentric symbolic thinking. A sonantic relationship with sounding in these epochs is realized by nonintensive structures. Unlike an archaic sonoric density, a pronunciation sonant (Lat. *sonans*) becomes a primary source of sounding. The recitation of the Holy Scripture prose should not be associated either with an abstract tone or rhythm. The pronunciation of syllables should be more compared with a sonant field, prolonged in time. The articulation of this field exceptionally depends on the syntax of an oral text. The recited sonants can be naturally intensified through various melismas. The recited sonantic field enriched with melismas is later supplemented with a dimension of perfect verticals, i. e. perfect sonants. The intensity of verticals can be increased by the use of imperfective variants of the sonants. In their turn, the sonants of the verticals are clarified by the introduction of pauses in separate voices. The mentioned means unfold themselves in a parallel Gothic organum. Of interest is also the fact that a sonantic field of verticals in organums is often articulated by the ways independent of the text syllables and syntax, i. e. vividly changing the intensity of verticals. Of interest is the fact that a quantitative development of the Gothic rhythm (modus, isorhythm) more witnesses an attempt to count and control the amount of expanding sonorous melisms than to introduce the rudiments of a tonal sense.

The Renaissance composers changed the forms perfect consonances into more rich third intervals. A third and its various permutations in respect of an octave as well as the contrast of two thirds through a harmonic or arithmetic proportion enabled them to discover an evenly sounding, panconsonanting field. It perfectly reflects the sensual perception of man of the period. Intervals of thirds base not only foburdonic sonants of the verticals but also polyphonic horizontals are united by the voice cantus firmus expansion. The favoured imitational texture led to the discovery of a diagonal mobility of a sonantic field. The whole sonantic system of the Renaissance is in fact a third isomelia. Here each of the voices not associated with a third is strictly regulated, trying to avoid an unwished dissonancing. A dissonancing of a terzisomelian sonantic field would undoubtedly destroy the desired continuous of sounding. An aspiration for a sonantic continuity stimulated to decline instruments and to be satisfied with vocal voices (*a cappella*) and the regulation of the voice tessitura (at third).

The mensural system of rhythm reflects the aims of the terzisomelic sonantic field. It composed optimal preconditions for the freedom of a melic expression, a variance of the structure at thirds as well as improvisation. A mensural rhythm as if meets a melic flexibly and agrees with it without imposing either a Gothic modus counting or accentuation so characteristic of the new ages.

With the momentum of the Renaissance, evident elements of tonicity show up in the depths of the pan-consonantic composition. For example, Josquin systematically cultivates quint chords instead of the earlier popular fobourbons, formed summing up intervals. Now, due to the use of quint chords, the principle tone (bass), competing with the cantus firmus voice, comes to light. An acoustic bass support perfectly based the links of chords of the fifth-fourth relationship characteristic of in cadencies. Eventually, chromatism cultivated by late madrigalists assisted to realize the importance of the leading tone. All of it was slowly leading to tonality and tonicity.

In the New Ages, with the consolidation of scholarly thinking, a tonal relationship with a sounding was discovered. Attempts were made to define each musical tone exactly, to check its pitch and metronomically specify the value of its rhythm. Besides, the functions of each tone were exactly defined in the mode (J. F. Rameau)³, strict models of the moving of tones were composed, specifying the exposition of tones, the changes in their relationship and a resultative end. The groomed tonal principle of composing made possible to contrast to a great extent separate tones and their complexes (chords, keys, textures, form sections). On the other hand, composers learnt to mix contrasts, synthesize, introducing new qualities of sounding.

J. Hauer declares the maximum separation (contrasting) of each of the 12 tones in his atonal melos conception.⁴ Here no place remains for any interrelations of tones (obertonal, chromatic, functional). An atonal conception faced great difficulties in its realization. One can realize today that to separate one tone from another and isolate on an absolute scale is compositionally impossible. It is worth recollecting the well known thesis that each tone is an accord (J. F. Rameau, H. Riemann).⁵

Tonicity (tones as parts) in a tonal music has most vividly manifested itself in second bas glides also in slides of harmony, without repeating the sounds of a previous chord. It has been noticed that with an increase of common tones among joining chords – analogically, common chords between different keys, tonicity contrasts become weaker. With the weakening of tonicity links, the space of the expansion of harmony sonantism (fonism) opens itself. Besides, the evolution of tonality in the 20th century draws in all 12 tones and autonomically dissonant accordics. This is how an approach is made to the tonality of a pandisonantic type.

Analysis

After the discussion of the most general aspects of sonorism, it is proper to analyse a specific interval at a second. It takes no time to notice that an interval at a second more than any other provokes a topical for today sonantic relationship with sounding. Therefore, it is proper first of all to clear up the type of an interval at a second during various composing times. That is why we will try to highlight universal features of the second interval by juxtaposing it with a wider interval. For the sake of obviousness we will compare the second interval to the fifth interval, which is diametrically opposite with its qualities.

Unlike the fifth, the second interval is especially convenient for the expression of melodic horizontal. Second tones, by following one after another do not create any acoustic links. More precisely, melodic second tones as if oust each other. No way can we state the same about fifth. Its tones have close acoustic relations. Therefore by acquiring a distance from each other, the tones of this interval naturally flow towards a harmonic vertical. By comparing both intervals as different verticals we can easily notice that seconds (both major and minor) sound intensive and are dissonant with regard to the fifth. Furthermore, second tones are not subordinated and sound on a par. In turn, the fifth because of the combination of tones presupposes a clearly audible base tone, which is dominating over the upper one.

Hence the second interval is characterized by the opposition (parity) of tones and intensity and dissonance of its simultaneous expression.

Seemingly precisely these universal psychoacoustic features of perception of an interval at a second influenced a gradual refinement of its sonoric characteristics until our times.

Let's illustrate this process, which we could describe as the process of sonoristic emancipation with particular music examples.

³ For more see: Rameau J.-Ph. 1722.

⁴ For more see: Hauer J. M. 1923.

⁵ For more see: Riemann H. 1920.

Unique examples of second sonorism can be found in the works of genius Lithuanian composer and painter M. K. Čiurlionis. In Example 1, in the 2nd measure of upper piano part, minor second sounds in different octaves. We can discover juxtaposition of a wide and narrow interval, e. g. a second is added to the lower sound of an octave (F \sharp 3–G2–F \sharp 2) or vice versa, a second is added to the upper sound (G1–F \sharp 2–G2). Ostinato figuration of this part is directly prepared by the previous measure (m. 1). Here the trill of the minor second (F \sharp –G) is overgrown with adjacent second sounds (E \sharp , A \flat), later this concentration of seconds is as if reduced to the figuration of seconds through octaves (m. 2).

Due to the systematic use of a minor second, the analyzed episode acquires a connotation of sonorism. This impression is even more evident in the next example (Ex. 2). In the upper voice the Lithuanian ethnomonody *Motule mano* is expressed via chords. It is accompanied by the sequence of seconds vibrating in bass (E–F–G–A). The sequence illustrates the systematics of sonoric formation expressed with a rather large-scale composing plan.

A verticalised version of the sequence can be seen in Lithuanian instrumental *sutartinė* (Ex. 3). Each next voice entering by a second here signifies the structures of second sonore (D \flat –C–B \flat –A \flat –G \flat). It is later repeated as ostinato.

Analogies of second sonorism can be discovered not only comparing a second with an octave, but also with other wide intervals – sixth, fifth, fourth.

In this example (Ex. 4) we can see a systematic attachment of a minor second to a sixth, which sequentially rises, and then descends (see slur between both parts). Similar bonded elements of sixth-second are known in Lithuanian ethnomonody (Ex. 5). The elements of octave-second or sixth-second are like the reductions of sonoric melodic intonations (Ex. 6).



Example 1. VL 341



Example 2. VL 341



Example 3. PLLIM 106



Example 4. VL 324



Example 5. JČLLM 81



Example 6. JČLLM 57

Čiurlionis impressively disclosed sonorism of a second by using the intervals of a fifth and fourth. By adding a second to the bottom of a fourth interval and the top of the fifth interval, the composer is forming an ostinato motif which is repeated systematically (Ex. 7, see the bass part).

Similar examples can be discovered in Lithuanian ethnomusic. Let's compare the previous example with *sutartinė* (Ex. 8) and monody (Ex. 9).

Third and second intervals bond similarly. A second is able to adjoin by crossing the ambitus of a third or by staying in its inside (Ex. 10). Here at the end of bass part (m. 3–4) we can observe the transformation of sonoric elements: third-second, fourth-second, fifth-second.

Sonoric third-second elements are evident in Lithuanian monody of laments (*raudos*, Ex. 11).

By systematically using a second near a wide interval, the composer, as we observed, is sonorising a melodic horizontal. However he is not limiting himself just to that. In his works we can find a harmonic vertical influenced by similar sonorism (Ex. 12). The first two-measure phrase of this example is slowly increasing vertical sonoritic intensity, and then, in the next measure is releasing it (m. 1–2). Similarly, however, in other height, the same sonoristic model is repeated in the next phrase (m. 3–4). A sonoric intensity of the third phrase is constructed in an alternative order. A maximally dense vertical is at the beginning, and then is alternatively released (m. 5–6).

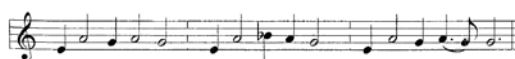
By comparing the last episode with the figuration of chords typical of romantic composers, we can see the principal difference (Ex. 13). In the example of music by F. Chopin, the figuration of chords is based on the slides of seconds to third tones, and this essentially keeps almost an equal intensity of harmonic verticals.



Example 7. VL 343



Example 8. PLLIM 35



Example 9. JČLLM 78



Example 10. VL 340



Example 11. JČLLM 80

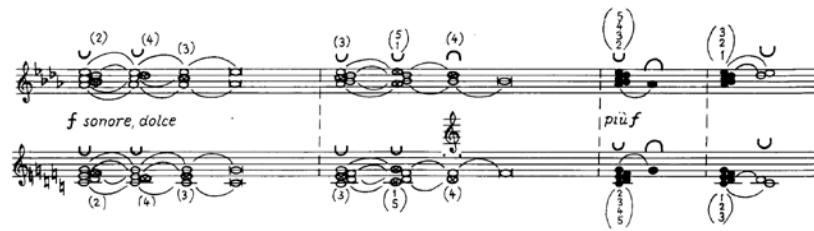


Example 12. VL 261



Example 13. Chopin, Etude op. 25 No. 11

Principles of sonorism are refined in 20th century music. Sonorism of a second definitively becomes detached from melodic slides in the seconds and chords based on thirds (Ex. 14). Here the operation of filtration of second complexes is used. It reveals a direct link between narrow (second) and wide (fifth) intervals.



Example 14. KJ, Sound-filtering, p. 22

In the next episode (Ex. 15) by concentrating even more seconds into a sonoric complex wider leaps of intervals (third, sixth, seventh) are used in parallel. In turn a sonoric horizontal appropriately develops an inherited traditional model of a melodic jump and its filling (Ex. 16). Here we see a second nearby a third (a), a second nearby a fourth and fifth (b), and second nearby an octave and a sixth (c).



Example 15. KJ, Consolation, p. 26



Example 16. KJ, Hommage a Jeney, p. 2

Addition

The carried out analysis of musical fragments (Ex. 1–16) enables one to perceive how an episodically showing itself a sonantic feeling of sounding (Čiurlionis) purifies a sonantic relationship with sounding (Kurtág). Tonal episodes of Čiurlionis' music absorb the sonorism of seconds popular in Lithuanian ethnomusic. Of interest is the fact that the composer interprets oppositions of seconds, peculiar to Lithuanian monodies, sonorically (Ex. 4–6, 7 and 9, 10–11). The sonorics of *sutartinės* due to an instrumental practice seem to draw nearer the examples of a tonal opposition in a monody. Therefore, a *sutartinė* can be perceived as a natural polyphony (Ex. 8–9). Different from arpeggio woven by the seconds by romantics (Ex. 13), Čiurlionis' slides of the seconds are sonantically autonomous (Ex. 1, 2), and vertically charged with seconds are dissonantly (sonorically) emancipated (Ex. 12).

Conclusions

The theoretical analysis with musical examples logically leads to the following principal conclusions:

The sonorism of an interval at a second is a partial case of a more general sonorism phenomenon and is determined by the composer's sonantic relations with sounding.

Due to a sonantic relationship, the composer discovers and realizes a sonoric field. This field can be dense, intensive (sonor) or lucid, panconsonantic (sonant). A tonal relationship with sounding is an opposition to sonantic. Due to a tonal relationship, a composition is made up of tones (small parts) and their groups, until it is induced into the whole of the work. In its turn, a deductive reduction is more topical to a sonoric field.

Composing tonally, a priority is given to the height and rhythm of the sounds while timbre and dynamics are more characteristic of sonors.

In the course of the evolution of music, a sonantic and tonal relationship with sounding would periodically change each other by this rhythm:

Worldoutlook	Composers relationship with sounding	Sound structure
myths of fire	sonantic	<i>sutartinė</i>
the world tree	tonal	monody
theocentrism	sonantic	sonants
scholarly thinking	tonal	tonality
new technologies	sonantic	synthesis of sonors

The model of the change of composing principles, besides, discloses transitional ambiguous positions (a monophone of diaphonia, the psalmodia with an opposition of an initial and final tone, a pansconsonating bass, a pandissonating tonality).

M. K. Čiurlionis' late period works disclose some manifestations of a dissonant, mode tonality. The composer seems to be the herald of a purified sonorism. His dissonant openings base themselves on the heritage of Lithuanian ethnomusic which is masterfully sonorized.⁶

Translated by Laima Zabulienė

Abbreviations

- JČLLM Čiurlionytė, Jadvyga (1999). *Lietuvių liaudies melodijos* [Lithuanian Folk Melodies]. Vilnius: Lietuvos muzikos akademijos.
- KJ Kurtág, György. *Játékok: zongorára* [Games: for piano]. Editio Musica Budapest, II.
- PLLIM Paliulis, Stasys (1959). *Lietuvių liaudies instrumentinė muzika* [Lithuanian Folk Instrumental Music]. Vilnius: Valstybinė grožinės literatūros leidykla.
- VL The list of M. K. Čiurlionis' Musical Works compiled by V. Landsbergis (Landsbergis V. Čiurlionio muzika [Čiurlionis' Music], Vilnius: Vaga, 1986, p. 223–296).
- VLKF Čiurlionis M. K. *Kūriniai fortepijonui. Visuma* [Compositions for piano. Completed]. Kaunas: Jono Petronio leidykla, 2004.

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⁶ For more see: Janeliauskas R. 2001, 2002, 2003.

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Sekundos intervalo sonorizmas tyrinėjant lietuvių etnomuziką, M. K. Čiurlionio ir XX a. kompozitorių kūrinis

Santrauka

Straipsnyje sonorizmo aspektu tyrinėjami M. K. Čiurlionio, etninės ir XX a. muzikos epizodai. Iškeliama ir argumentuojama idėja, kad įvairios sonorizmo atmainos atsiranda dėl sonantinio kompozitoriaus santykio su skambesiu. Skirtingai nuo toninio santykio, būdingo tonaliai muzikai, kai mąstoma tonais tarsi fizinio kūno dalelėmis, sonantinis kompozitoriaus santykis sublimuoja sonorinį lauką. Žvelgiant istoriškai, sonantinis ir toninis santykiai periodiškai keisdavo vienas kitą. Archajinių sutartinių sonorizmą (ugnies mitai) keitė monodijos tonų opozicijos (pasaulio medžio įvaizdžiai), viduramžių ir Renesanso sonantas (teocentristinė pasaulėjauta) išstūmė tonalumas (Šviečiamasis amžius). Naujosios garso sintezės technologijos sudaro sąlygas vėl plačiai atsiverti sonantikos ir sonorizmo fenomenams. Be to, sonantinių ir toninių fenomenų kaitos ritme pastebimos pereinamosios, difuzinės zonos, kuriose naujasis santykis su skambesiu išauga iš ankstesniojo. Todėl sonantiškumo ir toniškumo fenomenai susipina sutartinių monofonuose, pradinių ir baigtinių psalmidijos tonų opozicijose, pankonsonuojančiame bose, pandisonuojančioje tonacijoje ir pan.

Straipsnyje susitelkiama prie sekundos intervalo sonorizmo, kuris interpretuojamas kaip platesnio sonantikos reiškinių dalinis atvejis. Sekundos sonorizmas (tirštas, intensyvus) – visiška priešingybė skaidriems, neintensyviems, perfektiniams viduramžių sonantams. Gretinant sekundos intervalą su bet kuriuo kitu (platesniu) intervalu, galima pastebėti įvairialypius sonorizmo niuansus (spalvą, tembrą, intensyvumą, tirštumą).

Muzikos analizė padėjo išsiaiškinti, kaip epizodiškai pasireiškianti sonorinė skambesio pajauta išauga į sonantinį santykį su skambesiu (M. K. Čiurlionis – G. Kurtág); kaip tonalūs Čiurlionio muzikos epizodai absorbuoja sekundų sonorizmą, paplitusį lietuvių etnomuzikoje. Įdomu ir tai, kad Čiurlionio melodinės sekundų slinktyje dėl pasikartojančių ostinatų tampa sonoriškai autonomizuotos, o prisodrinta sekundomis vertikalė – disonansiškai (sonoriškai) emancipuota.

Reziumuojant galima teigti, kad vėlyvojo M. K. Čiurlionio kūrinuose pasireiškė disonuojančio derminio tonalumo fenomenas. Kompozitorius – tarsi būsimos išgryninto sonorizmo šauklys. Beje, jo disonantinės atvertys savo ištakomis siekia lietuvių etnomuzikos paveldą, kuris meistriškai sonorizuojamas.

Reikšminiai žodžiai: sonantinis santykis, sonantas, sonorinis laukas, sonoras, sonoristinis tirštumas, intensyvumas, sekundos sonorizmas, toninis santykis, disonantinis tonalumas.

Interaction of Sonoristic and Non-Sonoristic Material: Various Aspects of Musical Form and Aesthetics

Annotation

The article discusses music that contains both sonoristic and non-sonoristic materials. Their relationships frequently reflect the interaction of different styles (eras) as a significant feature of the culture of 20th/21st centuries. The manifestations of the interactions are diverse and unique; however, it is possible to define some of the most common models. In the article, they will be summarized and illustrated using examples from contemporary Latvian music, and a world context will also be provided.

The article will deal with the following models:

- 1) sonoristic material as a symbol of mystical world and eternity that often appears at the beginning and the end of a composition, while the remaining material is mostly non-sonoristic (with examples from music by Eriks Ešenvalds and Santa Ratniece);
- 2) sonoristics as a tragic culmination (catastrophe, collapse) of the development of non-sonoristic material (with examples from the works of Pēteris Vasks);
- 3) sonoristic material as a transformation (sometimes a parody) of non-sonoristic (neo-classical, neo-romantic) thematism – the main aesthetic idea is a contemporary modification of the classic values of the past (with examples from music by Arvo Pärt and Pēteris Plakidis).

Additionally, further models may be mentioned. The article is meant to encourage an evaluation of the forms of dialogue between the sonoristic and non-sonoristic material and the aesthetics they represent.

Keywords: sonoristic and non-sonoristic musical material, three models of interaction, main aesthetic ideas, sonorism in marginal phases and in culmination, alternating or simultaneous use of non-sonoristic and sonoristic material.

1. Introduction

For some time the researchers of sonorism mainly studied the *inner* essence of this compositional technique – sonorism and related phenomena are theoretically described both by composers (the classification of clusters by Henry Cowell (1930); the description of the net structure by György Ligeti (1960); the typology of the sound types of new music by Helmut Lachenmann (1970), etc.), as well as musicologists, for example, by Maria Anna Harley (1998), Alexander Maklygin (Маклыгин 2005), Zbigniew Granat (2009), et al. However, there has been comparatively little research focusing on the *external* environment of the sonoristics, e.g., its interaction with other, non-sonoristic musical material if it is used in the composition.

The forms of such interaction will be the main topic of this research. Attention will be paid to compositions, which include only episodic use of sonoristics – e.g. this technique is used in dialogue or confrontation with a relatively traditional melodic thematism. Such compositions were created by composers of different eras – many of them appeared at the time when the concept of sonorism had not yet been defined, respectively until the end of the 1950s/early 1960s, starting with the music of the so-called “cluster man” Henry Cowell (Chase 1992/1955: 578) or Béla Bartók. The clusters in their compositions will usually interact with a traditional melodic thematism. It is noteworthy that one of the first radical sonorists – Krzysztof Penderecki – in some of his works, for example, in the *St. Luke Passion* (1966), did not use sonoristics through the entire work, but used them merely as a particular means of expression in separate moments of development.

Latvian composers, starting with the first sonorists in the second half of the 1960s – Pēteris Vasks and Pauls Dambis – and then until the beginning of the 1990s, almost always used this technique in the interaction with a non-sonoristic, melodic thematism. This might be explained by the great influence of the neoromantic style¹ and the corresponding cult of melody in the Latvian music of this period. Only starting from the beginning of the 1990s did the sonorism appear in the works of many Latvian composers, particularly representatives of the young and middle generation, as the main and often the only kind of texture. Of course, there are also exceptions, for example, the works by Eriks Ešenvalds, in which sonoristic effects are used only occasionally.

Consequently, the forms of interaction of sonoristic and non-sonoristic thematism have existed for several decades and, although each of these forms is individual, we can at least in part systemize them into some groups which reflect various aesthetic correlations. The **aim** of the article is to analyze the most common models of such interaction. Several examples from the works of both foreign and Latvian composers will be provided.

¹ Read more about the neoromantic tendency in the Latvian music of this time in the Summary of the doctoral work by Jānis Kudiņš (Kudiņš 2008).

2. The first model: sonoristic material as a symbol of mystical word and eternity that often appears at the beginning and at the end of the composition

We can already find the historical roots of this model in several examples of romantic music; however, it is even more visible in the works by impressionists. They frequently reflect a slow moving and finely nuanced process of approaching and distancing with barely perceptible shades of transition between sound and silence. This creates an impression that music comes from a mysterious twilight or fog and returns to it; we could mention the apt observation by musicologist Jann Pasler: “These composers’ [impressionists – *B. J.*] attempts to explore the fleeting moment and the mystery of life led them to seek musical equivalents for ... fog, clouds and the night” (Pasler 2001: 91). That is why the beginning and the end of the compositions often contain those “musical equivalents” – chords, which can be regarded as precursors to sonorism because their coloring is more significant for the musical context as their harmonic function. In contrast, the central section of the composition, figuratively speaking, reflects a gradual retreat of twilight (fog), and a traditional or melodic thematism comes here to the foreground. The prelude *The Sunken Cathedral* by Claude Debussy is one of the best known examples of this conception. It begins with distinctive parallelisms of fourths and fifths which emphasize the mood of emptiness and remoteness coloring (mm. 1–15). The melody on this background arises only later, and in the central section of the work (mm. 28–41) it sounds really broad and sonorous, like a hymn. Then the music gradually returns back to silence, and the coloristic chords of fourths and fifths dominate at the end of the prelude again (the last 6 measures).

Another example of such development is the composition *Night Music* from the cycle *Out of Doors* by Béla Bartók. In this case, we can perceive the muffled seconds which are merged with a pedalization as forerunners of sonorism. They dominate in the beginning of the composition (mm. 1–16). In the central section of the work, these intervals become a background for two melodic themes in the mood of Hungarian folk music: at first we hear a theme with a song-like character and then a dance. At the end of the piece both melodies are slowly fading, we only hear some brief echoes, and the main method of expression in the last five measures is again the coloristic of the muffled seconds.

An example where a similar model is found in contemporary Latvian music, which does not just simply use the forerunners of sonorism (coloristic), but also true sonoristic thematism is *A Drop in the Ocean* (2006), the choir composition by **Ēriks Ešenvalds** (born 1977). This work was dedicated to the memory of Mother Theresa. The choice of the title was inspired by the words that she said about her life’s work: “My work is nothing but a drop in the ocean, but if I did not put that drop, the ocean would be one drop the less.”²

The composition begins with the use of some sonoristic elements in the voices of the choir – whistling and quasi-loud breathing, which symbolizes the rustling of the infinite ocean (Fig. 1). Gradually a melody arises as well, and its role, over time, becomes greater; in the central section of the work (from measure 55) each choral part contains an expressive melodic line, and elements of sonorism disappear completely. The end of the composition is characteristic for Ešenvalds: a brief melodic ostinato is repeated many times until it gradually fades and merges with the silence. And at the same time, the sonoristic features return in the voices of the choir – whistling and breathing as an imitation of the rustling of the ocean (Fig. 2).

Māks Terēzas piemiņai / In Memory of Mother Teresa
A DROP IN THE OCEAN
PILIENS OKEĀNĀ

Ēriks Ešenvalds
(*1977)
ca. 30'

*1 - Whistles each staff avoid of synchronism!
*2 - To create mystical atmosphere, T and B should imitate quasi loud breathing.

*3 - S II div. in 2-3 as independent and non-synchron singers following the S I as echo.
*4 - Before the last

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Fig. 1. Ēriks Ešenvalds, *A Drop in the Ocean*: beginning

² See mm. 90–118 of the composition by Ešenvalds.

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S solo

less, the less, the less, the less, the less, the less, the less, the less...

S I

S II, III

A I, II

A III

T I, II

B I, II

meno

dim.

meno

dim.

dim.

dim.

2006

Fig. 2. Ēriks Ešenvalds, *A Drop in the Ocean*: ending

We can also find a somewhat similar conception in *Chu dal* (*Silent Water*, 2008), the choir composition by **Santa Ratniece** (born 1977).³ In this work the sonoristic material is also dominant, mainly in the first and final section of the musical form.⁴ It is opposed by non-sonoristic thematism in the middle section, which in turn contains melodic beauty and expressivity and, similarly to Ešēnvalds, reflects a more subjective, neoromantic character. The conception of *Chu dal* was inspired by the history of Tibetan monks wandering to the Namtso Lake. The composer describes it as follows: "In the middle of this lake is an island that monks go to in the winter, when the water is frozen, and meditate there until the following winter. Then they can return to shore by crossing the ice once again. The form of the piece sketches this freezing in its marginal phases, with the melting, sunny, springtime island at its center. ... The long road upward to Namtso is begun at Uvs Nuur Lake in Mongolia, near the Tuvan border."⁵

⁵ Ratniece, Santa. *Choir music*. http://santaratniece.blogspot.com/p/blog-page_19.html (accessed 25/01/2015)

In the marginal sections of the form, in contrast to the polymelodic middle section, various effects of a voiceless sound dominate; they bring to the music a mystic nuance. Along with various nuances of vibrant lines, there is also the element of onomatopoeia as a glissando that imitates wolves howling. The composer herself has said about this work: "Tuva is located on the northeastern side of Ubsu-Nur, and their inhabitants inspire me with their peculiar ability to imitate the voices of animals (deer or wolves), and communicate with them."⁶

It can be summarized that in this case as well, sonoristic in the first and last section of the composition could be perceived as a symbol of the mystical world, of eternity, but at the same time as a representation of pristine and wild nature, without any urbanistic transformation. Therefore, the musical language emphasizes an archaic syncretism, frequently together with elements of traditional music and onomatopoeia. Thus the model inherited from impressionism is still evolving in the 21st century different interpretations, at times only having small traces of the origins of this conception.

3. The second model: the use of sonoristics to highlight the dramatic culmination

While the origin of the previous model was connected with impressionism, this next model may be considered as expressionistic – of course, only in the broadest sense of the word. The sonoristic technique is used in this case for creating effects that are not unreal and mystic, but extremal and dramatic. The main methods are a rich usage of clusters in a high dynamic gradation and a transformation of instrumental timbres; they appear in an uncomfortable tessiture and so reflect an extreme escalation of tension.

Such an interpretation of the sonoristic possibilities can be found in the work that is considered a manifest of this technique – *A Threnody to the Victims of Hiroshima* (1960) by Penderecki, with its twelve tone clusters and remarks requiring the highest possible pitches for the string instruments so that the sound is similar to the cry of pain.

The influence of such a dramatic interpretation of sonorism is seen in the music of **Pēteris Vasks** (born 1946). Along with Pauls Dambis (born 1936), he is one of the founders of sonorism in Latvian music. In the second half of the 1960s, Vasks studied at the Vilnius Conservatory and, as a member of a group of students, attended the Warsaw Autumn Festival. Here he became familiar with the sonoristic music of Polish composers that influenced his own works in the 1970s and 1980s. However, unlike the *Threnody* by Penderecki, Vasks had never used sonoristics throughout an entire composition. He prefers an interaction of sonoristics and non-sonoristic musical thematism according to a certain model. Namely, sonorism together with aleatorics appear frequently as a tragic culmination (catastrophe or collapse) in the development of the non-sonoristic material⁷; the musical form is mainly through-composed and contains a dramaturgical crescendo.

One of the examples is the *Drama* from the *Cycle* by Vasks (1976). There are two kinds of non-sonoristic material. The first contains nervous and fitful, impetuous motifs. We can recognize them by sharp syncopes, rising and chromatic minor seconds and harsh dissonances as major sevenths a.o. This kind of thematism may be associated with an expression of a protest or desperate anointing (see Fig. 3, mm. 1, 5, 9–11). The second kind of material is based on tritone unisons and a slower pulsation.

Fig. 3. Pēteris Vasks. *Drama* from the *Cycle*: ending

⁶ Diena.lv. (19.10.2009.). Latvijas Radio kora izpildījumā skanēs "Mijkrēšļa dziedājumi [Latvian Radio Choir will perform *Twilight chants*]. <http://www.diena.lv/izklaide/latvijas-radio-kora-izpildijuma-skane-mijkresla-dziedajumi-695026> (accessed 10/12/2014)

⁷ There is also a distant similarity with another work by Penderecki – his *St. Luke Passion* (1966) – that contains both sonoristic and melodic thematism. Sonoristic is used in dramatic moments. Musicologist Alexander Ivashkin observes that "a certain intonative sphere remains in the voices of the orchestra (the choir is interpreted as merely sonoristic – as the crowd shouts)" (Ивашкин 1983: 73).

It may be perceived as an expression of fatality (see Fig. 3, mm. 2–4, 6–8). It is noteworthy that this second kind of thematism appears in the *Drama* each time in a richer texture, as a more and more thickening danger (see score numbers 7 and 9). In one sense, it symbolizes the question that Vasks rhetorically asked in one of his interviews 1989 and that has strongly influenced his music: “Is a man or mankind able to overcome the urge of destroying that – I do not know even how to name it – what is sitting inside a man and occasionally flares with black flames?” (Jakubone 1990: 157).

The sonorism is manifested at first by a cluster (dynamic gradation *fff*) already at the beginning of the work, and during the *Drama* such a cluster is repeated twice (after score No 8) – as a laconic, brusque answer to the theme of protest. However, the main and the most durable manifestation of sonorism is the ending of the *Drama*: when the alternating development of both non-sonoristic materials has reached an apogee of a tension, it is followed by the culmination as a catastrophe: clusters, among them a forearm cluster in a very loud dynamic symbolizing a collapse and the futility of all the previous battles and protests (see Fig. 3, score No 10).

Vasks himself has mentioned that some of his compositions have a hidden programme that is influenced by the *Quartet for the End of Time* (1941) by Olivier Messiaen, and music reflects the dramaticism of the era – “a situation when mankind has come near to crisis, to catastrophe” (Jakubone 1990: 157).

A partially similar conception is found in the *Burlesca II* from the piano trio *Episodi e canto perpetuo* (1985) that Vasks had dedicated to the above mentioned Messiaen. In this composition we find the same model of interaction between two kinds of mostly non-sonoristic material until the apogee and a sonoristic culmination with the cluster (score No 46) which is perceived as a tragic collapse.

4. Third model – sonoristics as an element of collage

This model frequently reflects the dialogue (or confrontation) not only of different textures, but also of different styles (or eras) as a significant feature of 20th–21st century culture. In this case, the sonoristic material encourages a transformation (sometimes a parody or a caricature) of the non-sonoristic (neo-classical, neo-romantic) material, the main aesthetic idea is a contemporary modification of the classic values of the past. There is also a certain resemblance with the conception of the famous novel *The Picture of Dorian Grey* by Oscar Wilde (1891): the same face in different time periods gains surprisingly different traits, and the present is perceived as a parody (caricature) of the past.

Among the best known examples of such a conception in music is the Sarabande from the *Collage on BACH* for strings, oboe, harpsichord and piano by Arvo Pärt (1964). This composition is based on the Sarabande from the Sixth English Suite by Johann Sebastian Bach and consists of two kinds of sections; firstly, the material from the Sarabande by Bach in the instrumentation by Pärt that is sustained in the Baroque style; secondly, the imitation of the same material, as a kind of *Kingdom of Crooked Mirrors*, namely, the classical harmonies by Bach are replaced with clusters, and the sounding is strange, unreal. The alternating of the non-sonoristic/sonoristic material is constructed according the scheme a-b-a1-b1-a2. Pärt has also left the last word to Bach and thus he indirectly reveals his view on the permanent and the changeable in the confrontation of past and present.

One of the contemporary Latvian composers who have done the most cultivation of different forms of stylistic interaction is **Pēteris Plakidis** (born 1947). By the transformation of the stylistic of the past, he episodically also uses elements of sonorism; one example is his piano trio *Romantic Music* (1980) (Fig. 4). This work demonstrates another approach to the interaction of the past and present that we have seen in the Sarabande by

The image shows a musical score for a piano trio, specifically an excerpt from Pēteris Plakidis' 'Romantic Music'. The score is written for violin, viola, and piano. It features complex textures with clusters and dynamic markings like 'poco f'. The notation includes various musical symbols such as notes, rests, and dynamic markings, illustrating the interaction of different styles and textures.

Fig. 4. Pēteris Plakidis, *Romantic Music*: an excerpt

Pärt. In the work by Plakidis, a neoromantic theme in a classical tonality (G-Major, both string instruments) appears simultaneously with sonoristic flecks in the piano score – brief motifs or intervals of seconds – that are harmonically incompatible with the melody and sound in a high register and in muffled dynamics.

On the one hand, we can perceive these motifs as a manifestation of humor that is a characteristic feature in the nature and music of this composer. On the other hand, they also reflect a philosophical dimension – an estrangement of the stylistic of the past from the contemporary age, the unreality of former values. The interpretation of the conception could also be, as well as in the Sarabande by Pärt, ambiguous and could evoke different associations.

5. Conclusions

- The content, expressed during the use of sonoristics in the interaction with non-sonoristic material, can be variable. However, there are two main spheres of content that dominate: the first is connected with mystic and unreal images, the second – with an extremely dramatic tension.
- Both of the above mentioned spheres reflect a succession to the traditions of the past – on the one hand, to impressionism with its harmonical and tembral coloristics, on other hand, to expressionism with its congestion of dissonances and feeling of insolubility.
- The conceptions of interaction between sonoristic and non-sonoristic material are often influenced by programmatic ideas or a hidden programme; it is evidenced practically by all the analysed compositions.
- This article cannot be considered as a comprehensive study of the interaction between sonoristic and non-sonoristic material. However, it could serve as a methodological encouragement for future researches of this topic. Such studies could enrich the concept of sonorism in different aesthetic contexts that reflect not only the specifics of the music, but also contemporary art trends in general.

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Sonoristinės ir nesonoristinės medžiagos sąveika: įvairūs muzikinės formos ir estetikos aspektai

Santrauka

Straipsnyje aptariama sonoristinės ir nesonoristinės kilmės medžiaga muzikos kūriniuose. Šių skirtingų medžiagos tipų santykis dažnai atspindi skirtingų muzikos stilių (laikotarpių) sąveiką, ypač būdingą XX–XXI amžių muzikinei kultūrai. Nors tokios sąveikos apraiškos esti įvairios ir unikalios, vis dėlto galima išskirti kai kuriuos labiausiai paplitusius modelius. Straipsnyje aptariami būdingieji šių modelių bruožai, iliustruojami pavyzdžiais iš šiuolaikinės Latvijos ir kitų šalių muzikinės kūrybos.

Straipsnyje plačiau nagrinėjami šie modeliai:

1) sonoristinė medžiaga kaip mistinio pasaulio ir amžinybės simbolis, dažniausiai pasigirstanti kompozicijų pradžioje arba pabaigoje; tuo tarpu kita kūrinys naudoja medžiaga yra nesonoristinės kilmės (pavyzdžiai iš Ėriko Ešenvaldo ir Santos Ratniecės kūrinių);

2) sonoristika, pasitelkiama kaip nesonoristinės medžiagos plėtotės tragiška kulminacija (katastrofa, kolapsas) (pavyzdžiai iš Pėterio Vasko kūrinių);

3) sonoristinė medžiaga kaip nesonoristinio (neoklasikinio, neoromantinio) tematizmo transformacija, įkūnijanti šiuolaikinę klasikinių praeities vertybių modifikavimo estetinę idėją (pavyzdžiai iš Arvo Pārto ir Pėterio Plakidžio kūrinių).

Be šių trijų pagrindinių modelių, straipsnyje minimi ir kiti. Straipsnio tikslas – paskatinti svarstymus apie dialogo tarp sonoristinės ir nesonoristinės medžiagos formas bei estetikas, kurias jos reprezentuoja.

Reikšminiai žodžiai: sonoristinės ir nesonoristinės muzikos medžiaga, trys sąveikos modeliai, pagrindinės estetinės idėjos, sonorizmas užuomazgų ir kulminacijų fazėse, alternatyvus ar viena laikis nesonoristinės ir sonoristinės medžiagos naudojimas.

Intervallic Ratios as Keys for the Harmonic Texture Development in György Ligeti's *Melodien*

Annotation

The subject of this article falls within my musicological research on the contemporary period and is focused on the exploration of micropolyphonic methods which György Ligeti applied to a number of his orchestral works to generate various, previously unheard, interactive harmonic textures.

Although the aesthetic trajectory Ligeti follows is differentiated from those of 'pure' sonoristic composers such as Penderecki, Lachenmann, Sciarrino, his micropolyphonically constructed textures often create sonoristic environments based not on timbral, but mostly on pitch material. Various pitch series and intervallic ratios are often used as starting points for the generation of multi-layer canonic textures and imitative passages. Both the horizontal (melodic) and the vertical (harmonic) organisation of the pitch material form structures, which consist of linear sonic events, which in turn consist of multiple interactive, polyrhythmic gestures.

The orchestral work *Melodien* is not an exception from the above aesthetic direction. This article will attempt to present the principles applied by Ligeti in order to explore the sonoristic perspective of "Ligetiian" micropolyphonic sound clouds.

In particular, through *Melodien*, this article will focus on:

- how Ligeti's micropolyphonic techniques result in a variety of sonoristic textures;
- why Ligeti is usually placed among other sonoristic composers, even without using many instrument extended techniques;
- how the above techniques are applied to the orchestral work *Melodien*, the interaction between various types of Ligeti's harmonic surfaces, based on the juxtaposition and the densities of horizontal and vertical intervallic sonorities;
- a structural, textural and timbral synopsis of the above work.

Keywords: Ligeti, *Melodien*, micropolyphony, sonoristic harmony, harmonic texture, contemporary orchestral music.

1. The sonoristic element in Ligeti's language – micropolyphony

Previous literature on sonorism shows a variety of approaches to texture development, with timbre to be the centre of many composers' artistic interests.¹ Researcher Dr. Danuta Mirka describes sonorism as the exploration of pure sound values of the music material and characterises Krzysztof Penderecki's music as the earliest and most important manifestation.² From Penderecki and his contemporaries to the most recent generation such as Salvatore Sciarrino and Helmut Lachenmann, the exploration of timbre dominates almost every other parameter regarding the organisation of the music material. Looking back at the works by composers who set the foundation of what we currently call "sonorism", and taking into consideration that Ligeti uses extended instrumental techniques only occasionally (such as the "breath-tone passage" at his *Atmospheres*), one would reasonably wonder "what is the relation of Ligeti's compositional language and the one developed by the above group of composers?" The most possible key answer to the argument set above lies within the fact that Ligeti applied during the late 1950s and 1960s his unique, revolutionary and conventional approach to texture, based more on the timbral approach of harmony and less on the timbre itself. Jonathan Bernard, in his article "Inaudible Structures, Audible Music: Ligeti's Problem and its Solution", cites the composer's own words on the vertical thought for the works *Atmospheres* and *Lontano*:

"Technically speaking, I have always approached musical texture through part-writing. Both *Atmospheres* and *Lontano* have a dense canonic structure. But you cannot actually hear the polyphony, the canon. You hear kind of impenetrable texture, something like a very densely woven cobweb... The polyphonic structure does not come through, you cannot hear it, it remains hidden in a microscopic, underwater world, to us inaudible."³

During the second half of the last century, not only Ligeti but also an important number of European composers chose not to follow the integral serial thought and the aleatorism, but to establish a previously unheard style based on harmonic sonorities and the fluctuation of their densities. Penderecki, Lutoslawski, Xenakis and Ligeti, each of them following different principles, attempted the most significant approaches to the above aesthetic direction. Ligeti, opposed John Cage's aesthetic of "happening", moves toward a sense of

¹ *Sonoristics, sonorism* [Online]. Available: <http://www.oxfordmusiconline.com/subscriber/article/grove/music/2061689>.

² Mirka, Danuta (1997). *The Sonoristic Structuralism of Krzysztof Penderecki*. Katowice, Poland, Music Academy, p. 7–16.

³ Bernard, Jonathan (1987). Inaudible Structures, Audible Music: Ligeti's Problem, and His Solution. *Music Analysis*, Vol. 6, 207–236, p. 208–210.

flexibility in pitch and rhythm. Ligeti evolves his technique based on interwoven chromatic masses which often result in the obscuration of sound components.⁴ Undoubtedly, micropolyphony has been the most powerful tool for Ligeti to achieve a balance between timbre and the function of harmony. The form organisation often consists of successions of sonoristic events.⁵ Most of Ligeti's micropolyphonic textures consist of two levels: the outer-audible and the inner-inaudible. More specifically, the orchestral works *Apparitions* (1958–1959), *Atmospheres* (1961), *Lontano* (1967), *Melodien* (1971) and San Francisco Polyphony (1973–1974) explore the form of “moving clusters”⁶, which, because of their micropolyphonic structure, give a sense of internal motion.⁷ Hence, Ligeti chose not to destroy the Harmony but to cultivate a new style which sounds more as a sonority and less as a functional chord-sequence.⁸

1.1. The role of intervals

A few years after the creation of the major works which deal with what contributors describe as “sound masses”, Ligeti seems to aim to the rebirth of the intervals, which ten years earlier was abandoned. According to Ligeti:

“I disrupted the intervals: that is to say, I inserted so many minor seconds that even the minor seconds or the chromaticism disappeared in the harmonic sense.”⁹

Both Elliot Antokoletz and Paul Griffiths indicate that both static and canonic rules, which dominate Ligeti's major micropolyphonic works, result in the obscuration of the individual sound components¹⁰ and create several types of textures based on harmonies which do not change suddenly or successively, but they merge into one another.¹¹ Here, the specific, predominant arrangement of melodic and harmonic intervals play a fundamental role to determine the course of the music and the development of the form.¹²

2. *Melodien* – a structural and textural synopsis of the work

Melodien was composed in 1971, a few years later than *Lontano*, and three years before San Francisco Polyphony, the composer's last orchestral work. At this point one should underline that the orchestral works composed between 1958 and 1974 are some of the most representative examples which established Ligeti's micropolyphonic compositional language worldwide. According to Mike Searby and his article “Ligeti, the postmodernist?”, *Melodien* and *Chamber Concerto* are representative examples of the shift the composer gave towards melodic writing. While the traditional compositional means are almost destroyed by the majority of the composers during the 1960's, Ligeti dares to touch the “forbidden fruit” of modern music, which is the melodic shaping.¹³ Hence, forty-five years later, Ligeti's compositional methodology may answer to the composer George Dyson's concern regarding the melodic element in modern music's texture development.¹⁴ *Melodien* can be characterised as the composer's “pivot work”, which gradually change from the harmonic mass anonymity the individualism of multiple melodies¹⁵, to conclude a few years later setting the micropolyphonic thought on a triadic base.

