

## **Sound-Types of New Music**

The emancipation of acoustically defined sound from its rather subordinate function in earlier music is among the achievements of the musical developments in our century. The immediate empiric-acoustic perception of sound has found a place – not in the central position but in a key position – of musical experience, a place that was kept by an old perception, defined by tonal contexts and by consonance and dissonance.

Since then this liberation of the acoustic aspect has led to numerous (benevolent as well as malevolent) misunderstandings among listeners as well as among composers. One example would be a Timbre-Fetishism that is without doubt emotionally rooted, where an impressionism in disguise has nothing in common anymore with the originally innovative approach of the avant-garde.

This text is the attempt to trace back the seemingly endless abundance of empirical experience of sound to several few sonorous types, for the purpose of creating a general overview. The goal of such categorization can clearly not be the creation of a conclusive terminology describing a generally binding musical syntax. Since tonality has been seen off, such a general binding syntax does not exist anymore. The following sketch simply makes use of the possibility to abstract certain sonorous models. It aims for providing those who have compositional interests with a fitting guide for their attempts to gain access to the makings of new works.

Pitch, timbre, volume and duration are without doubt indispensable for the definition of an acoustically presented sound – particularly timbre as the sum and result of natural or artificial partials consisting of different volume and frequency. Just as important as these four parameters, though, is the differentiation between sound as [fixed] state and sound as process, or, to put it differently: sound with undefined length (which is determined in its duration only from outside), and sound with a duration intrinsically defined by a characteristic shape [or development].

Let us look at a series of different sounds:

Beispiel I

Viola

Marimba *fff* (harte Schlägel)

Helmut Lachenmann, *Trio fluido*, Takt 186

Ex. 1

Flöte

*<fff2>*

Ex. 2

*Jet-Whistle with vaulted embouchure directly into the mouthpiece.*

Marimba

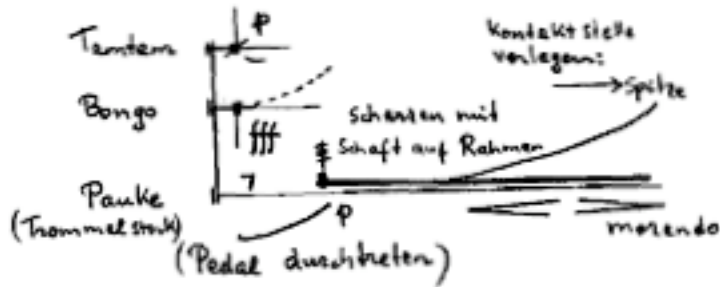
Tamtam

Becken

*mf*

Helmut Lachenmann, *Intérieur I*, Blatt 1 unten

Ex. 3



Helmut Lachenmann, *Intérieur I*, Blatt 17 unten

Ex. 4



Helmut Lachenmann, *Trio fluido*, Takt 183

Ex. 5

As different as these individual sounds may be in their complexity and originality, all are repetitions of one and the same sonorous type. It is characterized by the fact that it either builds up or disintegrates in one movement and that it produces its characteristics during that process. This sonorous type is the simplest, but it is by far not the most primitive one. It shall be named “Cadential-Sound”, since it has a characteristic slope, analogous to the tonal cadence. It could just as well be called Sound-Cadence.

A schematic representation of this type would have to refer to its dynamic process, and it would look like this:



### Example 6

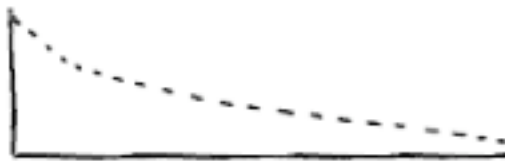
As the entire terminology here is only provisional, a sonorous type that functions as a subcategory of the cadential-sound is the “Impulse-Sound”.

