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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 Szwajgier.[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 Szwajgier, *Sonoryzm i sonorystyka* (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.

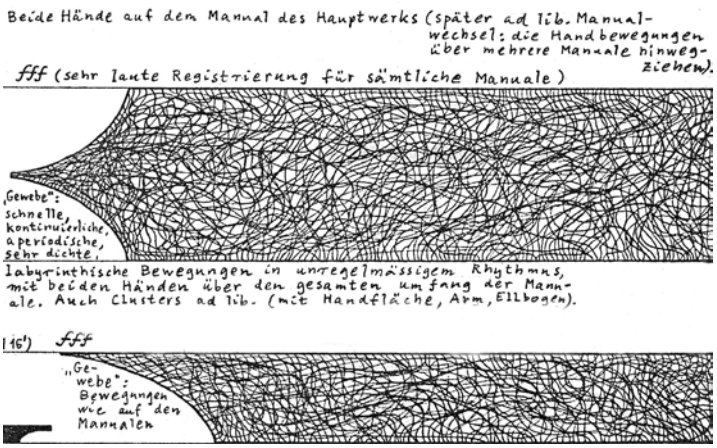
off the tracker action. The latter is a source of noise properties, whereas the possibility of producing a huge number of coloristic combinations creates a situation, in case of the organ, when a static, motionless cluster can be put through timbral permutations, thus gaining inner mobility. Since there 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:

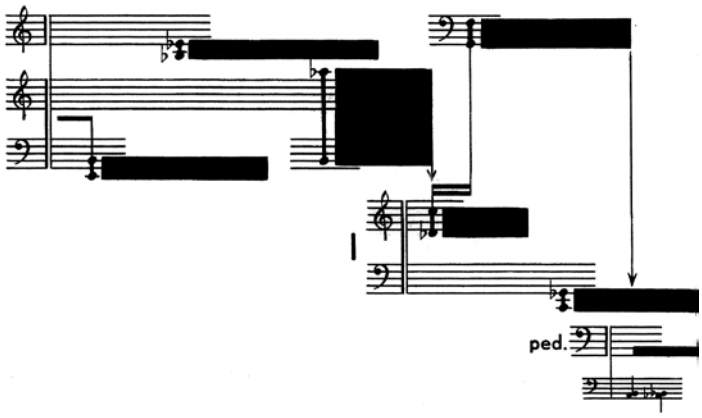
a) cluster of an ultimate width (the whole range of the keyboard),
b) cluster performed on the pedal keyboard,
c) arpeggiated cluster,
d) repetition of a cluster,
e) tremolo of clusters,
f) decreasing the scope of the cluster,
g) glissando of a cluster (also in the pedal part),
h) "geometric" extension 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 below[2] 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 material[3] / 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,

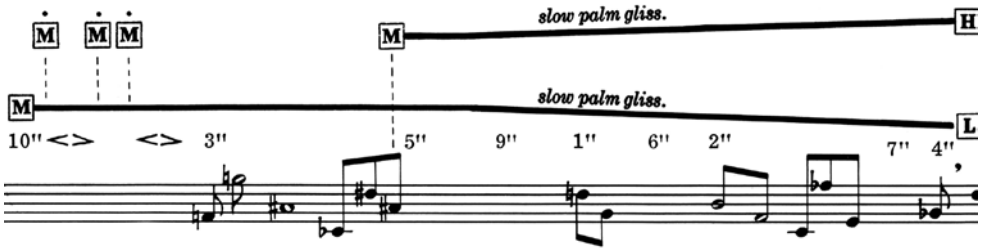
Ex. 3. Wiesław Rentowski. *Albebragen*, p. 12

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).

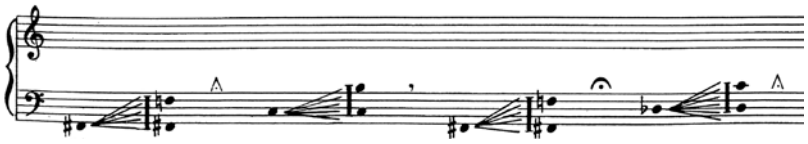
2.3. This group generally comprises two types:

a) static cluster – i.e. the one of unchanging pitch range,

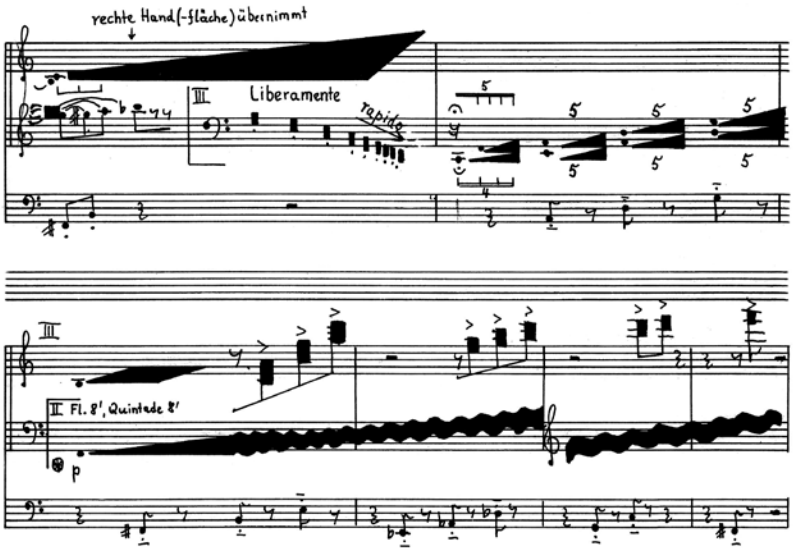
b) mobile cluster – i.e. the one using different kinds of inner and external mobility.