The overall structure of *Melodien* can be described as a simple three-part form, not very distant from the sonata form of the classic era. The work consists of an Exposition part with two basic ideas (the modal gestures and the unfolding melodic lines respectively), an Elaboration part (compressions-expansions of harmonic material), a Recapitulation part and a Coda.

⁴ Antokoletz, Elliot (1992). *Twentieth-century music*, Englewood Cliffs, N.J., Prentice Hall, p. 490–497.

⁵ As mentioned by Bernard (1987: 208–210).

⁶ Morgan, Robert (1991). *Twentieth-century music: a history of musical style in modern Europe and America*, New York, Norton, p. 389.

⁷ As mentioned by Morgan (1991: 389).

⁸ Plaistow, Stephen (1974). Ligeti's Recent Music. *The Musical Times*, Vol. 115, 379–381, p. 379–380.

⁹ Bernard, Jonathan (1999). Ligeti's Restoration of Interval and Its Significance for His Later Works. *Music Theory Spectrum*, Vol. 21, 1–31, p. 379–380.

¹⁰ As mentioned by Antokoletz (1992: 490–497).

¹¹ Griffiths, Paul (2010). *Modern music and after* [Online]. New York: Oxford University Press. Available: <http://public.eblib.com/EBLPublic/PublicView.do?ptID=716676>.

¹² *Ibid.*

¹³ Searby, Mike (1997). Ligeti the Postmodernist? *Tempo*, Vol. 119, 9–14, p. 9–11.

¹⁴ Dyson, George (1923). The Texture of Modern Music. *Music & Letters*, 4, 107–118, p. 108.

¹⁵ Steinz, Richard (2003). *György Ligeti: Music of the Imagination*. Boston, Northeastern University Press, p. 179–180.

2.1. Exposition part

The expressive opening of *Melodien* (bars 1–10) is based on a moving cluster, formed by upward, quasi-modal melodic gestures, which are performed by all instruments except Violoncello and Contrabass. These gestures, described as superimposed waves¹⁶, do not form an audible counterpoint, but they do generate a complex interweaving texture, which consists of a solid amalgamation of horizontal and vertical major and minor seconds.¹⁷ Macro-structurally, a sequence of pitches was used as starting points for each of the gestures. Those pitches also form a modal, ascending background and control the whole cluster's direction. Here, one could agree with composer Bruce Reiprich who underlines that each of Ligeti's layers are not totally independent but often merge with the preceding and the succeeding ones to sound like "organic continuations."¹⁸ Figure 1 illustrates the pitches used as starting points for each of the layers of *Melodien*. This skeleton consists of small intervals, which cover a range from a minor second to a perfect fourth. At this point, it should be underlined that Ligeti uses traditional and conventional ways (i.e. part writing) which are almost inaudible. On the contrary, what reach the audience's ears are sequences of pure sonorities.

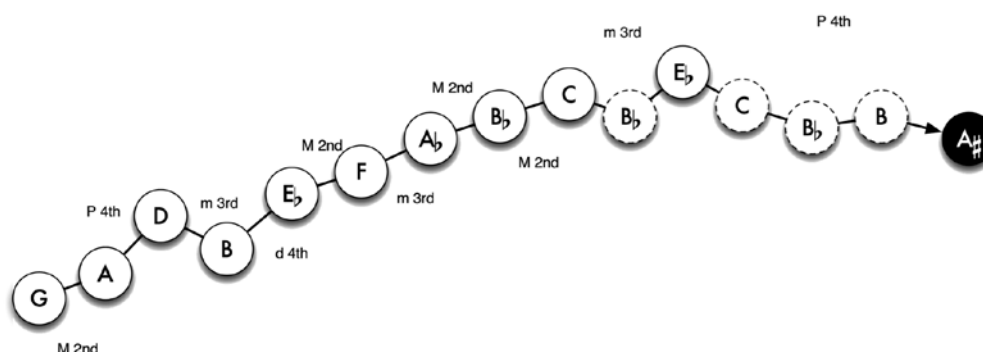


Fig. 1. Table of pitches

The second main idea of the work is set at bars 11–45. Contrary to the first part, here, Ligeti applies a technique which can be found in most of his major micropolyphonic works, the gradual unfolding of a single or various melodic lines. In particular, during the second part of *Melodien* (bars 14–29), a melody is gradually unfolded by the flute, the celesta, the xylophone and the violin. Figure 2 shows the first 4 (out of 57) steps of the expansion of the melodic material:



Fig. 2. Unfolding melody

Each instrument enters irregularly and each written part consists of different rhythmical sub-divisions.¹⁹ More specifically, the main melody unfolded by the flute is based on quintuplets. Similarly, the celesta, the xylophone and the violin parts are rhythmically based on septuplets, hexuplets and upbeat quavers respectively. The remarkable point of the above passage is the rhythmical asymmetries and irregularities Ligeti used to place vertically the four forms of the above melodies. The overlapping tuplets generate a micropolyphonic rhythmical effect during which the gradually unfolded material produces every possible harmonic interval. The parameter of rhythm always played an important role to the sonoristic development of Ligetian harmonic surfaces and *Melodien* is an important work based on the balance between the melodic line and the rhythmical

¹⁶ As mentioned in Steintz (2003: 179–180).

¹⁷ As mentioned in Searby (1997: 9–11).

¹⁸ Reiprich, Bruce (1978). Transformation of Coloration and Density in György Ligeti's *Lontano*. *Perspectives of New Music*, Vol. 16, 167–180, p. 167–168.

¹⁹ See also Bernard (1999: 379–380).

movement. Most of the micropolyphonic/polyrhythmic textures results in non static sonorities characterised by an inner motion which consists of multiple melodic and harmonic layers. Hence, the outcome of the above procedures often results in complicated harmonic, melodic and rhythmical sonorities. At this point, it should be mentioned that the opening of the third movement of the *Chamber Concerto* (1969–1970) can be considered as one more of the most representative examples regarding the poly-rhythmical element in Ligeti's micropolyphonic style.

2.2. Elaboration part

Bars 46–112 can be characterised as the main Elaboration part of the work. The music material is organised in three and four part chords, which were developed through various gradual intervallic compressions and expansions. Structurally, the middle part of *Melodien* consists of three developmental sections which are linked with two contrasting episodes. In particular, the first chord expansion takes place from bar 46 to 56. There, an arpeggiated chord (initially performed by the vibraphone, the piano and the violoncello) covers a range of an augmented fourth (pitches F–B). Gradually, as it is expanded to a compound minor third (reaching the extreme ends of the orchestral range), it is performed by almost the whole ensemble. The second expansion of the chordal material covers bars 70 to 95. During this section, Ligeti compresses the even more the initial range to a major second (vibraphone: pitches B–C#) to reach again the whole orchestral range in Bar 90). The third and last chordal passage lies between bars 107–112. Contrary to the two previous sections, during the above particular bars, there is no gradual opening of the range. The music material is directly presented in its fully expanded version and covers most of the strings' range (interval of a compound minor third). At this point, it is necessary to highlight that the two episodes, which link the three distinct developmental sections described above, appear totally incorporated to the Elaboration part. Although these sections are distinct, they provide a smooth textural passing from the one developmental core to the other.

2.3. Recapitulation and coda

Bar 113 marks the beginning of the Recapitulation part, where the modal upward gestures return. All the instruments of the orchestra re-perform quasi-modal scales, constructed by various sequences of major and minor thirds. Hence, likewise the very beginning, the “moving cluster” texture is regenerated, bringing back the initial idea of the “superimposed waves”.

Finally, bars 136 to the end can be titled as the “Coda” of the work, where a complete dematerialisation of the texture is achieved. Both the melodic and the harmonic canvases (Exposition/Recapitulation and Elaboration parts respectively) fade into a harmonic surface which is gradually dissipated by removing instruments, until only the two violins and the contrabass remain at bars 149–150 to perform a compound minor second interval. At this point, it should be noted that, by making the interval of minor second compound and by placing it to the two extreme ends of the orchestral range, Ligeti dematerialises maybe the most important interval which form his clusteroid textures. Figure 3 illustrates the overall structural plan of the work:

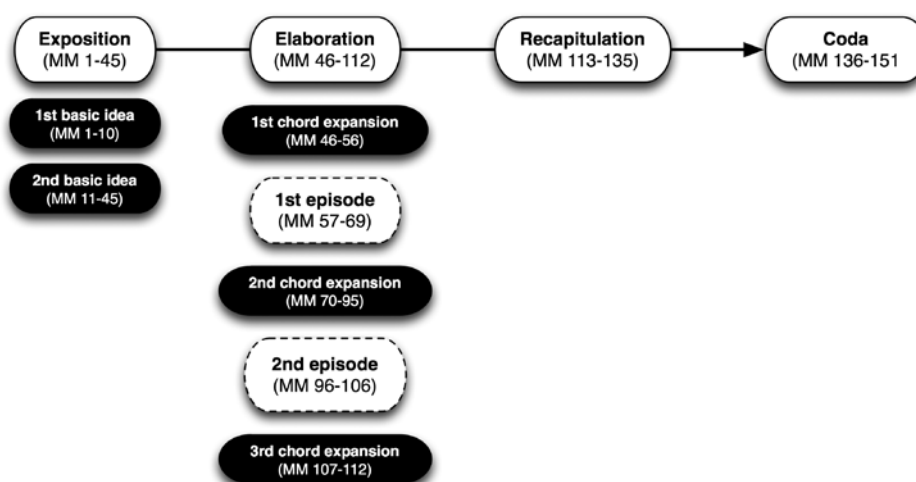


Fig. 3. Structural plan

In summary, this article aims to offer an alternative view of the sonoristic style, which has been developing from the 1950s until the present. In contrast with his contemporaries, Ligeti's artistic research does not involve timbre exploration of individual instruments, but focuses on generating harmonic surfaces which results in massive sonoristic effects. By using harmony more as unified timbre and less as tonal relationships between chords, Ligeti employs the traditional orchestral sound to raise his artistic voice in a period, where, the use of the majority of traditional sounds has been discouraged. In terms of the culmination of his micropolyphonic personal style, *Melodien* is undoubtedly one of Ligeti's orchestral masterpieces. It would not be unreasonable to consider *Melodien* as an opening to the composer's last artistic period, focused on the triadic organisation of his main music material.²⁰

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Intervaliniai santykiai kaip raktas į harmoninės faktūros plėtotę György Ligeti kūrinys „Melodien“

Santrauka

Šio straipsnio tema tiesiogiai susijusi su mano muzikologinio tyrimo sritimi ir jo pagrindiniu objektu – šiuolaikinės muzikos epocha ir konkrečiai György Ligeti mikropolifoniniais metodais, kuriuos jis taikė savo kūriniuose orkestrui, mėgindamas išgauti įvairias, negirdėtas, interaktyvias harmonines faktūras.

Nors G. Ligeti estetinė trajektorija skiriasi nuo „grynąją“ sonoristinę muziką kūrusių kompozitorių, tokių kaip Krzysztof Penderecki, Helmutas Lachenmannas ar Salvatore Sciarrino, jo mikropolifoniškai sukonstruotos faktūros neretai virsta sonoristinėmis terpėmis, kuriose vyrauja ne tembrinė, bet daugiausia garso aukščių santykiais grįsta medžiaga. Įvairios garsų serijos ir santykiai tarp garso aukščių (intervalai) čia dažnai tampa išieities tašku generuojant kanono techniką ir imitacijomis grįstas daugiasluoksnes faktūras. Tiek horizontalus (melodinis), tiek vertikalus (harmoninis) garsų organizavimas gimdo struktūras, sudarytas iš linijinių garsinių įvykių, kuriuos savo ruožtu sudaro daugybė interaktyvių poliritminių judesių.

Kompozicija „Melodien“ orkestrui kaip tik ir yra tokios estetinės krypties pavyzdys. Straipsnyje aptariami Ligeti taikomi principai, atskleidžiamas „ligetiškų“ mikropolifoninių garso debesų sonoristinis pobūdis.

Straipsnyje iškeliama alternatyvus požiūris į sonoristinę stilių, kuris formavosi nuo XX a. 6-ojo dešimtmečio iki šių dienų. Kitaip negu jo amžininkai, Ligeti savo kūriniuose neeksperimentavo su skirtingų instrumentų tembrais, bet dėmesį telkė į harmoninių paviršių generavimą, sukuriantį didžiulį sonoristinių masių efektą. Harmoniją traktuodamas labiau kaip unifikuotą tembrą nei tonaciniais ryšiais susijusių akordų visumą, savo kūrybinių sumanymų išraiškai Ligeti pasitelkė tradicinį orkestro skambesį tuo laikotarpiu, kai dauguma tradicinių tembrų ir garso išgavimo būdų tapo nebepopuliarūs. Kalbant apie Ligeti mikropolifoninio stiliaus apogėjų, „Melodien“ neabejotinai gali būti laikomas vienu iš jo orkestrinės muzikos šedevrų. Nesuklystume šį kūrinių pavadindami ir etapiniu, atveriančiu paskutinį jo kūrybos laikotarpį, kuriame kompozitorius gilinosi į muzikinę medžiagos formavimą iš trigarsių.

Reikšminiai žodžiai: Ligeti, „Melodien“, mikropolifonija, sonoristinė harmonija, harmoninė faktūra, šiuolaikinė orkestrinė muzika.

²⁰ See also: Drott, Eric (2003). The Role of Triadic Harmony in Ligeti's Recent Music. *Music Analysis*, Vol. 22, 283–314.

Vertical and Horizontal Sonoric Structures as Constructional Elements of Sonoristic Music

Annotation

Analysis of sonoristic music has always been a challenge for any musicologist, as it is a rather unique phenomenon of the 20th century music. This article aims to explain a few key aspects of analyzing musical form of sonoristic music using a cognitive approach. In this article we heavily rely on researches on the cognition of musical form by Irene Deliège and Marc Mélen and fundamental cognitive categories of horizontality and verticality. These are used in combine with the knowledge form musicology, acoustics and *Gestalt* psychology to define a methodology of analysis of form in sonoristic music. It encompasses the process of segmentation, principles of typologization of textures, attributes of vertical, horizontal and diagonal sonoric dimensions, issues with ascribing textures to any of theses dimensions, and determination of relations between the segments. Also as the examples of organisation of musical form are presented the excerpts of “Fünf Orchesterstücken” by Matthias Pintscher.

Keywords: sonoristic music, sonorism, cognition, cognitive psychology, *Gestalt* principles, verticality, horizontality, musical form, Matthias Pintscher.

Sonorism is a rather unique approach to the processes of composition as well as the perception of music. The primary goal of a sonorist composer is to create new auditory experiences. That is usually achieved by emphasizing the secondary parameters¹ of music because of their less determined cognitive differentiation. The parameter of timbre is often being used as a main variable in the construction of sounding objects. However, timbre is arguably the most complex parameter of music, which can manifest itself in a variety of ways (extreme registers, extended playing techniques, orchestration, etc.). As a secondary musical parameter, timbre cannot be differentiated in a scalar expression, what causes a significant indetermination of the sounding objects that are constructed in this timbre-centered manner.

A plethora of various sounding objects that are used in sonoristic music and inability to determine and categorize them as easily, as we do with the ones based on interactions between pitch and/or rhythm, leads into complex research of the perception of timbre, auditory scene analysis and other cognition studies. This research gives us a lot of valuable information about how these sound objects are perceived and processed within the brain. However these methodologies are more focused on explaining perceptual aspects of music than the principles of its organization and what limits the understanding of the compositional processes that are employed. This article aims to explain a few key aspects of the organization of sounding objects into a framework of a sonoristic piece (i.e. musical form). We will later refer to those sounding objects as sonoric structures.

1. A cognitive approach to a musical form in sonorism

As we have already mentioned, the goal of a sonorist composer is to create new auditory experiences, hence there is a close relationship between compositional intentions and the perception (unlike some other streams of 20th century music that focuses primarily on the structure with little or no concern to the resulting auditory experiences). That allows us to use studies like auditory scene analysis, timbre researches, etc. in combine with musicological theories to create a theoretical approach on the structural processes of sonoristic music.

One of the biggest issues of the cognition studies is that the vast majority of those are focusing on the sounding objects *per se*, which are being either extracted from a piece of music, or synthesized and presented in laboratory conditions. As has been argued by Deliège (1997), these sounding objects are “very brief stimuli of which the musical structure is very simple being conceived so as to vary one dimension (rhythm, melody...) while keeping others constant. As in any experimental science” (Deliège and Mélen 1997: 387) these

¹ As described by Snyder (2000), pitch, rhythm and harmony are considered to be primary musical parameters, because they can have relatively fixed proportional relationships between them, like the fixed proportions of a tuning system and the fixed proportions of a system of time intervals and durations. This makes it possible to identify patterns and their variations within a piece of music. With primary parameters, we can construct a number of different fixed conceptual categories, such as the pitch interval categories of a tuning system or a system of time interval categories, and both perceive and remember relations between these categories.

Secondary parameters (loudness, timbre, tempo) are aspects of musical sound that cannot easily be divided up into very many clearly recognizable categories. We tend to hear secondary parameters simply in terms of their relative amounts: we cannot recognize change in these parameters in terms of any but the most general categories, such as “much of” or “not much of,” and “more of” or “less of.” Secondary parameters are therefore generally used in music in simple increasing or decreasing progressions or in large contrasts (Snyder 2000: 195–196).

simplifications are based on a legitimate desire to control the variable. As a result, a lot of discoveries made in such experiments are not valid in real world experience and does not give us a lot of information about the cognition of musical form.

1.1. Schemata and hierarchies

One of the most significant papers on the cognition of musical form was prepared by Irene Deliège and Marc Mélen (1997). They are interested in the cognitive processes involved in attentive listening to a piece of music.² Their approach is similar to that of Imberty's (1981). The main principle lies in "the perception of qualitative changes, which is the basic principle of segmentation of the musical information. These changes accentuate the elements that confer directionality on the piece, which come to constitute the dynamic vectors that progressively take on the weight of the successive changes during listening. Simultaneously they determine the style and the global schema of the work, i.e. the macrostructure."³ The organization of the segmentations, reiterated at different hierarchical levels, permits the structure of musical piece to be grasped." (Deliège and Mélen 1997: 388)

Two types of hierarchical organization are postulated according to the perceptual salience of the changes encountered: when changes are few but very clear, they lead to a strong hierarchy; when segmentations are numerous and easily perceptible but are all of similar salience, they result in a weak hierarchy. The notions of the **schemata of order** and **schemata of order-relation** are linked to these two types of organization: the **schemata of order** are formed by simple successions and juxtapositions and embrace both proximate and distant relations (increase, decrease, repetition and imitation). The **Schemata of order-relation** involve the organic relations that enable the establishment of relations between temporally-adjacent elements (theme, variation of the theme, syntactical or rhetorical relations). The **Schemata of order are more numerous within weak hierarchies – a situation often encountered in twentieth century works, while schemata of order-relation can give a rise to strong hierarchies, which are much more common in pieces from the tonal repertoire.** (Imberty, 1985 in: Deliège and Mélen 1997: 388)⁴

The approach postulated by Deliège and Mélen sees auditory scene analysis as a schematization process. It is a process of "reduction or even a simplification of the material to be perceived based on particular events picked up from the musical surface by the listener" (Deliège and Mélen 1997: 389). The musical surface is first segmented into sections of various lengths. The segmentation of a temporal flow is allowed by two key elements of Deliège's studies: the cue abstraction mechanism and principles of sameness and difference.

1.2. The cue and the process of segmentation

"A cue is a kind of conspicuous point that becomes fixed in memory⁵ by virtue of its relevance and by repetition. What might constitute a cue depends on the cultural and historical provenance of a given piece" (ibid., p. 390). In Western music, since the 15th century until the end of common tonal practice cues are being abstracted primarily from motivic elements. However, in later periods these are more and more frequently substituted by other musical elements. In case of sonoristic music that would be characteristic timbre, orchestration, specific tessitura, certain cluster range or anything else that defines a specific sound quality of a certain sounding object.

Process of segmentation of information is essential in any perceptual domain. In case of music, the process of segmentation "assembles the sounds in groups on the basis of their temporal and/or acoustic properties" (ibid., p. 391). This procedure heavily relies on *Gestalt* principles, mainly the principles of proximity and similarity. However, Deliège proposes two principles that are even more general than proximity and similarity. These are the **principle of sameness** and the **principle of difference**. Using these two principles elements are attributed

² By "attentive listening" they mean the situation in which the listener is devoting maximal cognitive resources to engage with the structure of the piece in an active listening process.

³ Term "macrostructure" is used in works by Kintsch and van Dijk (1978) in the context of text comprehension.

⁴ Lerdahl (1989) suggested that in atonal music hierarchies of alterations of tensions and relaxations should be replaced by hierarchies of salience of auditory events. Imberty (1991, 1993) extended this suggestion to any music, whether tonal or atonal; he proposes that perceptual organization must constitute a hierarchy of saliencies before it can be a syntactic functional hierarchy. Nevertheless, according to Imberty, in the cognition of tonal music perceptual stability coincides with structural stability in contrast to what happens in atonal music (Imberty 1991).

⁵ The notion of memory is used here in a very general manner however the authors are referring to a long-term memory which is responsible for grouping and associating events of the past. According to M. Viļums, it is the formal stage of memory which signifies and ties together musical structures that are exceeding short-term memory time-span (3–5 seconds A.M. thus being longer than phrases) into the aspects of musical form (Viļums 2001: 20).

to a given group “as long as they are not considered too different from the preceding elements (principle of sameness), although a certain degree of tolerance is accepted and the boundary between two groups will be established when a contrast is perceived between two regions” (principle of difference; *ibid.*, p. 392).

It is suggested that the listener selects salient cues that are themselves incorporated in the groups rather than storing each group in his/her memory. These cues are abstracted from the musical surface because of their “special temporal and/or acoustic features” (*ibid.*) and contain invariants of the musical discourse, i.e. various deviations from the primary cues can be grouped together or separated on the basis of the principles of sameness and difference.

2. Sonoric field

While analyzing such auditory objects like the salience of musical surface, we find them strongly related to a musicological concept of sonoric field.⁶ We will refer to sonoric field as the largest structure of sonoristic music which contains all the variations of sonoristic values⁷ within the composition. From this point of view, each composition has its own sonoric field which is formed by the pitches, rhythms, timbres and formal processes that are used during the composition. Sonoric field is an abstract contour of the composition in which the qualitative and quantitative gradients are reflected. Maklygin points out three main criteria of sonoric field:

- Range, determined by pitch⁸ and time;
- Width, determined by the interval between the highest and the lowest pitches;
- Density, determined by intervalic consistency and timbral characteristics. (Ценова и Маклыгин 2005: 400)

Knowing these three criteria allows us to render a visualization of the sonoric field (Fig. 1). This rendition illustrates: time span range from left to right, changes of width from the bottom to the top and textural/timbral/intervalic density by a color gradient.

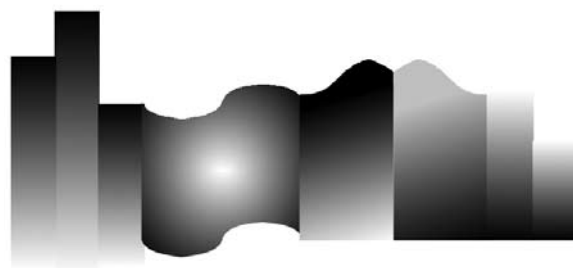


Fig. 1. Graphical visualization of sonoric field

This rendition brings us back to the music cognition studies. As we can see, it basically illustrates the salience of musical surface. The main benefit of linking the concept of salience of musical surface with the concept of the sonoric field is combining the criteria described by Maklygin with the segmentation procedure and cue abstraction mechanism to help us analyze the structural framework of sonoristic compositions.

Thus we can define the first step of the musical form analysis of sonoristic music. That is segmentation of the material into sections, which are defined by the principles of sameness and difference. It does not matter that the principles of sameness and differences are sometimes too general categories to define the segmentation. In those cases more specific *Gestalt* principles may be employed, namely proximity, similarity, good continuation and/or common fate. However, segmentation should not be based entirely on auditory experiences, but also on the score analysis. In contrast to pure cognition studies, our goal is not confined to name the aspects of cognition but also the principles of composing. In a lot of cases a certain amount of the cues that composer

⁶ There are more than a few different conceptions of the notion of sonoric field. One can argue that sonoric field could be understood as a philosophical hyper-structure existing in collective subconscious that encompasses all possible incarnations of sounding objects. In this case musical composition would be treated as fragment or rather a set of extracted fragments from The Sonoric Field, which is intriguing and promising, from the philosophical point of view. However, in this paper we will stick to this term as it is described by such authors like P. Boulez, Erkki Salmenchaara or A. Maklygin and treat it as the largest structure of sonoristic music which contains all the variations of sonoristic values within the composition.

⁷ Term by Chomiński *wartości sonorystyczne*.

⁸ The term pitch should by no means be understood as an absolute value. In sonoristic music this term can be treated in two ways: either as a description of a tone quality, which a timbral attribute or as a description of a relative range. Maklygin here is referring to the second case.

has intended to display are actually not being perceived due to slight miscalculations in orchestration, specific instrument issues not taken into account by a composer or a plethora of other factors including performance or audio recording issues. However, they are still functioning as a structural factor of compositional process that should be taken into account.

It is worth mentioning that sonoric field, as an entirety of the structural and auditory processes of the composition, is present in all music of any given style or time period. That is beautifully presented in research by Chomiński and his disciples, where compositions such as those of Beethoven or Brahms were analyzed from the point of view⁹ of sonoric fields. However, there is a paradigmatic difference between the concept of sonoric field in Western classical and sonoristic music. Aside from being the entirety of structural and auditory processes, it becomes the source of music, i.e. it is the source and the result at the same time. Not only from the philosophical point of view but also as a conscious concept. Sonoric field in a sonoric composition is a materialization of the imaginary sonoric field that is conceived by a composer as a primary compositional impulse and serves as a prototype of a yet unborn composition. All the structural processes and attributes of the sonoric field are already encoded in that prototype and the composer is trying to achieve a result which would be as close to this prototype as possible. However, the prototype encounters a number of physical and mental transformations during the process of materialization, thus the primal shape of it is not traceable. Only one attribute of sonoric field keeps its original form from the stage of prototype until the final stages of materialization that is the dimensionality of sonoric structures.

2.1. Dimensions of sonoric field

The process of segmentation of sonoric field reveals a certain set of juxtaposed sonoric structures. The aforementioned criteria of range, width and density are very well suited to describe the shape of the sonoric field, but in a lot of cases they are too general to define the processes between or within the segments.

Hierarchical relations between these sonoric structures do not entirely fit the concept of schemata of order nor schemata of order-relation. There are no such attributes as theme, variation of the theme, syntactical or rhetorical relations, which are common to the schemata of order-relation. However some key elements of musical material and their invariants in further development can still be found (not in each and every case, but it is still present as a paradigm). They do not produce functional relations, e.g. tonic vs. dominant however the archetypal structure of thesis-antithesis is also present in a lot of cases.

It becomes obvious, that the hierarchical relations between these sonoric structures are a little more complicated than simple juxtaposition and the principles of schemata of order. On the other hand, these relations are way more basic than the ones embraced by schemata of order-relation and do not contain such large variety as that of the tonal music.

It would be the most accurate to describe it as the hierarchy of dimensions. Sonoric structures here are considered more as a process than an object. The main criteria of distinguishing the dimension of sonoric structure are the directionality of processes within the segment. As a result, sonoric structures are not being analyzed independently but in a context of other adjacent sonoric structures. In accordance to directionality of the processes we will refer to these structures as vertical, horizontal or diagonal (Fig. 2).

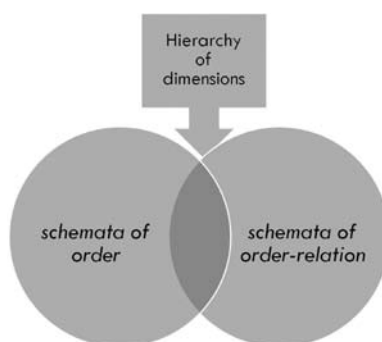


Fig. 2

⁹ Chomiński refers to the target of his research as a sonoristic layer, which is essentially equivalent to the term of sonoric field used in this paper.

2.1.1. Vertical and horizontal dimensions in sonoristic music

The concept of formation of horizontal and vertical structures is not new by any means. It was first mentioned by Chomiński. It is one of the five categories of formal issues in sonoristic music.¹⁰ However, Chomiński's approach to horizontal and vertical sonic structures is somewhat inconclusive. According to his theory, "clusters can be seen as a result of the transformation of a vertical structure into a horizontal one, which in effect completely destroys the harmonic factor. This kind of transformation, however, does not lead to a restitution of melodic qualities, for the new horizontal structure may swell, increase its sound mass or become a static sound block, i.e., acquire properties that are diametrically opposed to those of a dynamic, mobile melodic construct" (Chomiński 1968 in: Granat 2005: 829).

The biggest issue in Chomiński's approach is that he equates verticality and horizontality with respectively, harmony and melody. Verticality and horizontality are ones of the most fundamental properties of music. In fact, it is even more a cognitive term related to auditory scene analysis than a structural one. If we want to understand what the roles of verticality and horizontality in sonoristic music are, we should address those as cognitive phenomena first. We can perceive them as structural objects only after we distinguish their appearance in sonoristic music as auditory objects.

Verticality and horizontality are two fundamental categories, as described by Rosch (1975, 1978). Horizontality is to be understood as the spreading out of different exemplars within the same unit in which the category is still identifiable no matter how big of a deviation from the original model occurs. Verticality on the other hand specifies relationships between categories, which leads to the idea of hierarchy of subordinate levels.

Rosch defined three levels: the superordinate, the basic, and the subordinate levels. At the highest or superordinate level, the category is defined by its function. The intermediate or basic level contains the greatest number of specimens having common attributes. They belong to the functional category but remain independent from one another. The lowest level, the subordinate is made up of all imaginable variations of the specimens from the basic level.

According to Rosch, the notion of horizontality is exploited primarily in the listening process; however verticality is not nearly so obvious. The idea of basic level of in categorization in listening to music may be conceived of in terms of different cues being abstracted within the same work. Each of these cues will engender its own relationships of horizontality. They will each have their own function and create their own particular auditory image (Leipp 1977) yet share a common reference: the style of the work. The superordinate level may then be conceived as inhering in the referential value that each cue confers on a group within the mental representation of the work. The subordinate level is characterized by the relationships between patterns having analogous auditory images, which falls within the concept of horizontality.

It becomes evident that harmony and melody are just one of a few possible manifestations of verticality and horizontality respectively. Definition of horizontality made by Roch is so accurate and general that it perfectly fits the manifestations of this dimension in sonoristic music. The manifestation of verticality in sonoristic music is very close to what is described as a basic level of categorization. However, it does not matter if the relationship with horizontality might be weakened in purely vertical sonoristic music, meanwhile in cases where horizontal dimension is a clear priority, vertical dimension can manifest itself in a subordinate level.¹¹

2.1.2. Vertical and horizontal sonic structures

In order to define the dimension of sonic structure, we have to identify the directionality of the segment of musical texture. The number of textural variations in sonoristic music is virtually endless. Plus, as mentioned before, sonic structures should not be analyzed independently but in a context of other adjacent sonic structures. Thus, it is almost impossible to strictly classify sonic structures or textural models into vertical or horizontal.

¹⁰ Chomiński distinguishes five categories of formal issues in sonoristic music: sound technology, rationalization of time, formation of vertical and horizontal sonic structures, transformation of elements, and formal continuum (Chomiński 1961).

¹¹ It is not uncommon for a composer to have no intentions to exploit one of the discussed dimensions and focus exclusively either on vertical or horizontal dimension. In the first case scenario the most of the cues are being abstracted from the changes in vertical dimension, therefore horizontal musical dimension is being cognitively pushed to a background. In the second case, the majority of cues are being abstracted from the changes in horizontal dimension, therefore vertical dimension is being cognitively pushed to a background and becomes totally subordinate to the horizontal dimension. In any of these cases the dimension that is being cognitively pushed to a background despite being a permanent part of auditory field might not be a significant part of a compositional idea and/or structure.

Yet we can define the most general textural models in sonoristic music thanks to the classification by Maklygin (Ценова и Маклыгин, 2005). Maklygin classifies what he calls timbral-textural forms¹² according to:

- principle of time organization (continual, discrete or pulsing);
- the amount of components (single layered or multi layered).

Thus he distinguishes six main textural types:

- three pure types: dot, pointillist texture, line;
- three composite types: stain, flow, belt.

Let's look deeper into each of these textural types.

Dot is considered to be the main constructional element in other more complex sonoric structures as well as an independent sonoric structure itself. In the later case it usually presents vertical sonoric values with its timbral and/or articulation properties. However a few dots within a certain time span can present horizontal sonoric values as they might get affected by *Gestalt* principles, namely proximity, similarity, good continuation and/or common fate. The number of dots that occur simultaneously form stain. Stain is a typical sonoric structure that most often manifests itself as a cluster, which, opposing to Chomiński, in most cases possesses vertical sonoric values. That is mostly because clusters are dense sonoric structures. The intervallic density creates auditory image often described as a *field* which in most cases produces no cues in the horizontal dimension.

However, the gap between dot and stain is very narrow. It is difficult to strictly define, when does a dot become a stain and, perhaps, vice versa. Intervallic density and a sheer amount of tones forming the chord or cluster are ones of the main parameters describing the difference between dot and stain. However they might not be the deciding factors. There are a large number of cases when even whole scale clusters form an auditory image that is rather described as a dot than a stain. Cluster can be described by the same criteria as sonoric field (range, width, density). The parameter of range is crucial here, namely its aspect of time. It has been scientifically proven, that we need more time to process timbre, which is the main attribute of a cluster, than we need to process other parameters of music. It takes between 500 ms and 10 s for the brain to process timbre and characteristics of sound (Martin, 1999). There we can make a hypothesis that any cluster that is shorter in time span than 500 ms is perceived as a dot.¹³

Line, according to Maklygin, is “a continuous sounding of one pitch; a possible variation of this texture is a migratory line, e.g. glissando” (Ценова и Маклыгин 2005: 394). It is widely accepted to treat the term “linear” as synonymous to “horizontal”; however, the definition of “line” (at least the one by Maklygin) is somewhat arguable. First of all, because a single continuous pitch is not very common in practice of sonoristic music (not to mention it might as well be a non-pitched sound). Secondly, continuous sounding of one pitch (the same is applied to an interval, chord or cluster) in a prolonged period of time, does not create auditory cues in a horizontal dimension and is mostly distinguished due to its tone quality. In that case, a continuous sound creates an auditory image of field and falls into category of vertical sonoric structures.

In order to call a structure horizontal, it has to spread different exemplars within the same unit (Roch), i.e., the line has either to be migratory or create horizontal cues in relation to other adjacent structures. In the first case scenario, a migratory line can not only be a glissando-like continuous sound. It can as well take a form of a passage (Fig. 3) or a sequence of pitches/noises (Fig. 4) as long as they are affected by the *Gestalt* principles of proximity, similarity, good continuation and/or common fate, and form a single cognitive structure.



Fig. 3. A passage as a horizontal line in Ligeti's *Nouvelles Aventures*

¹² Тембро-фактурные формы (Ru.).

¹³ However, not every cluster that meets the 500 ms benchmark automatically creates the auditory image of a field. In our opinion there is a threshold of time (that is yet to be determined) that has to be passed as a lot of clusters that last merely longer than the given 500 ms form a very uncertain auditory image that cannot be classified neither as *stain* nor as *dot*. These sonoric structures by themselves have neither vertical, nor horizontal sonoric values; their directionality is totally dependent on the adjacent sonoric structures and overall musical context of the piece.

The same goes for the second case: the adjacent linear structures should form a single cognitive process under stimulus of the same *Gestalt* principles. In this case, lines might not be migratory, but they can “spread different examples” while differing in duration as it is the only parameter left that can create horizontal cues.

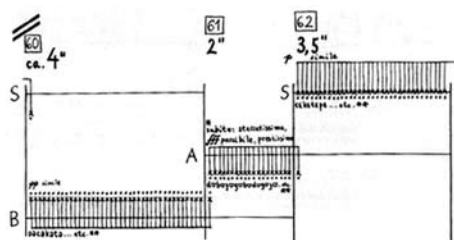


Fig. 4. Sequences of non-pitched sounds as horizontal lines in Ligeti's *Nouvelles Aventures* varying in the parameter of duration

The concept of **belt** in Maklygin's classification is rather unclear. He describes it as a conjunction of two identical lines and also mentions that in vertical expression it is a continuous cluster (ibid., p. 394). If we disagree with a statement, that a line is formed exclusively from a single sounding pitched or non-pitched sound, then a conjunction of two identical lines would not form another structure. Unless these structures are obviously and intentionally acoustically separated by a composer, employing differences in register, timbre, orchestration and other methods. In this case, belt within itself is a horizontal sonic structure, but it most likely has vertical sonic values in relation with the lines that are in conjunction to form it as it differs in a number of sound quality parameters such as timbre, velocity, and acoustic space. As we can see in the excerpt from the score of Ligeti's *Nouvelles Aventures* (Fig. 5) this is a monorhythmic passage which can be classified as a *belt*. However, the most of the instruments blend together and form a single passage. The only aspect that gives a cue of multiply sources that are employed in this texture is the timbre of the harpsichord.



Fig. 5. Monorhythmic texture in Ligeti's *Nouvelles Aventures*

In case of a continuous cluster, it falls into a category of vertical sonic structures the same way as a single continuous line does. What is more, in this case, belt may become hardly distinguishable from stain. The only difference between those two textural types is their theoretical origin.

As for a torrent, which is described as a pulsating polyphonic conjunction of many voices (or layers) or pointilistic texture, they are both completely dependent on development of textural material. Torrent, which essentially is a multipolyphonic texture, might possess a large amount of horizontal cues that are brought by the movement of different layers. However its own dimension might induce vertical auditory experiences as its range, width and/or density might vary in a given period of time. Pointilistic texture, on the other hand, consists of various separated auditory events that by themselves bring vertical sonic values. However this kind of texture tends to form a single structure that can gain any possible directionality.

Since we have already discussed the main textural types and their relation with horizontality and verticality, we can summarize the criteria based on which we can label a textural structure as vertical or horizontal. It should be pointed out that all aforementioned textural types can produce either vertical or horizontal sonic values. Thus, their labels, as described by Maklygin, should be used only as a reference point to their appear-

ance and not as a typology. Instead these textural structures should be grouped according to the sonoric values they produce/possess, which can be determined by following criteria:

- a textural structure produces/possesses vertical sonoric values in a given period of time if its cues are being abstracted from the shift in its range, width and/or density. These three criteria indicate changes in sound quality. This is the main criteria of vertical sonoric structures;
- a textural structure produces/possesses horizontal sonoric values in a given period of time if its cues are being abstracted from the shift in its integrity¹⁴, duration and/or the frequency of a tone or cluster, to which we will refer in a simplified manner and label it as *pitch*. These three criteria indicate changes in continuity. These are the main criteria of horizontal sonoric structures.

2.2. Diagonal sonoric dimension

After we discussed the aspects of verticality and horizontality in the most common textural models we can see that these two fundamental categories are able to manifest themselves in each and every textural model. What is more, textures are able to shift from being perceived as horizontal, to a vertical auditory image. However, there is an interstitial auditory state between horizontality and verticality that sometimes manifests itself as an independent sonoric structure. We will refer to it as a diagonal sonoric dimension and the structures that produce it will be called diagonal sonoric structures.

Diagonal dimension in music is more a philosophical phenomenon. It is best described by Deleuze, when he makes parallels between music by Boulez and the manner of works by Proust. It is described as a “manner in which noises and sounds detach themselves from the characters, places and names to which they are first attached in order to form autonomous “motives” that ceaselessly transform themselves in time, diminishing or augmenting, adding or subtracting, varying their speed and their slowness” (Deleuze 1986 in: Murphy 1998: 70).

Deleuze presents the idea that such a variety is developed in the autonomous dimension of time. He calls it “a ‘block of duration,’ a ‘ceaselessly varying sonorous block.’ And the autonomous dimension, which is not pre-existent and is drawn at the same time as the block varies, is called a diagonal in order to better mark the fact that it is reducible neither to the harmonic vertical nor to the melodic horizontal as pre-existent coordinates” (ibid.).

Indeed, diagonal sonoric structures are not a mere mechanical combination of simultaneously sounding vertical and horizontal structures, they cannot be separated into horizontal and vertical components, i.e. it acquires its vertical and horizontal values not in a mechanical, but in a conceptual process.

Diagonal sonoric structures are very insular and integral. That is one of the reasons why they often manifest themselves as short episodes. They are also the structures of ascending or descending intensity. They reach their maximal or minimal intensity in a rather short period of time, what causes certain limitations in terms of their duration. The best illustration of diagonal structures in Western Classical music (as proposed by Deleuze) is a cadenza. It is a short episode that simultaneously carries vertical and horizontal auditory values.

In sonoristic music diagonal structures become more complicated as the terms of horizontality and verticality here are applied in a more general way than in tonal music. That causes a greater variation of factors causing the vertical and horizontal values within the structure. If we look at the example (Fig. 6) we can see a quasi-melodic line, but its sound quality is constantly changing: the first note (played by flute) is being played as usual, next three notes as harmonics and the following three – as whistle tones. Then the process is repeated while reducing the durations. This causes a constant timbral shift, as the harmonics are less intensive and have brighter timbre than regular notes, and whistle tones are even less intensive and have even brighter timbre than the harmonics.

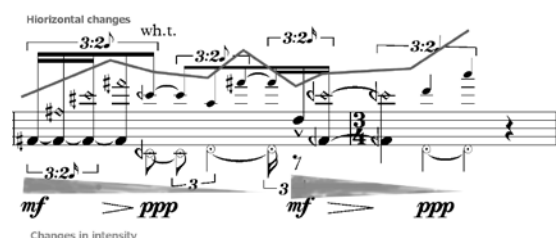


Fig. 6. Diagonal sonoric structures in *Incantation of the Freezing Haze* for flute by A. Maslekovas

¹⁴ There are a number of formations that can fall into a concept of integrity. It could be such playing techniques as *vibrato*, *tremolo*, *frullato*, *bisbigliando*, trills of two independent pitches, rhythmical variations of a continuous sound, etc.

We can describe these structures using the following criteria. The direction of the diagonal which describes whether horizontal values of the sonoristic structure are ascending or descending in terms of *pitch*. The amplitude which describes whether the intensity of sound quality is ascending or descending. It also shows the margins between the maximum and the minimum of intensity within the structure. The duration which indicates time that it takes for the sonoristic structure to reach its maximal or minimal intensity.

3. Principles of structural organization

There are two principles of structural organization of sonoristic structures: the discrete, and the composite. In the following chapter we will look at their most interesting manifestations in *Fünf Orchesterstücken* by Matthias Pintscher. The purpose of the following chapter is not to create or reveal any global manifestations of form in sonoristic music, but to exhibit the principles of structural organization which can be employed as prototypes in the process of analysis of other sonoristic compositions.

3.1. The discrete principle of structural organization

As the title suggests, the discrete principle of structural organization of sonoristic structures focuses on exploiting a single dimension sonoristic structures. The discrete principle of organizing horizontal sonoristic structures may be applied in two ways. Either exploiting all possible variations of a single horizontal sonoristic structure (e.g. line) which is often the case in pieces for solo instruments, either setting different (contrasting) sonoristic structures (e.g. self-evidently different forms of lines) against each other. In the first case scenario the aspects of musical form would be decided by the principles of timbral kinesis which we are not going to discuss in this article as it is a broad subject that should be covered in a separate paper.