Its decay process is identical with its natural sustain:



Helmut Lachenmann, *Intérieur I*, Blatt 16

### Example 7



Schematic representation

Or it has an artificially added sustain:

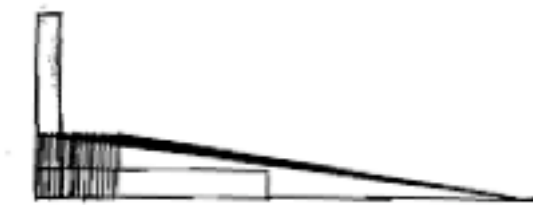
### Beispiel 8



Karlheinz Stockhausen, *Gruppen für drei Orchester*,  
zwei Takte vor Ziffer 9

### Example 8

Karlheinz Stockhausen, *Gruppen*, two measures before Rehearsal Mark 9

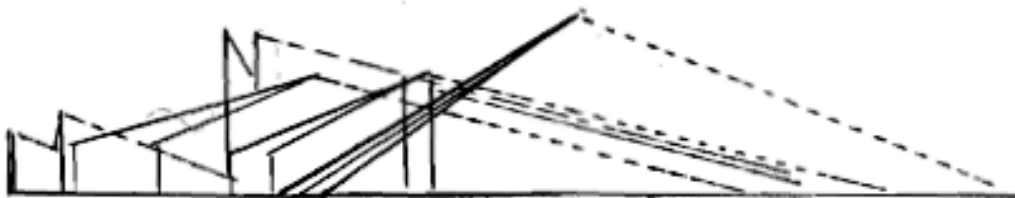


### Schematic Representation

Another subcategory of the cadential-sound could be called: “Attack-Sound”. [literally: transient-effect sound]

Handwritten musical score for Becken and Tamtam. The score is written on ten staves, grouped into two sections: Becken (top five staves) and Tamtam (bottom five staves). The staves are numbered 1 through 8 from bottom to top. The Becken section includes staves 1, 2, 3, 4, and 5. The Tamtam section includes staves 6, 7, 8, 9, and 10. The score features various musical notations including notes, rests, and dynamic markings such as *p*, *mf*, *f*, and *ppp*. The Becken part is marked with a *p = mf* dynamic at the beginning. The Tamtam part includes a *f* dynamic at the end. The score is written in a style that suggests a specific rhythmic pattern, possibly a 7/8 or 8/8 time signature, given the presence of 7 and 8 notes. The notation is somewhat simplified, focusing on the rhythmic and dynamic aspects of the performance.

### Example 9



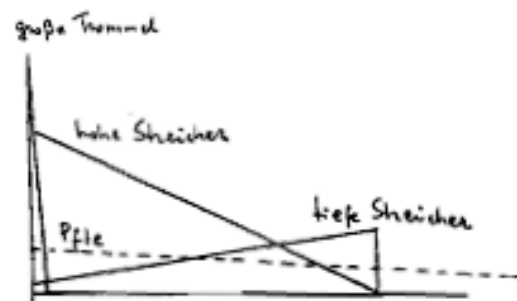
## Schematic Presentation

Below are two examples of a “Decay-Sound” that consists of a characteristically constructed dissipation-process. It is as if the sound, which has already from its start been condemned to quickly die off, struggles through a certain characteristic agony. While fading away, it transforms, and it even creates a crescendo-effect, as parts of the sound-spectrum shine through only belatedly:

Violinen  
Violen  
Cello  
Kontrabass  
Piano  
große Trommel

*György Ligeti, Apparitions, Takt 49*

Beispiel 10



Schematische Darstellung

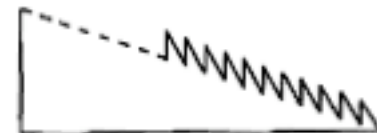
Ex. 10

Schematic Presentation

With distortion, as it occurs with incomplete dampening:

Harfe

*(Schnarr-Effekt)*  
*f (ff =)*  
Pedal unvollständig halten



Schematische Darstellung

Ex. 11

Here now are two examples of cadential-sounds that are characteristically shaped in both their transient-effect as well as in their decay:

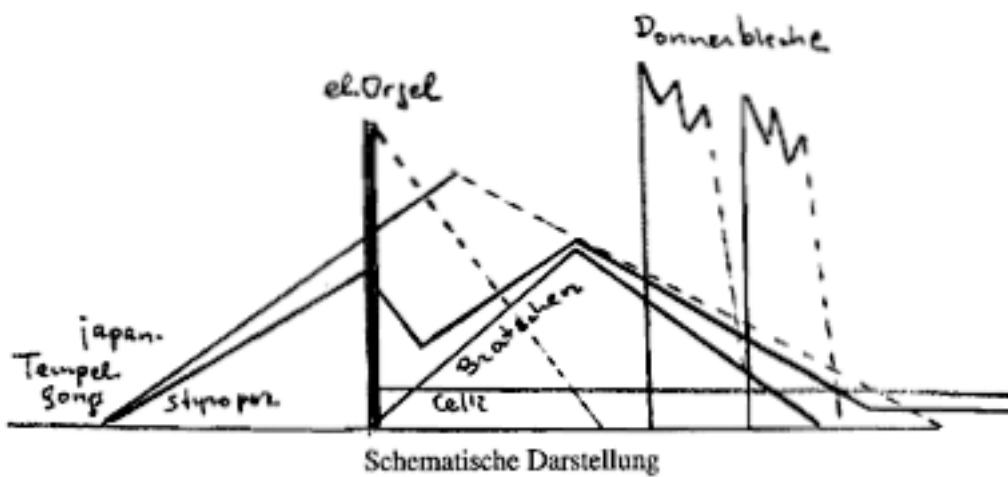
Handwritten musical score for Helmut Lachenmann's *Kontrakadenz*, Takte 259–262. The score is written for the following instruments:

- Synopoz:** Handwritten "im Kreis gerieben" (circled) and "fff".
- japan. Tempel Gong:** Handwritten "im Kreis gerieben" (circled) and "fff".
- el. Orgel:** Handwritten "nur perc." (only percussion) and "fff".
- Donnerbleche:** Handwritten "fff".
- Bratschen:** Handwritten "legno con sord." (wood with mutes) and "fff".
- Celli:** Handwritten "Sul IX" (Sul IX) and "fff".
- ppp flaut.:** Handwritten "ppp flaut." (ppp flute).

The score includes various musical notations such as dynamics (fff, ppp), articulation (div.), and performance instructions (im Kreis gerieben).

Helmut Lachenmann, *Kontrakadenz*, Takte 259 – 262

Ex.12b



Schematic Presentation



Let us make note of the basic principal, that a cadential-sound is always a process, and therefore the time needed to convey the character/feature of such sound – lets call it “Eigenzeit” / “innate-time” – is identical with exactly the time that the sound will generally take to unfold.

Our next sonorous type is entirely different in that regard. While the simplest form of a sonorous process was the cadential-sound, the simplest form of a stationary sound may be called Timbre-Sound (or sound-color / timbre) pointing to its more or less stationary spectrum.

Again and again confusion has been created by mixing up “Klangkomposition” (Sound-Composition”) with “Klangfarben-Komposition” (Timbre-Composition). The second term is longer, but the process itself is by far simpler. The stationary timbre has a negligibly short innate-time (Eigenzeit): the ear immediately registers the stable vertical sum of simultaneous pitches or partials. The final duration of such timbre-sounds has nothing to do with their innate-time (in opposite to the cadential-sound). Its length is entirely arbitrary. It has to be tailored in its duration from outside. The ear is informed and saturated often long before the actual timbre-sound has ended.

A schematic visualization therefore would look like this:



Ex. 13

with a timbral-design or a characteristic and regular shading chosen discretionarily and applied to the rectangle. The vertical line, which optically presents the bandwidth, could visualize the volume as well as the width of the sound. In the examples below, the volume is given as more or less stable, therefore the vertical axis defines the pitch-continuum, while the horizontal axis defines duration.

Here is an example of the simplest compositional handling of timbre-sounds.