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),



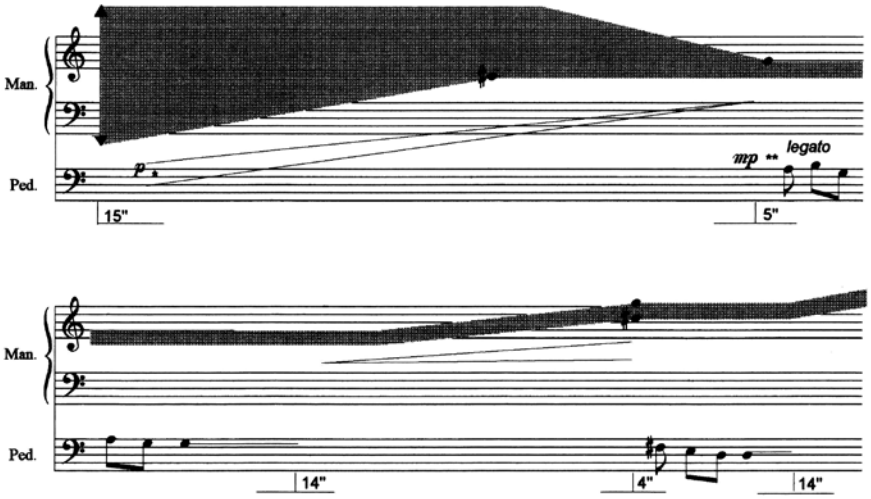
Ex. 5. Sofia Gubajdulina. *Hell und dunkel*, p. 8



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.



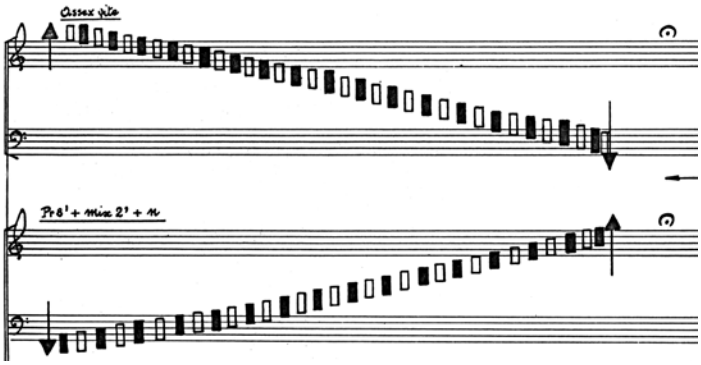
Ex. 7. Bernard Pietrzak. *Quattor segmenta '73*, p. 5

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),

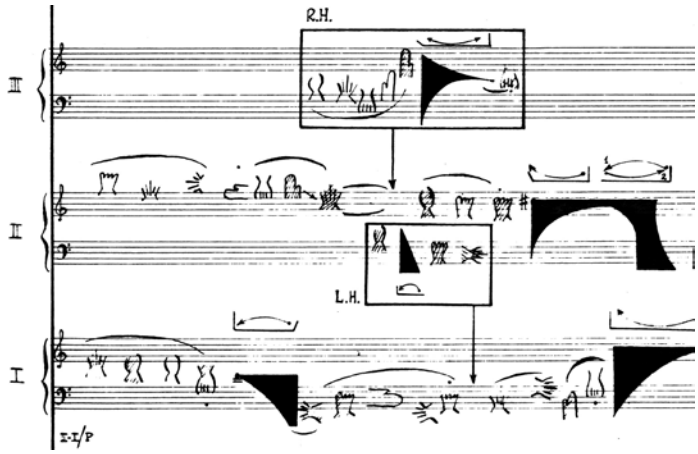
• a fist,

• 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.).

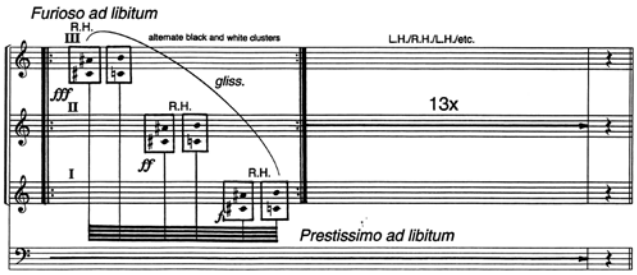
c) As a structural component in the textural development (e. g. Heinz Wunderlich *Sonata Tremolanda Hiroshima*). In the compositions with more traditional formal assumptions (for example, passacaglias) a cluster variation constitutes the ending of textural and dynamic growth processes.

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

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

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