A good example of the second case scenario is the first movement of *Fünf Orchesterstücken* by Matthias Pintscher. The composition is based on interactions between two different forms of lines. Line No. 1 is synchronous long notes (Fig. 7) and line No. 2 is short passages of approximate duration of an eighth note (Fig. 8).

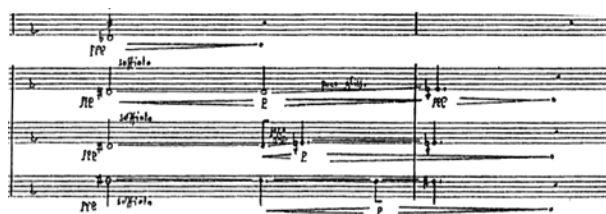


Fig. 7. Line No. 1

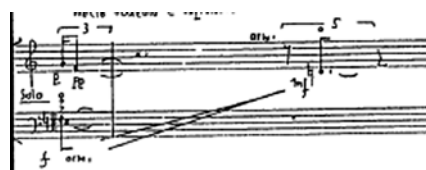


Fig. 8. Line No. 2

In the first section these two structures are exposed to each other and acquire attributes of the opposing structure. During this process structures No. 1A and 2A are formed. Structure No. 1A (Fig. 9) maintains duration and synchronous onsets from line No. 1 and acquires movement from line No. 2. Structure No. 2A (Fig. 10), maintains short duration from line No. 2, but loses its movement. It also gains synchronicity from line No. 1.



Fig. 9. Structure No. 1A



Fig. 10. Structure No. 2A

In the next section these four structures are being grouped by their kinship: structure No. 1 is grouped with structure No. 1A and structure No. 2 is grouped with structure No. 2A. First group (1–1A) is being exposed in bars 17–38 (Fig. 11) and the second group in bars 39–50 (Fig. 12).

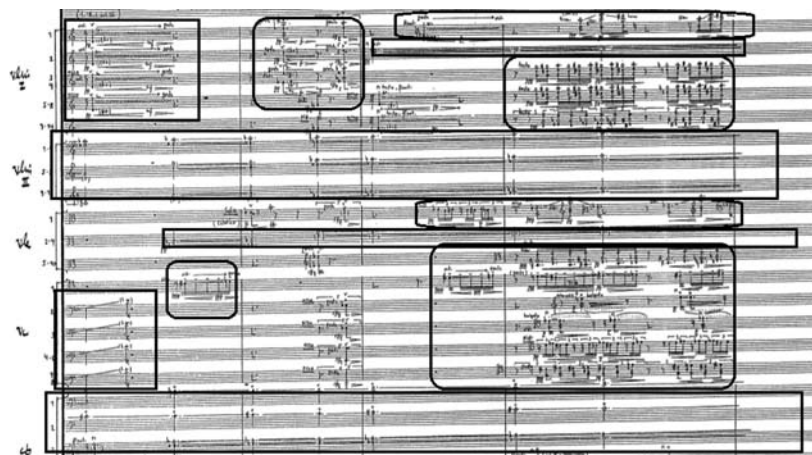


Fig. 11. Structures No. 1 (rectangle) and 1A (rounded rectangle)

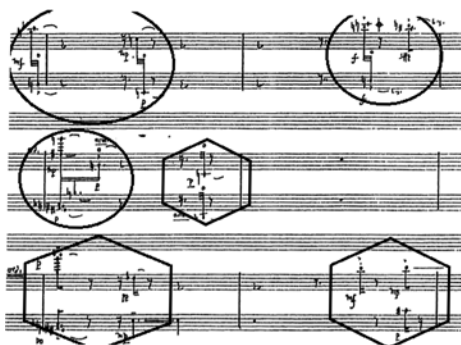


Fig. 12. Structures No. 2 (oval) and 2A (hexagon)

This leads to the third section, the climax of the first movement, where all of the structures are being stacked together into a massive texture (Fig. 13).

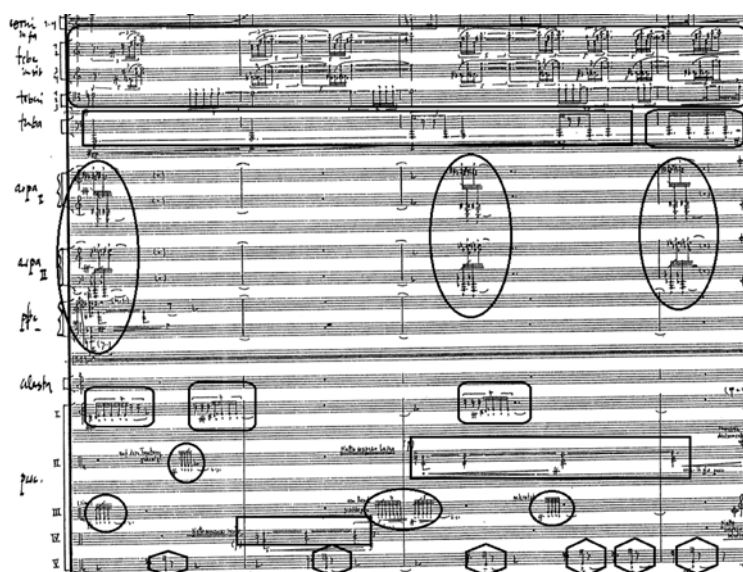


Fig. 13. Structures No. 1 (rectangle), No. 1A (rounded rectangle), No. 2 (oval), and No. 2A (hexagon)

The fourth and the final section is the biggest level of assimilation between all the textural models. Textural model No. 1 is being shortened and spread into tiny motives (Fig. 14). Thus auditory synthesis between two opposing structural models is achieved. There is such a high level of assimilation between the structures in the fourth section that it becomes almost impossible to distinguish them neither in auditory nor in analytical way.



Fig. 14. Assimilation between structures in the fourth section

All horizontal structural processes of the first movement can be summarized in the following scheme (Fig. 15) which reveals a heavy relation of structural organization and the principles of combinatorics.

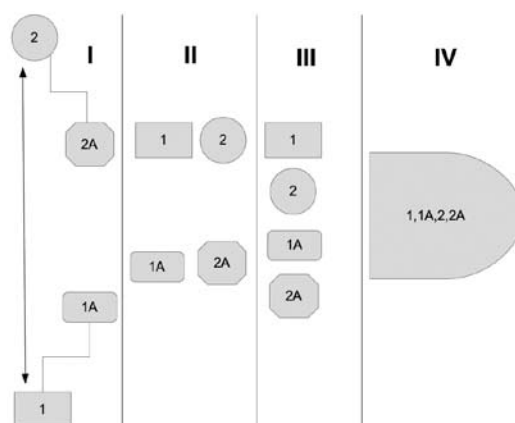


Fig. 15. Horizontal sonoritic structures organized by the discrete principle of organization in *Fünf Orchesterstücke* by M. Pintscher

The discrete principle of organizing **vertical sonoritic structures** is almost exclusively used in global changes of texture intensity. It is mostly due to the fact that verticality has an architectonic origin, i.e. it pervades all the auditory fields. Thus, setting multiply forms of vertical sonoritic structures against each other is very limited, primarily for cognitive reasons.

Fig. 16. Vertical changes in the texture of the second movement of *Fünf Orchesterstücke* by M. Pintscher

The main organizational principle of vertical sonoric structures in this movement is emphasizing the difference between maximal and minimal textural density of sonic field. The entire structural process is encoded within the first section of the movement (bars 1–20). In the beginning maximal and minimal intensities are being exhibited in equal durations. After that the duration of maximal textural density is being gradually stretched in favor of the minimal. In this particular case the processes of vertical changes can be represented by a sheer number of the instruments that are employed in each bar of the first section (Fig. 17).

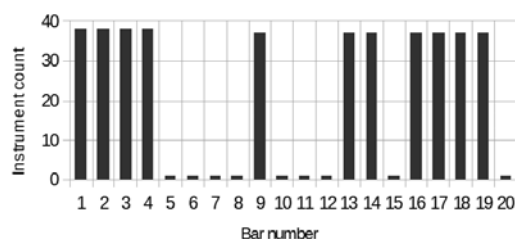


Fig. 17

In the next section (bars 24–49) a sort of balance between the minimum and maximum is being explored by creating a texture of fluctuating density. This is achieved thanks to a number of very rapid changes in quantity of employed instruments and avoidance of the usage of tutti or dramatically minimizing the orchestral mass (Fig. 18). It briefly reaches the density close tutti only in the last bars of the section. This section begins with a maximal textural density which is being reduced to reach the medium level.

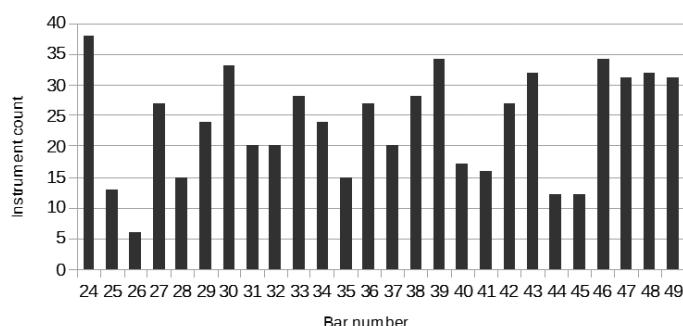


Fig. 18

In the third section (bars 50–61) the medium level of textural density is being achieved in an opposite way: starting from the minimal textural density in the bar No. 50, increasing it to the medium density during bars 51–58 and reaching maximal density in bars 59–61 (Fig. 19).

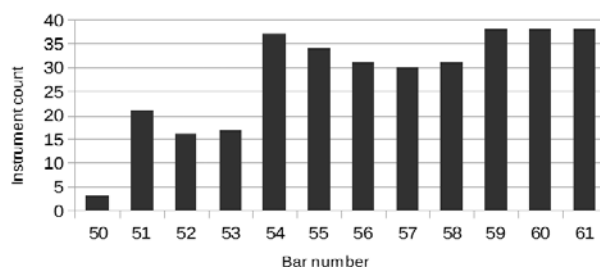


Fig. 19

This segment carries a very important auditory cue in a vertical dimension multiply glissandi in horn section (see Fig. 21). These glissandi are arguably the most impressive element in the entire piece and it becomes a new timbral characteristic of the maximal textural density as previously it was strictly associated with the timbre of orchestral tutti and a heavy load of percussion, while minimal density always manifested itself through the section of strings.

The fourth section of the piece (bars 62–74), which coincides with a golden section of the composition, disestablishes the contrasting nature of development of sonic field. During this section sonic field is no longer being developed as a sum of contrasts between minimal and maximal textural density and their assimilations, but rather as a consistent continuous process. The minimal textural density is being gradually increased until maximal tutti (Fig. 20). The section is repeated twice (as indicated by repeat marks in the score). This repetition creates an auditory image which can be described as two waves. This auditory image acts as a summarizing factor of the form, as it virtually fills the gap between heavily exposed contrast between orchestral tutti and the minimal textural density. It also establishes an alternative, non-contrasting, way of textural development.

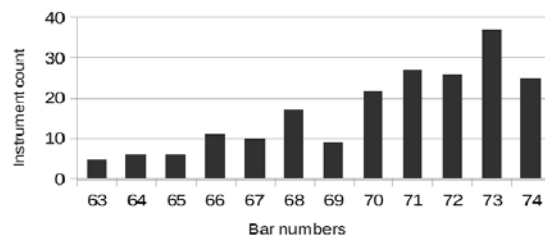


Fig. 20

The final section of the second movement serves as a peculiar coda. It is very similar to the third section; however it takes its model of textural development from the fourth section as it is being developed in a non-contrasting manner of continuous development. As this section is very similar to the third section, it takes one key timbral element from it – the glissandi in horn section (Fig. 21). It produces strong and memorable cues which, when repeated in the last section, consolidate themselves as new timbral attributes to the maximal textural density. Minimal textural density, on the other hand, also encounters a significant timbral transformation during this section. As it was primarily expressed via string section, it is now substituted with harps.



Fig. 21

It becomes evident that there are two schemata of structural organization employed in this piece: the scheme of manipulation of textural density which is illustrated in Fig. 22 and the schema of timbral development which is represented in Fig. 23. Scheme of manipulation of textural density is heavily related to the principles of combinatorics.

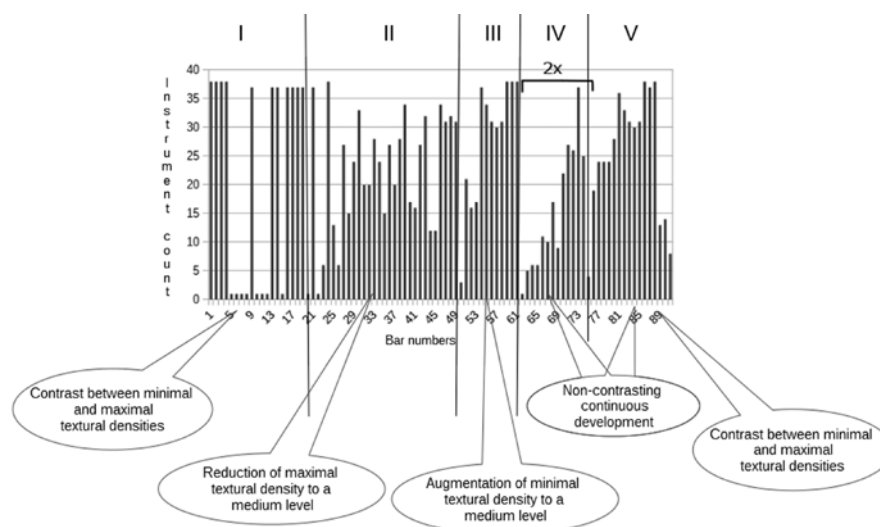


Fig. 22. Scheme of manipulation of textural density

Scheme of timbral development, on the other hand, is based on the cue abstraction mechanism and helps the musical structure to be grasped thanks to the changes in timbral attributes of minimal and maximal textural densities. As it is illustrated in the scheme (Fig. 23), minimal and maximal textural densities gain certain timbral attributes during the first two sections of the composition. These timbral attributes serve as cognitive cues, particular reference points for grouping textures according to *Gestalt* principles, as there are significant changes of timbral characteristics of maximal density during the third and fifth sections and in minimal density during fourth and fifth sections of the piece. The scheme reveals a number of cognitive ties that are formed throughout the piece and are mainly accumulated by the *Gestalt* principle of similarity.

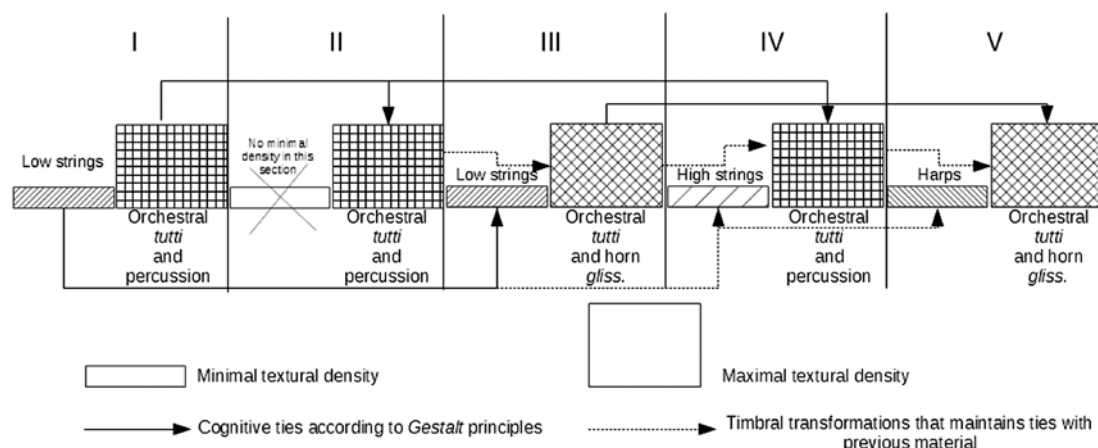


Fig. 23. Scheme of timbral development

3.2. The composite principle of structural organization

The composite principle of structural organization of sonic structures focuses on exploiting sonic structures of multiple dimensions. It can be applied in two ways: either setting vertical or horizontal sonic structures against each other, which is somewhat analogous to a previously discussed juxtaposition of two lines, or stacking, multiply horizontal structures together to produce vertical sonic values and turning them into vertical sonic structures.

The latter case is interesting because it represents the auditory threshold between a perception of multiple horizontal structures and the perception of a single horizontal structure. As we will see, this is heavily dependent on *Gestalt* principles, especially proximity.

An excellent example of this case is the third movement of the *Fünf Orchesterstücke*. It is based on the same horizontal structures as the first movement discussed in chapter 3.1. We will keep their denotation as line 1 and line 2 their derivatives 1A and 2A are also present, however we will group them together for the sake of simplifying the explanation of construction. However, these structures are being used in a different manner this time. They are stacked together to form vertical sonoric structures. Since there are two types of horizontal structures (line 1 and line 2), two generic types of vertical structures can be produced: the discrete (multiplication of a single horizontal structure), or composite (stacking two different sonoric structures together).

In the first section (bars 1–10) two horizontal structures are being exhibited one by one and in different layers of the texture (Fig. 24). This is done by exhibiting horizontal properties of line 1 while stacking the pieces of line 2 together into a vertical sonoric structure.

The image displays a musical score for the third movement of *Fünf Orchesterstücke*. The score is written for a full orchestra, with staves for strings (Violins I, Violins II, Violas, Cellos, Double Basses), woodwinds (Flutes, Oboes, Clarinets, Bassoons), and brass (Trumpets, Trombones, Tuba/Euphonium). The score is divided into two main sections. The top section, labeled 'Horizontal structures (Line 1)', shows a single horizontal line of music across the staves. The bottom section, labeled 'Vertical discrete structure (Line 2)', shows multiple horizontal lines of music stacked vertically. A large, dark, curved line is drawn over the bottom section, indicating a vertical structure. The score includes various musical notations such as notes, rests, and dynamic markings.

Fig. 24

In the second part of the first section (bars 10–15) the process is being reversed as the horizontal structures are being formed from line 2 and vertical structures – from deviations of line 1 (Fig. 25).

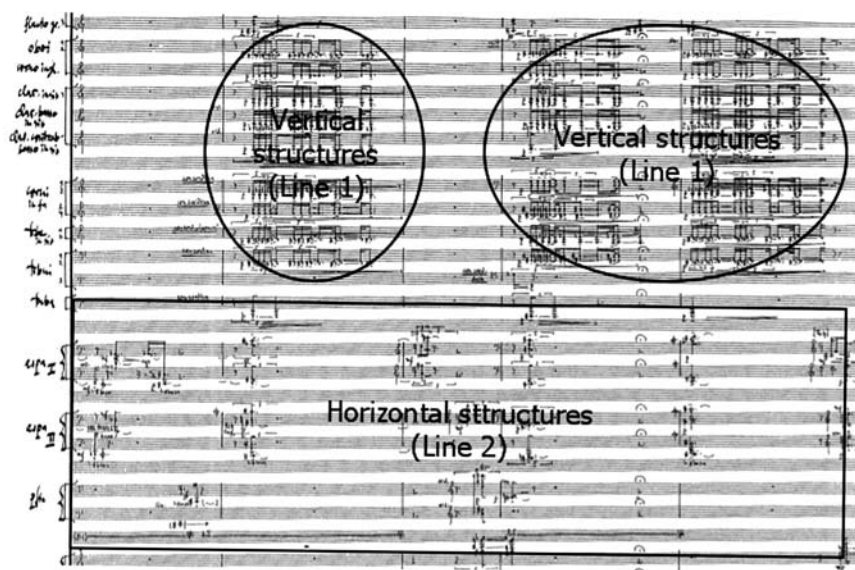


Fig. 25

In the next section (bars 15–23) the horizontal values of both structures are being exploited as well as these structures are being stacked together at the same time. During this process the amount of horizontal structures in the auditory field is being increased until the auditory threshold is being reached and a large amount of simultaneous events starts being conceived as a single process and it produces vertical sonoric values. Thus a vertical sonoric structure of a composite type is formed in a relation to horizontal sonoric values that were dominating before the reach of auditory threshold (Fig. 26).

A musical score for a large ensemble, including woodwinds, brass, strings, and percussion. The score is divided into three measures, each with a measure number (3, 5, 3) above it. The measures show a complex arrangement of notes across many staves, with some notes highlighted by boxes and others by circles, indicating a dense texture of simultaneous events.

Fig. 26

In the third section both horizontal and vertical sonoric structures constructed from line 1 and line 2 are being demonstrated in turns (Fig. 27).

Figure 27 displays a musical score for multiple instruments, including Flute, Oboe, Clarinet, Bassoon, and Trumpet. The score is divided into two main sections. The left section, labeled 'Horizontal structures (Line 1)', shows a series of horizontal lines representing the progression of sound over time. The right section, labeled 'Vertical structures (Line 2)', shows a series of vertical lines representing the simultaneous sound events. The instruments are listed on the left: Flute, Oboe, Clarinet, Bassoon, Trumpet, and Trombone. The score is marked with '5' and '3' at the top, indicating measures or sections. The right section is further labeled 'Horizontal structures (Line 2)' and 'Vertical structure (Line 2)'.

Fig. 27

The fourth segment (bars 42–61) is analogous to the second one as the structures are being stacked together and the amount of simultaneous events starts being conceived as a single process which produces vertical sonoric values. The only difference here compared to the second section is that the auditory threshold is not being reached exclusively by horizontal sonoric structures, as vertical strains of line 1 and line 2 are also being employed in this section.

In the fifth section we can see sonoric structures that are constructed from line 1 and line 2 being layered according to their dimensions. Therefore blocks of vertical and horizontal structures appear in succession (Fig. 28).

Figure 28 displays a musical score for multiple instruments, including Flute, Oboe, Clarinet, Bassoon, and Trumpet. The score is divided into two main sections. The left section, labeled 'Horizontal structures (Line 2)', shows a series of horizontal lines representing the progression of sound over time. The right section, labeled 'Vertical structure (Line 1)', shows a series of vertical lines representing the simultaneous sound events. The instruments are listed on the left: Flute, Oboe, Clarinet, Bassoon, Trumpet, and Trombone. The score is marked with '5' and '3' at the top, indicating measures or sections. The right section is further labeled 'Horizontal structures (Line 2)' and 'Vertical structure (Line 2)'.

Fig. 28

Horizontal sonoric structures are being perceptually differentiated into two groups due to their distinctive sound qualities (*Gestalt* principle of similarity), textural disposition (proximity) and individual course of processes (common fate). Vertical sonoric structures, on the contrary, sound simultaneously, thus the distinction between two different groups is being weakened. That allows vertical structures to form a single vertical sonoric structure of a composite type. This process is observed in the last section of the piece (bars 82–102, Fig. 29).



Fig. 29

The following scheme (Fig. 30) illustrates a large technical arsenal of the composite principle of structural organization. We can see how textural variety is being constructed and coordinated by manipulating the perception of sonic structures. The scheme reveals some manifestations of universal principles – prototypes of structural organization which can be found in a number of compositions.

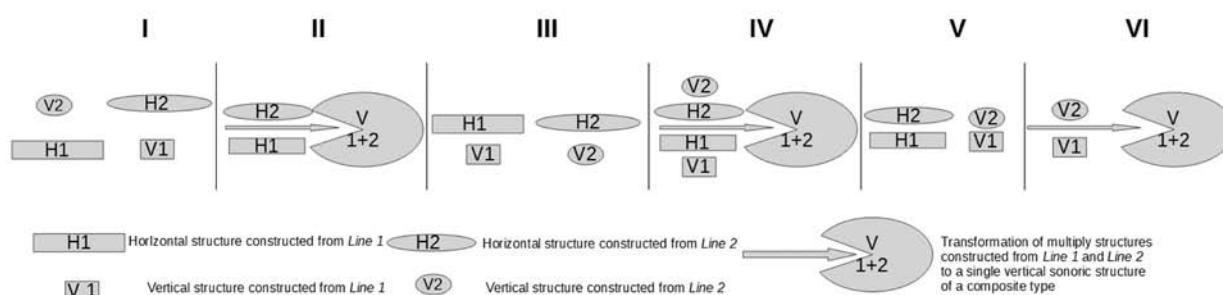


Fig. 30. Scheme of the third movement

We have discussed the parameters of some key parts of sonoristic music. However, this is only a structural point of view and by no means should be considered the only true explanation of the process of composing of sonoristic music. There are a lot of different mental layers that lead to the ways musical form is constructed. This one aims to explain one of those layers that can successfully coexist with a lot of other means of structural organization, which are yet to be explained.

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Vertikaliosios ir horizontaliosios sonorinės struktūros kaip konstrukciniai sonorinės muzikos elementai

Santrauka

Sonorizmas – tai unikalus muzikos komponavimo ir percepcijos būdas. Pagrindinis kompozitoriaus sonoristo tikslas yra sukurti naujus garsinius potyrius, o to dažniausiai pasiekama teikiant didesnę svarbą antriniam muzikos parametrui – garsumui, tempui ir ypač tembrui. Tembras neretai tampa pagrindiniu kintamuoju garsinių objektų konstrukcijose, tad dėl tembro, kaip parametro, kompleksiskumo šiuos garsinius objektus sunku diferencijuoti ir kategorizuoti.

Tai, kad vienas pagrindinių sonorinės muzikos (kitaip negu grynai struktūralistinių XX–XXI a. muzikos krypčių) komponavimo uždavinių yra tiesiogiai susijęs su klausytojo percepcija, mums atveria galimybes šios muzikos analizei kartu su muzikologiniais metodais taikyti kitų mokslo sričių – kognityvinės (suvokimo) psichologijos, akustikos, garsinės aplinkos įprasminimo (angl. *auditory scene analysis*) – žinias ir principus.

Straipsnyje nagrinėjama sonorinės muzikos formos analizės problematika. Čia remiamasi I. Deliège ir M. Méleno įžvalgomis apie muzikos formos suvokimo procesus bei vertikalumo ir horizontalumo koncepcijas. Pasitelkiant fundamentalias muzikologines žinias apie sonorinę muziką (J. Chomińskio, Z. Granato, A. Maklygino, P. Boulezo įžvalgos) ir akustikos bei *Gestalt* psichologijos dėsnius, aprašoma sonorinės muzikos formos analizės metodika: segmentavimo procesas, faktūrų tipologizavimo principai, sonorinių dimensių (vertikalios, horizontalios ir diagonalios) požymiai, faktūrų priskyrimo vienai iš šių dimensių problematika, loginių ryšių tarp segmentų nustatymas. Pateikiami ir sonorinės muzikos formos organizavimo pavyzdžiai M. Pintscherio kūrinyje „Fünf Orchesterstücke“.

Reikšminiai žodžiai: sonorinė muzika, sonorizmas, kognityvinė psichologija, *Gestalt* principai, vertikalumas, horizontalumas, muzikos forma, Matthias Pintscher.

Sound Plasma

Annotation

The Romanian composer Horațiu Rădulescu (1942–2008) was one of the leading pioneering figures in the development of spectral music in the closing decades of the last century. In 1972 Rădulescu's music formalised the aesthetics arising from his earlier compositions into one key idea: 'Sound Plasma' ('Sound Plasma, Music for the future sign, My High D Opus ∞ ' – Horațiu Rădulescu 1972–1973). This is a form of music in which sound, harmony, colour, texture and structure are all combined together. There are four key elements: the Sound Compass, Global Sources, The Narrow Frequency Band and Spectrum Pulse. All four of these elements combine to form the architecture of the work arising from them. This in turn gives way to Evo-Involution, the term used to describe the life of Sound Plasma which defines seven basic directions. This article explores the basic concept, outlined above, of Sound Plasma and demonstrates its application in the "Capricorn's Nostalgic Crickets" Op. 16 (1972, rev. 1980).

Keywords: spectral music, Horațiu Rădulescu, Sound Plasma, *Capricorn's Nostalgic Crickets*, Romanian music.

1. Who was Horațiu Rădulescu?

Horațiu Rădulescu was, arguably, one of the most important composers of the past fifty years. Born in 1942 he wrote some of the most imaginative and original works of the twentieth century. His most notable output was his string quartets, piano concerto and piano sonatas. Often associated with the Spectralists, Rădulescu's music constantly drew on the harmonic series, but never in the manner that became typical of other spectral composers.

In 1969 Rădulescu left Romania and was instantly drawn to the works of Stockhausen, Messiaen and later Scelsi. The attraction to Stockhausen mostly hung in the fact this was the first composer Rădulescu found who was interested in the harmonic series. Stockhausen's "Stimmung" (1968) a remarkable work in its own right, was written around the same time as Rădulescu's "Credo" (1969) which was written while he was still in Romania. The similarity between the two works is the fascination with the harmonic series, but Rădulescu's "Credo" explores forty-five partials of the harmonic series, whereas "Stimmung" only really explores nine.

The association with Stockhausen's work is what ultimately led to Rădulescu to write his book "Sound Plasma" (Rădulescu (1972–1973). Sound Plasma, Music for the future sign, My High D Opus ∞).

2. What is Sound Plasma?

In short "Sound Plasma" describes how to create this new music Rădulescu envisaged. This ideal is a form of music which transcends harmony and counterpoint entirely. This occurs because the "music" becomes almost like a physical object, where sound, harmony, colour, texture and structure all combine together into one.

This is made possible by understanding all the influencing forces Rădulescu identified: The Sound Compass, Global Sources, Narrow-Frequency Bands (NFBs), Spectrum Pulse and Evo-Involution.

2.1. The Sound Compass

The Sound Compass is a device mirrored on Jung's compass of psychological types. The Sound Compass defines sounds and textures but can also be used to map out new musical structures. It is built on two opposite extremities. One is Noise and Sound, Noise being a complex and unclear sound like white noise; whereas Sound is clear and easy to identify like a trumpet. Then there is Width and Element, Width is quite simply a thick texture like in Ligeti's Sonoristic music and Element is a thin texture like Byzantine Chant.

All sounds, both naturally occurring and musical, can be placed on the Sound Compass. For example, we can understand that a sine wave is both pure Sound and pure Element as it is an identifiable sound and it is a single voice in the texture. We can also see that white noise would be pure Noise as you cannot identify a single sound in it and it is pure Width as it is the thickest texture that can be achieved. If we take a traditional texture like Sixteenth century polyphony we can understand it to be pure Sound, as the voices are easy to identify, and closer to pure Width as the texture is relatively thick. If we also take Varese's *Ionisation* we can see it is pure Noise due to the complexities of the percussion but the texture is relatively thin throughout most of the work so it can be seen as closer to pure Element.

2.2. Global Sources

Rădulescu went on to define sounds further; he identified them as Global Sources. There are five Global Sources: Instrument or Object, these as sounds produced by an item like a violin or twigs; Human Source, these are defined as all sounds made by a humans excluding language; Nature is all sounds produced by the natural world like bird calls, the wind blowing or the sea; Electronic sounds are all sounds produced electronically like sine wave, distortion or feedback; Concrete Human Source or Language is all languages or sounds produced by languages.

2.3. NFBs and Spectrum Pulse

Beyond this, Rădulescu identifies two plasmic devices: the Narrow Frequency Band (NFBs) and Spectrum Pulse. These two devices give Sound Plasma its energy. Rădulescu refers to NFBs as the “cell” or “Micro Plasma”. An NFB is a compressed band of multiple sound waves which are constantly oscillating around a small difference in tone (between 1/3 and 3/4 tone). Because of the interference in these sound waves the fundamental becomes unstable, this one, can create an equivalency to consonance and dissonance, and secondly, makes a sound which constantly evolves and adapts on itself without the need of traditional development.

Spectrum Pulse is the second plasmic device. In short Spectrum Pulse can be described as a phenomenologically produced rhythm. This occurs under two circumstances firstly when another sound is introduced, producing NFBs and secondly, variable multiphonic treatment of a single source. In the first we hear two fundamentals trying to dominate creating a new pulsating spectrum. The latter is a where a fundamental is trying to evolve and change or multiple spectra trying to produce a relatively stable NFB.

2.4. Evo-Involution

With the understanding of sound and the plasmic devices Rădulescu combines them all to form the architecture of the work. He refers to this as Evo-Involution, this describes the life and evolution of sound plasma. There are seven basic directions:

1. Towards Noise from Sound Width and/or Sound Element;
2. Towards Width from Noise Element and/or Sound Element;
3. Towards Sound from Noise Width and/or Noise Element;
4. Towards Element from Noise Width and/or Sound Width;
5. Simultaneously towards all limits of the sound space;
6. Simultaneously towards the central sound space;
7. The purest form of Evo-Involution, a combination of the previous six processes or at least the combination of five and six.

3. How Rădulescu portrayed this in his scores

3.1. Capricorn's Nostalgic Crickets for Seven Identical Woodwinds Op. 16 (1972, rev. 80)

How did Rădulescu put this aesthetic into practice?

This analysis of his work “Capricorn's Nostalgic Crickets” will give you some idea of how Rădulescu put his aesthetics into practice (see Fig. 1). The piece, even though orchestrated for any seven identical woodwinds, was written for the clarinettist Susan Stephens. The score is very typical of Rădulescu at that time. At first glance the score looks very free and aleatoric but it is not quite the case. Rădulescu is very stringent on the performers but there is a lot of room for interpretation and naturally occurring phenomena.

The most basic level of the piece is a 96 note canon in seven parts. Every note has duration of 11 time units; this could be seconds or something else. Every note is assigned a timbre or colour. Rădulescu described the work as “Canonic Simultaneous Permutation”. What this means is the 96 note microtonal canon, combined with the complex colours, produces a circling haze of overtones where the single pitches become almost indefinable. This is produced because of the complex colours combined with the very close harmonies, producing unclear combined spectra or NFBs. If we look at the opening chord we see that it is a microtonal cluster spread of a ninth. The entries of each voice in the canon is spread unevenly, this needs to be highlighted because the graphic depiction of the score is heavily focused on symmetry or other patterns.

As we can see there are three lines of symmetry Horizontally, Vertically and one line Diagonally. The symmetry ties in with this idea of “Canonic Simultaneous Permutation” as well as the visual element of the performance as the performers follow their line around the score.

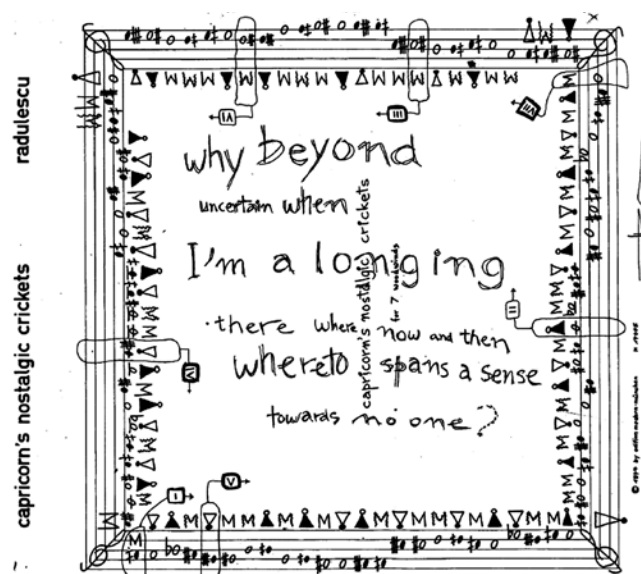


Fig 1. Horațiu Rădulescu, excerpt from the score of *Capricorn's Nostalgic Crickets*

Symmetry is not the only pattern being used in this piece. The importance of the number 8 is very significant. This is originally derived from the syllables in the title Cap-ri-corn's Nos-tal-gic Cric-kets. Bearing this in mind we can see that the sides of the score can be divided into three eight note chords. "Rhythmically" they are varying emphasis of the phrase: cap-RI-CORN'S nos-tal-GIC CRIC-kets or CAP-ri-CORN'S NOS-tal-gic cric-KETS. Each side follows this form of pattern. Another pattern begins to emerge but not quite as symmetrically as some of the others. The lines have small oscillations around a singular point. These points change irregularly but what they give the piece is a focal point to focus on.

This is only the musical level that is influencing the production of Sound Plasma. There are further levels of influence, the next point to look at is the central text:

Why Beyond
Uncertain when
I am a longing
There where now and then
Where to spans a sense
Towards no one?

This text, written by the composer, is used as an influencing device for the performers. The piece does not programmatically depict the text, but instead the performers must contemplate every element of it (phonetically, literally, musically and instrumentally). Rădulescu's intention with this is so the performers can further define the "intrinsic sound microgitation accompanying the real I/O sound". What he means by this is he wants the performers to use the words to expand the basic sounds of the instruments away from their original sound, to create something more plasmic.

With this in mind the performers can focus on the next key device Concealing Sound Source. Doing this will disassociate the listener from conventional sound and bring the piece closer to Sound Plasma. This is achieved by the way Rădulescu directs the performers to play each note. First each note must have no attack and gradually crescendo, then diminuendo hiding the point when the note starts and finishes. Secondly each performer is directed to make their sound appear like it is either a human sound turning into an instrumental sound or vice versa. The use of the complex colours allows the performers to really make this more achievable because the original instrumental sound is warped.

This combination of elements is what gives the work its plasmic sound and shows a whole world of possibilities within this sphere of composition. The devices used in this piece are not the only way to produce Sound Plasma; Rădulescu himself kept trying new or alternative ways to produce Sound Plasma. The one constant was the aesthetic. This was even the case later on in his life when writing works like his piano concerto "The Quest".

4.1. How can Sound Plasma be used today?

Any composer wanting to draw on Sound Plasma as a way to compose will need to constantly consider all the elements previously mentioned in this talk: Sound Compass, Global Sources, NFBs, Spectrum Pulse as well as use the harmonic series to expand their music. These elements have no specific techniques or devices so the thinking can never become dogmatic. Like early Spectralism the only thing to keep unity is the aesthetic.

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Garso plazma

Santrauka

Rumunų kompozitorius Horațiu Rădulescu (1942–2008) paskutiniiais praėjusio amžiaus dešimtmečiais buvo vienas iškiliausių ir novatoriškiausių spektrinės muzikos kūrėjų. 1972-aisiais jis suformulavo savitą muzikos estetiką, grįstą savo ankstesnėmis kompozicijomis, ir ją apibendrino sąvoka „garso plazma“. Visa tai jis išdėstė teoriniame traktate „Sound Plasma: Music of the Future Sign“ [Garso plazma, Ateities ženklo muzika], o jo muzikine išraiška tapo kompozicija „My D High Opus 19∞“ [Mano viršutinis D, op. 19∞] (1972–1973).

„Garso plazma“ – tai muzikos forma, kurioje susilieja garsas, harmonija, faktūra ir struktūra. Šią muzikos koncepciją grindžia keturi pagrindiniai elementai: garso diapazonas, pasauliniai šaltiniai, siauro spektro garso dažniai ir spektro pulsas. Iš šių keturių elementų formuojama kūrinio architektūra. Iš jų sąveikos taip pat atsiranda „evo-/involiucija“ – sąvoka, apibūdinanti „garso plazmos“ gyvybinį ciklą, besiplėtojančią septyniomis pagrindinėmis kryptimis.

Šiame straipsnyje aptariama anksčiau minėta „garso plazmos“ koncepcija ir jos pritaikymas kūrinyje „Capricorn's Nostalgic Crickets“ [Nostalgiški ožiaragio virpliai], op. 16 (1972, nauja versija 1980).

Reikšminiai žodžiai: spektrinė muzika, rumunų muzika, Horațiu Rădulescu, garso plazma, *Capricorn's Nostalgic Crickets*.

Psychoacoustical Issues of Dissonance in Lithuanian *Sutartinės*

Annotation

Sutartinės are a Lithuanian type of *Schwebungsdiaphonie* (Račiūnaitė-Vyčinienė 2002; Ambrazevičius, & Wiśniewska 2009; etc.). In contrast to Western art music, the dissonance-like sonorities in *Schwebungsdiaphonie*-cultures are at the core of the tonal structures. These cultures, although not abundant, are found in different locations all over the world.

It is a natural idea to predict that aesthetics and intervals of the sonorities in *sutartinės* are related strongly to certain psychoacoustical phenomena, namely to the perception of dissonance or roughness. On the one hand, studies of psychoacoustical roughness and sensory dissonance are really numerous. The notions of roughness and sensory dissonance are usually considered as synonyms. On the other hand, it was proposed that the ideal sounding of *Schwebungsdiaphonie* conforms to a maximum dissonance/roughness (Brandl 1989; the diaphony in the Balkans and elsewhere; Ambrazevičius 2008; etc.; the Lithuanian *sutartinės*). However, to be precise, the relations between roughness and sensory dissonance remain obscure. Therefore, in the current study, I aim to analyze the occurrences of the notions of roughness and sensory dissonance in the psychoacoustical studies and to define the case of *sutartinės* in this context.

The psychoacoustical studies were overviewed and discrepancies between the concepts of roughness and sensory dissonance were noted. The experimental findings on the intervals corresponding to the maximum values of roughness/sensory dissonance were collated and significant disparities were found. It seems that, at least for a substantial frequency range, roughness is associated with larger interval sizes. The collation of these results and the findings of acoustical measurements of *sutartinė* performances lead to the conclusion that the ideal vocal “clash” in *sutartinės* most probably corresponds to psychoacoustical roughness, but not to sensory dissonance.

Keywords: roughness, sensory dissonance, *sutartinės*, *Schwebungsdiaphonie*.

1. Introduction

The issue of consonance/dissonance is, probably, one of the “most ancient” issues in the history of music theory. The question whether sonorities should be considered as consonances or dissonances attracted the interest of scholars for many hundreds of years resulting in numerous theoretical treatises. And for many years, the answer seemed to be essentially simple: in one or another way, the issue was presumed to be tightly embedded in numerology. Briefly, consonance was equated to a “simple ratio” (of strings’ lengths, frequencies, etc.) and dissonance meant “not a simple ratio”.

However, really scholarly psychological studies appeared before some fifteen decades only (to mention Helmholtz 1863 as the seminal study). The later the more those studies revealed that the phenomenon of consonance/dissonance is quite multifaceted. Thus the rule of “simple ratios” appeared to be a crude oversimplification. For instance, consonance/dissonance depend on the exposure of an individual to a certain soundscape, i.e. on musical culture. This culturally dependent sense of consonance/dissonance is observed even in Western listeners. It results in the perception of just intervals by modern listeners as “lacking warmth” or “tasteless” and the preference is given to equal temperament (Roberts & Mathews 1984; Vos 1986).¹ Moreover, the sense of consonance/dissonance varies noticeably even in the frame of a single musical language (examples of the intervals in barbershop singing and violin music; Greene 1937; Sundberg 1982).

Quite a few musical cultures favour dissonances (in terms of physiological acoustics) rather than consonances in their polyphonies. This is described as various types of psychoacoustically based “diaphony of beats” (*Schwebungsdiaphonie*) in some places (although not abundant) throughout the world (Cazden 1945; Brandl 1989; Messner 1989; etc.). Moreover, dissonances are exploited in the music of idiophones. Beats between their partials occur due to inharmonicity of their spectra. This effect, as well as deliberate mistuning is used, for instance, to produce the distinctive “shimmering” quality of gamelan music.

To make things even more complicated, it is worth mentioning that there is prevalence of timbre over precise intervals in some cases. Thus, comparative study of consonance/dissonance and musical scales, in general, can be senseless if the determinant is timbre in the case under investigation.²

¹ The intervals in twelve-tone equal temperament could not be expressed by simple ratios of frequencies at all, except of octaves.

² Here we stop at the consonance/dissonance of isolated sonorities. Further the temporal component of consonance/dissonance should be discussed.

Only several cases should be mentioned when the natural intervals really appear. For instance, these are so-called instrumental scales inbuilt in the design of certain musical instruments. The natural scale also inherently appears in overtone singing since it is based on the successive exaggeration of separate partials of the voice spectrum.