Beispiel 14: Krzysztof Penderecki, *Anaklasis*, nach Ziffer 3

Handwritten musical score for Krzysztof Penderecki's *Anaklasis*. The score includes several staves with musical notation and dynamic markings. Key elements include:

- Top Staff:** Labeled "10 Violinen" and "pp" (pianissimo). It features a wavy line and a large black arrow pointing right.
- Second Staff:** Labeled "10 Violinen 8 Violon" and "ff" (fortissimo). It features a large black rectangle.
- Third Staff:** Labeled "ff" and "Clusien aus 10 Viertelklängen". It features a musical staff with a treble clef and a key signature of one sharp (F#).
- Fourth Staff:** Labeled "Clusien aus 12 Viertelklängen". It features a musical staff with a treble clef and a key signature of one sharp (F#).

Ex. 14

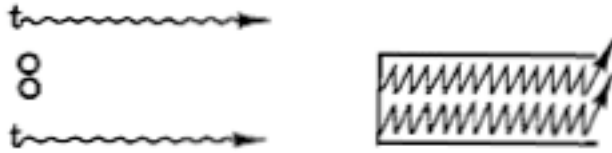
In this context belongs the well known example by Ligeti – an initially stationary timbre-sound is increasingly modulated internally by a far-stretched development: one could say about *Atmosphères* that it is one single sound which is slowly transforming (although it is initially merely shifted in its contour).

Handwritten musical score for György Ligeti's *Atmosphères*. The score includes several staves with musical notation and dynamic markings. Key elements include:

- Top Staff:** Labeled "molto sostenuto (♩ = 40)" and "pp" (pianissimo). It features a musical staff with a treble clef and a key signature of one sharp (F#).
- Second Staff:** Labeled "4 Flöten", "4 Klarinetten", "6 Hörner", and "3 Fagotte Kontrabass". It features a musical staff with a treble clef and a key signature of one sharp (F#).
- Third Staff:** Labeled "Violen" and "pp" (pianissimo). It features a musical staff with a treble clef and a key signature of one sharp (F#).
- Fourth Staff:** Labeled "Violoncelli Kontrabässe". It features a musical staff with a bass clef and a key signature of one sharp (F#).

Ex. 15

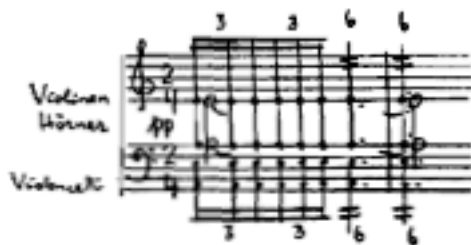
The innate-time necessary to identify a timbre-sound increases with the degree to which the characteristics of the timbre are no longer a static spectrum, but consist of small, more or less periodically repeated movements instead (trills or tremolos in the simplest case). Nevertheless, the ear still perceives these sounds as a vertical timbre-phenomenon.



Ex. 16

Such internal movements can be prolonged, until the innate-time of the timbre as an internal, periodically repeated variance is clearly perceived. Therewith, the sound-type has changed: the sustained timbre-sound has transformed to a “Fluctuation-Sound”, which is made up of a short internal process that repeats more or less periodically. The effect is still that of a static-condition; the characteristic innate-time comes into its own, but has nothing to do with the actual duration of the sound.

Examples of this can already be found in traditional music, often deliberately constructed [as a fluctuation-sound].



Ludwig van Beethoven, *Symphonie Nr. 9*, Anfang

Ex. 17



Ex. 18



Frédéric Chopin, *Étude op. 25 Nr. 1*, Takte 45/46

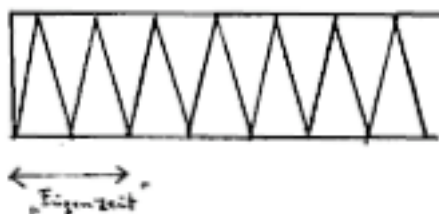
Ex. 19



Claude Debussy, *Feux d'artifice*, Takte 1/2

Ex. 20

A schematic representation of the fluctuation-sound could draw on any kind of regular pattern symbolizing the given periodically repeated figure.



Ex 21

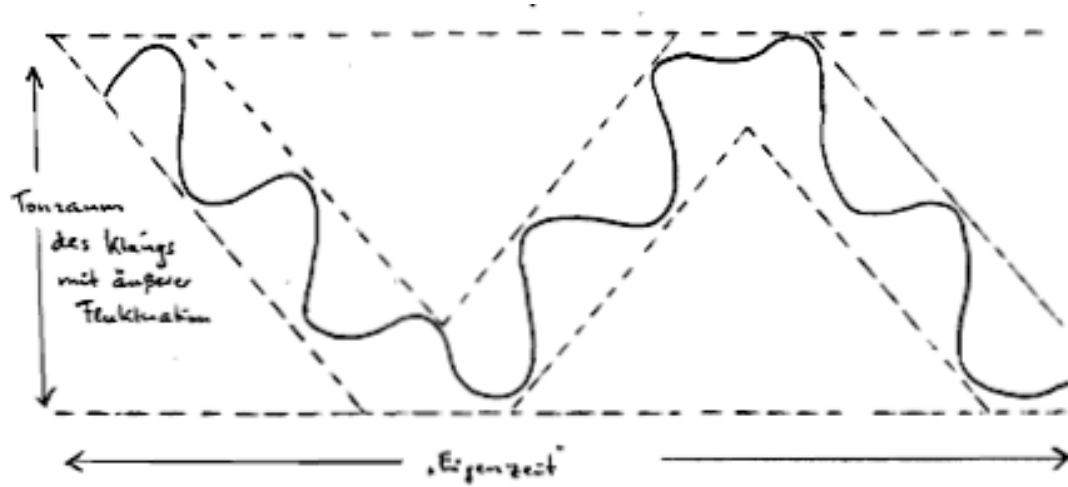
We know fluctuation-sounds that carry an internal fluctuation, but are static in their outer shape – all movement occurs “inside” the sound.

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V. II. 2  
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György Ligeti, *Atmosphères*, Partitur Seite 21, Ausschnitt

Furthermore, we know sounds with external fluctuation: here the entire shape of the sonic-event itself moves in a periodically circling figure.



Example 23

Additional examples:

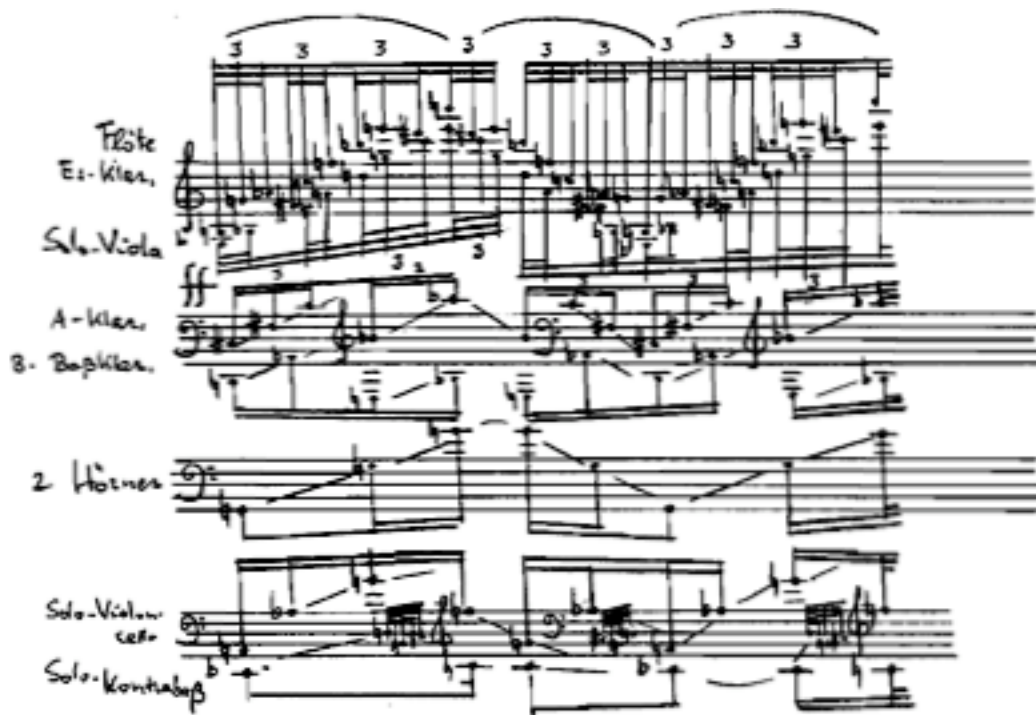


Example 24



Example 25



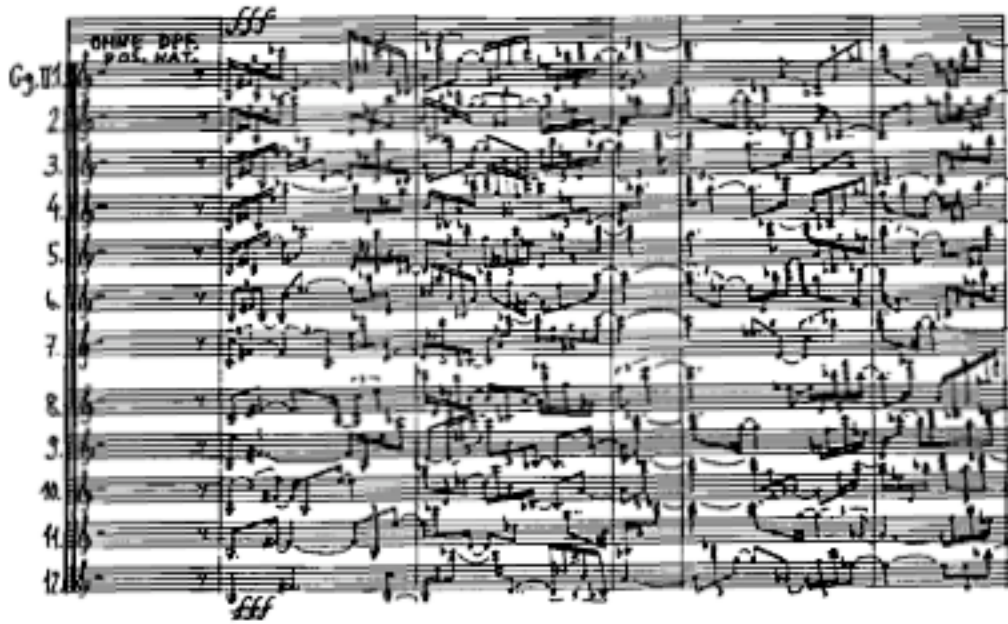


Alban Berg, *Wozzeck*, 2. Akt, Takt 402

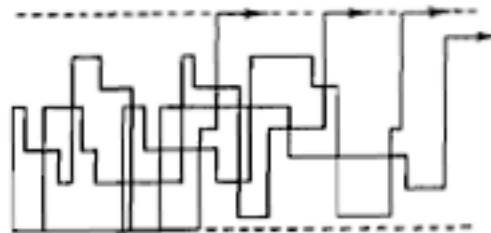
#### Example 26

The element of time has become considerably more important with those sounds fluctuating in their outer shape. Cutting into them would make neither the entire contour nor the timbre-characteristics perceivable anymore. Now these demand a certain characteristic duration to be experienced by a listener in a process of successive “scanning.” Once that duration has passed, the active interest in such sound rapidly slips away. Even though their inner articulations are not repeated literally, they still remain clearly predictable; one reacts to the inner workings of such a fluctuation-sound with similar saturation and passivity as with the simpler timbre-sounds. Intrinsic to fluctuation-sounds is the condition that – on the microscopic level – every moment is different, while nothing is really unexpected or new.