2. Dissonance and roughness

Beside of dissonance, another notion of roughness is used in psychoacoustical studies. Roughness is considered to be a specific “annoying” sense resulting from physiology of inner ear, from the action of the basilar membrane induced by beats. Similarly as other psychoacoustical quantities, roughness can be even evaluated from psychoacoustical experiments. The unit of roughness is asper (Fastl & Zwicker 2007: 257).

It was Herbert von Helmholtz who noticed the relationship of roughness and beats (Helmholtz 1863). He obtained that the strongest sense of roughness appears when the frequency of beats equals approximately 30–40 Hz. Starting from this seminal finding, the notions of dissonance and roughness (as psychoacoustical dimensions) usually tend to be equated, although sometimes they are distinguished. It is generally believed that the two notions are merely two manifestations of the same phenomenon; “roughness” belongs to a somewhat “technical” domain of psychoacoustics, whereas “sensory dissonance” stands for somewhat “music-colored” attribute.

The classical study of Plomp & Levelt (1965) could serve as a typical example of the presumed interchangeability of the two notions. While the authors asked the subjects to judge intervals on the scale “consonant-dissonant” (or, in the case of incomprehension, they substituted the “consonant” with “beautiful” or “euphonious” instead; p. 553), they exploited both notions of dissonance and roughness unambiguously in their discourse. Incidentally, in many other studies, the questions presented to the participants are not revealed and the procedures of the experiments are not (or only faintly) detailed. Therefore the subjective sonic qualities meant and evaluated in the experiments remain obscure.

However, it is also argued that, even though roughness is one of the main constituents of sensory dissonance, it is not the only one. Moreover, several types of roughness are distinguished or in some cases the multidimensionality of roughness is suggested.³

Now we will take a glance at the results of several studies on sensory dissonance/roughness. For instance, Ernst Terhardt (1968: 219) states that “the modulation frequency of maximum roughness increases with increasing carrier frequency initially and reaches a constant value $f_{\text{mod}}^* = 75$ Hz at carrier frequencies above approximately 2 kHz”⁴ and presents the corresponding graph (see Figure 1). In his later study (1974), Terhardt claims the approximate identity of dissonance and roughness. However, there is some discrepancy between this claim and the factual results (Figure 2): it is clear that at least in the relevant spectral range the sense of roughness slightly differs from the sense of dissonance. Briefly, roughness is stronger for wider seconds and dissonance is stronger for narrower seconds.

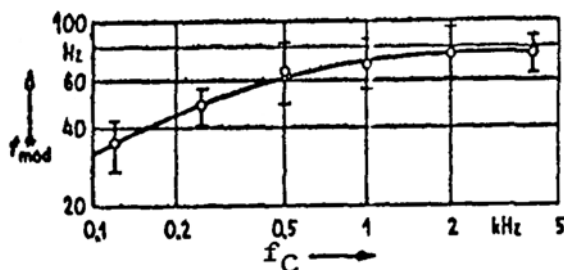


Fig. 1. Modulation frequency for maximum roughness f_{mod}^* as a function of carrier frequency f_C . Modulation factor is 1, SPL = 60 dB (Terhardt 1968: 219).

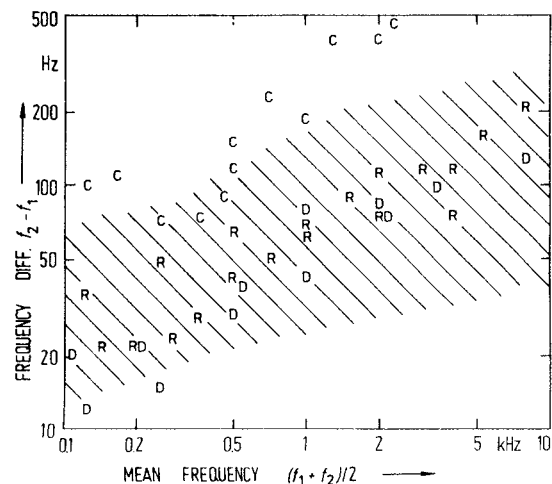


Fig. 2. Dissonance, consonance, and roughness; according to Terhardt, 1974: 1062. Hatching marks the area of pronounced roughness, “R”, “D”, and “C” mark, correspondingly, the maxima of roughness and dissonance, and the limit of appearance of consonance.

³ See the forthcoming paper Ambrazevičius 2015, for details.

⁴ A number of studies employ AM (amplitude modulated) sine tones, while others use sine tone pairs. However, it is stated that the results do not differ significantly for the two cases (e.g. Terhardt 1968: 219).

The findings of Andrzej Rakowski (1982) lead to the approximation for the frequency interval for maximum roughness as $2\sqrt{f}$. William Hutchinson and Leon Knopoff (1978) proposed noticeably different evaluation of dissonance. They designed their own approximation for the critical bandwidth as $1.72f^{0.65}$ and employed the Plomp's and Levelt's 1/4 CBW-criterion for the maximum dissonance.

The results of Marc Leman's model for roughness (2000) are presented in Figure 3. Pantelis N. Vassilakis (2001: 197–198) applied the model proposed earlier by William A. Sethares (1998; see the illustration from the second edition of his book on Figure 4). Finally, consider the evaluations by Fastl & Zwicker (Figure 5).

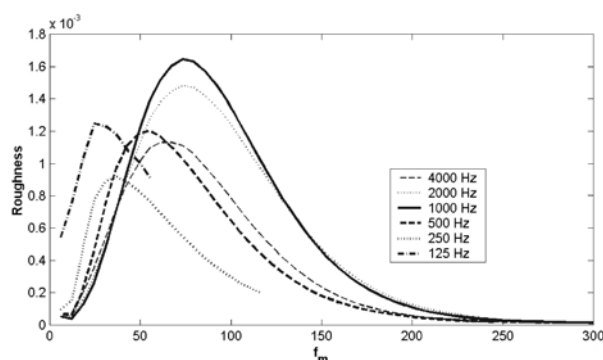


Fig. 3. Roughness in the function of modulation frequency of different carrier frequencies (modulation factor is 1; Leman 2000: DAFX-5).

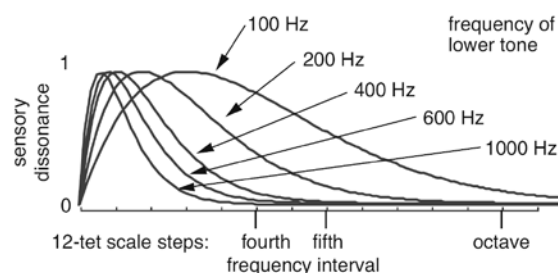


Fig. 4. Sensory dissonance in the function of frequency interval between two sine tones sounding simultaneously (Sethares 2005: 47). Curves for different frequencies of the lower tone are presented.

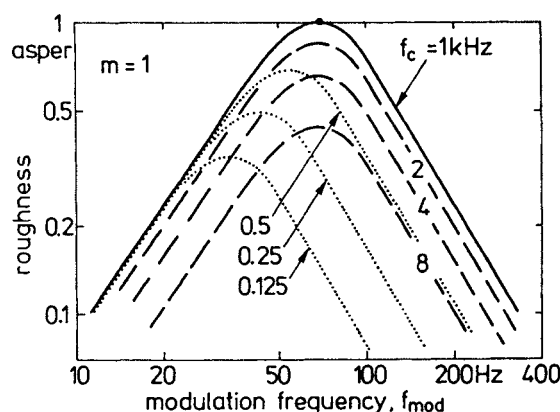


Fig. 5. Roughness of 100% amplitude-modulated tones; according Fastl & Zwicker 2007: 259. Curves for different centre frequencies are presented.

Now let's compare the findings of the psychoacoustical studies. The curves in Figure 6 were composed based on the formulas and interpolations of graphically presented results from the discussed sources. Probably, the confusion between the dissonance, roughness, and its possible types explains why the results of the experiments show significant discrepancies. A closer examination of Figure 6 reveals that roughness is typically

associated with larger interval sizes, and that sensory dissonance is associated with narrower interval sizes. For instance, Terhardt in his experiment asked the subjects specifically to evaluate roughness (1968: 216), and the corresponding curve lies higher. On the contrary, as already mentioned, the well-known relating of the maximum dissonance to 1/4 of critical bandwidth (Plomp & Levelt 1965) refers specifically to dissonance but not to roughness.

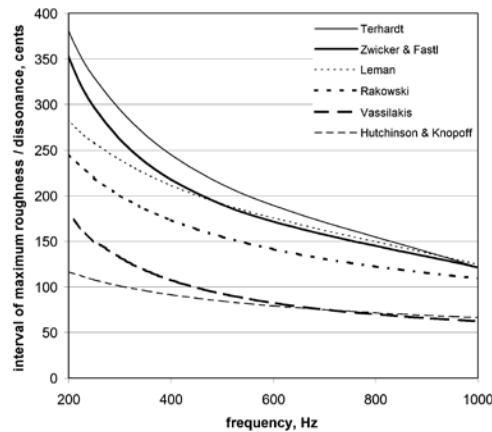


Fig. 6. Dependence of maximum roughness/dissonance on the central frequency. See the body text for details.

On the one hand, roughness is typically associated with the perceptual result of rapid fluctuation of envelope of sound pressure amplitude, i.e., with the subjective rate of amplitude change (expressed as product of the subjective modulation depth and f_{beats} ; e.g. Fastl & Zwicker 2007: 262), or, briefly, with the “bumpiness of the [subjective] acoustic surface of a sound” (Parncutt 2006: 202). On the other hand, sensory dissonance could be probably connected to the features of critical bandwidth. Certain doubts remain whether the “bumpiness” and critical bandwidth are tightly related. From my purely subjective observations, the (sensory) “dissonance”, “unpleasantness”, or “annoyance” could be rather equalized to “harshness” and not so much to “roughness”. One may therefore speculate that, for instance, a semitone in the middle of a piano keyboard sounds harsher, whereas the whole tone seems to be rougher. Incidentally, the terms such as “harsh” or “turbid” occur episodically when describing non-euphonious, unpleasant, or dissonant sonorities (e.g. Plomp & Levelt 1965: 554; Mashinter 2006: 65, 66).

3. *Sutartinės*: general remarks

Now from the “cosmopolitic” experiments on psychoacoustical roughness and sensory dissonance we move to the Lithuanian ethnic *sutartinės*. The most distinctive kind of Lithuanian *sutartinės* present a peculiar type of *Schwebungsdiaphonie*, i.e., the diaphony of the *sutartinės* is based mostly on intervals of the second occurring between the vocal parts which intertwine polyphonically and polyrhythmically.

A $\text{♩} = 72$

Mi — na, mi — na, mi — na — gau —
— čio ly — lio, mi — na — gė — la ly — lio.
Su — jo — ja, su — jo — ja, su — jo — ja
sve — te — liai, su — jo — ja sve — te — liai. O-ai!

Fig. 7. *Sutartinė* “Mina, mina, minagaučio lylio”: original transcription of one part (Slaviūnas 1958: 657 [Nr. 428a]). The entrance of the canonically succeeding voice is asterisked.

Figure 7 shows a typical example of a *sutartinė*. This *sutartinė* was performed canonically by three singers in such a way that the two parts A and B (separated by an asterisk in the figure) sound simultaneously, except in the beginning when only one voice (part A) sounds. The lyrics change. Thus mostly intervals of the second occur continuously between the two voices.

When listening to the original recording of this *sutartinė* (Račiūnaitė-Vyčnienė 1998)⁵, even unsophisticated ear could suggest the idea that the transcription in Figure 7 is actually crude or, at least, quite approximate: the real recording sounds “non-tempered” enough. To reveal the actual scale, the recording was analyzed acoustically: the pitches of dyads were measured and the intervals were calculated (Ambrazevičius 2005). The pitches were determined from the spectra of the dyads: certain partials were identified as belonging to one or the other of two voices, their frequencies were measured (see the example in Figure 8), and the pitches were calculated. Relatively stable portions of the dyads were considered in terms of spectrum (fortunately, the intrasonic intonation of *sutartinės* features quite stable segments).

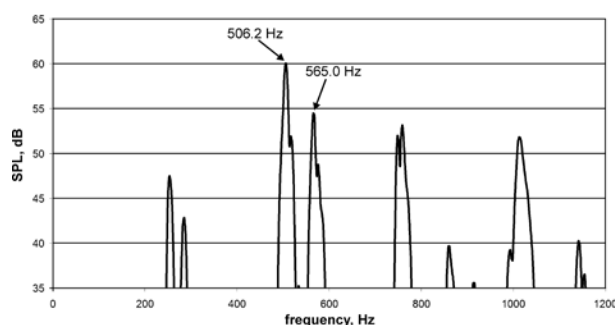


Fig. 8. Excerpt from typical spectrum of the *sutartinė* “Mina, mina, minagaučio lylio”

The statistical distribution of pitches is depicted in Figure 9. It shows approximately 1.8 of tempered semitone between the most frequent intonations. Thus the corresponding most frequent thirds in vocal parts (G3–B3 and A3–C4⁶) equal approximately 3.6 semitones, i.e. they are neutral. Fourth G3–C4 equals 5.4 semitones. D4 occurs very seldom, thus categorical conclusions about its position in the tuning system could not be drawn. Nevertheless C4–D4 equals 1.5–2.2 semitone, i.e. also roughly 1.8 semitones on the average. A3 and H3 are the most stable tones according to the corresponding sharp peaks in Figure 9. This bichord could be treated as certain bitonal nucleus and anchor of the tuning system. G3 and C4 are less stable, whereas F3 and D4 are the least stable. The zones of intonation are quite wide, even for the most stable anchors. Hence, to generalize, the two central steps are intoned relatively steadily in the course of the entire performance thus forming the nucleus of the scale. The marginal steps show greater freedom in intonation.

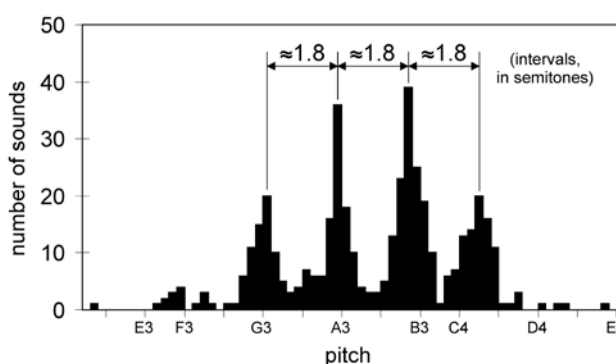


Fig. 9. Histogram of pitches in the *sutartinė* “Myna...” (Figure 1); all pitches in all parts.

The analysis leads to a conclusion that we have to be very cautious when treating and denominating the scale and tuning system aurally. The Western major-minor system and equal temperament work as elements of apperception, which results in “aural ghosts”. They lead to misinterpretation that design of the scale is diatonic.

⁵ The digitized version of the old recording (from the 1930s).

⁶ Here and hereafter a simplified marking for pitch class is used. For instance, C4 actually could be as high as C#4 or even higher.

Actually the tuning system has nothing in common with diatonics: there is no semitone/whole tone contrast in the sequence of intervals. The scale could be considered as “squeezed anhemitonics”, since the intervals between the adjacent pitches are a bit narrower than the tempered whole tone.

One could try to visualize the revealed regularities of the scale in transcription (Figure 10) where a peculiar staff is intentionally applied to avoid associations with the diatonic scale.



Fig. 10. Transcription of characteristic patterns of the *sutartinė* “*Myna, myna, mynagaučio lylio*” on an alternative staff. The petit notes show the most characteristic variants.

In the subsequent study (Ambrazevičius 2008), a total distribution of dyad-intervals in 25 *sutartinės* has been also composed. The distribution showed that the majority of the intervals are seconds. The category of the interval is quite wide and does not split into the individual categories of minor and major seconds. As in the case of the separate *sutartinė* “*Myna, myna, mynagaučio lylio*”, the seconds slightly narrower than the tempered whole tone (around 1.7 semitones) are most preferred.

So, again, we come to a simple conclusion: the intervals of second between the voices in the dyads of *sutartinės* comprise relatively wide category centred at, approximately, 170–180 cents. What accounts for such a peculiar interval? Let’s return to the psychoacoustical studies on sensory dissonance / roughness and collate their results to the findings of the study on intervals in *sutartinės*.

4. Dissonance or roughness in *sutartinės*?

For female voices, frequency of the first formant ranges roughly from 400 to 1000 Hz. So this frequency range is expected to be the most intense range in the spectra of singing voices. This corresponds to the second or third (or sometimes fourth) harmonics. The application of these frequency values to the graphs in Figure 6 leads to an insight that the singers were aiming for maximum roughness: the most intense frequency range corresponds to the wide range of pitch intervals centered at slightly “squeezed” whole tone. Importantly, the aiming for maximum dissonance would lead to significantly narrower intervals, around 70–100 cents, what is not the case of *sutartinės*. It seems that specifically roughness was meant by the singers of *sutartinės* when describing the sonorities as “clashing” (clanging, warbling; but not “cutting” which would point to the sensory dissonance and narrower intervals). The “perfect clash” was considered by the singers as an essential quality and marker of a congenial performance. Earlier Brandl already concluded that the psychoacoustical correlate of the ideal ring in *Schwebungsdiaphonie* (found in the Balkans and elsewhere) is of maximum roughness (1989). It is actually dubious whether this statement really works for all traditions in Balkans, as there quite different intervals in the dyads could be registered for different cases (cf. Miljković 1998; Rihtman 1969). At any rate, the measurements in our studies support this statement when applied to Lithuanian *sutartinės*. Therefore it can be credibly stated that the scales of *sutartinės* are actually determined by psychoacoustical, i.e. by extramusical phenomenon.

Importantly, the noun *sutartinė* derives from the verb “sutarti” which means “to agree”, “to be in concord” (“to live in concord”, “to sing in concord”, and so on); in other words, “to sing in consonance”. Nowadays the word *sutartinė* is sometimes even applied to signify a perfect, harmonious performance in general, no matter the kind of the performance. Thus, in the case of the Lithuanian *Schwebungsdiaphonie*, roughness obtains a positive connotation: aesthetically and semantically, the sonorities in seconds are considered as consonances.

However, it should be pointed out that the requirement of maximum roughness is not categorical in the Lithuanian case for the following reasons: the intonational zone of a second is too wide, durations of the sounds are too short to produce exact intervals (initial glides are characteristic), and the partials are, on the average, too different in SPL.⁷ All these factors diminish the role of maximum roughness. It could be stated that maximum roughness is a desirable quality, but the zone of the suitable roughness is quite wide; the factor of roughness is possibly reduced by other important factors of articulation.

⁷ Roughness shows substantial dependence on the ratio of amplitudes of the “clashing” harmonics. The strongest roughness occurs for equal amplitudes. The more different in SPL are the harmonics, the weaker is the sense of roughness (Terhardt 1968; Vogel 1975; Guirao and Garavilla 1976).

5. Conclusions

The close inspection of psychoacoustical studies on roughness / sensory dissonance show significant divergences in their findings. Most probably, this results from different experimental conditions and confusion of notions of roughness and sensory dissonance. Attempts to separate these two notions reveal that, at least for a substantial frequency range, maximum roughness tends to be associated with larger interval sizes, compared to the case of maximum sensory dissonance.

Brandl's insight on aiming for maximum psychoacoustical roughness in performance of *Schwebungsdiaphonie* (exemplified mostly by the examples of Balkan music traditions), most probably, is valid for the case of Lithuanian *sutartinės* as well. Here specifically roughness and not sensory dissonance is meant; this results from the collation of the findings of psychoacoustical studies on roughness / sensory dissonance and the findings of acoustical measurements of *sutartinė* performances. The rough quality of the sonorities in *sutartinės* obtains positive connotations, i.e., in a broad sense, these sonorities are considered as "consonances". The maximum roughness is obtained for the intervals slightly narrower than the tempered whole tone, for the characteristic spectra of the female voices of *sutartinės* singers. This results in the peculiar scale structures deviating considerably from the twelve-tone equal temperament. As a side product, the problem of transcription occurs, making the conventional five-lined staff unsatisfactory for adequate presentation of the scale structures in the roughness-based *sutartinės*.

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Psichoakustiniai disonanso aspektai sutartinėse

Santrauka

Reikšminga sutartinių dalis priskirtina samplaikų diafonijai (*Schwebungsdiaphonie*; Račiūnaitė-Vyčinienė 2002; Ambrazevičius & Wiśniewska 2009 ir kt.). Kitaip negu vakarietiškoje akademiniėje muzikoje, samplaikų diafonijos kultūrose disonansų tipo sąskambiai formuoja garsų sistemos branduolį. Šios kultūros, nors ir negausios, randamos įvairiose pasaulio vietose.

Tikėtina, kad sutartinių sąskambių intervalams didelės reikšmės turi tam tikri psichoakustikos reiškiniai, būtent disonanso arba šiurkštumo suvokimas. Viena vertus, psichoakustinio šiurkštumo ir sensorinio disonanso tyrimų ištis daug. Šiurkštumo ir sensorinio disonanso sąvokos paprastai tapatinamos. Kita vertus, manoma, kad samplaikų diafonijos skambesio siekinys – stipriausias disonansas / šiurkštumas (Brandl 1989; diafonija Balkanuose ir kitur; Ambrazevičius 2008 ir kt.; sutartinės). Tačiau, tiksliai kalbant, šiurkštumo ir sensorinio disonanso sąryšis lieka miglotas. Todėl šiuo tyrimu apžvelgiamos šiurkštumo ir sensorinio disonanso sąvokos įvairiuose psichoakustikos darbuose ir apibūrinamas sutartinių fenomenas psichoakustikos kontekste.

Atidžiau panagrinėjus įvairių mokslininkų pateiktus eksperimentinių šiurkštumo / sensorinio disonanso tyrimų rezultatus (dažniausiai neskiriant šių sąvokų), išryškėja reikšmingi jų skirtumai ir prieštaraivimai. Stipriausias šiurkštumas, atrodo, atitinka platesnius intervalus negu stipriausias sensorinis disonansas. Sugretinus šiuos rezultatus su sutartinių intervalų akustinių matavimų rezultatais, prieinama prie išvados, kad idealus balsų „sumušimas“ sutartinėse tikriausiai atitinka stipriausią psichoakustinį šiurkštumą, o ne sensorinį disonansą.

Reikšminiai žodžiai: šiurkštumas, sensorinis disonansas, sutartinės, samplaikų diafonija.

2

SONORIZMAS	SONORISM
AKUSTINĒJE MUZIKOJE	IN ACOUSTIC MUSIC

**From *Tingel Tangel* by Georges Aperghis
to *Le Troisième Jour* and *Silence... on tourne* by Frédéric Daverio:
'Sonoristic Music'?**

Annotation

The Polish musical movement "sonorism" is well expressed in France by the work of the Greek composer Georges Aperghis (b. 1945), as well, who is living and working in Paris since 1963. Aperghis has been influenced by the serialism and the musical techniques of Iannis Xenakis while he was forming his personal music style. He has been also influenced by avant-garde music, especially by the idiomatic musical creation of Mauricio Kagel.

"Musical theatre", which is based on improvisation, takes the most important place in his original compositions although he composed a great number of works for solo instruments, solo voices, musical ensembles etc. The piece *Tingel Tangel* for soprano, percussions (cymbalum) and accordion is of a great interest. The composer dedicated *Tingel Tangel* to his three main performers: Valérie Philippin (soprano), Françoise Rivallant (percussions) and Frédéric Daverio (accordion).

Frédéric Daverio (b. 1961) who, apart from a prominent accordionist, is also a distinguished composer is influenced by the musical creation of Aperghis and in an indirect way by the musical movement of "sonorism".

The aim of this article is to present the expression of basic characteristics of "music sonorism" in Aperghis' *Tingel Tangel* and Daverio's *Le Troisième jour* and *Silence... on tourne*.

Keywords: contemporary French music, Georges Aperghis, Frédéric Daverio, music and theatre, improvisation.

Clusters, glissandi, extremes of dynamics, intensity, use of traditional and sometimes non-traditional instruments to get non-traditional sounds, lack of melody, rhythm or harmony in the traditional sense of those terms are some of the characteristics of the unconventional and experimental musical movement "sonorism", which arose in Poland in the mid-1950's and flourished in the 1960's.

According to the musicologist Lidia Rappoport-Gelfand (1983: 339–416), "we can define sonorism as a special system of musical means, where the sound coloristic functions as the primary factor of a composition. The concept of sound coloristics includes aspects of musical language such as timbre, harmony, register and texture.

Sonorism is one of the wide-spread phenomena that influenced the national school of Polish composers of the post-war period. It absorbed a large variety of stylistic tendencies of the 20th century."

From the "controlled or limited aleatory" (Beltrando-Patier 1998: 1048–1049) by Witold Lutosławski, as himself calls his compositional process, to the "path of indeterminacy" (Beltrando-Patier 1998: 1049) by Kazimierz Serocki, who "is an adventurer of the world of sound in the lineage of Webern and Stravinsky" (*ibid.*), from "colorist music" by Krzysztof Penderecki to the importance of "emotional impact" (*ibid.*) in the work of Henryk Mikołaj Górecki, we find different aspects of "sonorism".

Although in the early postwar years in Western Europe there was a constant search for new musical languages, the movement of "sonorism" did not boom beyond the Polish borders. However, some of the principles of "sonorism" are detected in the musical language of the Argentinean composer Mauricio Kagel and of the Greek composer Iannis Xenakis, among others.

Kagel, who for some people reflects "the reappearance of Dadaism or the enhancement of a scathing or black humor" (Beltrando-Patier 1998: 1055), while others believe that "he advocates a poetic of the absurd" (*ibid.*), he is mainly attached to instrumental theatre by renewing the sound materials. "From one work to the next, he invents a real 'instrumentarium'. For him, music is like anything that sounds: the sound itself is a theatre." (Beltrando-Patier 1998: 1056)

"As for the architect, philosopher, mathematician and above all, the composer Iannis Xenakis, he bears a unique musical perception. Gifted with an inventive and curious mind, he takes part of modernity" (Beltrando-Patier 1998: 1027) and "underlines the new relationship, which is created between art and science and mainly between art and mathematics. For Xenakis, music is a socio-cultural phenomenon and therefore, is associated with a given historical period. Along with the other arts, music constitutes the 'crystallization and the realization of the human spirit'" (Stiga, 2013). "His original musical language is based among others, on mathematical theories (probability theory, Fibonacci sequence, etc.) and aims to reveal all the sound capabilities of the musical instruments. Indicatively, we mention his interest for the mass effects, such as the glissandi of the strings or the "clouds" of the sounds in pizzicati." (Beltrando-Patier 1998: 1027)

His first work for orchestra *Metastases* (1954–1955) is characteristic. The work requires an orchestra of 61 players (12 winds, 3 percussionists playing 7 instruments, 46 strings) with no two performers playing the same part. It was written using a sound mass technique, in which each player is responsible for completing glissandi at different pitch levels and times. The piece is dominated by the strings, which open the piece in unison before their split into 46 separate parts.¹

The Greek autodidact composer, George Aperghis is among the later composers, who were influenced by the work of these two. He was born in Athens on 27 December 1945 and grew up in a progressive artistic environment, since his father was a sculptor and his mother a painter. His artistic tendencies were initially expressed through painting, as he had his first exhibition at the age of 12 and afterwards through music. In Athens, he took piano lessons, but he did not often have the opportunity to listen to the works of contemporary composers such as Stravinsky, Bartok and Stockhausen, which Aperghis tried to learn through scores. The discovery of the *musique concrète* by listening to the works of Pierre Schaeffer and Pierre Henry shocked him. In 1963, he left Greece and moved to Paris, where he has lived and worked thenceforth. He studied European, African and Asian music, he was introduced to counterpoint and fugue and he started composing. At the same time, he came into contact with the pioneering music movements of the period, thanks to the concerts organized by the concert society Domaine Musical, which was founded by Pierre Boulez in 1954 and by the Maison de la Radio.

In his first works *Antistixis* (for 3 string quartets, 1967) and *Anakroussis* (for seven instruments, 1967) the impact of serialism and the musical techniques of Iannis Xenakis is evident. Nevertheless, he rapidly formed his personal musical language, which was influenced by the music of John Cage and especially of Mauricio Kagel. In line with Kagel, as far as used sound material is concerned, Aperghis stated that “we can make music from everything.”² The composer and musicologist Daniel Tosi wrote: “For George Aperghis, everything is music: the noise and the silence, the time and the space, the gesture and the voice, the scenery and the picture, the theatre and the orchestra, sports and politics.” (Beltrando-Patier 1998: 1060)

This conception of the sound material is at the root of an original musical language, which is singular, unclassifiable and where the performer’s improvisation is a vital component.

Thus, a rich and varied work saw the light of day; it includes: a) pieces of chamber music, b) pieces for instrumental ensembles, c) pieces for orchestra, d) pieces for instruments or solo voice and these pieces are often dedicated to performers with whom he often collaborated, e) operas, f) pieces of musical theatre. All these works have been classified by the musician and Aperghis’ biographer, Antoine Gindt into three main categories: a) musical theatre, b) concert music and c) the opera.³

Aperghis discovered the musical theatre thanks to his wife, the actress Edith Scob, and “began to think about relations, harmonious or conflicting, between the expressive abilities of the human body and musical structures.”⁴

From his first piece for musical theatre *The Tragic Story of the Necromancer Hieronimo and its Mirror* (for two female voices: singing and speaking, a lute, a cello), created in 1971 at the Avignon Festival, his concerns about the relation “between music and text” and “between music and scene” are detected.

“He presents the musical theatre as a new genre and never as an alternative to the opera due to lack of means. For him, musical theatre differs from opera by changing the function of drama, which does not come hereafter from the text, but from music: “It is the score that should give rise to images, to situations, to the actors’ plays.” Music becomes a unifying and coordinating element by organizing all the various components together. It may be in harmony with the text or be opposed to it and in this way, it acquires great independence: “I always see my music as someone who lives and breathes; I say to myself: it could go here or there.”⁵ “What interests me is to see how far music can organize a set of different elements.” (Albera 1989: 100)

On the contrary, in his operas *Pandemonium* (1973; after Jules Verne), *L’écharpe rouge* (1984, libretto by Alain Badiou), etc. “the text is the unifying and determining element; the singing voice is the principal vector for expression.”⁶

“In 1976, he founds the Atelier Théâtre Musique – A.T.E.M. – at Bagnolet, moving to the Théâtre Nanterre-Amendiers, at Nanterre in 1991. In this connection, he revises completely his practice as a composer. Calling equally on musicians

¹ [http://en.wikipedia.org/wiki/Metastaseis_\(Xenakis\)](http://en.wikipedia.org/wiki/Metastaseis_(Xenakis))

² The Oxford Companion to music, *Aperghis*.

³ <http://www.aperghis.com/lire/bio.html>

⁴ [http://www.detambel.com/fr/Aperghis_Georges_Pièces_de_théâtre_musical_\(Dramaturgie_de_la_musique_non_du_txt\)](http://www.detambel.com/fr/Aperghis_Georges_Pièces_de_théâtre_musical_(Dramaturgie_de_la_musique_non_du_txt))

⁵ *Op. cit.*

⁶ <http://www.archipel.org/global/past/2008/index.php> (Archipel festival des musiques d’aujourd’hui Genève 23 mars–1er avril 2007)

and actors, his music theatre works are inspired by everyday life, by social realities transferred to a poetic world that is often both absurd and satirical and that develops as rehearsals progress. All the ingredients (vocal, instrumental, gestural, scenic) have equal status and contribute to the dramaturgy of these stage works, regardless of any preexistent text.”⁷

All this is organized in the score, which “reigns over primary and secondary events (their intensity, their fate), the abstract or meaningful texts, the lightings, the gestures. The score does not only organize the sound, but all the elements of the performance to the behaviors, stories, objects, etc. It ensures in this way, a dramaturgy of the inexpressible.” (Gind 1990: 62)

However, the score is not a “closed” system. Improvisation is one of the constituent elements of Aperghis’ works for musical theatre. Thus, he urges on his colleagues to improvise and he selects and integrates in the work some of the ideas resulting from improvisation. Besides, this is what he means by saying: “I hear better the score on the occasion of the rehearsals.” (Gind 1990: 41)

Moreover, what characterizes Aperghis’ work in ATEM is the use of things, objects, sounds and daily habits beyond normal framework. As the composer himself states: “Diverting objects, ideas and sounds constitute for us the core of our artistic desires. Making the social intimate, the sound visual, the concert theatrical, the words music, the sentimental comical seems a vital game for us, since we are committed to the polemic against modernization. This can be found in the reproduction of our performances and it can be confusing, due to the displacement of values and ideas. Thus, ATEM acts as a sort of generalized diversion.” (Gind 1990: 65)

Indicatively, the use of voice by instrumentalists as well, is mentioned, as for example, in *Récitations*, wherein he explores whether a voice can be converted into a percussion instrument (Poutios 2009: 43).

The ‘controlled’ improvisation and theatricality – sometimes only gestural – may be considered as coherent elements among Aperghis’ works, which belong to different music genres. For instance, they may appear both in a musical theatre work and in a work for instrumental ensemble, such as *Tingel Tangel*, which will be discussed in further detail, in our effort to detect the indirect influence of sonorism on the composer.

Tingel Tangel for soprano voice, accordion and percussion (who plays *cymbalum*) was composed in 1990 and dedicated by the composer to the first performers: Françoise Rivallant (percussions), Valérie Philippin (soprano) and Frédéric Daverio (accordion). The accordionist Daverio wrote regarding *Tingel Tangel*: “Aperghis had never composed for accordion; I had the chance to meet him in 1988 and that day he immediately had the idea to compose a trio for my accordion, a soprano voice and percussions. We have created this piece in 1990 at the Garonne Theatre, in Toulouse and we have played it about twenty times thereon, mainly at the auditorium of the Bastille opera in Paris, at the Lyon Opera, at the Music Biennale Zagreb, at the Festival Musica in Strasbourg, at the Manca Festival in Nice, at Radio France, at the Tokyo Summer Festival and in Nancy, where we had a live recording (CD).” (Stiga 2014)

More precisely, *Tingel Tangel* lasting 25 (24, 96) minutes, consists of ten parts:

1. *Prologue*
2. *Intermède I* (Interlude I)
3. *I. Masques* (Masks)
4. *Intermède II* (Interlude II)
5. *II. Premier Amour* (First Love)
6. *III. Speakerine* (Announcer)
7. *IV. Equilibristes* (Equilibrists)
8. *Mélodrame* (Melodrama)
9. *V. Pas à pas* (Step by step)
10. *VI. Salto mortale*

It is an original work, which incorporates elements of ‘musical theatre’ (such as mimicry, movements, laughter, singing or speaking voices). The spirit of the work is already indicated by its own title, *Tingel Tangel*, which refers to the earliest forms of cabaret, which appeared in Berlin around 1880 and which had their roots in the Parisian café-concerts, where music prevailed over social satire (Louis Brunet 2009: 85). The descriptive titles of the work’s parts seem to refer to situations taking place within a *Tingel Tangel* and can be either comical, such as those of a circus (*Masks* or *Equilibrists*) or tragic (*Salto mortale*).

In contrast to ‘musical theatre’ works, the score of *Tingel Tangel* is specified, without implying that it is binding concerning the performance.

⁷ Grove Music Online, Oxford, *Aperghis*.

The element of improvisation when interpreting ‘the phonemes’ is intense – since it is not about full words, but it is about a text resulting from the union of word elements:

“Ha sa sa a né
Sa sa ho ! pe cca to ran san dan...”

à Françoise Rivalland, Valérie Philippin, Frédéric Dazerois

TINGEL TANGEL
pour voix de soprano, accordéon
et percussionniste (jouant le cymbalum)

Georges APERGHIS

Prologue

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Paris, France

D. & F. 14726

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Ex. 1. Aperghis G., Tingle Tangel, *Prologue*, mm. 1–4
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Usually, the semantic content of the words is indistinguishable. In some cases though, either through some sound combinations of the phonemes, which refer to specific words, for example, at the 100–110 meters of the part *Premier Amour*:

“Il s'en alla disant pourquoi ? Pourquoi suis-je venu?”

D. & F. 14726

Ex. 2. Aperghis G., Tingle Tangel, *Premier Amour*, mm. 104–110
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or through some ‘pure words’, for example, at the 43–44 and 47 meters of the part *Mélodrame*:

“Cette dansez-vous: m’avez attiré dans cette villa

Pour m’assassiner

.....

mortal corpo...”

Ex. 3. Aperghis G., *Tingel Tangel*, *Melodrame*, mm. 43–47
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or at the 54–59 meters of the part *Salto Mortale*:

“Ca to pe ca to mor ta ta le

a le salto”

Ex. 4. Aperghis G., *Tingel Tangel*, *Salto Mortale*, mm. 54–59
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and especially through their interpretation, we suspect the situations described.

The dramatic words in both the above-mentioned cases are outlined from both the music text and the expressive interpretation of the soprano:

the chromaticity of the melodic line interpreted in *p/f* describes the questions that possess lovers at the time of separation, while the explosion of the accordion, of the percussions and of the soprano in *fff* in the second case, highlights the devastation that someone feels at the moment of the lethal jump.

The unique rhythmic and harmonic complexity (e.g. *Premier Amour*), the clusters (e.g. *Equilibristes*):

Ex. 5. Aperghis G., *Tingel Tangel, Equilibristes*, mm. 6–7
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the intense swings in dynamics (e.g. *Mélodrame*):

Ex. 6. Aperghis G., *Tingel Tangel, Melodrame*, mm. 19–25
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Ex. 7. Aperghis G., *Tingel Tangel, Melodrame*, mm. 48–52
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the original sound combinations arising from the creative conciliation of instruments and voices – speaking voice, singing voice (e.g. *Mélodrame*) – and the unusual use of instruments (for example, a sound resulting from the bellows' articulation of the accordion: e.g. *Speakerine*: meters: 9, 10, 12, 17–23, 49–52):

Ex. 8. Aperghis G., *Tingel Tangel, Speakerine*, mm. 9–10
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Ex. 9. Aperghis G., *Tingel Tangel, Speakerine*, mm. 17–23
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Ex. 10. Aperghis G., *Tingel Tangel, Speakerine*, mm. 49–52
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the frequent interpretive indications, which reinforce the theatricality of the work (e.g.: *Prologue*: agitated; *Masques*: audacious voice, emotion, appeased, canticle, conviviality, mysterious-doubt, voices of popular dance, mercantile, drama, child; *Premier Amour*: laughter; *Speakerine*: talking-recited passionately-irascible-on the breath; *Equilibristes*: distraught, tense) create unutterable musical images that are consistent with or contrary to the descriptive titles of the parts of the work. A typical example is the *Equilibristes*, where according to the title, someone would expect a calm ambience, but confronts fast rhythms, dynamics' bursts, use of the limits of the sopranos' extent, clusters, which create an exceptional tension.

These pioneering hearings led us to sonorism features and confirm the indirect impact of the movement in Aperghis' musical language.

The particularly impressive interpretation of the accordionist Frédéric Daverio at the presentation of *Tingel Tangel* in the Theatre of Clermont-Ferrand, in 1998, prompted us to investigate both the personality of the composer and performer Frédéric Daverio and his own compositions and to seek in them a probable impact of 'sonorism'.

Frédéric Daverio was born in Saint-Cloud (Hauts de Seine) in 1961; he was raised in Provence where he studied at the Ecole de Musique de Salon de Provence (1966–1972) and at the Conservatoire d'Aix-en-Provence (1972–1979) accordion with Professor Marc Pierre Constantin, music theory and music history. In 1978, he was awarded the Coupe de France de l'accordéon, and at the international competitions in Lyon and in Antibes, in 1976, and in Aix-les-Bains, in 1978.

As a performer of classical (Johann Sebastian Bach, François Couperin, Domenico Scarlatti, Dmitri Shostakovich, Nino Rota) and contemporary repertoire (Georges Aperghis, François Sarhan, Alfons-Karl Zwicker, Valérie Stefan), he has collaborated, among others, with his sister, the internationally renowned violinist Valérie Daverio, with the Orchestre des Concerts Lamoureux and with the ensemble of modern music Linéa. Since 2008, he has arranged works for accordion and piano by Piazzolla, Ravel, Franck, and Gershwin and performed with the Japanese pianist Madoka Ochi.

At the same time, he composes music: a) for modern dance (*Veni Vidi Vinci* for the Italian choreographer Patricia Lo Sciuto), b) for theatrical performances, in which he participates as an actor-performer. He has collaborated with the stage directors Thierry Bedart, Christian Schiarette, Jacques Nichet, Daniel Soulier, François Rollin, c) for documentary films by Jean-Pierre Vedel (Planete, Arte, France 3) and by Jean-Michel Vennemani (France 2, Arte), d) for the radio show The Elastic Minute by Jean Piero (Radio France, France Inter). He also sets to music lyrics by Anne Dubray, with whom he had formed the interpretive duet Les petits assassins and he sets to music the musical poetic texts by Jacques Prévert.

According to his words, he is inspired by "life itself. I feed on everything I live; my meetings, my joys, my sorrows, everything that happens in the world, my exasperation and my anger. And of course, all the music I listen to; in the disorder, there were the songs of Brel, Ferré, the music of Mahler, Shostakovich, Stravinsky, Prokofiev, the Italian music, classical or popular. I have Italian roots, I can feel them how powerful they are and I also think that they can be heard in my music. Then, there are the composers with whom I worked and who wrote for me (especially Aperghis, Alfons Karl Zwicker, Valérie Stefan), who introduced me to another type of writing and of musical universe. They push me to go further in my research and be more daring." (Stiga 2014) And Frédéric Daverio adds: "...when I have to write for a performance, I have a story and a text that inspire me. Otherwise, it is music that comes all alone; *le troisième jour*, for example, resulted while I had to do this first cd. I had lots of small pieces of music to finish and by looking for other music, this one came!" (Stiga 2014)

As for the composing process used, he explains in a humorous style: "I never took music composition or harmony lessons, except from once, but as the teacher spent all his time telling us what we did not have the right to do, I never returned! I think this is what explains the way I compose: I directly start with accordion improvisations and I write with the instrument. It starts with a rhythm or a melody, but often with a rhythmic cell as well, where both hands come together, as if I was typing on a percussion instrument. And then, I spend a lot of time in turning it in all directions trying to find a progression, a development. And since I did not learn what is 'normally' forbidden, I explore all sides with the aim to use all the sound and rhythmic possibilities of the instrument." (Stiga 2014)

According to an article published in *Le Courrier d'Aix – Spectacles, Expos...*, on May 22, 1999, Daverio "draws from his instrument, with which he is stuck together, an effect of permanent surprise" (Le Courrier d'Aix 1999). The repeated collaboration with Aperghis initially participating in the music theatre show *Jojo* (1990) and then interpreting *Tingel Tangel* (1990) led, among others, Daverio to explore all the sound possibilities of the accordion, in accordance with the standards of sonorism. Françoise Jallot writes about: "Frédéric Daverio has always liked the visual aspect of the instrument, playing from the scene, unfolding the accordion as a fan, doing a cartwheel with this splendid and radiant instrument with bellows." (Jallot 1998)

The impact of *Tingel Tangel* on Daverio's music is impressive, as it results from the comparison between the musical text for accordion at the part *Mélodrame* (mainly the melodic motifs of the meters 2–5, 19–23 and 25–27) and the sound of his own musical creations.

His musical language contains elements of modern music movements, among them sonorism as well, as revealed by the study of cycles *Le troisième jour* and *Silence... on tourne*.

More specifically, the cycle *Le troisième jour*, which was recorded in 1997, consists of 15 parts:

1. *Cucurbitacées* (Cucurbits)
2. *Le troisième jour* (The third day)
3. *Grande réserve* (Grand reserve)
4. *Disarmonica*
5. *L'Évre (Tom I)* (The drunk (Tom I))
6. *Accords d'en haut* (Upwards agreement)
7. *Vagues à l'âme* (Waves to the soul)
8. *Le corps y fait* (The body does it)
9. *Veni-Vidi-Vinci (à Léonard)*
10. *L'Évre (Tom II)* (The drunk (Tom II))
11. *Marche de Noé* (Noah's step)
12. *Porca Miséria*
13. *L'Évre (Tom III)* (The drunk (Tom III))
14. *Pour Quoi?* (For What?)
15. *Ne pas déranger...* (Do not disturb...)

while the cycle *Silence... on tourne*, which was recorded in 2008 consists of 31 parts:

1. *Faux départ* (False start)
2. *Rupture* (Rupture)
3. *Soleil de mars* (March sun)
4. *Scenic railway*
5. *Pieds nus* (Barefoot)
6. *Palpitations*
7. *Musaique 1*
8. *Musaique 2*
9. *Musaique 3*
10. *Relache* (Relax)
11. *Pied de nez*
12. *Petite valse molle* (Little sop waltz)
13. *Ailleurs* (Elsewhere)
14. *Silence... on tourne* (Quiet... we're shooting)
15. *Musaique 4*
16. *Musaique 5*
17. *Musaique 6*
18. *Pas de deux* (Step for two)
19. *Entre deux eaux* (In midwater)
20. *En train* (By train)
21. *L'attente* (The expectation)
22. *Musaique 7*
23. *Musaique 8*
24. *La lune et la nuit* (The moon and the night)
25. *Lent demain* (Slow tomorrow)
26. *Valse maigre* (Emaciated waltz)
27. *Musaique 9*
28. *Musaique 10*
29. *Le temps haletant* (The panting time)
30. *Un matin* (One morning)
31. *Silence... on tourne* (Quiet... we're shooting)

Just by reading the titles of the music of these two cycles, images, 'sound images', they are formed in front of us, as if they were chapters of a novel or scenes of a play or a film.

At the same time, the “sound” reading, the musicality, in French words, can transfer us to other words, to other situations...; for example:

L'ivre (Tom I), Le corps y fait, L'attente:

L'ivre (Tom I) / livre tome 1; The drunk (Tom I) / book volume 1;

Le corps y fait / le coryphée; The body does it / the coryphaeus

L'attente / la tante / latente; The expectation / the aunt / the latent

The composer answers our question regarding the choice of titles, by saying:

“...important question! For me, titles should be suggestive, but they should not say too much: I want people to make their films on their own and tell things without giving them too much information. I am often told that my music brings images or tells stories, while I want everyone to be able to tell their own story. But, it also has to speak to me and inspire me. Most of the time, I find the titles after I write the music. So, I have to be able to play, while thinking about this title and it has to work.

For example: *Porca miseria* was an incidental music for the show *Les citrouilles*, by Christian Schiaretti after texts written by Alain Badiou and it did not have a title for a long time. I had to find one, when I had my first CD *Le troisième jour* and I had to look for a long time for a title to remind me of something and to inspire me. I wanted an Italian title, because it reminded me a little bit of Italy and it was a friend, who found me this title, which is a popular curse word, such as ‘for God’s sake’ in French. And when I played this piece in order to ‘validate’ this title, it worked right away and I played differently, as if it had been another title! Titles influence my way of playing. Some titles are inspired by the context in which they were written: for example, *Les cucurbitacées* is also one of the show’s music *Les citrouilles*. *Les cucurbitacées* is the plant family, which includes *Les citrouilles* and I found this word funny and musically interesting!

Regarding *Le troisième jour*, I was looking for a title referring to the sea, but somewhat mysterious and then again, it was a friend who found me this title. The third day is the day that God created the sea (even though I am not a believer, it helped me!).

Veni Vidi Vinci is a pun on *Veni Vidi Vici* (‘I Came, I Saw, I Conquered’ uttered by Julius Caesar). It is music written for a contemporary dance solo inspired by drawings of Leonardo Da Vinci.

Musaïque (pronounced ‘musa-ic’) is a pun on ‘music’ and ‘Mosa-ic’. These are very brief pieces that I wrote for the radio in order to illustrate interviews conducted in the street, which were quite humorous and full of poetry and tenderness.

L'ivre tom 1, 2 and 3 are brief pieces written for theatre and are reminiscent of a little weird character, maybe drunk (pun from Book, hence ‘Tom’, which can also be a first name!).

I am always told that my music tells stories (in fact, very different stories according to the audience), but I do not have images in my head when I play! I rather have sensations.” (Stiga 2014)

Minimalist melodic motifs, clusters, inventive rhythmic designs, sound innovations arising from the ‘non-traditional’ use of the accordion, give life to these undefined images, to unpredictable, subjective thoughts and representations for each listener...

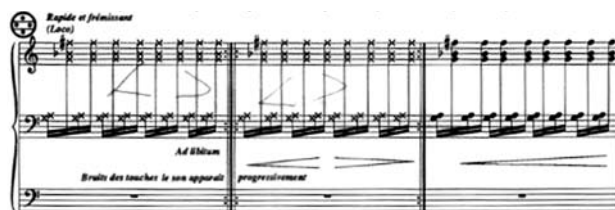
Indicatively, we mention:

- the particularly sensitive melodic line in *Rupture*;
- the minimalist melody with the characteristic ostinato in Frédéric Daverio’s musical language, in *L'attente*;
- clusters in *Le troisième jour*;



Ex. 11. Daverio F., *Le Troisième Jour, Le troisième Jour*, mm. 154–157
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- the unique sound sensation caused by the unexpected use of the accordion:
 - bellows' articulation *Veni Vidi Vinci*;
 - new rhythmic designs are created between the two hands due to the noise caused by tapping the keys and the register, e.g. *Veni Vidi Vinci*, *Ailleurs*, *Scenic Railway*.

Ex. 12. Daverio F., *Le Troisième Jour*, *Veni Vidi Vinci*, mm. 32–33

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Ex. 13. Daverio F., *Silence... on tourne*, *Ailleurs*, m. 1

© Frédéric Daverio (Composer's Archives: manuscript)

Moreover, the intense element of improvisation and the interpretation of extreme sensitivity and musicality by Frédéric Daverio, who is defined as a “powerful *accordéonophore*, (with) strong hands, accurate fingers, a rigorous and delicate phrasing” by Georges Moustaki, as “a great virtuoso and a great talent” by George Aperghis and as “an original composer who plays ‘du Daverio’” by Marcel Azzola, enable us to include him among the contemporary, pioneer French composers-performers.

To conclude, both through *Tingel Tangel* and through the cycles *Le troisième jour* and *Silence... on tourne*, it is proved that the Polish avant-garde movement ‘sonorism’ offered innovative features in the musical language of the composers, who lived in France after 1960, such as George Aperghis and his younger, Frédéric Daverio. Thanks to the further development of their musical language till nowadays, should not their works be described as ‘post-sonoristic music’?

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Nuo Georges'o Aperghis'o „Tingel Tangel“ iki Frédéricio Daverio „Le Troisième Jour“ ir „Silence... on tourne“: „sonoristinė muzika“?

Santrauka

Lenkų muzikoje susiformavusi „sonorizmo“ srovė Prancūzijoje ryškiausiai atsiskleidė nuo 1963 m. Paryžiuje gyvenančio graikų kompozitoriaus Georges'o Aperghis'o (g. 1945) kūryboje. Dar tik ieškančiam savo individualaus stiliaus kompozitoriui įtaką darė serializmas ir Iannio Xenakio muzikos technika. Jo muziką taip pat paveikė avangardas ir ypač polistilistinė Mauricio Kagelio kūryba.

Improvizacijomis grįstas „muzikinis teatras“ kompozitoriaus originalioje kūryboje užima bene svarbiausią vietą, nors jis taip pat nemažai kūrė solo instrumentams, solo balsams, kameriniams ansambliams ir t. t. Labai įdomi G. Aperghis'o kompozicija „Tingel Tangel“ sopranui, mušamiesiems (cimbolams) ir akordeonui. Kompozitorius skyrė šį kūrinį nuolatiniais savo kūrybos atlikėjams – sopranui Valérie Philippin, perkusininkei Françoise Rivallant ir akordeonistui Frédéricui Daverio.

Frédéricas Daverio (g. 1961) žymus ne vien kaip akordeonistas, bet ir kaip kompozitorius, kuriam reikšmingą įtaką padarė G. Aperghis'o muzikinė kūryba, o netiesiogiai – ir sonorizmas.

Šiame straipsnyje išskirti svarbiausi sonorizmo bruožai G. Aperghis'o kūrinyje „Tingel Tangel“ ir F. Daverio kūrinuose „Le Troisième jour“ ir „Silence... on tourne“.

Reikšminiai žodžiai: šiuolaikinė prancūzų muzika, Georges Aperghis, Frédéric Daverio, muzika ir teatras, improvizacija.

Metallica's Tone Colour Characteristics of their Riffs (1983–1986) and the Differences between Slayer and the New Wave of British Heavy Metal

Annotation

The aim of this article is to consider the design of the riffs of *Angel of Death* and other songs from the first three albums by Slayer (*Show No Mercy* 1983, *Hell Awaits* 1985 and *Reign in Blood* 1986) from a music analytical point of view (including tone-colour analysis of the riffs).

If Slayer's riff design (from 1983 to 1986) is considered from an overall perspective, the following results can be observed:

- A rapid tempo and a constant change in the tone-colours of the guitar (palm mute, powerchords and monophonic melodies) characterise the sound of most riffs from the first three albums of this band.
- Although the number of tone colours is limited, exact repetitions of tone colours are avoided.
- Melodies in thirds, sixths and octaves are rare.

At the same time (1983–1986) and in the same geographic area (U.S. West Coast), the band Metallica found their own compositional path within the thrash metal genre. Although the two bands dedicate their songs to very different topics, there are significant proximity points in the section of riff design. The same music-analytical methods (such as the analysis of tone-colours) are used with Metallica again. Thus, on the one hand, correlations can be determined and special features unique with Slayer's music can be highlighted on the other.

Furthermore, in order to determine other similarities and differences, the riffs of Metallica and Slayer will be compared with riffs by bands belonging to the NWoBHM (New Wave of British Heavy Metal) and were active in the years 1983–1986 (including Iron Maiden and Motörhead). The findings are commented in detail by means of clear tables and viewed from an overarching perspective.

Keywords: Heavy metal, Riff, Tone colour analysis, Metallica, Slayer.

Although the New Wave of British Heavy metal (NWoBHM) influenced the worldwide heavy-metal music with bands like Iron Maiden, Motörhead or Saxon around 1980, the music of this genre was only limited to a few large centres such as Los Angeles, San Francisco and New York City in the United States (Christie, pp. 47–66). When Iron Maiden celebrated their successful debut album in England, played in sold-out concert halls and appeared on BBC's Top of the Pops, the U.S. West Coast bands Metallica and Slayer were far from recording an album with any major record label. In 1980 they were still busy recruiting musicians and composing their very first songs.

At that time only a few youngsters listened to the music of NWoBHM on the West Coast of the United States. However, they were loyal fans, searched various music stores for new records of this kind of music, and attended their concerts in the U.S. One of these youngsters was Lars Ulrich, drummer and later cofounder of Metallica. Already at that time his musical experience was ranging from jazz and Deep Purple to NWoBHM.

Lars Ulrich wanted to form a band, not just to play covers, but also to compose their own songs. Those songs should have a new sound, one that no other band had so far (McIver, p. 35).

In 1981 Lars Ulrich began composing the songs *Hit The Lights* and *No Remorse* together with James Hetfield (the second cofounder of the band) and Troy James. Both songs are among the first compositions of the Thrash Metal genre (this specific style of heavy-metal did not exist both compositionally and terminologically up this point of time) and due to the high speed and the aggressiveness of the guitar, fans and reviewers immediately took notice of them. *Hit The Lights* was even selected by the U.S. Blade Records for the very first sampler edition of *Metal Massacre I*.

How can Metallica's popularity be explained? Which musical features characterise this band? Can the music of this group be explored by means of music analysis at all?

The aim of this article is to consider the design of the riffs of *Hit The Lights* and other songs from the first three albums by Metallica (*Kill 'Em All* 1983, *Ride The Lightning* 1984 and *Master of Puppets* 1986) from a music analytical point of view (including tone colour and rhythm analysis of the riffs). Subsequently, the results obtained from the analyses are presented in an overarching perspective to make visible the change of Metallica's sound during the 1980s.

At the same time (1983–1986) and in the same geographic area (U.S. West Coast), the band Slayer found their compositional path within the Thrash Metal genre. Although the two bands dedicate their songs to very different topics, there are significant similarities in the section of riff design. The same music analyti-

cal methods (such as the analysis of tone-colours, rhythm and tempo of the riffs) are used with Slayer again. Thus, correlations can be determined on the one hand and special features unique with Metallica's music can be highlighted on the other.

Furthermore, in order to determine other similarities and differences, the riffs of Metallica and Slayer will be compared with those of bands belonging to the New Wave of British Heavy metal (NWoBHM) in the years 1983–1986 (including Iron Maiden and Motörhead).

Thrash Metal music of the U.S. West Coast in the years 1983–1986 is characterized by a massive increase in tempo compared to the NWoBHM. *Hit The Lights* (the first song in Metallica's debut album in 1983) starts with a frenetic riff at a tempo of 120 qpm and consists mostly of sixteenth notes. Such fast riffs were very rare in the English area but not uncommon in the first three albums by Metallica.

The biggest difference of such riffs compared to typical NWoBHM riffs lies in the different tone colours and their constant switching within the riffs.

Figure 1 gives an overview of the timbral disposition of the introducing riff in *Hit The Lights*. This riff consists of three tone colours:

- Fast repetitions of an open string, damped with the lower part of the hand (palm mute). This results in a muffled sound with very few overtones (section A / square).
- Power chords, not damped. Due to the heavy distortion, the impression that the guitarist plays no double stops is given. The sound is rich and full (section B / grey square).
- Monophonic melody, neither plentiful nor damped in terms of tone colours (section C / black line).

The early version of *Hit The Lights* (*Metal Massacre I*, 1982) is very different from the version of the studio album (1983) with regard to the timbre of the singer. The three tone colours of the introduction riff, however, remain the same in both versions.

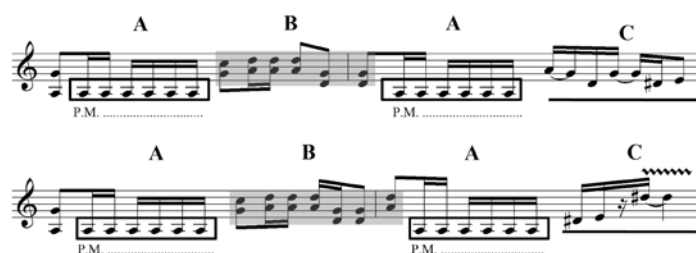


Fig. 1. Introduction riff, b. 1–4 of *Hit The Lights* (*Kill 'Em All*, 1983)

Motorbreath (from the album *Kill 'Em All*) was one of the four songs from the Power Metal-demo that certainly had little to do with the Power Metal style (McIver, p. 49). The same three tone colours are also used here within the song's four riffs (Fig. 2). This time, however, one tone colour per riff dominates (first row: introduction riff, palm mute / second row: main riff, double stops / third row: melody). When the lead guitar plays the solo melody in bar 44, the rhythm guitar constantly changes the tone colours as in *Hit The Lights*. Thus, the solo is highlighted additionally. It is notable that each of the four riffs has a different tone colour set-ups.



Fig. 2. Song riffs of *Motorbreath* (*Kill 'Em All*, 1983)

The riffs of *Metal Militia* (Fig. 3, first row: introduction riff, second row: main riff) and *No Remorse* (Fig. 4, first row: main riff, second row: riff B) are constructed in a similar manner. Within the two songs, one can never find riffs with an identical tone colour change. Even if all riffs of the four songs mentioned so far are placed side by side (Figs. 1–4), it turns out that there is no exact tone colour constellation sequence among all nine riffs.

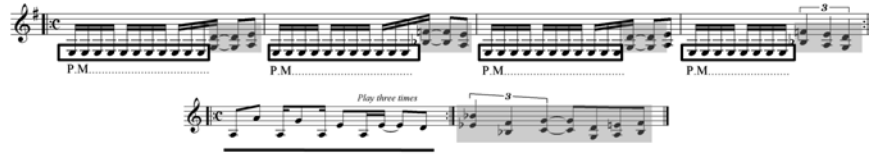


Fig. 3. Song riffs of *Metal Militia* (*Kill 'Em All*, 1983)



Fig. 4. Song riffs of *No Remorse* (*Kill 'Em All*, 1983)

Despite the timbral variety of riffs in *Kill 'Em All*, the melodies and riffs in this album are missing the sounds of acoustic guitars and other interval constellations such as third, octave and tenth, which are typical for NWoBHM (In his treatise on heavy-metal (*Schwermetallanalysen, die musikalische Sprache des Heavy-metal*, 2010) Dietmar Elflein tries to compare interval constellations of NWoBHM-songs to those of thrash-metal). When listening to the beginning of *Fight Fire With Fire* (the first song of Metallica's second album *Ride The Lightning*, 1984), a melody led in thirds and played by an acoustic guitar is the very first acoustic information the listener gets. The differences between the song's introduction and its main part could hardly be greater.

While the introduction (Fig. 5, first row) offers many new things in terms of tempo (slow) as well as timbre (Metallica performed a melody in thirds (grey note heads) for the first time), the main part sounds very familiar. The tempo is fast, sixteenth-note figures dominate, and there is a noticeable timbral change. There are riffs with a continuous tone colour change (b. 18–19, second row) and riffs with no timbral changes at all (b. 50–51, fifth row). Only the thirds-figure of the last row (b. 73–76) would not fit into the *Kill 'Em All* song.



Fig. 5. Complete riffs of *Fight Fire with Fire* (*Ride the Lightning*, 1984)

In the performance of power chords Metallica is not limited to double stops on a guitar with heavy distortion in the low register only, but instead the band occasionally use the reverse possibility. This becomes obvious at the beginning of the song *Ride the Lightning* from the album bearing the same name (Fig. 6, b. 1–2). A melody is performed by two instruments without distortion in different intervals (also fifths) and in a relatively high register. Thus, an intense yet clear sound is created that differs completely from the distorted monophonic double stops in the bars 3–4. The doubling of the distorted riffs, played by an additional guitar, amplifies the tone colour differences between the two riffs at the beginning of *Ride the Lightning*.

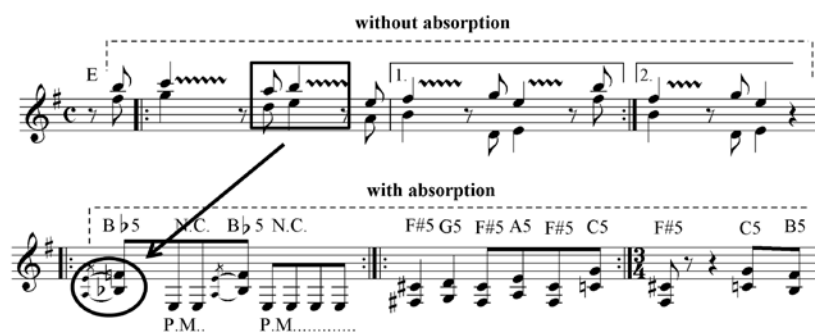


Fig. 6. Introduction of *Ride the Lightning* (*Ride the Lightning*, 1984)

The song *Master Of Puppets* from the album *Master Of Puppets*, is one of the greatest thrash metal songs in music history. It was highly praised by a number of radio channels (including VH1) and magazines (including Q magazine) and regarded as a role model for several newer bands. The song deals with a person who loses control of himself through the use of hard drugs and is thus a slave of his own addiction. The narrator shows no sympathy for drug addicts, which is clearly illustrated through an audible sadistic laugh after the final chord.

The song *Ride The Lightning* raises the question whether murderers actually deserve the death penalty. The opinion of the author of the lyrics is clear: yes. Metallica's songs are often very provocative without having any anti-Christian background. There are even papers that deal with the philosophy in Metallica's lyrics (Irwin, ed., 2007).

No matter what controversy a song causes, if fans and critics praise it enthusiastically, there are almost always music analytical aspects that can explain the success of the song.

Master of Puppets is a hard, musically complex piece, which lasts about eight minutes. It is notable for its many distinctive and extremely varied motifs. Figure 7 provides an overview of the ten motifs in this song. The term "motif" instead of "riff" is used deliberately because "motif" also includes melodies. A riff is usually just a rhythmic figure, while a motif may be of both, rhythmic and melodic nature.

On closer examination of Figure 7 one can observe the following results:

- Three riffs (first three rows) before the first verse: The palm mute melody of the first two lines is a combination of palm mute repetitions and undamped melodies. There are timbral changes within each of all three riffs. Until 1986 the use of various riffs before the first performance of a singer was a rare phenomenon with Metallica, but by far no novelty with other bands at that time.
- The song's instrumental middle section deals with the mental state of a drug addict immediately after the use of a heroin syringe. This section differs from all other parts due to the lyrical character of the motifs (fifth and sixth row) and because of an overall change in the design of the motifs as well. While all motifs up to the middle section (first to fourth row) show a continuous timbral change, the motifs then remain uniform in terms of tone colours (fifth row: monophonic melody, sixth row: melody in thirds).
- The transition from the middle part to the re-emerging verse from the beginning indicates the end of the effect of the heroin (eighth row). In terms of its tone colour design, it is a mixture of the middle and first section. The motif of this transition unites tonal harshness of the beginning with the uniform timbral disposition of the middle part (each melody consists of a single tone colour).
- The last two motifs are taken from the final part of *Master Of Puppets*. The use of a third within the motif's repetition (last line) gives intensity, increases the tension of the music and enriches the overall sound. Although such processes are common within the music of Judas Priest and Iron Maiden (Elflein, pp. 135–241), they remain an exception within the compositional work of Metallica between 1983 and 1986.

If Metallica's riff design (from 1983 to 1986) is considered from an overall perspective, the following results can be observed:

- A rapid tempo and a constant change of different tone colours of the guitar (palm mute, power chords and monophonic melodies) characterise the sound of most riffs from the album *Kill 'Em All* (1983).
- Although the number of tone colours is limited, exact repetitions of tone colour sequences are avoided.
- Melodies in thirds, sixths and octaves are rare within *Kill 'Em All*.
- All above mentioned musical features (melody in thirds, sixths and octaves) appear for the first time in the second album *Ride The Lightning* (1984). From then on, they are fixed components in the riff design until the *Black Album* (1991).
- The songs tend to be longer and more complex after *Ride The Lightning*. The number of riffs rises. Exact repetitions of tone colour sequences within the song riff design are very rare (as in *Kill 'Em All*).
- Metallica avoid using multiple juxtaposed riffs before the first verse of the singer.
- The tempo of the riffs is extremely high, in contrast to the NWoBHM songs of the same period (1983–1986).

The image displays the complete musical motifs for the song "Master Of Puppets" by Metallica, from their 1986 album of the same name. The notation is presented across ten staves. The first staff includes a "Play 4 times" instruction. The notation features various guitar techniques such as palm mutes (P.M.), power chords, and monophonic melodies. The key signature is one sharp (F#) and the time signature is common time (C). The notation includes various rhythmic values, including eighth and sixteenth notes, and rests. The notation is presented in a standard musical score format with a treble clef and a key signature of one sharp.

Fig. 7. Complete motifs of *Master Of Puppets* (*Master Of Puppets*, 1986)

At the same time (1983–1986), in the same geographical area (U.S. West Coast), another band significantly influenced the process of heavy-metal. Slayer was formed at the beginning of the 80s as well and immediately after their first gigs they gained the reputation of being an uncompromising loud and fast playing band.

If one compares *Kill 'Em All* with Slayer's first album (*Show No Mercy*, 1983) similarities in terms of riff sound and structure are very striking. Despite intensive research by the biographers of the two bands (see: McIver, and Szubrycht) and a number of interviews with several band members, only little evidence of an intensive contact between the two bands (in the years 1981–1986) has been found so far. It seems pretty unlikely that there have been longer conversations between the guitarist Kerry King (Slayer) and James Hetfield (Metallica) about the instrumental subtleties of heavy-metal music.

In fact, the artists of the two bands had hardly any contact on a personal level. Slayer developed a compositional language which, at first glance, appears very similar to that of Metallica. In some points however, the two differ greatly from each other. The unique anti-Christian and partly satanic verses of Slayer's first three albums are perhaps the biggest non-musical difference between the two groups.

On closer inspection of Figure 8, both similarities and differences of the two bands with regard to the design of their riffs become clear. As with Metallica, the tone colour change takes place in a very high tempo. The introduction of *Black Magic* (from *Show No Mercy*, 1983) could be mistaken for the beginning of a Metallica song written in the years 1983–1986. However, there are a number of significant differences refuting that: The juxtaposition of four riffs before the performance of the singer is extremely unusual for an early compositional work by Metallica. The very fact that the beginning/introducing riff is repeated 18 times shows how different the two groups have dealt with the same material.

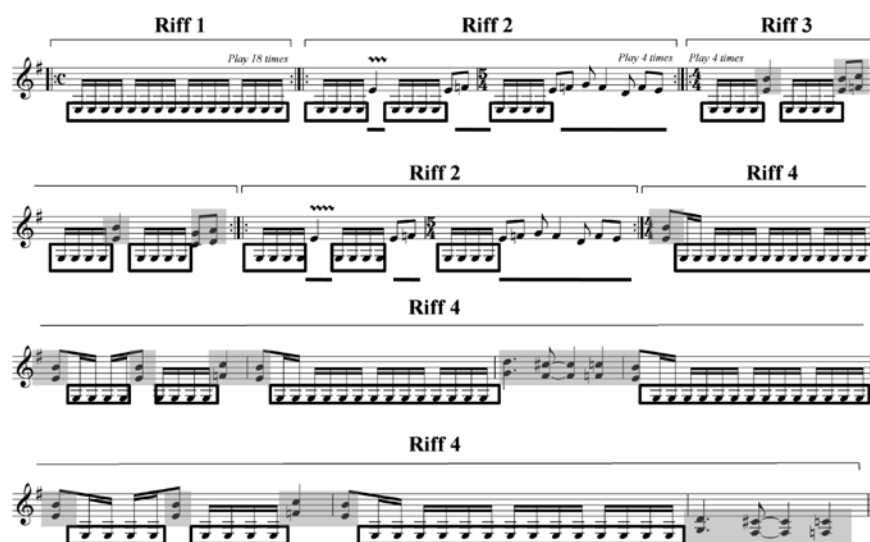


Fig. 8. Slayer: introduction of *Black Magic*, *Show No Mercy* (1983)

In *Black Magic* Slayer used a striking low number of tone colours in designing all four riffs. A similar picture can be found within the riffs of Metallica's first album. But while the sound in Slayer's first and the second album (*Hell Awaits*, 1985) shows hardly any timbral differences, Lars Ulrich and his band strongly developed their riff design within the next three albums (e.g. blend of acoustic and electric guitars, introducing melodies in thirds and octaves).

The frenetic tempo and the numerous riffs within a song from the album *Show No Mercy* are driven to the extreme in *Hell Awaits*. The construction of the introduction of the song *Hell Awaits* from this album demonstrates the high levels of compositional maturity the group already had at the very beginning of their career (Fig. 9). The beginning part of this song consists of seven riffs. Up to this point of time, there have hardly been other heavy-metal songs, which have had such a large number of riffs.

The complexity of this song is not only limited to the choice and disposition of the riffs (all structured differently). The different tempi of the various riffs and their skilful use add extra tension to the music and are perhaps the most brilliant aspect of this composition.

Riff 1 $\text{♩} = 109 \rightarrow 55$ half feel time	
Riff 2 $\text{♩} = 109$	
Riff 3 $\text{♩} = 109$	
Riff 4 $\text{♩} = 109$	
Riff 5 $\text{♩} = 132$ P.M.-----	
Riff a+6b $\text{♩} = 192$	
Riff a+6b $\text{♩} = 192 \rightarrow 384$ double feel time	
Riff 7 $\text{♩} = 192 \rightarrow 384$ double feel time	

Fig. 9. Introduction of *Hell Awaits* (*Hell Awaits*, 1985)

The drummer's role in the performance of the riffs was not mentioned so far. Slayer use the drums to alter the actual perception of the pace e.g. to reduce it by half (half time feel) or to increase it twice (double time feel). Such subtleties are notated accurately in the band's authorized score. Especially in this song the real tempo perception is changed from 55 bpm to incredible 384 bpm. A possible answer to the question of why this band uses so many riffs could thus be the development of tempo. In order to continuously move from a slow tempo at a very fast one, a lot of time is required. Thus, the use of several riffs serves both, the avoidance of rhythmic monotony and on the other hand to achieve a high degree of tone colour diversity.

In a nutshell, one can highlight the following basic points about Metallica and Slayer:

- A fast tempo and use of the same tone colours are the similarities between the two bands in terms of riff design around 1983.
- After 1984 Slayer does not show any timbral development in the construction of their riffs any more.
- In the years 1984–1986 Metallica introduced new sounds and tone colours. Their tempo remains high.
- At the same time, Slayer accelerated the already fast tempo even further and increased the number of riffs.

In the years 1983–1986 Iron Maiden and Motörhead were the most famous NWoBHM bands. Both were compositionally active and enjoyed a high degree of fame and credit outside the U.K. Despite numerous differences in the compositional language of the two American bands, the following figures (Figs. 10–12) demonstrate their riff design in 1983.

Around 1983, Iron Maiden experienced their international breakthrough. At that time they had already produced albums like *Iron Maiden* and *Killers*. The release of the third album *The Number Of The Beast* (1982) evoked tensions with conservative Catholic circles. Steve Harris and his band were already the most famous heavy-metal group in England.

Iron Maiden's fourth album (*Piece of Mind*, 1983) includes a number of songs which can be thought of as “classics” today, e.g. *The Trooper* or *Revelations*. *Revelations* is a song with profound lyrics and striking for its distinctive and powerful introducing riff (Fig. 10), which already shows Iron Maiden's typical rhythmic motifs. This riff is of a completely different structure compared to those by Metallica and Slayer. *Revelations* shows a riff with only one tone colour at a steady pace. While Bruce Dickinson sings the first verse, the guitars play the same riff. There is only tone colour during this riff. The vast majority of the riffs belonging to main tracks on this album is structured in a similar manner.

Fig. 10. Iron Maiden: introduction riff of *Revelations* (*Piece of Mind*, 1983)

Even when Iron Maiden wrote several riffs before the first verse, those were composed completely differently compared to similar passages in a Metallica or Slayer song, e.g. *Invaders* (Fig. 11) from *The Number of the Beast* (1982). Until 1982 there were only few Iron Maiden songs with several riffs before the singer's entrance. Even in *Invaders* differences become visible.

Fig. 11. Introduction and beginning of the 1st verse of *Invaders* (*The Number of the Beast*, 1982)

Although the first two riffs (riff 1a and 1b) have a different tone colour than riff 2 and a fourth riff (riff 3) is heard with the entering of Bruce Dickinson, there is no diversity or change of tone colours within one of the four riffs. The degree of complexity certainly is not a criterion for the quality of the songs.

At that time Motörhead was not less famous than Iron Maiden. The former is considered one of the earliest heavy-metal bands and has been active as composers before the vast majority of the NWoBHM groups. In 1983 the band had already composed their greatest hits such as *Motörhead*, *Overkill*, or *Ace of Spades*.

Iron Fist (*Iron Fist*, 1982) builds on the successes of the band's first phase. The introduction to this song is of a similar structure like many other songs by Motörhead (Fig. 12).

The image shows a musical score for the song 'Iron Fist' by Motörhead. It consists of two systems of staves. The first system has a vocal staff (Voc) and a guitar staff (G). The guitar staff has a heavy, distorted riff. The vocal staff has the lyrics 'Dark night nothin' to see...' and a 'Play 4 times' instruction above it. The second system also has a vocal staff (Voc) and a guitar staff (G). The guitar staff has a heavy, distorted riff. The vocal staff has the lyrics 'In visible hand in front of me'.

Fig. 12. *Motörhead*: introduction and beginning of the 1st verse of *Iron Fist* (*Iron Fist*, 1982)

Motörhead's riff structuring has elements of both bands from the U.S. West Coast and Iron Maiden. On the one hand, there are tone colour changes within a riff, the pace is relatively fast and the distortion of the guitars is heavier than with Iron Maiden (similarity with Metallica and Slayer), while on the other hand, there are big differences. Motörhead has a strong preference for chords which include the third (Metallica and Slayer mostly use chords without the third) and the number of tone colours is limited so far that it is hard to find similarities between songs of Motörhead and Metallica in this respect.

In 1980 NWoBMH established itself as the world's fastest, hardest and most aggressive kind of heavy metal. A few years later a gradual hardening of the sound was noticeable in the U.S. West Coast. Unquestionably, thrash metal was already established as early as 1983 (with the debut albums by Metallica and Slayer). The sound of that genre fascinated a whole generation of musicians and fans. Some important musical aspects of this music include a fast tempo, a constant change of different tone colours within a riff and the principle of hardly/never repeating the very same tone colour sequence within a song. Such characteristics hardly existed in heavy metal composed in Great Britain at that time (1983–1986).

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„Metallica“ rifų (1983–1986) tembrinės charakteristikos ir jų ypatumai lyginant su „Slayer“ ir Naujosios britų sunkiojo metalo bangos (NWoBHM) grupėmis

Santrauka

Straipsnio tikslas – aptarti dainos „Hit the Lights“ ir kitų dainų iš pirmųjų trijų sunkiojo metalo grupės „Metallica“ albumų (*Kill 'Em All*, 1983; *Ride the Lightning*, 1984; *Master of Puppets*, 1986) rifų sandarą muzikos analizės požiūriu (t. y. analizuojant rifų skambesio spalvą ir ritmą). Tyrimo pabaigoje analizės rezultatai pateikiami ilgalaikėje perspektyvoje, norint išryškinti „Metallica“ skambesio kaitą praėjusio amžiaus 9 dešimtmetyje.

Tuo pačiu metu (1983–1986) ir toje pačioje geografinėje zonoje (JAV vakarinė pakrantė), trunkiojo metalo scenoje (*trash metal*) iškilo ir savitą skambesį atrado grupė „Slayer“. Nors abi grupės kūrė dainas labai skirtingomis temomis, jų rifų sandara gana panaši. Tie patys analitiniai įrankiai (tembro, ritmo, tempo charakteristikos) buvo pritaikyti ir „Slayer“ rifų analizei. Viena vertus, tokiu būdu buvo atskleistos sąsajos tarp abiejų grupių rifų, o antra vertus – išskirti unikalūs „Metallica“ rifų bruožai.

Tęsiant panašumų ir skirtumų vartinę, „Metallica“ ir „Slayer“ dainų rifai lyginami su to paties laikotarpio Naujosios britų sunkiojo metalo bangos (NWoBHM) grupių muzika (įtraukiant tokias grupes kaip „Iron Maiden“ ir „Motörhead“).

Reikšminiai žodžiai: sunkusis metalas, rifai, tembrinė analizė, grupės „Metallica“ ir „Slayer“.

Cluster in Organ Music: Sound, Typology and Functions

Annotation

Cluster is one of the most characteristic phenomena of the sonorism understood as a sort of technology in compositional process. Being a form of sound material's setting it belongs either to sphere of texture or time organization. Besides cluster is a spatial and acoustic phenomenon, evoking a kind of auditive experience close to the perception of noise.

The organ as a music instrument generates a specific sound that as a static strand could be prolonged unlimitedly. Thanks to the registers system there is also a possibility of structuring the sound color, somehow reminding electronic music. This makes organ especially interesting medium in the cluster technique. The most of organ compositions exploring this technique date from two decades of 1960s and 1970s. The author proposes a synthetic approach to handling of a problem, focusing on three fundamental matters:

- a) proposition of an subjective description of clusters' sound in some chosen works (for ex. by György Ligeti, Mauricio Kagel, Lucas Foss, Kazimierz Serocki, Sofia Gubajdulina, Norbert Mateusz Kuźnik, Joanna Bruzdowicz, Volker Bräutigam, Wiesław Rentowski and others);
- b) typology of organ cluster;
- c) specification of cluster's functions in different contexts.

Keywords: organ music, cluster, sonorism, texture, timbre, articulation.

It has already been forty years since one of the most eminent Polish musicologists, Józef Michał Chomiński (1906–1994), formulated the theory of music sonology, which was probably the most important achievement of post-war musicology in Poland, with a significant impact on the Polish school of composition, too. The fact of attributing “the function of a structural dominant in the constitution of a musical form” (Gołąb 2011: 228) to the timbre of sound became the key idea at that particular historical moment of searching for an alternative to dogmatism of serial music on the one hand, and to the secondary nature of neoclassicism on the other one. The idea was directing composers' imagination towards a more thorough insight into purely sonoristic aspect of music. Chomiński's work from the mid-1970s – *Podstawy sonologii muzycznej* (The rudiments of music sonology) – has been continued in the works of numerous authors from next generations, just to mention Iwona Lindstedt or Krzysztof Sz wajgier.¹ Putting aside the question of the terminology used in the theory (sonoristic regulation, sonology, sonoristic music, etc.), we will try to elaborate on the subject of one of the most characteristic elements of sonoristic music – a cluster – in terms of the contemporary organ music.

Writing about elements of the sonoristic regulation within the group of traditional instruments, Chomiński (and Lindstedt after him) did not mention the organ at all; whereas in the organ music a cluster, as a result of new textural developments, is one of the most commonly used means. Although both authors discuss the case of the prepared piano, a cluster performed on the organ should not be associated with the preparation procedure, in spite of false analogies with the piano (the keyboard). The systematics of potential “activities constituting sonoristically-regulated formation process” (Lindstedt 2010: 104) enumerated by Chomiński, also considers “the use of new methods of articulation and sound production on traditional instruments” (Lindstedt 2010: 104) along with the use of an electronic component (generating sound, processing the already existent material, combining electronic devices with traditional instruments, etc.). For the first time these new articulatory means appeared in the organ music between 1959 and 1962 in compositions of the three pioneers: Bengt Hambraeus, György Ligeti and Mauricio Kagel. The sensational piece from 1962 by Ligeti, *Volumina*, was inspired by pieces composed a little earlier: *Constellations I and II* by Hambraeus (1958–1959).

The main idea of *Volumina* treating the organ timbre as a form-shaping element, as well as exploring different forms of the organ sound volume (a volumetric aspect, in other words) – undoubtedly indicates the impact of electronic music on Ligeti's compositional practice. The notation of the piece is approximate, smooth changes in the compass, density, content, timbre and dynamics of clusters are most often described graphically, or defined verbally. Among new articulatory means there appear playing with organ registers (free switching the stop knobs on and off during a static chromatic cluster – e.g. in No 9 in the score) and the effect of turning

¹ Iwona Lindstedt. *Sonorystyka w twórczości kompozytorów polskich XX wieku* (Sonoristics in the output of Polish composers of the 20th century) Wydawnictwa Uniwersytetu Warszawskiego, Warszawa 2010; Krzysztof Sz wajgier, *Sonorystyka i sonoryzm* (Sonorism and sonoristics). In: *Ruch Muzyczny* 2009, 10; and *Sonorism – Idea, Form, Meaning*. In: *Music as a Message of Truth and Beauty*. Akademia Muzyczna w Krakowie, Kraków 2014. See also: Danuta Mirka. *The Sonoristic Structuralism of Krzysztof Penderecki*. Akademia Muzyczna w Katowicach, Katowice 1997 and Mariusz Wrona. *Brzmieniowy aspekt muzyki organowej w świetle teorii sonorystycznej Józefa Michała Chomińskiego* (Sonorous aspect of organ music in the perspective of the theory of sonorism by Józef Michał Chomiński). In: *Polski Rocznik Muzykologiczny*, 2007–2008, 6.

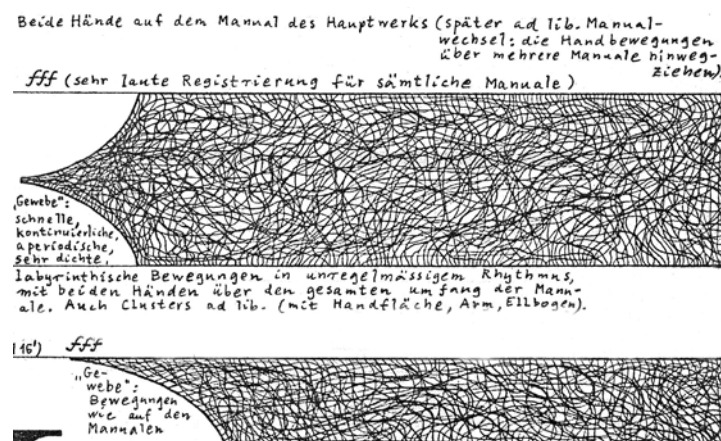
off the tracker action. The latter is a source of noise properties, whereas the possibility of producing a huge number of coloristic combinations creates a situation, in case of the organ, when a static, motionless cluster can be put through timbral permutations, thus gaining inner mobility. Since there is a correlation between timbre and the pitch compass, as well as density inside the sound field. And, as Lindstedt (2010: 211) remarks, “thanks to the independence of ‘vertical sound cohesion’ from melodic patterns, the whole attainable sound material, noises including, can be engaged in the processes of increasing and decreasing the sound mass ...”. That is why *Volumina* is also regarded as a flagship composition of the “noise music” category.

1. Sound

As a sort of presenting the sound material in its ultimate sonic density, a cluster should be considered a form of acoustic experience. Therefore, the perceptive aspect is equally important as purely acoustic one. Condensed sound stream of high-level complexity can lead to something in-between the perception of a single sound and noise. There is a totally different approach to a wide sound stream, yet limited in terms of the material (e.g. the whole-tone one) where one cannot observe a complete disappearance of intervallic properties. The organ has a peculiar creative potential for static sound streams which internally vary in timbre. Since each change in density or with parameters is perceived as a change in timbre. At the same time an organ cluster excellently conveys the character of the timbral structure, which is simultaneously the sum and coefficient of its components. Due to that it has a lot in common with a cluster realized by an orchestral or vocal ensemble and much less with the piano cluster, despite certain analogies in terms of the playing technique. Continuity of the instrument’s sound is all-important here. With a prolonged cluster an impression of fullness gets more intense, on the other hand staccato or some movement inside (trills, rapid repetition of the groups of tones) lessen the sensation of density. When structures of a different complexity overlap, the temporal order also gets distorted. Time becomes “spatial”. Ligeti himself compares these structures to “hanging in the air, huge, full of oriental peace carpets” (after Hans Holländer 1967: 119).

Thanks to the continuity of the organ sound it is also possible to obtain a cluster of constant pitch parameters, but of changeable density or timbral structure. Oscillations inside the cluster, overlapping, pulsations, interferences, etc., are the ways of realizing dynamic-timbral passages, or “inner articulation of the states of timbre”, according to Helmut Lachenmann (1970: 23). Fluctuations inside the cluster are received as a complex, simultaneous motion of timbre. Since the number of the pressed organ keys also determines intensity of sound, crescendo can be, therefore, achieved not only by gradual extending the volume of a cluster, but also through changes in its inner density.

Another method of processing the timbre filtration is using registers and micro-polyphonization (*Texturklang* according to Lachenmann), though the latter works best in an orchestral texture. The equivalent of micro-polyphonization within an orchestral cluster makes the “Gewebe” (spider’s web) cluster in Ligeti’s *Volumina*, wherein rapid non-periodic strikes within a fixed external outline are perceived as sound with inner filtration.



Ex. 1. György Ligeti. *Volumina*, No 36

One more means of transforming timbre in this piece is gradual shifting of a single cluster onto another manual with a different registration. Such “sliding” from one manual to another enables to minimize the timbral contrast, which usually accompanies a change in the organ manuals. What also helps to do away with

that contrast is velocity of the sequential passages in the aforementioned “web cluster” where Ligeti achieves coloristic pulsation within a static sound stream.