Our next type – the so called “Texture-Sound” is different in that regard. The following example represents it:



György Ligeti, *Apparitions*, Partitur Seite 19, Ausschnitt



Schematische Darstellung

### Example 27

We have an excerpt from a network of 48 voices that are constructed canonically; every voice has the same series of pitches, but they differ in the durations assigned to those pitches.

Innate time has settled in this sound-type in a vague / undefined way. It is characteristic of this sound-type that it can constantly change in its acoustic micro-features – for example in regards to harmony (as seen in the example above) – without ever repeating (like the fluctuation-sound).

Therefore the innate time of this type could be seen as infinite, if the concentration on permanently transforming details would not eventually revert to a statistical experience of the whole.

Therefore, this sound-type is met eventually by the same fate as its predecessors, the timbre-sound and the fluctuation-sound: after a certain time (which is unpredictable, since it differs for each individual [listener]) it is no longer perceived as process, but as an arbitrarily extendable stasis.



[...]

This sound-type as well as the one still to be discussed can only be quite inadequately represented schematically, since its characteristics lie precisely in the small differences in the array (or “disarray”) of its elements. A schematic representation therefore has to content itself with the visualization of the unpredictability of details as well as their irrelevance for the characteristics of the statistic whole.



Suggestions for a schematic representation:

An example for a gradually growing texture, or “transient”-texture, is given in Stockhausen’s *Gruppen*:



Schematic diagram for Stockhausen’s *Gruppen* (rehearsal nr. 117-119)



It should be stressed once again, that the character of the whole (of a texture) is nowhere necessarily identical with the momentarily sounding detail-character anymore; the degree of complexity of the resulting whole is often much lower than that of the rather arbitrarily connecting figures in its inner workings – just as a crowd is often more primitive than its components.

Timbre-sound, fluctuation-sound, and texture-sound form a family that is distinct from our first sound-type, the cadential-sound. They embody static or statistic experience of sound, where innate-time is independent of the sounds' actual duration. To the degree to which they increasingly differ – from the primitive experience of simultaneity in the rigid timbre-sound to the surprising inner processes of the texture-sound – “time” has increasingly carved out its own place from inside. And through that these types have come closer to an area of sonorous experience, which has become so rich in its internal temporal structure, that it no longer carries solely sonorous importance, but gains formal meaning as well.

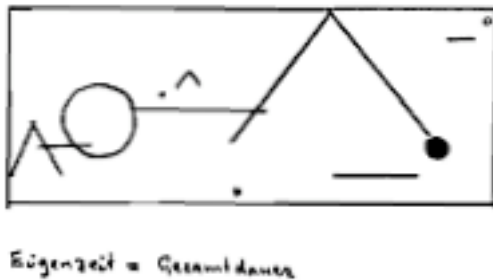
This area of experience is reached with our last sound-type, the “Structural-Sound.” Here sonorous aspect and formal aspect merge. On its surface it is the continuation of the texture-sound, whose destination ends – in spite of highly complex detail-qualities – with the overall impression it creates. With the structural-sound we experience a lot of different details – individuals sounds – which are not at all identical with the overall impression of the sound: they rather interact (or cooperate) in its creation.

This overall-character (or: character of the whole) is no longer a primitive macro-quality, but something virtually new. Its originality justifies all the details, by giving them function in the creation of this whole. That means: the structural-sound (and what is it other than a sound-structure) carries an innate time that is identical with its actual duration. It cannot be extended indefinitely as it can be done with timbre or with texture. Its character communicates itself precisely, but it cannot be perceived as a contemplative stasis, but solely as process. The difference from the cadential-sound lies in the fact that the structural sound is a multilayered and multivalent scanning-process.

We don't want to comfortably mystify the specific quality of the structural-sound, and by that exclude it from rational investigation. Its superiority comes from the fact that in such a sound-structure not only the characteristics of its elements present their particular effect. Its details are functions of a structure. They are elements of precise construction, and can therefore display an immediately active richness of proximity- and contrast-relations among each other. Out of such connection and context they communicate themselves and they can be understood entirely anew. Each distinctive structural-sound as a whole is a result of the rationally directed interaction of

such relations of individual sounds. Its inner configuration from beginning to end is crucial for the experience of its overall character: the innate-time of this sound-type lasts from its beginning to its end. Therefore, it demands its projection into a horizontally scanned temporal space that goes beyond a purely vertical sonorous perception.

The following (clearly insufficient) attempt to represent a version of a structural sound schematically, makes use of three elements, each occurring in different frequency: three v-shapes, four lines, and five circles (or dots). Just as the length of the lines and the size of the circles or the v-shapes vary, other aspects could have been manipulated: the direction, the thickness, and the dashing of the lines; colors and color-intensity of the dots; the angle bracket and direction of the v-shapes etc. The result is a whole that is different from the detail, but that nevertheless depends upon it. It is not only quantitatively but qualitatively more than just the sum of its parts. Therefore, “structure” can be defined as polyphony of dispositions (or configurations).



Stockhausen’s concept of “Zeitgeräusch” (time-noise / time-sound), as it was articulated 10 years ago, seems to correspond to this sound-type. A process like the one in the beginning of *Gruppen* – e.g. measures 2-6 – does not simply communicate a statistical experience of time, which could be perceived before the entire process has ended; quite the opposite: each of the numerous details contributes an indispensable addition to the communication of a sonorous structural character, which needs for its communication precisely this process. More on the makings of such structures in “*Gruppen*” can be found in Stockhausen’s article “... wie die Zeit vergeht” [ ... as time passes ...].

Beispiel 29

95

Karlheinz Stockhausen, *Gruppen für drei Orchester*, Partitur Seite 2

Boulez entire Structure Ia for two pianos could be understood (and listened to) in this way: as a projection of a structure-sound (controlled serially), which, in its sound-idea, by far transcends a purely vertical concept of sound. That means: its “form” influences back on the individual resulting detail, and by that transforms the well-known piano-tone impulses into expressive novelties.

[...]

The structure-sound remains the only sound-type in which truly new sound-concepts can be realized. Sound- and form-concept merge with this type. Form can now be experienced as one single oversized sound, which we perceptually scan in its particles when we listen to it, to render an account for ourselves of a sound-concept that transcends a purely vertical experience.

Even though the following thought might seem adventurous, it clearly is not out of the question, rather the opposite: it is absolutely logical that each self-contained work – if it's a several hour long Wagner opera (or even the entire *Ring*) or a 7-bar movement by Webern – is an example of this sound-type.

The superiority of the structure-sound does not disqualify the other sound-types: the sub-elements of each structure-sound mentioned above will always be subordinate sound-types. They can even be modulated with one another, as it has been shown in some examples already: a texture can consist of impulses or of complete cadential-sounds, a fluctuating sound can become part of a cadential process, etc.

As mentioned above: the terminology used is provisional, and the entire presentation is speculative. It amounts to the fact, that the idea and the concept of “sound” no longer denote something acoustically homogenous. Now, where music itself can be understood empirically, “sound” can be just as well understood as the homogeneity of a successively operating order-principle. Such a functional concept of sound has its tonal analogy in the traditional music's cadence, which is a result of heterogeneous details that do not appear simultaneously (vertically) but successively and in relation to one another. With that step, the border between formal concept and sonorous concept has become fluid. The one can change into the other – the one can be the other.

Cadential-sound, timbre-sound, fluctuation-sound, textural-sound, structural-sound. Or: Sound-cadence, timbre[-sound], sound-fluctuation, sound-texture, sound-structure: makeshift terminology, assisting in fathoming the large territory of available sonorous material with one goal: to make use of our empirical acoustic possibilities in the realization of new and current sonorous concepts, on a level where the dualism of “sound” and “form” no longer exists.

**(1966/91)**

[Translation; Hans Thomalla]