2. Typology

The classification of clusters presented by Chomiński obviously should be considered as a very provisional one. He distinguishes:

- a) in terms of the pitch range – small/narrow and large/broad clusters,
- b) in terms of mobility/motionlessness – totally static clusters and those changing the pitch within the same width of the stream,
- c) swelling and descending clusters – i.e. combining both the pitch and mobility/ motionlessness categories. It should be noticed here, however, that the terms “swelling” and “descending” constitute a false dichotomy; the opposite of a descending cluster is the ascending one, and the adjective used by Chomiński – “swelling” – suggests the category of dynamics,
- d) clusters “changing their density through overlapping different intervals, from a quarter-tone to a whole tone, or through reducing the smallest intervals” (after Lindstedt 2010: 113).

The clusters from *Volumina* can be divided into two main categories: the material one, connected with an articulatory factor:

- performed on the white keys, i.e. diatonic clusters,
- performed on the black keys, i.e. pentatonic clusters,
- chromatic clusters,

and the motion/motionlessness category:

- static,
- slowly reduced in terms of the pitch range,
- slowly shifted,
- rapidly shifted,
- fluctuating (slowly changing inside).

Inner changes are achieved in different ways, apart from those already mentioned above, also through gradual releasing the black keys in a chromatic cluster until only a diatonic streak remains.

In Polish organ music a cluster appears for the first time in 1963 in the piece *Dwie improwizacje* (Two Improvisations), composed by Bernard Pietrzak. In this peculiar study of a cluster technique the composer used the following means:

- a) cluster of an ultimate width (the whole range of the keyboard),
- b) cluster performed on the pedal keyboard,
- c) arpeggiated cluster,
- d) repetition of a cluster,
- e) tremolo of clusters,
- f) decreasing the scope of the cluster,
- g) glissando of a cluster (also in the pedal part),
- h) “geometric” extension of a cluster,
- i) the effect of switching the tracker action on and off while performing a static cluster.

As one can see, along with the material category (a), Pietrzak’s composition is dominated by the operations which make the motion of sound streams more dynamic – both in terms of changes in their volume (categories: f, g, h) and means of sound articulation (categories: c, d, e). Another innovator of the Polish organ music was in the 1970s Norbert Mateusz Kuźnik, who made a cluster a means of sonoristic playing technique in his compositions *Organochromie*, *Multiplicatio*, *Hekla*, and others. In turn, in *Psalmus* by Marian Borkowski cluster-shaping and developing cluster sequences through making the motion more dense, or widening the pitch range were associated with the simplest linear system of dynamic markings; what dominates here is a tendency to combine a cluster with traditional vertical and linear means.

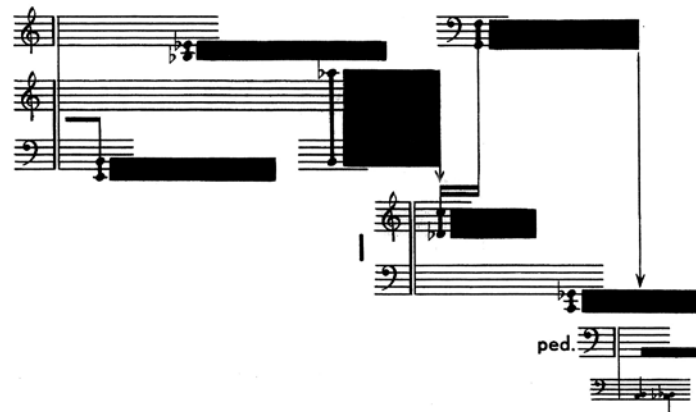
The grounds for the typology presented below² are formed through singling out the categories which comprise basic physical properties of a cluster and the manner of performing it with regard to notational solutions. They are four categories as follows: sound material³ / density, pitch range, motion / motionlessness and articulation.

² See the list of analysed compositions.

³ Of course, the organ generally uses an equal-tempered tuning system.

2.1. The first group comprises:

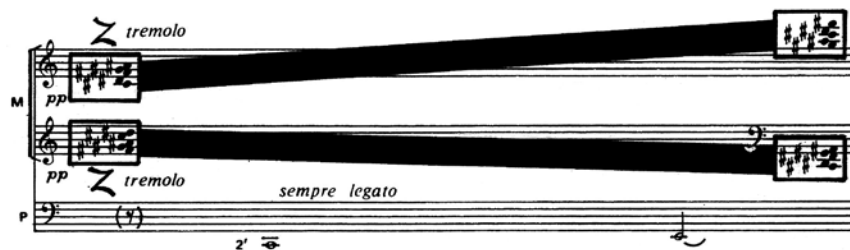
a) chromatic cluster,



Ex. 2. Kazimierz Serocki. *Fantasia elegiaca*, No 174

b) diatonic cluster,

c) pentatonic cluster (i.e. performed on the black keys) – in Example 3 additionally with a changing pitch range and inner mobility,



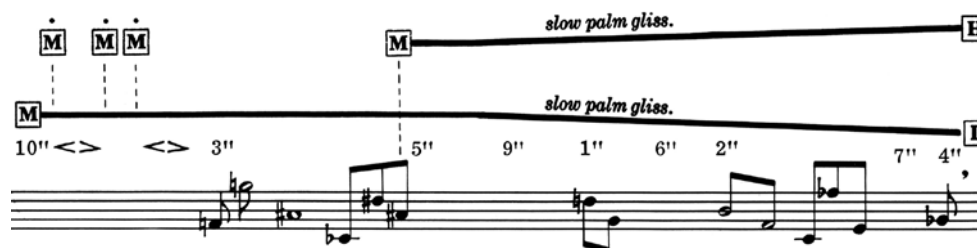
Ex. 3. Wiesław Rentowski. *Albebragen*, p. 12

d) modal cluster (incomplete chromatic-diatonic, wherein the tone content is an outcome of using a certain scale, e.g. a Lydian scale).

The consequence of choosing the material of a scale is a change in density of the cluster, from the densest one – chromatic, through diatonic / modal to the pentatonic one. Interestingly enough, a whole-tone cluster is scarce, which results from the playing technique specificity.

2.2. In the second group one can find examples of clusters varying in pitch, for which the criterion is a notational idea:

- cluster in the lowest register,
- cluster in the medium register,
- cluster in the highest register.



Ex. 4. Lucas Foss. *Four Etudes*, p. 11

In Example 4 notation is extremely simplified (L = low, M = medium, H = high).

2.3. This group generally comprises two types:

- a) static cluster – i.e. the one of unchanging pitch range,
- b) mobile cluster – i.e. the one using different kinds of inner and external mobility.

The category of external mobility is obviously connected with changing the pitch range through, for example:

- gradual reducing and building up a chromatic cluster (from and to a single tone),



Ex. 5. Sofia Gubajdulina. *Hell und dunkel*, p. 8



Ex. 6. Volker Bräutigam. *Epitaph für Maksymilian Kolbe*, p. 11

- gradual reduction of a diatonic cluster (on the white keys),
- free changes in the scope of a cluster.



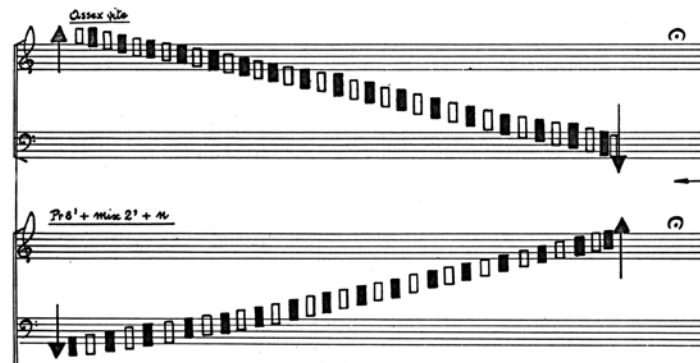
Ex. 7. Bernard Pietrzak. *Quattor segmenta '73*, p. 5

However, in case of the next sub-group of clusters with a changing pitch range, the basis for motion is formed by suitable articulation:

- glissando on the white and black keys,
- glissando either on the white keys, or on the black ones only (see: Example 3 – combined with tremolo).

This example demonstrates a combination of external mobility (change in the pitch range) with inner motion (glissando + tremolo).

- “shifting” repetition of a cluster.



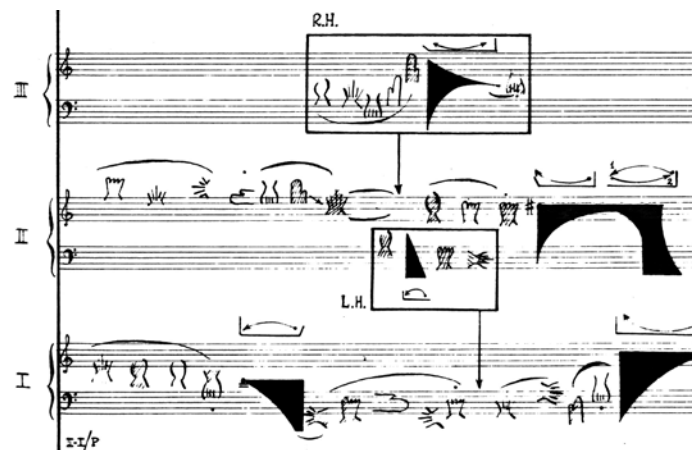
Ex. 8. Joanna Bruzdowicz. *Einklang*, p. 17

In Example 8 there are clusters of comparable pitch range performed on the white and black keys alternately.

In turn, inner mobility is achieved basically through non-periodic releasing and pressing any keys within the cluster (see “Gewebe” in *Volumina* by Ligeti; analogical solutions are found in the compositions by Joanna Bruzdowicz, Norbert Mateusz Kuźnik, Wolfgang Stockmeier, Wiesław Rentowski and others).

2.4. The widest range of clusters varied by indicating the mode of performance (articulation criterion) is comprised in *Improvisation ajoutée*, a composition by Mauricio Kagel. What determines, in the first place, the pitch range and static character of a cluster are particular ways of placing one’s hand on the keyboard? Hence, the composer differentiates between clusters performed with:

- a palm with rolled-up fingers,
- an open palm (also with one’s hand positioned in a given direction),
- a closed palm (also with one’s hand positioned in a given direction),
- a fist,
- the edge of one’s hand,
- an elbow,
- a forearm (excluding hand),
- a forearm (including hand or edge of the hand).



Ex. 9. Mauricio Kagel. *Improvisation ajoutée*, p. 6

In case of the clusters performed with a forearm, Serocki introduces in his *Fantasia elegiaca* a division into white and black keys. We can also find here a connection between a given performance manner and making the motion of a cluster more dynamic by, for example:

- changing the position of the hand (without taking it off the keyboard) from the transverse to natural one, and the other way round,
- pressing the keys gradually, starting from fingertips until the whole hand lies on the keyboard and in reverse (releasing the keys gradually starting with the whole hand),
- pressing the keys gradually, starting with an elbow and in reverse (releasing the keys gradually starting with an elbow).

As Lindstedt (2010: 114) remarks, “structures accumulating different sorts of clusters are of a particular sonoristic interest”, which is a phenomenon often called by composers an improvised cluster playing (Ligeti’s *Volumina*, score No 13). It can be subjected to contrapuntal regulations; in that case “sonic layers entering various internal relations become structural components instead of voices” (Lindstedt 2010: 114). For instance, in Juliusz Łuciuk’s *Image* free cluster playing, performed with the left hand and left forearm on the black keys and with the right hand and right forearm on the white ones, is accompanied by melodic improvisation in the pedal part (*Image*, score, p. 19). In turn, in the third etude by Lucas Foss clusters in the manual part, free from any pitch regulation, are synchronized rhythmically with a melodic line of definite pitch and rhythm in the bass (pedal part).

3. Functions

Based on the analytical material presented above one can distinguish the following functions of a cluster in the organ music:

a) As a higher form of a chord – in compositions with prevailing harmonic factor, the vertical one; particularly in the pieces where secundal chords are mainly used, tone cluster becomes a textural, dynamic and timbral extreme (e.g. Rafał Augustyn *Laudes*, Józef Rychlik *Grave*).

b) As a dynamic climax (e.g. Krzysztof Baculewski *Trois Grâces*, Kuźnik *Contra bellum*, Aleksander Glinkowski *Sonata*, etc.).

c) As a structural component in the textural development (e.g. Heinz Wunderlich *Sonata Tremolanda Hiroshima*). In the compositions with more traditional formal assumptions (for example, passacaglias) a cluster variation constitutes the ending of textural and dynamic growth processes.

d) As a substitute of counterpoint – tone cluster in the form of a stream with melodic properties, especially in the pieces where chorale characteristics is present (e.g. *Al Fresco* or *Quattor segmenta '73* by Pietrzak – see: Example 7), makes a reference to a polyphonic multi-voice structure. Molding, which comprises – for instance – narrowing one side of the stream, or even convergent narrowing of the cluster towards its central tone and free fluctuation of its pitch range, is a manifestation of a prevailing linear factor.

e) As an element of formal development; for instance, in *Psalmus* by Borkowski a swelling and shrinking sound stream plays the role of a peculiar refrain.

f) As an illustrative factor in the pieces of a programmatic character; for example, in the third part of the *Jordan* triptych by Bronisław K. Przybylski *The Red Sea* divergent glissando of clusters reflects the image of the sea parting.

g) As a component of the virtuoso playing technique; solo cadenza of the organ in *Fantasia elegiaca* by Serocki is full of different types of clusters. Whilst in *New Orleans Magnificat* by Rentowski the culmination is made up of a sequence of rapid glissandi in both hands not along the keyboard but cascading down the three manuals.

Ex. 10. Wiesław Rentowski. *New Orleans Magnificat*, p. 12

As one can see, the question of functions of a cluster in the organ music is closely linked not only with timbre, or a sonoristic transformation of traditional textural formulas, but also with the issue of performing techniques – often of an experimental nature.

Translated by Elżbieta Fesnak-Przybylska

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The list of analysed works

- | | |
|---|--|
| William Albright. <i>Night Procession</i> (1971); <i>Finale: The Offering</i> (1971) | György Ligeti. <i>Volumina</i> (1962) |
| Rafał Augustyn. <i>Laudes</i> (1973) | Norbert Linke. <i>Rital</i> (1969) |
| Krzysztof Baculewski. <i>Trois Grâces</i> (1975) | Juliusz Łuciuk. <i>Image</i> (1977) |
| Augustyn Bloch. <i>Jubilate</i> (1974) | Tadeusz Machl. <i>Pejzaże</i> (Landscapes, 1976–1978) |
| Marian Borkowski. <i>Psalmus</i> (1975) | Stanisław Moryto. <i>Conductus</i> (1987) |
| Volker Bräutigam. <i>Epitaph für Maksymilian Kolbe</i> (1975) | Bernard Pietrzak. <i>Dwie Improwizacje</i> (Two improvisations; 1963); <i>Al fresco</i> (1968); <i>A piacere, chorale, e a piacere</i> (1977); <i>Quattor segmenta '73</i> (1972–1973) |
| Joanna Bruzdowicz. <i>Einklang</i> (1975) | Bronisław Kazimierz Przybylski. <i>Jordan</i> (2010) |
| Bogdan Dowłas. <i>The View</i> (1990) | Wiesław Rentowski. <i>Albebragen</i> (1985); <i>Piffero</i> (1985); <i>Por dia de annos</i> (1987); <i>New Orleans Magnificat</i> (1993) |
| Lucas Foss. <i>Four Etudes for Organ</i> (1967) | Józef Rychlik. <i>Grave</i> (1973) |
| Aleksander Glinkowski. <i>Sonata</i> (1981) | Kazimierz Serocki. <i>Fantasia elegiaca</i> (1971–1972) |
| Sofia Gubajdulina. <i>Hell und dunkel</i> (1977) | Wolfgang Stockmeier. <i>Variationen über ein eigenes Thema</i> (1979) |
| Jan Wincenty Hawel. <i>Studium</i> (1967) | Karmella Tsepkenko. <i>The Light Which Is in You Is Not Darkness</i> (1992) |
| Mauricio Kagel. <i>Improvisation ajoutée</i> (1961–1962) | Zbigniew Wiszniewski. <i>Trigonos</i> (1987) |
| Norbert Mateusz Kuźnik. <i>Contra bellum</i> (1970); <i>Organo-chromia II</i> (1973); <i>Muzyka koncertująca</i> (Concert music) (1974); <i>Multiplicatio</i> (1976); <i>Duo concertante per piano e organo</i> (1978–1979) | Heinz Wunderlich. <i>Sonata Tremolanda Hiroshima</i> (1984) |

Klasteris vargonų muzikoje: skambesys, tipologija ir funkcijos

Santrauka

Klasteris yra vienas būdingiausių sonorizmo reiškinių, komponavimo procese suvokiamas kaip tam tikra technologija. Kaip viena iš garsų organizavimo formų, jis priklauso tiek faktūros, tiek laiko organizavimo sritims. Nėgana to, tai dar ir erdvinis, akustinis reiškinys, sukeliantis triukšmo suvokimui artimą audialinį potyrį.

Vargonų kaip muzikos instrumento specifika yra ta, kad jais išgaunamas skambesys gali būti tęsiamas neribotą laiką ir tapti statiška muzikinio audinio gija. Registrų sistema taip pat atveria daug tembro struktūravimo galimybių, prilygstančių tembro modifikacijoms elektroninėje muzikoje. Dėl to vargonų muzikoje labai plačiai galima taikyti klasterių techniką. Dauguma tokių kompozicijų, kuriose tyrinėjamos šios technikos galimybės, buvo sukurtos XX amžiaus 7 ir 8 dešimtmečiais. Nagrinėdama šią temą, straipsnio autorė siūlo kompleksinę prieigą ir sutelkia dėmesį į tris pagrindines užduotis:

- subjektyviai apibūdinti klasterių skambesio savybes pasirinktuose kūriniuose (pavyzdžiui, György'io Ligeti, Mauricio Kagelio, Lucaso Fosso, Kazimierzo Serockio, Sofijos Gubajdulinos, Norberto Mateuszo Kuźniko, Joannos Bruzdowicz, Volkerio Bräutigamo, Wiesławo Rentowskio ir kitų kompozitorių kompozicijose);
- pasiūlyti vargonų klasterių tipologiją;
- išskirti ir apibrėžti klasterių funkcijas skirtinguose kontekstuose.

Reikšminiai žodžiai: vargonų muzika, klasteris, sonorizmas, faktūra, tembras, artikuliacija.

Sonorism and Implementation of the Idea of Programmatic Music in the Output of Polish Composers in the Second Half of the 20th Century

Annotation

The text makes an attempt to follow through the changes, occurring over two decades (from the late 1950s till the end of the 1970s), in the manner Polish composers treated sonoric means, as well as in the role those techniques played in a musical piece. First efforts at incorporating into musical compositions the material of indefinite pitch, resulting from an unconventional use of traditional instruments, expressed an avant-garde approach of the composers who negated musical tradition in terms of material, form and notation. It was already back then when color qualities of those techniques were revealed, as well as their dramatic and expressive potential. The twilight of avant-garde enabled composers to not only combine, or juxtapose sonorism with the twelve-tone and tonal material but also to make references to the 19th-century tradition of using musical means for conveying non-musical content in a more or less evident way. In the compositions regarded as 20th-century replicas of the 19th-century idea of a symphonic poem sonoric means gain a new quality, becoming one of the most important attributes of program music, a medium for building up evocative images or expressing a wide range of emotions.

Keywords: sonorism, program music, Polish music, avant-garde music.

The first chamber and orchestral compositions by Krzysztof Penderecki, written at the end of the 1950s and in the early 1960s¹, wherein the composer used the material of indefinite pitch stemming from an unconventional use of traditional instruments, already revealed not only coloristic qualities of these means, but also their dramatic and expressive potential. However, composer's approach to the prospects of presenting different sorts of states, stories or emotions with the help of sonoristics was highly ambiguous at the time. On the one hand he clearly realized what an enormous imaging potential was there and tried to highlight this evocative property in the titles given to his compositions: *Threnody for the Victims of Hiroshima*, *Dimensions of Time and Silence*, *Polymorphia*. However, when successive interpretations finding practically an obvious storyline in *Threnody* started to appear, he strongly and vigorously protested.² Such interpretations are evident, for example, to Siglind Bruhn (2011: 93), who writes that the composition "depicts the brutality of war in a most literal way by evoking – in exact timing – the sonoristic effect of the American bombing of Hiroshima".

Different approach to a sonoristic material was adopted by Penderecki already a few years later, in the mid-1960s, when his *Pasja wg św. Łukasza (St Lucas Passion)*³ was written and by the end of that decade when he composed *Diabły z Loudun (The Devils of Loudun)*. *Passion* differed from extremely avant-garde pieces from the beginning of the 1960s in terms of character – heterogeneous, synthetic, based on the combination of sonoristic material and tones of definite pitch (twelve-tone, tonal and micro-tonal structures). This varied sound material was organized according to different rules – integrated in terms of motifs (with the "b-a-c-h" leitmotif indicating how deeply it was ingrained in the tradition of the genre), tonality (with emphasized "d" and "g" tones)⁴, or serialism – thanks to the presence of two twelve-tone series. Nevertheless, in spite of such a profuse material and technical⁵ variety, there emerged a coherent work with a clearly outlined dramaturgy.

¹ *Dimensions of Time and Silence* (1959–60); *Threnody for the Victims of Hiroshima* (1959–61); *Polymorphia for strings* (1961); *Fluorescences for orchestra* (1961).

² "Some time ago there was a similar misunderstanding concerning *Threnody* which I gave the title *For the Victims of Hiroshima*. Many people were trying to find out later in which place of the score the planes were flying and dropping the bomb, where the explosion was, etc. I am afraid that a similar situation might await me with this composition [*Jacob's Awakening* – note by EK-Z], whilst there is no literary quality or illustration here, either" (Droba 1978: 73). It is also worth mentioning that primarily the composition was entitled 8'37" and bearing that title it was awarded the 3rd prize at the G. Fitelberg Composers' Competition in 1960. Before publishing the score and sending a recording to the UNESCO International Composers' Rostrum in Paris where in May 1961 the piece won the 3rd prize, the composer made a decision to change the title for *Threnody for the Victims of Hiroshima*.

³ *St. Lucas Passion* also opened a totally new perspective in Penderecki's oeuvre. Just a few years after his bright debut at the Warsaw Autumn Festival in 1959 with *Strophes* and a series of inventive orchestral pieces, the composer clearly turned towards musical convention provoking critics' outrage and being accused of "betraying avant-garde ideals". However, in spite of using a radical music language, the symptoms of the bonds with tradition were already noticeable in Penderecki's works such as *Psalms of David* or *Stabat Mater* (Kowalska-Zajac 2010: 46).

⁴ Krzysztof Penderecki was aware of his connections with the past and he expressed it many times saying: "The contradiction between avant-garde and tradition has seemed to be surface only since the very beginning. One cannot sever with the musical past of its strict sense, what is more – with cultural heritage in its broadest sense" (Penderecki 1997: 66).

⁵ Józef Chomiński (Chomiński; Wilkowska-Chomińska 1984: 460) distinguished there six different compositional techniques: serial, organum, motet-based, variational, thematic and sonoristic.

In this composition it is actually the text that determines positioning of the material – sonoristics appears in particularly dramatic fragments, i.e. while “unleashing of the forces of darkness” (Tomaszewski 2008: 200) takes place, whereas unconventional vocal effects in the *turbae* part create “an evocative, realistic vision of the agitated crowd, full of anger and cruelty, striving to annihilate an individual”: *The Mocking before the priest, Jesus before Pilate* (Chłopicka 2000: 38).

Ex. 1. Krzysztof Penderecki *Passio et mors Domini nostri Iesu Christi secundum Lucam*
(*St Lucas Passion for solo voices, narrator, boys' choir, mixed choir and symphony orchestra*)

© by PWM 2000, p. 40.

To arrive at such a credible picture of the crowd tormented by extreme emotions it was crucial that vocal means, modeled after instrumental effects, should be tackled in a special way. Actually, while gaining in expression and intensity of a dramatic impact the composer loses clarity of the message behind its semantic layer, however it was not a priority for Penderecki (as examples of his other works prove, e.g. *Kosmogonia* [*Cosmogony*]). Similar means (as well as similar outcomes of putting them to use) can be noticed in the central movement of *Trois poèmes d'Henri Michaux* (*The Three Poems by Henri Michaux*)⁶ by Witold Lutosławski, for whom “in many places words constitute a purely sonic component, reaching listeners in the form of different kinds of murmur, noise, din, as sound complexes (...) of no particular meaning” (Schiller 1964: 9). They convey, however, a very clear and unambiguous image of a fight, mutual struggle of two counter-powers.

⁶ “A setting of three poems by a contemporary French poet, Henri Michaux, the three-part work follows the principles of a classical tragedy. The first poem, *Pensées*, a skeptical reflection on human thinking, is followed by *Le grand combat*, presenting a bloody fight of two people and constituting the work's culminating point. Like in a Greek tragedy, there is an escalation of conflict and unfolding of disaster. The third poem, *Repos dans le malheur*, brings melancholic resignation and relief.” <http://culture.pl/en/work/trois-poemes-dhenri-michaux-witold-lutoslawski>

Another, though equally spectacular and evocative, use of sonoristics for expressing emotions included in the textual layer of a vocal-instrumental composition are scenes from the 2nd act of *The Devils of Loudun* by Penderecki, an opera drawing on historical events from the 1st half of the 17th century, from 18 August 1634 to be exact, when a priest – Urban Grandier – charged with satanic practices was burnt at the stake in Loudun after a two-year trial. As Regina Chłopicka writes elaborate scenes of exorcism determining the character and expression of the second act (2000: 48), are “filled with dramatic tension, though not missing out the touch of grotesque and irony”. Like in *Passion*, what matters in these scenes are solo vocal parts and choral ones, in which the composer used original Latin texts applied at the time while performing an exorcism. Their presence ensured an effect of “a particular tension between the sphere of the ritual and the sphere of reality, the tension being even more heightened by a language contrast” (Chłopicka 2000: 48).

96

CORO
 S
 A
 (Clamour of diabolical voices. Derisive laughter, grunts, squeals, howls.)
 (Höllensgeschrei, teuflische Stimmen schreien durcheinander. Hohn Gelächter, Quaken, Heulen.)
 cl ss
 cor ss
 cl es
 fr ss
 tb ss
 flx
 rgn
 tmh
 pf
 Gabrielle
 Vn
 Vl
 Vc
 Vb
 repeat if necessary
 nach Bedarf wiederholen

Ex. 3. Krzysztof Penderecki, *Die Teufel von Loudun: Oper in drei Akten*
 (The Devils of Loudun: opera in three acts)

© by B. Schott's Söhne, 1969, p. 106.

Second Symphony by Henryk Mikołaj Górecki, *Cosmogony* by Krzysztof Penderecki⁷ and *In Honorem Nicolai Copernici* by Bronisław Kazimierz Przybylski.⁸

Composers raising this issue must have been aware that “the current situation is, however, much more complicated than in the times when science faced out the Ptolemy – Copernicus dichotomy” (Voisé 1973: 146). In view of numerous model solutions, contemporary scientists are willing to concur with the statement that “the cosmos has no inner logic in a standard meaning of the word but tends to make a string of coincidences subject to some laws. The laws themselves are, however, irrational and do not stem from any fundamental order” (James 1996: 13–14). Chaos and indeterminism – motifs dominating in the 20th-century science – start to play more and more important role in art, too, which is reflected in a great deal of works with a different degree of indeterminacy. They constitute one of the most important achievements of the European avant-garde from the beginning of the second half of the 20th century.

The aforementioned compositions by Penderecki and Przybylski are, therefore, a sentimental journey back to the times when one model of the universe was in use, as well as represent a peculiar act of their authors' courage – since the 20th century, in spite of all its diversity, did not favor program music. Compositions with the titles bringing to mind a certain non-musical content were placed away from the mainstream, the following stages of which were marked with technological advances and the most frequently used, or even overused, word was a structure.

⁷ The composition was commissioned by The Secretary General of the United Nations to commemorate the 25th anniversary of the organization.

⁸ Bronisław Kazimierz Przybylski – born in Łódź, 11 December 1941; died in Łódź, 4 April 2011. Composer and academic teacher. Since 1963 he has been associated with the State Tertiary School of Music in Łódź (since 1982 the Academy of Music), where he has been a Professor of composition and Head of the composition section since 1987. His pieces have been presented at many prestigious contemporary music festivals, such as The Warsaw Autumn, The Poznań Music Spring, Musica Polonica Nova in Wrocław, The World Music Days in Tel-Aviv, Musikprotokoll in Graz, or The International Composers' Rostrum in Paris (Kowalska-Zajac 2013; 1013). Principal orchestral compositions: *Quattro studi* (1970); *In honorem Nicolai Copernici // Omaggio a Nicolaus Copernicus* (1972); *Scherzi musicali* (1973, 1978); *Memento* (1973); *Guernica – Pablo Picasso in memoriam* (1974); *Sinfonia polacca* (1974, 1978); *Sinfonia da Requiem* (1976); *Animato e festivo* (1978); *Cottbuser ouverture* (1980); *A Varsovie* (1981); *Sinfonia-Corale* (1981); *Sinfonia-Affresco* (1982); *Folklore* (1983); *Jubiläums-Sinfonie // Sinfonia-Anniversario* (1983, 1995); *Return – quasi symphonic poem* (1984); *Midnight Echoes Music* (1985); *Lacrimosa 2000. Holocaust – Memory* (1991); *The Night Flight* (2008); *Cztery nokturny kurpiowskie* (1973, 1975); *Program „S” hommage à Karol Szymanowski* (1982); *North* (2011).

Ex. 4. Bronisław Kazimierz Przybylski, *In honorem Nicolai Copernici* for Symphony Orchestra. Part 3 *Commentariolus*
© by PWM 1974, p. 53.

In his two-part *Cosmogony* Penderecki presents “two eternal human strivings: a yearning to understand the universe and a desire to break away from the planet” (Erhardt 1975: 159). Whereas *In honorem Nicolai Copernici* by Przybylski, composed in 1972, shows the four phases of a human thought development in four pictures. *Almagest* – is the Ptolemaic system of the universe, *Planetarium* is a manifestation of numerous cosmic associations, the two following parts: *Commentariolus* and *De revolutionibus orbium coelestium* are two phases – the early and the advanced one – of detecting a new order in the cosmos. Hence, in these compositions there are two aspects interwoven: a reflection upon the history of space exploration with the history of a rapid (as it was believed at the time) conquest of it.

The sphere of non-musical references, significantly determining the structure, makes an essential component of the compositions mentioned above and the vision of the universe is depicted through evocative means of a contemporary musical language. What is more, it seems that sonoristic means finally provide composers with the tools suitable for creating sonic equivalents of the cosmos and they cannot be, as it was commonly believed, against the laws of nature since they substantially help to reproduce it.

Compositions by Penderecki, Górecki and Przybylski emphasize different elements of a musical work, despite a similar performing ensemble – symphony orchestra, which turned out to be a perfect medium for conveying the ideas. Przybylski's piece opens up with an image of harmony of the spheres. "This music is generated by [as we can read in *Scipio's Dream* (Cyceron 1994: 14)] a rotary motion of the celestial spheres themselves, at the same time through combining high pitches with the low ones arises a harmonious, though diverse, symphony of them. Since such powerful movements cannot take place in silence, according to the laws of nature extreme spheres resound with high-pitched tones on the one side and with the low-pitched ones on the other. Thus, the highest sphere – the sphere of the skies – with the fastest rotation moves with a high-pitched and sharp sound, whereas the sphere of the moon – the lowest one – also resounds with the lowest tone". Przybylski recreates this harmony of the spheres with retained tones in the parts of wind instruments played against the fifth in double-basses resounding throughout the whole movement. Quintal harmony and the sound of the organ realizing the plainsong chant give part I an archaic character which the last part lacks – in spite of apparent similarities to the first one. The 2nd movement shows rich abundance and complexity of the universe, a contemporary vision of space as a chance creation devoid of any logic, and the third one – the successive phases of attempts to grasp it with a human mind, symbolized by the titles of Copernican works. Solemn, ceremonial atmosphere introduced with triumphant sounds of the trumpet initiating the first tones of the plainsong chant does not last long as it gives way to ominous, distantly echoing with *Dies irae* sounds of the tuba.

For Penderecki it was important to show the dynamism of the creation process itself in *Cosmogony* – from the simplest fundamental means to the complex ones, both in terms of sound material and texture. The low-pitched tone played by double-basses, soon enriched with a glimmer of harmonics in the strings, becomes the background out of which a picture of the world is slowly emerging. The dynamism of the process is expressed by means of texture, gradual shifting from static streams to more varied melodic lines, increasing density, intensifying motion. The central point of the composition, an E flat chord symbolizing the sun, marks the border between the first phase showing the processes undergoing in nature and the second one indicating an increase in human activity, which led to a human being leaving the Earth.

Visions of the universe created by Penderecki and Przybylski indicate associations with the 19th-century tradition of programmatic music, of the need for referring to the roots, starting a dialogue with the past. What helps to orient listeners' imagination towards appropriate areas are the titles of movements – *Geneza* (*Genesis*) and *Nieskończoność* (*Infinity*) in *Cosmogony* by Penderecki, *Almagest*, *Planetarium*, *Commentariolus*, *De revolutionibus orbium coelestium* in Przybylski's composition, or Copernicus' surname appearing in the title of the work. What matters are also texts, though not always clear enough to a listener⁹, but when put into a concert program they effectively play the role of a commentary. Apart from these purely outward operations, artists also referred to musical attributes of programmatic works (Golianek 1998: 90 and next) in the form of quotations (the plainsong chant in *In honorem*), use of certain instruments (e.g. the organ for evoking an archaic atmosphere), or symbolic use of keys (E flat major in *Cosmogony*).

Cosmogony by Penderecki and *In honorem Nicolai Copernici* by Przybylski were written almost at the same time, between 1970 and 1972, and the palette of means which was at composers' disposal at the time got significantly enhanced through sonoristic solutions applied in these compositions, in a conscious and consistent way, for creating certain programmatic connotations.

Presented examples of the use of sonoristics in order to generate an emotional atmosphere, or to convey the programmatic content are clear evidence of a change in artists' approach – from a typical avant-garde negation of the tradition and use of sonoristics as the material enabling them to sever with tonality to postmodernist pluralism. We also deal here with a paradoxical situation – the means which were supposed to help realize the idea of "the past vs present dialectics" (Kramer 2000: 67) were not used for coming into conflict with it but, as the aforementioned author writes, for peaceful co-existence with the past. Whereas sonoristics, a tool which was supposed to revolutionize the language of music, turned out to harmonize perfectly with a flagship category of Romanticism, that is presenting a non-musical content with the help of music, and led to the reactivation of a symphonic poem genre, becoming more attractive thanks to its new sonic format.

Translated by Elżbieta Fesnak-Przybylska

⁹ In *Cosmogony* the composer used quotes from Sophocles, Ovid, Lucretius, Leonardo da Vinci, Giordano Bruno, statements of astronauts – Yuri Gagarin and John Glenn, as well as fragments of the Holy Scriptures.

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Sonorizmas ir programinės muzikos idėjos raiška XX a. antrosios pusės lenkų kompozitorių kūryboje

Santrauka

Straipsnyje nuosekliai atskleidžiama, kaip per du dešimtmečius (nuo XX a. 6-ojo deš. antrosios pusės iki 8-ojo deš. pabaigos) keitėsi lenkų kompozitorių muzikoje vartojamos sonoristinės priemonės ir jų vaidmuo muzikos kūrinuose. Pirmieji bandymai kompozicijose naudoti neapibrėžto aukščio garsus, išgaunamus neįprastais būdais grojant tradiciniais muzikos instrumentais, išreiškė avangardines nuostatas tų kompozitorių, kurie atmetė muzikinės tradicijos suformuotas medžiagas, formas ir notacijas sampratas. Kaip tik tada buvo atskleistos spalvinės sonoristinių technikų savybės, taip pat jų dramatinės ir ekspresyvosios galimybės. Avangardo nuosmukis suteikė kompozitoriams progą ne tik derinti, gretinti sonorizmą su dvylikatone technika ir garsynu, bet ir remtis XIX amžiaus tradicija muzikinėmis priemonėmis perteikti nemuzikinį turinį daugiau ar mažiau akivaizdžiu būdu. XX amžiaus kompozicijose, reprodukuojančiose XIX amžiaus simfoninės poemos idėją, sonoristinė technika įgyja naują kokybę ir tampa svarbiausiu programinės muzikos atributu, priemone kurti asociacijas žadinančius vaizdinius ar išreikšti pačias įvairiausias emocijas.

Reikšminiai žodžiai: sonorizmas, programinė muzika, lenkų muzika, avangardinė muzika.

Sono-colority as Multi-Dimensional Texture Articulation Principles in Mārtiņš Viļums' "Tvyjōraan" for Chamber Orchestra

Annotation

One of the main aspects of the compositional realization of "Tvyjōraan" (2012) is exhibited as spatialization of music processing in the way we have abilities to imagine a visual phenomenon. Although being differently created, all patterns and parts of the composition comply with the strategy of *sono-coloristic* (the term first defined in this article). The presented analysis of one fragment in "Tvyjōraan" proved compositional, even aesthetical interpretation of the piece, in a way it could be explained by the concept of micro-sonority. The strategy principles of the processes related to the musical expression forms are decoded with reference to the functional (the term adapted for the method of analysis invented by me) articulation identification aspects of sound parameters.

The articulation processes related to the "Tvyjōraan" are interpreted as the spaces of sounding wherein certain lines, figures, colors, layers or images of *sono-coloristic* properties come into light. The expression forms of sounding linger and disappear over the patterns and emptiness of spatial landscapes.

Keywords: sono-colority, micro-texture, harmonic space, harmonic matrix, parameters of sound, pitch, timbre, loudness, imaginal sounds, sounding landscape, enlighten sounds, spatial music, Viļums, "Tvyjōraan".

Introduction

The formation of my compositional aesthetic¹ is grounded on the principles of multi-textural sono-colority created by me. The most important ones are:

1) form is created from different harmonic fields – spaces wherein every structure of the sounding verticality (harmony) initiates and marks a certain part of a composition as time extended space. Therefore, harmony becomes a particular spatial-harmonic matrix on which colorized lines and textures of sounding landscape are highlighted.

2) an internal sounding dimension has possibilities to be formed using hierarchical differentiation of all sound parameters (dynamics, timbre, pitch and rhythmic) in the figure ↔ texture relationship. Therefore three basic levels of sounding deepness could be defined:

- a) foreground/figure (all parameters are subordinated to reinforce musical expression);
- b) background/phonic (all parameters are subordinated to dim musical expression);
- c) shadow (all parameters are subordinated to mute musical expression [noise, whispering, etc.]).

3) the general principle of formation is described as rearticulation of the sounding micro and macrolayers (invariability of sound/sounding implication). The aspects of my aesthetical principles in the composition "Tvyjōraan" (2012) will be demonstrated in the way of *sono-coloric* articulation.

The term *sono-colority* (Lat. *sonus* sound + color [Lat., It., Eng.]) is defined in this article for the first time.² By this term the timbral quality of sound articulation should be postulated in the aspect of human ability to perceptually recognize³ compositional processes as the light of imaginary colors, visualized phenomenon of objects, patterns etc. On the one hand, that concept of visualized sounding processes have to be interpreted within phenomenological, cognitive principles of how we are getting to understand our being, the world around us, how we group environmental elements into an understandable system. On the other hand, these perceptual abilities (multi-sensory aspect of the human body, all the senses and brain) give us an opportunity to adapt such categories to understand and explore the musical *expression forms*⁴ as well as structural processes of them interdisciplinary, in cognitive way.

¹ The author of this article is analyzing his own composition.

² The term 'sono-colority' seems to be close to the conception named *sonorystyka* first invented by Józef Michał Chomiński in his article "Z zagadnień techniki kompozytorskiej XX wieku" [Problems of the compositional technique in the twentieth century] (Chomiński, 1956: 23–48). Under this conception Chomiński claims a new understanding of contemporary music tendencies in the 20th century. The main discourse related to the term *sonorystika* suggests the idea to interpret musical sounds as having quality of itself, moreover, as containing properties of tone colour (Granat 2009: 821–833). However, the term *sonorystyka* is usually related to particular musical style, especially to aleatoric compositional principles found in polish music, and is not prevalent in Western Europe. The term sono-colority invented by myself contains a renewed compositional strategy to interpret sound processes as color-filled, visualized musical expression forms.

³ The aspect of human abilities to recognize sounding processes as imaginal visualized figures and expression forms have been explored in dissertation of the author of the article (Viļums 2011).

⁴ In *Gestalt* psychology one of the most important criteria of perception explanation is to understand the form as a unity (Ehrenfels formulated this concept as *Gestaltqualitate*). The totality of elements as a mental combination is more significant than the number

When analyzing the piece, the main attention should be drawn to the quality's aspect of sounding processes, in order to uncover how the concept of sono-colority may have been realized as compositional decision.

Aesthetical aspects of my musical language and principles of time-space analysis developed by myself⁵ are used as primal roots for "Tvyjōraan" analysis. The strategy principles of the presented analysis are developed on the basis of such analytical decision through which a compositional, even aesthetical interpretation of the processes related to the sounding expression could be decoded with reference to the functional identification of sound parameters. Therefore the analysis of "Tvyjōraan" can be actualized through several hierarchical levels of investigation:

1) *sono-coloristic* articulation principles and functional significance of sound parameters (pitch, timbre loudness) for form building strategies. The analytical goal is to define decisions of compositional *sono-coloristic* implementation throughout different levels of form: from micro-structural dimension (articulation of single sound) to the higher levels of object analyzed. In line with relevant analytical principles such hierarchical levels could be marked out:

- a) micro-articulation of single sound;
- b) group of sounds as *sono-coloristic expression form* (heterophonic articulation);
- c) layers of different *expression forms* – as coloration of sounding landscape;
- d) part of piece as *sono-coloristic* space (part as wholeness) – as highlighting space;
- e) whole piece as *sono-coloristic* space;

2) with reference to aspects of functional correlation and connections between sound parameters the compositional type is defined;

3) recognition of the musical piece as kind of phenomenological (based on *Gestalt* principles⁶) expression forms.

To avoid long, second-rate analytic descriptions, some of the mentioned stages of methodical procedures intentionally are skipped or explained mostly as a result in this article. The focus of the analysis is to highlight the aspects of *sono-coloric* qualities and compositional decisions how they are realized within the one fragment of piece in Part C.

1. Compositional aspects of *sono-colority* in "Tvyjōraan"

Tvyjōraan means phenomena in the language I invented. There might reluctance to rank the piece as a kind of the conventional symphony or chamber symphony. It is rather a symphonic depiction. The opus is among my deeply private compositions: the experience of diverse worlds have resulted in mental visions creating ideas and sounds.⁷

The composition consists of six parts where two of these create another temporally and spatially significant dimension of form. Thereby, parts X and Y are illustrated beside parts A, B, C, and D as being compressed in time, different functional meaning.⁸

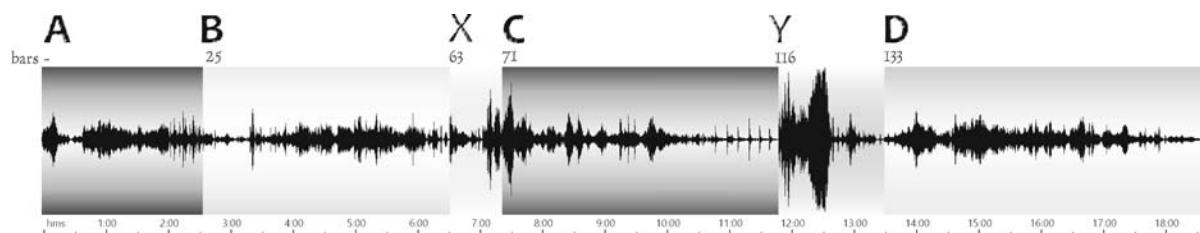
of its separate parts (Fuchs, Milar 2003: 17, Coren 2003: 105–106, Schirillo 2010: 469). Thus the totality of elements in the aspect of its multisensory perception, according to the author of the paper, can be characterized as the expression form of these elements (Viļums 2011: 56).

⁵ The analytical tools are interdisciplinary developed from physical (J. W. Solomon, 2007; M. Trochimczyk, 2001, etc.; psychophysical, J. Smythies, 2003; E. Zeidel, 1992, etc.; cognitive and psychoacoustic, A. D. Lyons, 2003; D. J. Levitin, 2002; R. Shepard, 2001; J. M. Chowning, 2000 etc.) investigations in the context of music as well as compositional and psychological interpretations of musical dimensions as categories of time (D. Temperley, 2001; B. Snyder, 2000; J. D. Kramer, 1999; G. Grisey, 1987; L. B. Meyer, 1961 etc.).

⁶ Principles of *common fate*, *good continuation*, *proximity*, *closure*, *similarity* as the main *Gestalt's* grouping rules are most suitable for recognition of musical processes (Snyder 2000: 45; MacKay). In that way the expression of musical elements perceptually would be characterized as a multimodal perceptual form of projection, the fusion into wholeness of "image".

⁷ The mental imaginary worlds emerge out of twilight, rust, dusted scripts and the memories yellowed and blurred. When I was working on the opus, I tended to find a balance between experienced and suspended musical time – the time for spatial-perceptual possibilities in relation to musical events and their contemplation.

⁸ Part X (bars 63–71) compositionally connects parts B and C and functionally has to be interpreted as transmission from one *sono-coloric* space to another. In opposite, part Y takes a main dynamical place and, although is made from resembling sounding material as part X, separates (in functional opposition to part X) parts C and D. Therefore, parts X and Y consist of alternative dimension wherein one part grows up from the main compositional level as a non-independent section and other part – rise to become the general point of piece.



Schema 1. Parts of harmonic spaces in "Tvyjōraan"

Every part is built as different harmonic *sono-coloric* space. Each of these ones has a peculiar harmonic matrix (space) as well as a particular compositional articulation of textures. The levels of textural implementation are analyzed through the hierarchic structural stages. Therefore, articulation of pitch, timbre and loudness (including their aspect of time/duration and qualities/space⁹) have to be observed in regards to this analytical background, i.e., as textural levels of *sono-coloristic* realization. In order to uncover how the aspects of *sono-colority* are realized within musical material, the analytical research to one fragment of part C (bars 97–103) is applied.

1.1. Micro-textural dimensions of *sono-colority*

The smallest compositionally possible articulation is related to changing qualities of sound¹⁰ (by micro variations of basic sound parameters – pitch, timbre, loudness and duration of all of them). These small bits of elements that usually are hidden inside the sound/tone, can be articulated structurally and could be interpreted as micro-structural realization of musical processes. Such the principles within the textural articulation of music, like one tone re-coloration, multi-faceted exposing of extended techniques are inherent for my music as whole and compositionally are realized as basic continuities of sounding processes. Small layers of the components of articulation that reflect on transition and changeability of sound quality, create a particular textural kind of material which I have called *micro-textural* articulation of *sono-colority*. The possibilities that these micro elements coexist and interact with one another are illustrated in Example 1.

Example 1. Micro-textural articulation

⁹ The author of this article defined in his dissertation that the parameter of pitch can be recognized as sounding foreground, surface; timbre as an aspect of quality and color, whereas loudness would be associated to a spatial localization of sounding object, distance. These parameters continuously impact and correlate with each other in order to realize musical expression (Viļums 2011: 80–114).

¹⁰ Such articulation possibilities are observed in the dissertation of the author of this paper. Accordingly, pitch high (as quantitative aspect) can be articulated in the range of verticality – space (↕) and horizontality – time (→) and forms textural surfaces of sounding processes. Timbre lies in the quality aspect of sound and is closely related to the parameter of loudness. They both represent an dimension of sounding deepness and have possibilities to be realized in the way of *stable*, *pulsating* or *modulating* articulation (Viļums 2011: 80–198).

Example 1 presents only one voice in the larger fragment of part B of “Tvyjōraan”. There are six basic elements¹¹ of *micro-textural* implementation as it is shown in the example given. Each of these relate to a particular parameter. Consequently, the articulation *a* is realized by the thrill, which, because of speed and small range of interval, impacts the given quality of sound (not as syntaxes between two tones)¹²; the elements *b, c, d* represent a particular timbral articulation, i.e., the first one (*b*) gradually changes brightness, the articulation *c* – the quality between tone and noise whereas the *d* element indicates the clarity of sound; the elements *e, f* have to be assigned to parameter of loudness; these types emphasize and raise all the articulation levels as brightening and signifying sounding space.¹³

There are several characteristic *micro-textural* realization principles during the whole piece from the point of the compositional decision of colority. The basic ones have to be mentioned as: a) giving an inside articulations of *shadow*/noise sounds using extended techniques of instrument; b) by realizing different kinds of flickering sound quality – e.g., using dynamic pulsation, thrills, tremolos, *bisbigliandos*, various kinds of changing timbre, etc.

By the example given (see Ex. 1) the typical *micro-textural* articulation of musical processes in “Tvyjōraan” is shown. Naturally, such a kind of the smallest compositional implementation connects to the highest level of *micro-textural* realization heterophonically (see Ex. 2).

The image shows a musical score for Example 2, titled "Hetero-textural articulation". It consists of four layers of musical notation, labeled A, B, C, and D, arranged vertically. The layers are connected by arrows, indicating a relationship between them. Layer A is the most complex, containing a central figure alpha. Layer B is a simplified version of A. Layer C is a further simplification. Layer D is the simplest, showing only the basic elements. The layers are connected by arrows indicating their relationship. The score is divided into bars 97 to 103. The notation includes various musical symbols such as notes, rests, and dynamic markings.

Example 2. Hetero-textural articulation

There are four basic layers which consist of *micro-textural* realization in the presented fragment of “Tvyjōraan” (see Ex. 2 here and further in the text). Each of them is enlightened as having specific amount and condition of articulated elements. The central figure α is one of heterophonic elements in Layer A in this example (Layer A has the largest number of elements). Particular elements of figure α (as well as the whole Layer A) reflect to other layers which become as specified articulation of α elements. Therefore Layer A as the main articular structure hetero-phonically correlates with other individualized layers.

¹¹ a) Tr – thrill; b) OST – between *ordinario* and *sul tasto*; O – *ordinario*; SP\ – *sul ponticello* with *col legno tratto*; c) – gradually increase and decrease bow pressure; d) – light finger pressure on string gradually changing to ordinary pressure; e) – marcato; f) – crescendo–diminuendo.

¹² The quantitative processes of sounds merge into a fused qualitative flow if fluctuation speed exceeds perceptually distinguished boundaries. The narrower the interval ranges between tones are, the easier their succession fused in one stream (Snyder 2000; MacKay 1981; Zimbardo 2002, et al). Regular structures (invariant, periodically recurring) of musical time and space constitute a form of perceiving the sounding condition. The structures of such texture can be named as spatialized ones (Viļums 2011: 83).

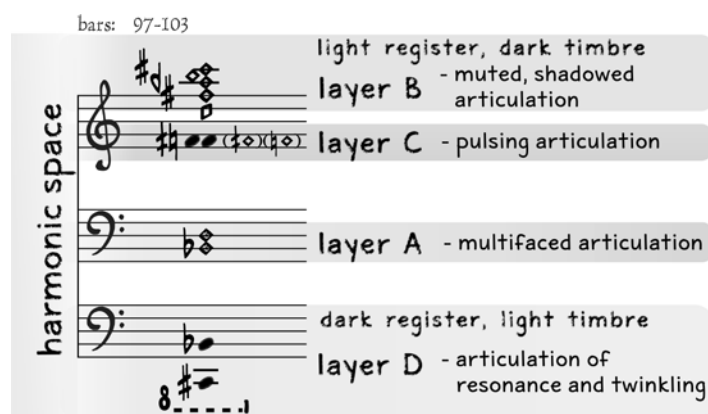
¹³ Aspect of deepness as psychological category understanding loudness graduation processes as imaginary perspective of space could be explained by psychoacoustic abilities to recognize sounds as they to exist in quasi spatial perspective. It reflects human abilities to localize sound source and meaning of signal in environment (Viļums 2011: 103–114; Chowning 2000: 2–6).

Layer B consists of muted and noise emphasized sound – it reflects transformed elements of *d* (muted sound without transformations¹⁴) as well as mixed elements of *e* and *c* (see elements in Ex. 2). Likewise, timbral peculiarity is employed by non-fluctuating differing sound's clarity (matches element *d*), aspect of syntax of pitch is leveled and hidden from hearable processes, fade in and fade out represent a general spatial aspect of dynamical interpretation in “Tvyjōraan” (similar to the element *f*) whereas loudness and timbre have articulated as synthesized elements for pulsing processes (as transformed from elements *c*, *e*).

Layer C brings out a rhythmic aspect of timbral articulation which becomes to be processes of syntax, consisting of different emphasized points of color. There are two sub-layers: the first one is realized by percussions (suspended cymbal, maracas), the second one by the woodwinds (flute, clarinet). The section of percussions reinforces an aspect of rhythmic flow of noisy emphasis (element *e+c*). All the beats are gradually extending in time and create an enlarged slowdown pulsing process. Pulsing articulation of flute is created of the element *d*, whereas a small motive of the clarinet (in intervallic range of quartertones) is implemented as a jag of thrill from the element *a*. Both of them realize articulation between tones and shadow. Thus Layer C uncovers the rhythmical aspect of micro-textural articulation of sono-colority.

Layer D is realized by contrabasses in the way of reinforcing harmonic space (as lowest sound) as well as giving flickering and brightening quality that comes using thrill together with *arcato irregolare* (modified element *a*) and *flautando* (a new element that brightens the color of timbre). Layer D could be interpreted as opposite to Layer B: the first one brightens soundscape whereas second one – darkens.

All the presented layers of hetero-textural articulation types have one textural expression form but each one in its peculiar way. As it is shown in the given example (Ex. 3) sound parameter of pitch is eliminated from the active processes of syntax. It becomes as additional microtextural/microstructural aspect of sound's quality, such as thrill, *lento vibrato*, small motive in micro-intervallic range $f-f^{+15}$). Meanwhile, aspect of pitch has importance for spatial verticality in range of harmonic structuration, more or less reinforced juxtaposition of different layers:



Schema 2. Harmonic space of pitch highs and layered distributions of timbre

As it is shown in Schema 2, different groups of articulation are localized in their own register in order to uncover particular types of *micro-textures*, i.e., kinds of sono-colority. By concluding, the aspect of pitch has bilateral explanation:

- parameter of pitch, as *micro-textural* compositional decision is completely involved in processes to vary quality of sound and give an inside, coloristic roughness;
- harmonic layout of pitches' verticality gives possibilities to implement *micro-textural* layers in the way they get *sono-coloristic* properties. Moreover, harmony as stable field of flowing processes (harmonic matrix) could be interpreted as kind of *sono-colority* itself (to express poetically – as engraved contours of sounding landscape¹⁶).

¹⁴ Muting the string with a light pressure of the finger.

¹⁵ “+” – quartertone higher; “-” – quartertone lower.

¹⁶ Such comparison is not only associative utterance: a stable harmonic structure gives possibilities to let sounds be in their own places, to live in an individual manner so they could be more or less brightened as well as narrowed in case of clarifying (as tone) or blurring (as noise) *micro-textural* lines.

The aspect of loudness is primary integrated into the brightening or emphasizing peculiarities of timbral expression (see given Ex. 2). Accordingly, there are twofold articulation types:

- increasing and descending dynamic of every micro-textured line could be interpreted from two-edged sights – a) as gradually illuminating sono-coloristic figure (see *crescendo–diminuendo* lines in Ex. 1, 2); b) as approaching and receding object¹⁷;
- dynamic accents form syntax-kind structures of rhythmic pulsations. These ones could be achieved by emphasizing quality of noise (using specific playing technique as in elements *c, d, e* in Ex. 1), clarifying tone (pulsation by fl. Cl. in Layer C) or dynamic strokes without pitch heights by timbrally different percussion instruments (Cymb., Mar.).

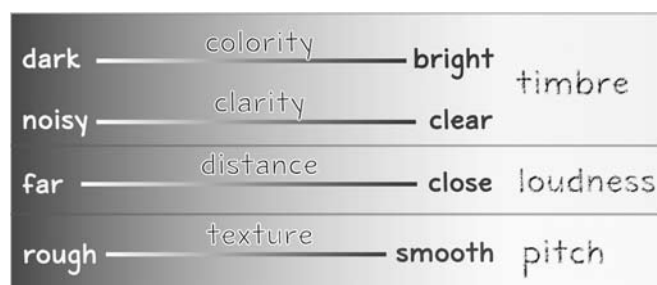
The aspect of timbre has to be defined as dominant *micro-textural* articulation principle not only in given fragment of “Tvyjōraan” (see Ex. 2) but also in my musical aesthetic in general. Obviously, this is because of cognitive abilities to understand musical aspect of quality, phenomenon of timbre in the way of visualizing, coloring processes of sounding object (Viļums 2011: 41–60). Herewith aspects of other parameters as changing or reinforcing sounding elements, which become a quality of musical expression (e.g., thrill aspect of pitch, brightening illumination of loudness) have to be interpreted in term of timbral, coloristic dimension. The parameter of timbre in given fragment is realized by differentiating *sono-coloristic* qualities of tone/noise and organizing these ones into groups, layers. Thus, there are several compositional decisions of *sono-coloristic* articulation whereby timbre can be used

- to produce different timbral characteristics of brightness¹⁸ by changing kinds of traits (e.g., ST–SP). Such a interchanging of color is realized not only within one line or one group, but also to make juxtapositions of opposite layers. For instance, Cb. (Layer D) are lightening low tones *cis, bes* by highlighting overtones using *flautando* (*Fl.*) trait whereas producing tones of Vln. II (as harmonics from fundamental *b*) are tembrally muted, spectral brightness is darkened;
- to control quality aspects within the range of noise and tone. That aspect is adjusted to almost each layer in particular way. For example, gradually increasing and decreasing the force of noise is realized in Layer A; as a marked point of noise have to be produced by bowing pressure in Layer B; interchanging fluctuation between tone (*f/f+*) and shadow sound (whispering sound) creates a slowing down pulsation/ twinkling in Layer C. Additionally, this slowing pulsation is accompanied by percussion instruments (emphasizing rhythmic aspect of articulation of noise).

It is revealed that this particular aspect of timbral articulation corresponds to the proper layer of compositional implementation. Meanwhile, the function of timbre could be defined as duplex *sono-coloristic* differentiation in the scale of a) colorfulness and b) noisiness. These two sides of articulation of timbre, as it is shown in analyzed fragment (see Ex. 2), have possibilities to be applied in all the textural levels.

1.2. Expression form and functional correlation of sound parameters'

Considering observed aspects of *sono-coloristic* articulation levels the main correlation principles of sound parameters' function and interaction with each others have to be drawn up. Firstly, the changeability (modulation) ranges how sound parameters could be compositionally articulated within aspect of their functionality:



Schema 3. Modulation ranges of sono-coloric qualities

¹⁷ Spatial aspect of loudness whereby crescendo and diminuendo have be recognized as approaching and descending object is outlined by paper's author (Viļums 2011: 41–48).

¹⁸ The sound's aspect of brightness is significant understanding quality of timbre (Beauchamp 2007: 272; Rossing 2002: 135). There are several basic dimensions within perceptual phenomenon of timbre acts: *brightness, spectral flux, harmonicity, attacca* etc. (Dubnov 1996: 8, 17).

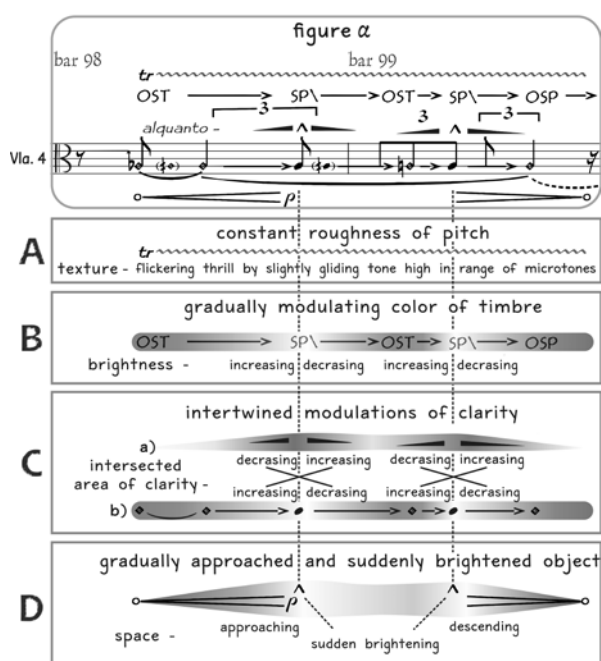
In Schema 3 the basic functional significances of sound parameters outlined. It is shown that aspect of timbre is interpreted as color and clarity, gradation of loudness gives an associative dimension of distance/deepness, whereas pitch – a textural (roughness) quality of sound. All kinds of possible sound characteristics, which would be produced by various traits, can be implemented under these functional categories and their ranges of modulation.

Secondly, it is obvious those given aspects of parameters interact and correlate with each other. Thus, noise eliminates a pitch high; whereas register of tone impacts a brightness of color¹⁹ (the higher register is, the brighter it looks).

Considering possibilities of such multi-interrelated actions of parameters in musical processes, two main manners of affection has to be mentioned:

- 1) one or a few of parameters reinforce the expression of other;
- 2) one or a few of parameters weaken the expression of other.

In order to give an example how interactions between parameters become articulated, the retrieve from the fragment of figure α in Example 2 (the same as figure in Ex. 1) in new spotlight is required. Given figure α is illustrated as being affected by various interconnections of parameters (see Ex. 3):



Example 3. Micro-textural articulation of *sono-colority*

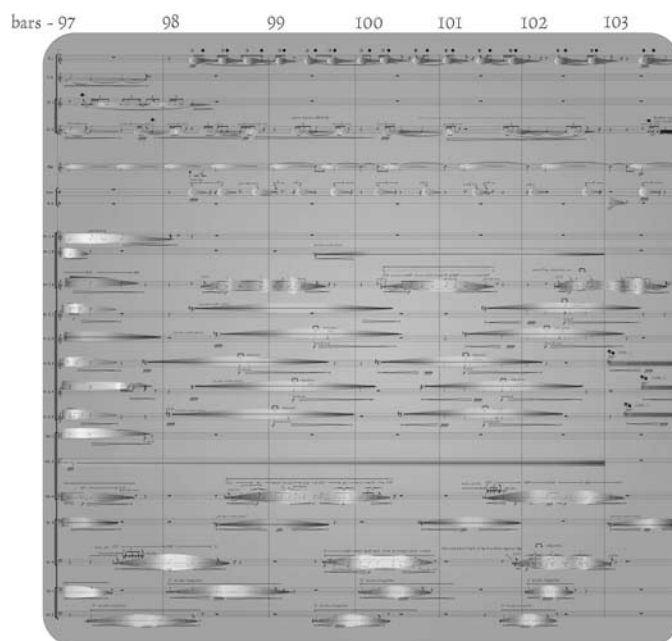
All the parameters, excluding the clarity aspect of noise and textural implementation of pitch, are involved to synchronize the expression of articulation in the given example. Namely, the parameter of loudness along with the dimension of colority (parameter of timbre) express an approaching and brightening sonoric object, having two phases of reinforcing their properties followed by fading away. However, the dimension of clarity (Section C) has two reverse forces of articulation. On the one hand, gradually increasing the quality of tone supports the general trend to brighten sonoric object; on the other hand, increasing pressure by bow decreases the clarity of sound. Such contradictory articulation blows up a noise mixed brightness and gives a sense of flash, rust and sharpness. In this context pitch has to be interpreted as the textural condition of the pre-given quality of figure.

In response to the mentioned aspects of interaction between sound parameters three functional significances of them could be recognized:

- reinforcing expression form as general trend;
- intruding into expression form as clashing articulation;
- supplementing expression form as a pre-given quality.

¹⁹ Pitch position in registry can give an allusion of the object's size (the lowest tone seems to be increased in size and weight) whereas the highest ones – as being brighter and more intensified (Bissel 1999: 74–75).

The kind of articulation analyzed (see Ex. 3) shows possibilities to compositionally realize and control a great number of small details within sound's quality. The wholeness of analyzed figure might be understood as lighting up and disappearing sonoric object. Therefore, other levels of *sono-colority's* textural implementation have to be explained in a similar way – Figure α takes a part of larger group (as Layer A), likewise Layer A correlates along with the specified, hetero-phonically related layers B, C, and D as sono-coloristic wholeness, as a unified expression form of sounding space.



Example 4. Visualized sono-coloric space

It can be said that the sounding landscape of the reviewed fragment (see Ex. 2 and 4) could be interpreted as space wherein small continuous elements of sounding objects are elucidated. That principle of spotlighting and shadowing particular musical elements can be extended similarly to the whole form of “Tvyjōraan” where every part is shown as a uniquely illuminated space (made from particular harmonic matrix) of various sono-coloristic undertones, as light reflecting on sounding figures and layers. Such an imaginary sight of analytic process is especially important for the aim to get a key to interpret musical formation as kind of perceptually understandable units of expression, to explore compositional content as kind of art.

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Sonokolorizmas kaip daugiadimensinis faktūros artikuliacijos principas Mārtiņo Viļumo kūrinijose kameriniam orkestrui „Tvyjōraan“

Santrauka

Vienas svarbiausių šio straipsnio autoriaus kūrinio kameriniam orkestrui „Tvyjōraan“ interpretacijos bruožų siejamas su muzikos procesų suerdvinimo aspektais, skambesio, kaip menamos vizualizacijos, reiškiniu. Nors kiekviena iš kūrinio dalių paklūsta skirtingiems garso išraiškos formavimo principams, kone į visus kompozicinio įgyvendinimo sprendimus gali būti žvelgiama per *sonokoloristinio* (ši sąvoka lietuvių mokslinėje literatūroje įvedama pirmą kartą) skambesio supratimo prizmę.

Pasirinkta kūrinio fragmento analizė apima keletą *sonokoloristinio* komponavimo lygmenų:

- mikrofaktūrinis lygmuo – realizuojamas vieno garso lygmenyje kaip daugialypė mikrostruktūrinių elementų sąveika;
- heterofaktūrinis sluoksnis – formuojamas iš keleto mikrofaktūrinių garsų;
- heterofaktūrinių sluoksnių ekspozicija – keletas sluoksnių sąveikauja, papildo vienas kitą ir formuoja harmoninę erdvę.

Analizuojamojo fragmento *sonokoloristinės* savybės apibrėžiamos atsižvelgiant į pagrindinių garso parametrų (aukščio, tembro, garsumo, trukmės) funkcines savybes, t. y. kaip vienas ar kitas garso parametras pasitarnauja muzikos išraiškos formai sudaryti.

Garso aukščių artikuliacija įgyvendinama dviem aspektais:

- *mikrofaktūrinių* lygmeniu garso aukščių procesus visiškai lemia garso kokybinė / tembro artikuliacija;
- statiška harmoninė garsų erdvė sudaro galimybę realizuoti *sonokoloristinius* muzikos raiškos procesus.

Garsumo parametro artikuliacija reiškia dvejopai:

- per tembro savybių laipsnišką erdvinės dimensijos išryškinimą;
- per tembro savybių akcentuaciją.

Tembro artikuliacijos savybių išryškinimas ir sustiprinimas laikomas svarbiausia *sonokoloristinės* realizacijos dimensija. Išskiriami du pagrindiniai tembrinės artikuliacijos kompoziciniai sprendimai:

- tembras naudojamas siekiant diferencijuoti tono spalvą, ryškumą (pvz., tamsus [*sul tasto*] ar šviesus [*sul ponticello*]);
- tembro savybės artikuliuojamos tono–triukšmo gradacijos skalėje.

Garso parametrų sąveika paklūsta komponavimo siekiui išryškinti *sonokoloristinius* skambesio medžiagos pavidalus, kurių pirminis išraiškos formos *atpažinimo kodas* siejamas su garsų procesų suvokimu kaip objektų *apšvietimu* erdvėje. Tam tikros garsų linijos, figūros, kontūros, spalvos bei vaizdiniai ir sluoksniai kaip *sonokoloristinės* skambesio savybės suspindi erdvėje, jų *išraiškos formos* išplaukia ir gėsta kraštovaizdžio formose ir tuštumoje.

Reikšminiai žodžiai: sonokolorizmas, mikrofaktūra, harmoninė erdvė, harmoninė matrica, garso parametrai, garso aukštis, tembras, garsumas, garsovaizdis, apšviesti garsai, erdvinė muzika, Viļums, „Tvyjōraan“.

3

SONORIZMAS	SONORISM
ELEKTRONINĒJE MUZIKOJE	IN ELECTRONIC MUSIC

The Systematic Grouping of Detection Tools for Properties of Acousmaticity: Binary Tension between Sonority and Pulse

Annotation

The relation of sound and image renders more new questions when facing the contact of two musical worlds: acoustic and electronic. A notion of acousmaticity arises as a key factor in this field. Especially when we talk about acousmaticity separated from any bonds with the specific musical genre.

This article is a modest endeavour to newly identify main elements of acousmaticity and their *modus operandi* in contemporary music. First two dimensions describe visuality of sound and its internal movement. The later gives basis to hypothesis that acousmaticity is closely related to the notion of uncanny.

Keywords: acousmaticity, audiovisual contract, inverted acousmaticity, vertical axis of acousmaticity, horizontal axis of acousmaticity.

To separate a property from its surroundings, a notion of acousmaticity is used. It is the essence of acousmatic sound, which should be separated from any genre and time specific bonds. It deserves additional attention looking from today's perspective. A contemporary composer might describe it like this: it is a degree of the reciprocal relation of sound and image.

Contemporary music is music of new ideas and new expressions. When speaking about acoustic and electronic sound, one should seek a new systematic view of the set of problems related to music composition. Acousmatic sound is the key that unlocks many doors on this path.

According to Leigh Landy (2007: 17), acousmatic music is a direct descendant of musique concrète. The former has inherited the aesthetic guidelines of the later and has expanded them. The question arises, where does acousmaticity originate? Is it an object of listening analysis, music philosophy, or something else?

Firstly, there is a strong temptation to regard this through the prism of listening. This is due to the natural assumption that listening is probably the key element of acousmaticity if we look at it both historically and philosophically. Given these points, the action of hearing is the magical key to the great depths of the acousmaticity phenomenon. As Leonard Meyer and Grosvenor Cooper (1963: 119) stated in their book *The Rhythmic Structure of Music*: "The art of analysis is based upon the art of listening."

However, in the first place listening is a reactive operation. It is a reaction to the matter that *already exists*. As if it is some sort of archeology excavation, seeking to reconstruct processes that caused the form and content of the work of art. Moreover, there is a great number of works that analyze and catalogue the sounding of contemporary electronic music (from P. Schaefer's *Traité des objets musicaux* (1966) to Dennis Smalley's spectromorphology of sound objects (Landy 2007: 96), which describe and systematize the common structures of sonic organization; however the amount of research of global nature is not so comprehensive. In other words, there is a lot of work being done, which describes grasses and herbs, but not so much about the meadow.

The intention to identify acousmaticity related factors in the music composition stage would seem rather complicated at the first sight, even though it would be more convincing. One would come up with a rather brave, but truthful statement that this property is a part of music composition in a first place. The origins of this belief should be looked for not at the aesthetic level (the level of music listening and comprehension, according to Jean Jacques Nattiez, 1990: 153), also not in the immanent structure of the piece, but in the poietic (pre-compositional) musical dimension and its processes.

The musical pre-compositional segment itself bears the initial charge of acousmaticity. In other words, namely a composers' precedent relation with sound describes the aspects typical only to this dimension – how and in what way the relation of light and darkness will unfold. It is obvious that acousmatic phenomena may be simultaneously studied from various points of view; however, this brings the danger of an overexpanded research field to the level beyond one's control. On the one hand, in the contemporary musical context the triad of creation – existence – listening has acquired enough common features with vague lines of separation. For instance, the situation of the improvisational nature in case of live electronics and live coding shows the extremely vague borders of the above mentioned triad. On the other hand, it is almost impossible to explore this phenomenon decoupled from its surrounding elements. In other words, if this article were not about acousmaticity, but melody, it would be very complicated to talk about it without mentioning the properties of

rhythm, harmony and timbre. A rather legitimate choice would be to look at manifestations of acousmaticity through some sort of holistic prism. On the other hand, the operation of composition should be regarded as the starting point, no matter how camouflaged it is. If we dared to debate with Roland Barthes, we would say, that in spite of the death of an author, and the birth of a listener, there is no basis for the texts (in our case – for music) to appear from absolute emptiness. If there were no author, it would have been necessary to invent him – a remix of Voltaire’s saying might be suitable here (with no hints to divinity, of course). In this dynamic and confusing field, it is necessary to have solid ground for further steps. Composition and creative global thinking should be some of them.

Looking from the perspective of the composition principle, it would be right to arrange the ideas of the acousmaticity of in relation with existing theories and views. The vast majority of ideas separate the art of music into separate segments that may contribute to this research. From the above mentioned Barthes and Nattiez, we may add the views and ideas of Lasse Thoresen (2007) and his individual extensive genesis tree of musical forms, which is based on the treatise of musical objects by Schaeffer.

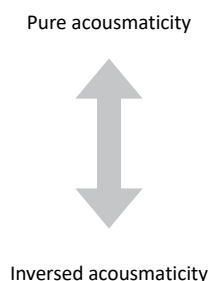
However, let us focus on a hypothetical level; naming and systematizing the tools that unveil acousmaticity in sound, and music in particular. Let us take the set of oppositions to open and identify the acousmatic property in music. With the help of the oppositions’ immanent tension the phenomenon of acousmaticity takes a recognizable shape. Here are the tools that we will use to trace and describe acousmaticity in music. The two main coordinate axes, where acousmaticity is easily noticeable, are:

- 1) the vertical axis of acousmaticity – this vertical line is primarily related to Chion’s (1994: 239) audiovisual contract with its breaks and ruptures in particular;
- 2) the horizontal axis of acousmatic ness. It is a binary opposition between drone (sonority) and pulse, as its counterpart.

These dimensions will help us to identify the manifestations of acousmaticity in the music composition processes, which are not visible from the first sight.

Vertical axis of acousmaticity

On this axis the bonds of sound and sight (or image) and their reciprocal relations in the musical composition are arranged.



At the top of this axis is pure acousmaticity. This is a sound that is totally separated from image, which usually accompanies sound. This is the zone where Chion’s audiovisual contract starts. It is characteristic of human hearing to link aural information with the visual objects which emit those sounds and which are the cause of these sounds. The sound of the vast majority of musical instruments is directly linked to mechanical motion, be it the strings of a stringed instrument, the gesture of a musician holding a bow, or a percussive instrument etc. There may be some discussion about the visibility of sound emitted by wind instruments, especially brass, because in many cases the sound producing causes are not so visible – such as the vibration of air in the valves of a trumpet, however, the presence of a performer, especially his or her breathing is the direct cause of the sounds heard in this case. Sounds that do not have an obvious bond with the environment they are spreading in are acousmatic sounds. In this case, we usually talk about the sounds emitted via loudspeakers and the artistic message they carry.

It is obvious that thorough the long process of biological evolution human sight and hearing have acquired exceptional aspects of common operation in synthesis. Looking into the primordial layer of human consciousness, it is clear, that sound, at the dawn of human civilization had the function of a signal – a primitive man could very easily make a “friend or foe” sonic distinction, relating the sound to imaginative physical objects or

phenomena – be it the state of the atmosphere, animals or humans. Such an operation of audiovisual contract D. Smalley calls indicative sound (2007: 35–58).

Jonathan Sterne in his book “Audible Past” (2003) describes multipolarity of sound using, as he calls it, a litany (with theological overtones used deliberately):

- 1) hearing is spherical, vision is directional,
- 2) hearing immerses its subject, vision offers a perspective,
- 3) sounds come to us, but vision travels to its object,
- 4) hearing is concerned with interiors, vision is concerned with surfaces,
- 5) hearing involves physical contact with the outside world, vision requires distance from it,
- 6) hearing places us inside an event, seeing gives us a perspective of the event,
- 7) hearing tends towards subjectivity, vision tends towards objectivity,
- 8) hearing brings us into the living world, sight moves us towards atrophy and death,
- 9) hearing is a primarily temporal sense, vision is a primarily spatial sense,
- 10) hearing is a sense that immerses us in the world, vision is a sense that removes us from it.

A loudspeaker as an impersonal physical object, that emits sounds, visually it bears almost no information about the sound emitted. We hear sounds, however the cause is invisible, as if we were Pythagorean *akousmatikoi* hearing sounds behind the veil. It is worth noting that this kind of experience relies greatly on the context. Our ears are overwhelmed by the amount of loudspeaker generated sounds in our daily life, so each time we hear them we are not as surprised as a medieval person would be. On the other hand, to not think about the sonic environment that we are forced to get used to would be an error. Furthermore, the quest for the artistic justification of acousmatic sounds is still ongoing.

Acousmaticity may be attributed to the consequences of technological progress. Acousmatic sound has been chasing us from the very beginning of the era of recorded sound. Edison’s phonograph opened possibilities to capture the sonic environment, and reproduce more or less analogous version of it at another time. With the help of telephony one can hear the voice of a person who is further than vision or hearing can reach.

The bottom part of this axis is occupied by inversed acousmatic. It is a mirror reflection of pure acousmaticity. In this case we talk about images with no sound. In other words, if pure acousmaticity is sometimes described as “disembodied voices”, thus inversed acousmaticity would be labeled as “mute objects”. Following this analogy, the opponent of a loudspeaker, would be a video projector. Moreover, the latter contracts the visual world into a flat square, in the same manner as the former contracts audio space into a homogenous sonic stream. Inversed acousmaticity – the silent zone – is waiting for a more exploratory view in future research.

From a creative aspect, the top of this axis may be inhabited with recorded music that has no individual visual line. The bottom part is reserved to theoretically possible inaudible music. It may be an oxymoron but one can find quite a number of musical examples of this type: non-cochlear sound described by Seth Kim-Cohen (2009), also broad spectra of conceptual music, from John Cage’s 4’33” to the Fluxus movement. For instance, the current Wikipedia list of silent pieces spans up to 60 entries. However, on lower part of this list there are audible pieces too: the piece by Yannis Kyriakides called “Mnemonist S” for ensemble, sound track and video text. As the author himself states, one interesting aspect is reflected – the so called video text track (coherent, large format text flow in the visual projection), which instead of creating a coherent entirety with musical material, gradually gains individuality, separate creative lines, which bear distinctive but convincing charge. Indeed, the visual text is a part of the piece, while rather autonomous and voiceless, creates the impression of a silent contact. (This piece is based upon the testimonies of the mnemonist Solomon Schereshevsky in the 1930s.)

This initial draft of the vertical axis would be incomplete without mentioning its central part. Obviously, these axes are of a continuous nature, nevertheless at its hypothetical central area one might assume the existence of some sort of balance between visible and audible, namely the balance of audiovisual contract. Some describing aspects might be:

- 1) convincing creative decisions in connecting recorded sound with live performance,
- 2) creative situations, where the static and non-expressive presence of a loudspeaker is resolved,
- 3) digital and electronic processes are masked by the veil of acoustic instruments.

In the first case, creative credibility is based on many factors, but it is easy to notice whether the recorded sound has gained an important role in the composition, whether the author took into account the aspects of

the recorded/reproduced sounds and the totality of acousmatic aspects coming with it, or not. (We can mention the composition by Bronius Kutavičius' *Two Birds in the Shade of the Woods*, a form of virtual dialogue with a recorded voice – a metaphor of conversation between free and caged birds.)

In the second case, we have pieces which show the creative use of the nature of loudspeakers, where the so-called disadvantages become advantageous parts of the composition. Canadian composer's Gordon Monahan's composition called *Speaker Swinging* (1982) illustrates such kind of decisions – three performers spin loudspeakers in a circular motion, thus creating a vibrant sonic space filled with the Doppler Effect sounds. Here acousmatic music gains additional “deacusmatising” factors:

- the speakers' Doppler Effect,
- the speakers gain dynamic attributes – they become moving objects in space,
- the people spinning the light emitting speakers becomes music performers.

The third case is possibly the most fruitful and attractive part of contemporary music, in which some sort of musical concealment takes place. Computer technologies and processes with all their acousmaticities are concealed or masked under the sound of common, conventional acoustic instruments. This aspect is reflected in P. Ablinger's piece *Speaking piano*: the sonic surface is purely acoustic – we hear only live piano sounds, however, all sounds are controlled by a computer algorithm that transforms human speech into the piano part. Similarly, the piece by R. Mažulis *Ajapajapam* for twelve voices and string quartet has a computer generated tone and tempo prompter for each individual player, nonetheless the audible surface is purely acoustic too, resulting in a lush micro-canonic texture.

The horizontal axis of acousmaticity

In the aim of unlocking the property of acousmaticity into separate dimensions, we gain an opportunity to discover traces of acousmaticity in musical territories that are of little relation with each other.

The horizontal axis of acousmaticity connects two poles of the music sound set – an uninterrupted continuous drone (sonority), and an aspect of fragmentation in pulse and rhythm.

Due to its cohesion with the concept of the uncanny (Jentch 1906; Freud 1919), this axis is related to the dimension of uncertainty and knowledge which will be discussed in further chapters. The drone's anamorphism of gradual change contrasts with the sound of an impulsive nature. More broadly speaking – the anamorphism of drone “feeds” the uncanny through analogy of statics and “slow revival/slow death”, whereas the repercussion of rhythm destroys the uncanny and maintains an “eternal vitality” and “eternal motion”.



From the physical point of view, the relation of drone and pulse is much more evident.

On the left-hand side of the axis we have the sonority and drone aspects of the sound. Thus we have a two dimensional prime plane, consisting of basic binary oppositions based audiovisual context, and purely sonic context, where we can plot a musical composition. Hypothetically we may evaluate the degree of acousmaticity in this way.

At this point we must state the hypothesis that all acousmatic sound may be reduced to the notion of acousmaticity. This resides in all audible matter to a certain degree. Going further, we should assume, that acousmaticity is an audible representation of the uncanny. Generally speaking, acousmaticity is uncanny, and vice versa. This statement has not yet been aired either in the Schaefferian and post-Schaefferian traditions, or in the latest treatises on acousmatic sound, such as Brian Kane's book *Sound Unseen* (2014).

Conclusions

1. Acousmaticity is a part of the pre-compositional processes.
2. Audiovisual contract forms one of the main axis of coordinates in the plane of acousmaticity.
3. Sonority and pulse form another one.
4. These axes enable us to make an attempt to put a more systematic view to music in regard to acousmaticity.
5. Acousmaticity = uncanny.

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Akusmatiškumo savybių atpažinimo instrumentai ir jų sisteminis grupavimas: sonoro ir pulso binarinė įtampa

Santrauka

Dviejų muzikinių pasaulių – akustinio ir elektroninio – kontaktas sudaro sąlygas kelti naujus klausimus apie garso ir vaizdo santykį. Šioje situacijoje akusmatiškumas tampa pagrindiniu atspirties tašku. Ypač kai atmetame visus žanrinius akusmatiškumo saitus. Šis tekstas yra kuklus bandymas naujai identifikuoti akusmatiškumo sudedamąsias dalis ir jų *modus operandi* šiuolaikinėje muzikoje. Pirmosios dvi matavimo kryptys apibūdina garso vizualumą ir jo vidinį judėjimą. Pastaroji suteikia pagrindą kelti hipotezę, kad akusmatiškumas yra glaudžiai susijęs su nejaukos sąvoka.

Reikšminiai žodžiai: akusmatiškumas, garsovaizdos sutartis, apverstasis akusmatiškumas, vertikaloji akusmatiškumo ašis, horizontalioji akusmatiškumo ašis.

Principles of Sonoristic Technique in the Electronic Music for the ANS Synthesizer by Stanislav Kreichi and Other Russian Composers of the 1960s and 1970s

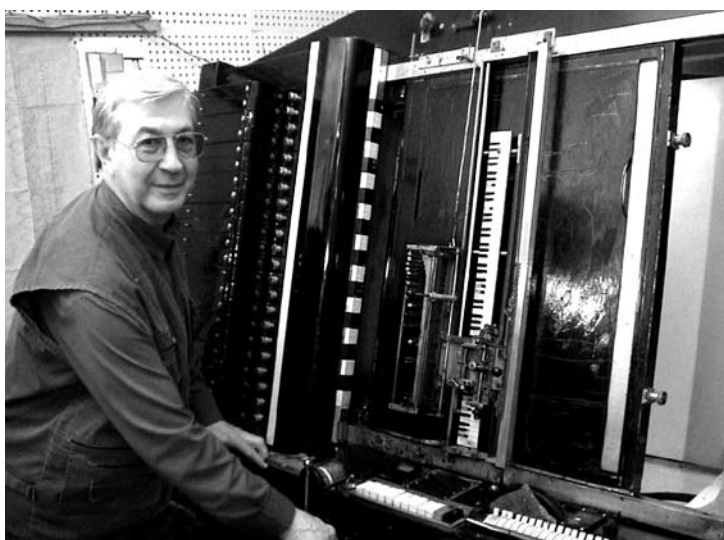
Annotation

The advent of electronic music in Russia came with the appearance of the ANS synthesizer – virtually the first electronic instrument in the Soviet Union. It was conceived of by musicologist Evgeny Alexandrovich Murzin in 1938 and manufactured in 1964 (a preliminary working model was built in 1958). The name of the instrument was contrived from the initials of Alexander Nikolayevich Scriabin, a composer whom Murzin was especially fond of, and whose ideas of microtonality he incorporated into the construction of the instrument. The ANS synthesizer is constructed in such a way that there are plates of glass covered with mastic. Music is composed on the instrument by the composer scraping off bits of mastic from the glass plate and then processing the latter through an electric construction with light, so whichever portions of the plates that have the mastic scraped off convey the sound of the respective pitches and registers. By this seemingly simple means of sound production countless variants of sound become available to composers. At the Moscow Electronic Studio, hosted at the Scriabin Museum in the late 1960s and early 1970s, many composers have experimented with the ANS synthesizer. The famous avant-garde Russian composers, Alfred Schnittke, Edison Denisov and Sofia Gubaidulina have each written a piece for the instrument in the 1960s and 1970s. The most prominent composer for the instrument, however, is Stanislav Kreichi, who saved the instrument twice from destruction and has tended to it ever since, up to the present day. He continued writing for the instrument, since the Electronic Studio was closed down in 1975, and has achieved remarkable results in his diverse and contrasting compositions. His music explores the various possibilities of sonoristic technique, derived from the unusual means of sound production of the ANS synthesizer and contains rich, innovative textures, from the most experimental ones to conscious stylizations of and derivations from past styles. Many of his compositions present a fertile ground for analysis and demonstration in terms of their formal structure, expressive means, depictive, theatrical possibilities and imaginative sonoristic textures.

Keywords: ANS synthesizer, electronic music, Russian composers, Moscow Electronic Studio, Evgeny Murzin, Alexander Nemtin, Stanislav Kreichi.

The advent of electronic music in Russia came with the appearance of the ANS synthesizer – virtually the first electronic instrument in the Soviet Union. It was conceived of by scientist and engineer Evgeny A. Murzin (1914–1970) in 1938 and manufactured in 1964 (a preliminary working model of the instrument was built in 1958). The name of the instrument was contrived from the initials of Alexander N. Scriabin, a composer whom Murzin was especially fond of, and whose ideas on microtonality he incorporated into the construction of the instrument. The ANS synthesizer was built in such a way that there are plates of glass covered with mastic. Music is composed on the instrument by the composer scraping off bits of mastic from the glass plate and then processing the latter through an electric contrivance with light, so whichever portions of the plates that have the mastic scraped off convey the sounds of the respective pitches and registers. By this seemingly simple means of sound production countless variants of sound become available to composers. Thereby it is possible to create purely sonoristic compositions with varying volumes of sounds. It is also possible to fixate exact pitches and, thereby, to write tonal or atonal compositions, in which pitch plays a greater role than musical texture. As a result, there have even been arrangements of works by classical composers, including Bach and Tchaikovsky, for the synthesizer. Due to the instrument's capacities for microtonal intervals, it is possible to incorporate into musical compositions various microtonal scales, up to 72 notes to the octave. The pitch-wise possibilities of the synthesizer also make it possible to create overtones on it. As a result, a composer working on the instrument may create certain concrete instrumental textures by means of applying overtone sonorities. Thus, the possibility is open to imitate musical instruments, such as violins, flutes, clarinets, etc. Finally, the instrument has also been used for sampling human speech and creating actual sounds of words “pronounced” by the ANS synthesizer, and not by a human being. The latter occurrence made it possible to use the instrument for lingual experiments at Moscow University's Linguistics Department in the final decades of the 20th century. Thus, the ANS synthesizer has been a unique instrument in that it has been able to combine the functions of composition and performance.

The preliminary working model of the synthesizer contained 576 pure tones covering the range of 42–10800 hertz, 8 octaves, 72 tones per octave, four optical discs, each disc containing 144 tracks containing 144 tracks (covering a span of 2 octaves) with diameters of 120–130 millimeters, 0.31 millimeters width and oscillation speed of respectively 12, 3, 3/4 and 3/16 rotations per second. The ultimate model of the ANS synthesizer,



built in 1964, contained 720 pure tones covering the range of 21 hertz – 21.6 kilohertz (covering 10 octaves), with five optical discs with oscillation speed of respectively 24, 6, 4/4, 6/16 and 6/64 rotations per second.

The constructor of the instrument, Evgeny Murzin was born in Samara in 1914 and died in Moscow in 1970. He studied at the Samara Technical School for Construction and Moscow Institute for Engineers of Communal Construction and subsequently worked as a military engineer dealing with technical devices for military anti-aircraft defense. At the same time, he was a devotee of music, particularly of the works of Scriabin. In 1938 he proposed to the Moscow Conservatory the idea of creating a synthesizer able to produce musical sounds. He was inspired by the musical experiments of “graphic sounds” undertaken by music theorists Arseny Avraamov and Evgeny Sholpo in the 1920s and 1930s. Murzin was only able to accomplish his task of constructing the instrument in 1958 – this was the preliminary experimental working model, made out of wood, built during the course of ten years in the composer’s apartment. In 1959 it was placed in the Scriabin Museum in Moscow, after which Murzin began to invite young composers to come and experiment with the instrument and compose pieces for it. Among the first composers to work with the instrument were Nikolai Nikolsky, Piotr Meshchaninov, Andrei Volkonsky (virtually the first composer in the Soviet Union to write twelve-tone music, who wrote “Musica Stricta” for piano and “Suite of Mirrors” for soprano and chamber ensemble in 1960), Alexander Nemtin (who completed Scriabin’s mystical composition, the “Prefatory Action”), Stanislav Kreichi, Oleg Buloshkin and Shandor Kallosh. The ultimate version of the ANS synthesizer was constructed in 1964. Following that, the young Russian composers who later achieved celebrity also started coming to the Scriabin Museum to work with the synthesizer. They were Alfred Schnittke, Edison Denisov, Sofia Gubaidulina and Eduard Artemyev. The Moscow Studio for Electronic Music was formally created in 1966 within the Scriabin Museum, where the ANS synthesizer stood, even though informally it existed ever since the working model of the instrument was brought to the museum in 1959. The electronic studio became not only a place where composers came to work with the ANS synthesizer and create music on it, but also a creative setting where intellectuals and devotees of innovative musical trends, as well as philosophical, mystical and esoteric directions discouraged by the Soviet regime, came to socialize with the composers and to discuss important aesthetical issues. Two LP records of electronic pieces were released by the Melodiya record firm (under the auspices of which the Moscow Electronic Studio existed). The first record was released in 1973 and included works by Nemtin, Kreichi, Artemiev and others. The release of the second record was delayed until 1987 due to the fact that it included pieces by Schnittke, Denisov and Gubaidulina, whose music was discouraged from being performed and promoted in the 1960s and 1970s. The contents of both LP records were produced in CD format in the late 1990s by the Electroschock CD label.

After Murzin died in 1970, there began a campaign by the Soviet authorities against the Moscow Electronic Studio, which was seen by them as a haven for “decadent,” “bourgeois” and “reactionary” artistic influences. After various repeated attempts, the government bureaucrats finally succeeded in closing the studio in 1975. The ANS synthesizer was saved from demolition through the efforts of Stanislav Kreichi, who turned

to the Linguistic Department of Moscow University and suggested that the instrument be moved to one of the buildings of the university to be used for linguistic experiments, namely, for construction of human speech. Kreichi himself found employment by the Linguistic Department of Moscow University, and his responsibilities included tending to the instrument. The composer continued his own musical experiments on the synthesizer, composing music for it, and he invited other composers to come and work on the instrument, albeit on a much less overt scale than it was possible to do during the existence of the Moscow Electronic Studio. In the late 1980s and early 1990s, when the last of the Soviet prohibitions against avant-garde and experimental art were lifted, Kreichi was able to invite composers in a much more overt capacity into the basement of the Department of Journalism of Moscow University, where the instrument stood. The next dramatic episode in the history of the ANS synthesizer took place in the summer of 2005, when the authorities of Moscow University decided to clear the basement of various redundant objects, the synthesizer among them in order to use the space for more practical purposes of earning money. Kreichi received a phone call, where he was asked to remove the instrument from the basement, which he did with the help of Andrei Smirnov, the head of the electronic studio at the Moscow Conservatory. Together, they took the instrument apart and brought it to the Moscow Conservatory, where it stood in the electronic studio for a few months; a few months later, Yulia Murzina, the scientist's daughter arranged to have the instrument transferred to the Glinka Museum of Musical Culture where it is presently located as part of the permanent exhibition.

In the late 1960s and early 1970s the Moscow Electronic Studio was a popular venue for composers to come and experiment with the ANS synthesizer. The most famous Russian composers of the avant-garde trend in Russian music, Alfred Schnittke, Edison Denisov and Sofia Gubaidulina each wrote one piece for the instrument. Schnittke's piece is called "The Stream" and it is built entirely on various stratifications of overtones of the pitch C, as a result of which a most interesting, constructively intricate and emotionally saturating composition was formed out of these sonoristic strata. Edison Denisov composed a piece called "Bird Songs." He incorporated into it actual bird calls recorded by biologist Boris Veprintsev, which the composer recreated on the mastic plated score of the ANS synthesizer. Denisov's "Bird Songs" exists in two versions, the first one being solely for the ANS synthesizer, while the second contains a part for piano (likewise incorporating bird calls), which may also be played on virtually any other instrument. The piece does indeed bring in the atmosphere of a large assortment of birds, including owls, making their calls in the forest, along with sounds of rustling trees in the winds and other illustrative sonorities, some of them being purely abstract synthesizer reverberations. Gubaidulina's "Vivende – Non Vivende" incorporates the recording of a singing soprano along with sounds on the ANS synthesizer. The interplay and cross-relation of the sounds of the living soprano and the "non-living" sounds of the synthesizer constitute the basic conception of the piece. The latter include sustained and altered reverberating sonorities, as well as short percussive effects. The recordings of the vocal singing range from unaltered to heavily distorted sounds, the latter bringing in a touch of the grotesque. Eduard Artemiev, who later made his name with his music for movies, wrote two pieces for the ANS synthesizer, "Mosaic" and "12 Perspectives of Sound". "Mosaic" presents a sound collage of mysterious, reverberating synthesizer textures with a very small quantity of grotesquely distorted vocal effects. In "12 Perspectives of Sound" twelve different sonic textures are developed on the instrument and presented successively, ranging from static and mysterious to dynamic and harsh ones, the latter especially endowing the composition with a vibrant and dramatic mood. There is an assortment of pictorial associations present in the music, as could be inferred from the sonorities, some of which resemble bird calls, airplane noises and gusts of wind. Artemiev subsequently incorporated the ANS synthesizer in music for movies, most notably, for Andrei Tarkovsky's famous film "Solaris," released in 1972. Artemiev and Kreichi also jointly wrote music for the short motion picture "Cosmos" ["Outer Space"], a fragment of which was released on one of the LP records with music for the ANS synthesizer. Oleg Buloshkin wrote a short piece called "Sacrament," in which sonoristic electronic effects were combined with a diatonic melodic line and reverberating percussive effects, resembling some of the present-day trends in ambient music. Shandor Kallos's "Northern Tale" is a five-minute dramatically intensive piece making use of a broad range of sonic textures, ranging from static to extremely dynamic and from mellow to harsh ones. The succession of these textures and moods of the piece create a vibrant dramaturgy, suggesting a narrative of a story – the latter is greatly enhanced by the descriptive title of the piece.

Alexander Nemtin wrote a number of pieces for the ANS synthesizer, only two of which were released as an LP record and, subsequently, on as a CD – "Tears" and an arrangement of Bach's Chorale Prelude in C major. "Tears" is basically a transcription of Bach's short choral piece with the same name, set to a poem by Walt Whitman. The composer was able to use the sounds of the instrument in such a way that the piece

is not perceived in the least as an arrangement of a choral work, but as a true electronic piece, in which the pitch-related diatonic harmonic progressions and intricate melodic writing blends very well with non-pitch textural sonoric effects, the latter endowing the piece with a cosmic feel. The arrangement of Bach's Chorale Prelude demonstrates a sound texture very close to that of the organ, and yet possessing individual features of the sound of an electronic synthesizer as well. Nemtin's other pieces not released in the LP and CD are "Voice" and the Suite Forecasts. "Voice" is based on an arrangement for the ANS synthesizer of a movement of the composer's "Concerto for Organ" (for solo organ), titled "Aria." The composer incorporated into the work a recording of a solo soprano singing the melodic line of the "Aria," with the ANS recreating the other voices of the organ piece in an original manner, taking full advantage of the sonoristic capacities of the instrument, so that it is perceived not in the least as an arrangement, but as an original composition, which it essentially is. The Suite Forecasts consists of four movements – a lengthy Fugue, lasting 11 minutes. It is a 12-voice fugue, written in the microtonal temperament of $5/72$ of an octave ($5/6$ of a semitone), in order to avoid the interval of the octave, presents virtuosic contrapuntal treatment of melodic lines and has a serious, philosophical mood. The other three movements – Gallop, Waltz and March – are much shorter in duration and possess humorous, theatrical characteristics, including low-keyed kitsch stylizations and parodies of the Soviet popular music of that time.

Stanislav Kreichi was one of the first composers to write for the ANS synthesizer, and he has continued to use the instrument for his compositions up to the present day. His music explores the various possibilities of sonoristic technique, derived from the unusual means of the synthesizer's sound production and contains rich, innovative textures, ranging from the most experimental ones to conscious stylizations of and derivations of historical and vernacular styles. Many of his compositions present fertile ground for analysis and demonstration of in terms of their formal structure, expressive means, depictive, theatrical possibilities and imaginative sonoristic textures. His earliest compositions were written in the 1960s at the Moscow Electronic Studio, and three of them – "Echoes of the East," "Intermezzo" and the music for the film "Cosmos" written jointly with Artemiev – were recorded on the first LP record. Unfortunately, the recordings of Kreich's other electronic compositions from that time have been lost, when the Electronic Studio was closed down in 1975.

"Echo of the East" lasts only two minutes and incorporates the exotic element of stylization of folk music of unspecified Asian countries along with modernist textural effects common to a synthesizer, at times bordering on popular music effects. In addition to the textural sound of the melodic line, resembling an unspecified folk instrument from an Asian country, the exotic ethnic element is also enhanced by using quarter-tone intervals, bringing in additional affinity with Asian folk music. The music from the film "Cosmos" is an extensive 12-minute composition featuring a set of successive episodes of sonoristic sound effects, including static, vibrating and glissando sonorities, all of them aspiring to explore the hidden dimension of sound and, thereby, quite appropriate for depicting outer space and the cosmic dimension. The music is greatly enhanced by certain elements of more recognizable diatonic harmonies and allusions to classical musical instruments, most notably, the organ. "Intermezzo" is another short two-minute-long piece with a lively, romantic emotional mood, composed entirely in a popular quasi-jazz style current in the Soviet Union in the 1960s, the sound textures greatly emulating the sounds of a jazz orchestra, including woodwind and brass instruments, drums and even a harmonica. It was composed for the occasion of an exhibition to which the ANS synthesizer was taken in the 1960s and was meant to demonstrate the possibility of electronic music of being accessible to mass audiences.

Kreichi continued composing electronic music after the closing of the Moscow Electronic Studio. In the late 1970s, 1980s and early 1990s he cooperated with the puppet theater Ognivo writing music for the ANS synthesizer for two theatrical productions "Ogon' nadezhdy" ("The Fire of Hope") and "Zavtra nachinayetsya vchera" ("Tomorrow Begins Yesterday") as well as a number of separate electronic numbers for puppet shows. Since 1992, he has been a member of the Society of Electronic Music, which forms a branch of the Moscow Composers' Union, and every year he has participated in the annual Moscow Autumn festival of contemporary music, where the Electronic Society has an annual concert, for which he writes a new piece. Thereby, starting with the early 1990s Kreichi has written a whole set of interesting and imaginative electronic compositions, most of which utilize the sonorities of the ANS synthesizer in one way or another, sometimes fully for an entire piece, and sometimes with added recordings of musical instruments, singing voices or living concrete sounds, but many of which make use of other, newer electronic or computer music programs. In recent times, he has been using pre-recorded samples of sounds of the ANS synthesizer, processed by modern computer

programs, sometimes sounding unaltered, and at other times sounding greatly transformed. Many of his compositions are inspired by certain literary, artistic or theatrical plots, thereby incorporating pictorial or theatrical elements to the music.

Some of Kreichi's compositions are made almost entirely of sounds of the ANS synthesizer with only a small amount of added sounds. A most noteworthy composition in this category is "ANSiana," which is composed entirely of the sounds of the ANS synthesizer. The first version of the piece was written in 2000, while the second version was completed in 2014. In the latter version, the samples of sounds of the ANS synthesizer are transformed in such a masterful manner that they are virtually unrecognizable, creating a most varied assortment of sounds, resembling both those of the most advanced computer music programs, as well as pre-recorded sounds of percussion or non-musical objects in the manner of *musique concrete*. Other works composed almost entirely of sounds of the ANS synthesizer include the triptych "Ocean" (with a small amount of added sounds of dolphin calls and drums), "The Head" (a work inspired by a painting of the same name by Russian artist Pavel Filonov), "The Birth of the Vertical" (with added sounds of tremolos on string instruments) and his two compositions inspired by Mikhail Bulgakov's novel "The Master and Margarita" – "Yeshua and Pilate" (with added recordings of human voices) and "The Bad Apartment" (with added recordings of playing on string instruments, as well as the composer's joint improvisations with Alexander Nemtin and Eduard Artemiev at the Scriabin Museum in the 1960s). Three compositions were written for pre-recorded ANS sounds and a live performer on the theremin – "Immersion," "Contemplation" and "Confession." The latter also has a version with pre-recorded vocalization, instead of the part for the live theremin player. In other compositions the ANS synthesizer sounds are used on an equal proportion with other live or computer-generated sonorities. These include "Rorshakh" (with added sounds of *musique concrete* recordings) and "The Four Seasons" (with recordings of sounds of nature). Some of Kreichi's electronic compositions do not employ the ANS synthesizer at all. They are "Voices and Movements," which consists entirely of *musique concrete* sounds, "Ellipsiada," a composition for a home-made instrument, the ovaloid (constructed by architect Vyacheslav Koleichuk), and "Music for Wood and Metal," which consists of the sounds of these two components.

Since the late 1980s and early 1990s, a number of composers of younger generations have come to compose music for the ANS synthesizer, attended by Stanislav Kreichi – first in the basement of the building of the Department of Journalism of Moscow University, then at the Moscow Conservatory's Electronic Studio and, finally, at the Glinka Museum. Many composers have tried out the synthesizer and written at least one composition for the instrument. Among these, mention must be made of the piece "ANSynopsis" by Anatoly Kiselyov, the chairman of the Association of Electronic Music, affiliated with the Moscow Composers' Union, "Obscurity" by Vladimir Komarov, "ANSonatina" by Valery Beluntsov, "Concordance," "Correspondence" and "Chorale" by the writer of these lines and "Illumination" for theremin and ANS synthesizer, as well as a number of other pieces by Olesya Rostovskaya, who is also an accomplished performer on the theremin.

The ANS synthesizer remains a noteworthy landmark of the legacy of contemporary Russian music, and electronic music, in particular. Having had an intriguing and dramatic history – having served as virtually the first electronic instrument in the Soviet Union on which some of the greatest late 20th century Russian composers wrote their musical pieces, having twice been in danger of being virtually destroyed, having been saved just in time by Stanislav Kreichi and, finally, having found a permanent home at Moscow's Glinka Museum of Musical Culture, the instrument has remained an important artifact of 20th century Russian music and a constant source of inspiration for younger composers. The legacy of electronic music composed for the ANS synthesizer by the older and younger generations of Russian composers has yet to be discovered and appreciated in full by connoisseurs of contemporary music around the world.

Sonoristinės technikos principai Stanislavo Kreiči ir kitų XX a. 7 ir 8 dešimtmečių rusų kompozitorių elektroninėje muzikoje ANS sintezatoriui

Santrauka

Elektroninės muzikos pradžia Rusijoje siejama su ANS sintezatoriaus atsiradimu – galima sakyti, pirmuoju Sovietų Sąjungoje pagamintu elektroniniu instrumentu. Jį 1938 m. sukūrė muzikologas (taip pat garso ir optikos inžinierius – *vert. past.*) Jevgenijus Aleksandrovičius Murzinas; pirmasis bandomasis modelis buvo sukonstruotas 1958 m., o gamyklinis modelis pasirodė 1964 m.

Instrumento pavadinime užšifuoti Aleksandro Nikolajevičiaus Skriabino inicialai. Šį kompozitorių J. Murzinas ypač mėgo ir vertino, o jo mikrotoninės muzikos idėjomis rėmėsi konstruodamas savo instrumentą. ANS sintezatoriaus konstrukcijos pagrindas yra mastika padengtos stiklo plokštelės. Kurdami muziką šiuo instrumentu, kompozitoriai išraižydavo savo kompozicijas stiklo plokštelėse, tam tikrose vietose nugremždavo mastikos sluoksnį, o vėliau optiškai skenuodavo tas raižytas plokšteles elektros įrenginiu, kuris atkurdavo atitinkamo aukščio ir registro garsus pagal plokštelėse išraižytas garso bangos formas. Tokiu iš pažiūros nesudėtingu būdu buvo galima išgauti nesuskaičiuojamą daugybę garsų, o kompozitoriams atsivėrė didžiuliai garsyno galimybių klodai.

Skriabino muziejuje įsikūrusioje Maskvos elektroninės muzikos studijoje XX a. 7 deš. pabaigoje ir 8 deš. pradžioje kurdami garsus ANS sintezatoriumi eksperimentavo daugelis žymių Rusijos avangardistų – Alfredas Schnittke, Edisonas Denisovas, Sofija Gubaidulina tuo laikotarpiu sukūrė bent po vieną elektroninę kompoziciją. Tačiau daugiausia kūrinių juo sukūrė Stanislavas Kreiči, kuris, be kita ko, dusyk išgelbėjo instrumentą nuo sunaikinimo, juo iki šiol žavisi ir kuria muziką. Jis nenustojo rašyti šiam instrumentui netgi tada, kai 1975 m. Maskvoje buvo uždaryta elektroninės muzikos studija, o vėlesniais metais savo įvairialypiuose ir kontrastinguose kūriniuose pasiekė ištis išpūdingų rezultatų. S. Kreiči kūryboje tyrinėjamos įvairios sonoristinės technikos galimybės, kurias atvėrė neįprastas garso išgavimo ANS sintezatoriumi būdas; kūriniai išsiskiria sodriomis, inovatyviomis faktūromis – nuo eksperimentinių garsovaizdžių iki sąmoningų praėjusių epochų muzikos stilizacijų ir vedinių. Daugelis jo kompozicijų yra puiki medžiaga analizuoti ir iliustruoti įvairius reiškinius kalbant apie formos sandarą, išraiškos priemones, iliustratyvumą ir teatrališkumą bei vaizduotę žadinančias sonoristines faktūras.

Reikšminiai žodžiai: ANS sintezatorius, elektroninė muzika, rusų kompozitoriai, Maskvos elektroninės muzikos studija, Jevgenijus Murzinas, Aleksandras Nemtinis, Stanislavas Kreiči.

Electronic Music and Sonorism

Annotation

The essence of music based on sonoristic technique is the use of “the purely sonic properties of the tonal material for artistic purposes”. Hence the communicational competence between a composer and a listener often boils down to the ability to recognise communicational situations and the composer’s selection of appropriate means for the creation of an auditive perceptible sound shape. This auditive perceptible sound shape results from the composer’s auditory representations, which in turn reflect his thoughts and influences the shape of the perceptual representations arising in the mind of the listener while consciously listening to music.

In this context, it is not surprising that sonoristic music is rarely made the object of reflection from the perspective of semi-otic research and various theories of communication. It would seem more legitimate to employ examples of sonoristic music in reflection from the field of psychoacoustics or the psychology of hearing. And yet sonoristic music is unquestionably a cultural phenomenon, and as such it must subject itself to semiotic-musical reflection. Sonoristics could constitute “a whole new area of musical thinking, straddling music theory, compositional practice and the psychology of hearing”.

To my mind, this “new musical thinking” is linked to the fact that in a sonoristic composition, a semantic unit refers to the musical sign that is created by autonomous qualities produced by the musical structure and most often not having an object of reference to extra-musical reality. Sonoristic music is characterised by an exceptional wealth – in comparison with all other music – of musical structures, arising from the huge possibilities for the sonological transformation of pitch material. As Józef Chomiński writes: “Formal structuring assumes the simultaneity of the joint action of all the elements of a work, namely the tonal material, tonal systems, frequency bands, time regulation, states of compression and rarefaction of the sound and its modulation. And different types of structure depend on selection, hierarchy and proportion and the way these elements are treated.”

The subject of the research recounted here is the creative attitude that is manifested by composers who are interested in the possibilities for creating a new sounds and ways of organizing sound material that is conceived electronically. The inspirations derived from the theoretical discourse and the practical experiences in the numerous centers of electronic music have resulted in varying, with regard to material, form and the creative strategy application of so-called electronic music. The musical works of composers such as Iannis Xenakis, Karlheinz Stockhausen, György Ligeti, Luigi Nono or Luciano Berio indicate that the experience with electronic music was for them to be either a turning point and had an impact on their later achievements, or accounted for a relatively brief “episode” in the creative attitude, which, however, did not remain without influence on the stylistic idiom of the later compositions. Because electronic music is the music that is created by autonomous qualities of the musical texture produced by the sonological transformation of musical material, the consideration of electronic music as an example of sonorism seems to be fully justified.

Keywords: György Ligeti, Luigi Nono, Luciano Berio, Józef Chomiński.

1. Introduction

I would like to offer some reflections on sonorism and texture music in the light of the thought of Polish musicologist, Józef M. Chomiński (1906–1994). The most important theoretical Chomiński’s works (1956: 23–48, 1961: 3–10) in which he coined the term “sonoristics” and its derivatives (for example: sonoristic values, the theory of sonoristics, sonoristic regulation or sonoristic technique), show that “sonoristics” he understood as a new branch of musicological and analytical studies, which is centered on the sound technique of a composition. In the article from 1956 – the first in which he introduced the term – Chomiński undertook an evaluation of the changes that had taken place in the early 20th-century compositional technique up to that time and demonstrated a new methodological approach to the music in question based on developments in contemporary music.

My modest aim is the indication of three main issues that have been undertaken by Chomiński, that is to say: the origin of sonorism, the distinctions between the terms “coloristics”, “tone color” and “sonoristic values” as well as the proposal for subdivision of the theory into five categories. I will try to exemplify and explain these separated categories on the chosen works of electronic music.

2. The origin of sonorism according to Chomiński

As to the origin of sonorism Chomiński has indicated mainly three phenomena of the early 20th-century music. The first, he related to the impressionist period, in which the composers have discovered “pure sound” independent from chordal relationships and as the result of this they have developed of new structural principles that are based on the transformations of the fundamental substance of music – the sonus itself. According to Chomiński in the impressionist period, in the context of this, one can note the transformation of melodic and harmonic functions into timbral ones.

The second phenomenon of early 20th-century music is the change of composers' interest from the "content" of musical work to its actual, sounding form. Chomiński has linked the change with the tendency to the penetration of the sonic properties of the musical material. Per analogous to the discoveries of musical aspects of the words and to the shifting the focus from the meaning of the words to its sounding, made by symbolist poets, Chomiński has recognized the composers' tendencies to the shifting the focus from motives, themes of the musical work and their development to its sound qualities.

And finally Chomiński distinguished the new approach to musical composition of the Viennese composers, already seen in about 1913, especially in the works of Anton Webern, recognized by Chomiński as a turning point in the history of the musical technique. These specific features of the new approach were the emancipation of individual notes of melody and the elimination of the bass foundation from the sound structure of musical work. According to Chomiński a complete transformation of melody and harmony from their traditional sense occurred together with the breaking of the melodic line into isolated sounds that were placed in contrasting registers and the use of the bass register for purely timbral effects. Since these changes, melody and harmony have become a sonic universe regulated by rhythm, timbre and registral contrasts, and in the result of it "the structural and expressive roles were taken over by purely sonic values of the work, enriched by registral differences and the wealth of dynamic, agogic, and articulatory means" (Chomiński 1969a: 5).

On the margins of the phenomena observed in early 20th century music, Chomiński discussed also the differences between the terms: coloristics – tone color – sonoristic values. Originally, Chomiński linked the sonoristic element in music with "tone color", the emancipation of which occurred also in the impressionist period. But then, clearly, he differentiated these concepts, emphasizing that coloristics, as it had developed since the Mannheim school and throughout the nineteenth century, is the element of the musical work that has a merely "coloring" role and appears on the basis of other elements, such as harmony, in turn color in music "does not have a visual character, but is simply a substitute term denoting a conscious formation of sonic, sonoristic values" (Chomiński 1969b: 181). Chomiński identified the sonoristic values as a result of utilization sonoristic means, such as: timbre, texture, registers, articulation, dynamics, rhythm agogic and also melody and harmony, although the latter he linked with other elements that interact with each other. According to him sonoristic values are the new autonomous elements of musical work, which encompass all aspects of the work's sonority and they are generated by sonoristic means and their interaction.

3. The theory of sonoristics and its categories

By introducing the new term, Chomiński also attempted to rationalize analytical terminology, to capture the novel sound qualities of 20th-century music that could not be explained satisfactorily by older music theory.

Sonoristic music is rarely made the object of reflection from the perspective of semiotic research and various theories of communication. It would seem more legitimate to employ examples of sonoristic music in reflection from the field of psychoacoustics or the psychology of hearing. And yet sonoristic music is unquestionably a cultural phenomenon, and as such it must subject itself to semiotic-musical reflection.

Sonoristics could constitute "a whole new area of musical thinking, straddling music theory, compositional practice and the psychology of hearing" (Bristiger 1973: 109). To my mind, this "new musical thinking" is linked to the fact that in a sonoristic composition the semantic unit refers to the musical sign that is created by autonomous qualities produced by the musical structure and most often not having an object of reference to extra-musical reality. Sonoristic music is characterized by an exceptional wealth – in comparison with all other musics – of musical structures, arising from the huge possibilities for the sonological transformation of pitch material. As Chomiński wrote: "Formal structuring assumes the simultaneity of the joint action of all the elements of a work, namely the tonal material, tonal systems, frequency bands, time regulation, states of compression and rarefaction of the sound and its modulation. And different types of structure depend on selection, hierarchy and proportion and the way these elements are treated" (1976: 25). He believed that the problems of sonoristic phenomena in 20th-century music required the analysis focus on "the factors shaping the sound of the work, i.e., the selection of performing means, instrumental and vocal texture, dynamics, agogic, articulation" (1969b: 183).

Chomiński introduced the new classification of formal issues which formed the essence of an analytical method that became known in Polish musicology as the theory of sonoristics – "new branch of study, with the sound technique of our century as its subject" (1961: 4). Chomiński subdivided the following categories: sound technology, rationalization of time, formation of horizontal and vertical structures, transformation of elements and formal continuum.

4. Electronic music and its characteristics

Electronic music blossomed in the second half of the 20th century. Not only did it expand instrumental music to a wider range of sound material, but it also opened a new sonic art form – another branch of music, as different from instrumental music as cinema is from theater. Since the inception of the electronic age, the music world has witnessed a veritable flood of extraordinarily diverse creative efforts, at times resulting in music of uncommon richness and diversity.

The subject of the paper is also the creative attitudes that are manifested by composers who are interested in the possibilities for creating a new sounds and ways of organizing sound material that is conceived electronically. Inspirations derived from the theoretical discourse and arising from numerous centres of electronic music resulted in varying with regard to material, form and the applied creative strategy of so-called electronic music. The musical works of composers such as Iannis Xenakis, Karlheinz Stockhausen, György Sándor Ligeti, Luigi Nono or Luciano Berio indicate that the experience with electronic music was for them to be either a turning point and had an impact on their later achievements, or accounted for a relatively brief “episode” in the creative attitude, which, however, did not remain without influence on the stylistic idiom of the later compositions. Because an electronic music is the music that is created by autonomous qualities of the musical texture produced by the sonological transformation of musical material, the consideration of electronic music as an example of sonorism seems to be fully justified.

One of the characteristics of electronic music is its sound materials containing both a pure sine tone as well as a virtual kaleidoscope of noise. Another feature of this music is diversity of the sound transformations. Among them one can mention: a loop, an echo-reverberation, a filtering, a modulation of one or more parameters, a change of reading velocity of the tape (time stretching, transposition), a tape reversing or a spatialization. In this context electronic music has introduced the change of instruments of musical writing – the microphone, the reverberation (with loudspeakers and microphone), the tape and an instrument with keyboard which permitted to vary the reading velocity of the tape (the ancestor of modern samplers), the generator of sound materials, finally the computer and digital software. Thanks to such diversity of musical material and sound transformations, an entirely new vocabulary of sounds could come into being, and an organization of electronic music has been extended beyond the well-known structures of a traditional musical language.

In turn, the music theory has not got yet fully developed the means to confront such a wealth of sound materials. Up to now in research are used such tools as: typomorphology, spectromorphology, spatialmorphology, UST (*unités sémiotiques temporelles*), language grid, something to hold on to factor, new computational approaches (ones to do with structure beyond the level of gesture, and ones to do with live performance, installations or audio-visual works). The main problem of research is the lack of analogous representations to the conventional scores and the presence of different formats of the same electronic music. Compositional techniques are depended on the creative composer’s attitude, and an analysis of electronic music is related to the particular musical work. The knowledge of the historical period and instruments typical for musical repertory is fundamental here, because electronic music equipment with their potentials and limits, influence the typology of sound, the compositional process, the performance and the listening. Even if the analyst is not interested in the real process of the technical realization of sound, he should consider these aspects in order to understand at least the compositional and perceptive problems.

5. Electronic music and five categories of the theory of sonoristics

Composers of electronic music, rather than concentrating on conventional units of musical meaning, focus on concrete “sound objects” and their transformations. Since these objects are approached as real, i.e., aurally perceivable phenomena, analysis, according to Chomiński, should begin with the description of the specific performing forces that are used to generate them, the specific kinds of manipulation employed in their execution, and their dynamic features. All these elements form the first category of the theory of sonoristics, which Chomiński called “sound technology”. According to him, sound technology “comprises the entire set of procedures associated with the selection and treatment of generators of sound, both traditional and new” (1968a: 129).

Concret PH, 2-track (1958) by Iannis Xenakis in the Philips Pavilion was projected over 425 loudspeakers through an 11-channel sound system. This is an example of *musique concrète*, in which the crackling and hissing of burning charcoal is the only sound source. The main creative attitude was the study of density and the calculation of articulation points for each layer of sound. In the result, the crackling texture evolves in a continuous manner and additionally the music moved along the trajectories through the loudspeakers,

specially using primarily mid-to-high-register grains of sound. According to Xenakis, the effect of the sound technology is “lines of sound moving in complex paths from point to point in space, like needles darting from everywhere” (Rowell 1983: 241). The recorded sound source was cutting into one-second fragments, with numerous transpositions and overdubs. And a granular texture creates a continuum. Using slight manipulation, the main techniques were splicing, tape speed change, and mixing. The piece was composed intuitively, but with using technology. One can note its continuously varying processes and accumulated power with the fluctuating timbre of a rough dust of sound with rare periodic patterns. Frequency and its perceptual feature, the pitch, are hardly controllable here, as it is impossible for listener to integrate differences of pitch and amplitude in such brief moments.

The consideration of time organization in 20th-century musical works led Chomiński to the discovery of two operating procedures which transcended the older categories of meter and rhythm: monochrony and polychrony. Monochronic organization is the regulation of time by the use of a single primary temporal unit to which the most diverse rhythmic and metric patterns can be related; all temporal relationships are relative and independent of the agogic factor. While polychronic organization as rationalization of time (the second category of the Chomiński's theory) is “synthesis of various factors, namely agogic, metric and rhythmic values” (Chomiński 1968b: 107) and this organization has an aleatoric character of an auditory effect. The polychronic organization involves constant variability of dynamic temporal units. In the music that is based on this principle, the temporal flow of sound impulses is measured in seconds, but within these precisely measured spaces the duration of individual impulses remains variable.

Karlheinz Stockhausen's *Gesang der Jünglinge* (1955/56) typically proceeds from a single governing idea. Here, the idea was to seamlessly fuse the sound of the human voice with electronically generated sounds. At West German Radio's Studio for Electronic Music, Stockhausen analyzed sung verses divided into their elementary phonetic components, then incorporated these sounds into a timbre continuum that ranged from pure tones (electronically generated sine waves) to white noise (electronically generated aperiodic sound). In order to construct a smooth continuum that embraced all vocal elements, Stockhausen had to create additional elements to fill in the gaps between them. Using contemporary studio resources, Stockhausen generated sine wave complexes to imitate vowel-like sounds and filtered electronically generated noise to arrive at consonant-like sounds. Once the continuum had been constructed, the composer extracted from it the basic elements and groups of elements he would use in composing. As to organization of time Pascal Decroupet, Elena Ungeheuer and Jerome Kohl indicate four temporal parameters in *Gesang*: “1. the *value*: the fundamental duration, which regulates the intervals of entry between successive complexes; 2. the *duration*: the actual duration of each complex obtained by a positive or negative transformation of the value; depending on the duration/value ratio, the complexes will be partially superimposed or will be separated by a silence; 3. the *group of formants*: the number of ‘octaves of durations’ within which the durations will be taken for carrying out the various harmonic subdivisions of the duration, the octave grouping being limited to 5 octaves; 4. the *evolutionary form in time*: where the concepts of attack and decay of the sound, developed earlier, take place. The temporal reference grid has seven octaves with seven equidistant subdivisions and extends from four to 512 centimetres, which for a tape playing speed of 76,2 cm/sec corresponds to a scale extending from the twentieth of a second to nearly seven seconds” (1998: 101).

The nature of the specific sound objects of electronic music is clearly far removed from typical melodic and harmonic constructs of tonal music. Therefore – in Chomiński's opinion – the horizontal and vertical structures (the terms used as the third category of his theory of sonoristics) could be discussed systematically only in very general terms. The sound objects of electronic music, as a result of constant balancing between the horizontal and vertical structures, generate purely sonoristic qualities of music.

In 1956 György Ligeti composed *Artikulation* after moving to Cologne into the same building as sound pioneers Stockhausen and Gottfried Michael Koenig. While it's reported that he was highly influenced by the crazy electronic sounds he heard coming out of this building; this is one of only two electronic pieces he composed before returning back to the instrumental medium. Ligeti assembled small sound fragments and artificial speech components, using sine-wave, white-noise and impulse generators, plus filtering equipment. He grouped these source ingredients associatively into ten categories, for example: grainy, friable, fibrous, slimy etc. Then from these elements were extracted bits of tape, which were spliced together to make “syllables”, “words” and “sentences”. Finally, the resultant “language” was subjected to the transpositions, reversals and overdubbing of standard tape manipulation (Steinitz 2003: 80). Therefore *Artikulation* shows constant balancing between the horizontal and vertical dimensions of the composition. In the 1970's, a graphic designer, Rainer Wehinger,

created a “score” for Ligeti’s *Artikulation*. The liner notes for the score provide an explanation for what’s going on in the music: “The piece is called ‘Artikulation’ because in this sense an artificial language is articulated: question and answer, high and low voices, polyglot speaking and interruptions, impulsive outbreaks and humor, charring and whispering” (Ligeti 1970).

The fourth category of the discussed theory – distinguished by Chomiński – concerns the transformation of elements. Moreover, the most noticeable kind of transformation one can be found just in electronic music. Chomiński noted that in electronic music “a specific sound object is indeed subjected to transformational manipulations” (1968a: 164). *La Fabbrica Illuminata* (1964) by Luigi Nono is composed for female voices and four-channel magnetic tape that uses noises and speech sounds recorded in a factory. These were combined with choral and electronic sounds and taken through multiple transformations. Chomiński stressed that the transformation is, on the one hand, “only when certain instruments are used in a manner different from that applied formerly, against their natural properties and original purposes; in other words, when generators of melody and harmony are transformed into tools that serve to produce rustling effects and tone colours” (1968a: 164) but also on the other hand he noted that “the evolutionary processes of music in general can be reduced to constant transformations of sonic phenomena” (1968a: 163). In *La Fabbrica* massive vocal tone clusters followed by declarative, fragmented political chants begin the work. The evolutionary processes of this musical work are reduced to constant transformations of such sonic phenomenon as deep rolling sounds, wind-like roars of empty landscapes, voices of muscle-exhausted workers and the sounds of their expended effort, cars rushing past, and the actual and electronically described sounds of turning gears. As the result of this creative attitude Nono has created the work that encompass a variety of sonic phenomena, and the range of the musical material has been extended to include a variety of non-musical sounds, because the sound sources are used against their natural properties and original purposes.

The last category is formal issues. Chomiński’s discussion of form in the context of sonoristic regulation was reduced and defined in very general terms such as “the resultant of the interaction among various regulatory elements” (Józef M. Chomiński; Krystyna Wilkowska-Chomińska 1983: 15). Nevertheless, a form of electronic music is not exclusively related with the internal structure of the work, but may point to its surface, that is to say to the level on which the sonic phenomena are heard.

Perspectives for electronic sounds on tape (1957) by Luciano Berio is a nearly seven- minute-long work for two-track magnetic tape. The piece has a pointillist style of writing, has used long tones in juxtaposition to these points later in the respective pieces, it contains spatialization techniques, and it uses dramatic and abrupt changes in dynamic level. The work is organized into eight sections, each set apart by lengthy (usually about 3.5 seconds in length) silences. Within each section one can observe diverse sound of surface of musical form.

6. Conclusions

Analysis of selected parameters of musical works mentioned above confirms the observation that electronic music has got the specific features with regard to a sound material and its utilization to construction of musical form, entirely distinct from musical tradition. Moreover, from the one hand, it includes all categories of the theory of sonoristics that are indicated by Józef Chomiński, and from the other hand, these categories determine the main aspects of musicological analysis of electronic music with its sonoristic point of view.

Acknowledgments. This work has been funded by the National Science Centre in Poland appropriations for science in the years 2012–2015 as research project Grant number 2011/03/B/HS2/03935, Program Opus 2.

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Elektroninė muzika ir sonorizmas

Santrauka

Sonoristinė technika sukurta muzikai esminga tai, kad joje „meniniams tikslams pajungiamos grynai garsinės prigimtios medžiagos savybės“. Tokiu būdu komunikacinė kompetencija tarp kompozitoriaus ir klausytojo susiaurinama iki gebėjimo atpažinti komunikatyvias situacijas, o kompozitoriaus atveju – dar ir pasirinkti tinkamas priemones klausia suvokiamų garsinių pavidalų kūrimui. Toks klausia suvokiamas garsinis pavidalas kyla iš kompozitoriaus audialinių vaizdinių, kurie atspindi jo mintis ir daro poveikį tam, kokie vaizdiniai suvokimo metu kyla klausytojo sąmonėje, šiam atidžiai klausantis muzikos kūrinio.

Esant tokiam kontekstui nenuostabu, kad į sonoristinę muziką retai žvelgiama iš semiotinių tyrimų ar komunikacijos teorijų perspektyvos. Atrodytų kur kas labiau įprasta pasitelkti sonoristinės muzikos pavyzdžius svarstant psichoakustikos ar girdėjimo psichologijos klausimus. Tačiau sonoristinė muzika, kaip kultūros reiškiny, turi būti atviras semiotinėms-muzikinėms refleksijoms. Sonoristika galėtų tapti „visiškai nauja muzikinio mąstymo sritimi, jungiančia muzikos teoriją, kompozicijos praktiką ir girdėjimo psichologiją“.

Mano nuomone, „naujas muzikinis mąstymas“ remiasi duotybe, kad sonoristinėse kompozicijose semantinis vienetas nurodo į muzikinį ženklą, kurį sukuria autonomiškos muzikinių struktūrų ypatybės, neturinčios jokių reikšminių sąsajų su tikrove anapus muzikos. Iš visų kitų muzikos rūšių sonoristinės kompozicijos išsiskiria ypatinga muzikinių struktūrų įvairove, kurią lemia neribotos garso aukščių sonologinių transformacijų galimybės. Pasak Józefo Chomińskiego, konstruojant formą vienu metu pajungiami visi kūrinio elementai – garsinė medžiaga, jos organizavimo sistemos, dažnių amplitudė, laiko organizavimo būdai, skambesio kompresijos ir išretėjimo būsenos, kaita. O skirtingus struktūros tipus lemia atrankos, hierarchijos ir proporcijų kriterijai, būdas, kuriuo šie elementai jungiami kūrinyje.

Minėto autoriaus darbe tyrinėjama kūrybinė nuostata būdinga kompozitoriams, kurie domisi naujų garsų kūrimo galimybėmis ir būdais organizuoti elektroniškai apdorojamą garsinę medžiagą. Inspiracijos, kurias teikė daugelyje elektroninės muzikos centrų plėtojamas teorinis diskursas ir kaupiama praktinė patirtis, vadinamojoje elektroninėje muzikoje įgijo pačius įvairiausias pavidalus pasirenkamos medžiagos, formos ir kūrybinių strategijų požiūriu. Tokių kompozitorių kaip Iannis Xenakis, Karlheinzas Stockhausen, György'is Sándoras Ligeti, Luigi Nono ar Luciano Berio kūriniai aiškiai rodo, kad elektroninės muzikos kūrybos patirtis jiems tapo tam tikru posūkio tašku, lėmusiu jų vėlesnius laimėjimus, arba tebuvo trumpas kūrybinio darbo „epizodas“, neišvengiamai siek tiek paveikęs ir jų vėlesnių kūrinių stiliistiką. Elektroninė muzika kuriama remiantis autonomiškomis muzikos faktūros ypatybėmis sonologiškai transformuojant garsinę medžiagą, todėl visiškai pateisinama į ją žvelgti ir ją nagrinėti kaip vieną iš sonorizmo atvejų.

Reikšminiai žodžiai: György Ligeti, Luigi Nono, Luciano Berio, Józef Chomiński.

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