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# A Critical Over iew of Spectral and Minimalist Music

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#### Abstract

More or legal real number of all great composition seem to turn into obsolescence one legal real integration of all great composers of all times: the need for structural integration in a musical composition.

From Bach to Bc lez, the structural integrity in a piece of music was always considered to the first requirement for a consistent and interesting musical composition.

Following the  $Darms_{\ell}$  dt school and their integral serialism methods and polemical style, some kinds of "nti-intellectual" currents in music started to emerge.

Probably due to the use (an 'se') of numbers methods in advanced-integral serialism where all elengent and parameters were forced to be expressed by numbers and fractions, r in have found more relaxing to work on "inspiration alone"...

Besides this, all kind of extra-musical representations are sought after to be used in music composition. Those we give jing from more or less higher mathematics (probabilities, stochastic procedure etc.) to the recent scientific discoveries like the fractals and genetical algorithms up to more obscure numerology or even occultism.

One common aspect of those currents in musi ... their lack of a solid knowledge base. They were all in one of two extremes: n. c age the value of the so called "free-inspiration" above any organizational a cedures or denying any of the composers freewill by creating a "system" at a transcribing the musical score from it.

Another common aspect is that the "intellectual" backgr at a steemed of being of outmost importance in the act of musical composition not only by the *Darmstadt* school but also by most composers of the past, we relegated to a "meprisable" level, instead so called "simplicity" and so called "simplicity" are simplicity.

Among these, "minimalism" and "spectral composition" seem to be in favor and "sound hip" those days.

This paper attempts to show those methods and concepts' inconsistencies and tries to set the value of structural integrity in musical composition.

Structural integrity, even though most composers and musicologists agree on its value as a *sine qua-non* requirement for, if not "good" at least a "decent" musical composition can not be created by the use of common minimalist or spectral composition methods.

Recent advances in Digital Signal Processing (DSP) and recording technology in general made "fashionable" looking at alternative methods for analvzing music. Among them spectral analysis and some other technologies bas d on the recorded sound seemed to be new and valid analytical tools, esides if not instead of the musical score, for investigating into a musical co pos tions' inner workings (structures).

se nethods and tools are inadequate and erroneous in any attempt to rev , y musical structure. This is not due to the current state of technology by, more radically, to a very important and radical difference between a final and the sound of it; the "written" music and the "sounding" music. 

P. mstadt School" o The "Darmstadt School" designates a group of composers attending the "Darm a International Summer Courses for New Music" from the early 1950's \( \text{early 60's.} \)

The de Jm. ation, coined by Luigi Nono<sup>1</sup> has become synonymous with uncompron. Sorial techniques and (almost) a "harsh" modernist attitude by composers ' ' ' erre Boulez, Bruno Maderna, Karlheinz Stockhausen<sup>2</sup>, Franco Evangelisti, L' siano Berio, and Henri Pousseur.

By 1961, the "w —ed" Darmstadt School dissolves due to musical differences.

The "school" attempted to create a new musical discourse based mostly on the works of Anton Webern, but also Edgar Varèse. And considered Olivier Messiaen's "Mode d' ... le rs et d'intensités" (from the Quatre Etudes de Rhythme) as their "flagship" consition.

The "school"s publications and it was were soon criticized by many composers with Hans Werner Henze w music was regularly performed at Darmstadt in the 1950s) among them — the "totalitarian" language. Effectively, young composers were almost to reed to compose in total dodecaphony or they were ignored or ridiculed.

Pierre Boulez wrote<sup>3</sup>:

In our days, a composer who's not composer ing rath serial methods is useless

Henze recalls student composers rewriting their value on the train to Darmstadt in order to comply with Boulez's expectation ("I" nze 1982, 155). One of the leading figures of the Darmstadt School itself, rar b Evangelisti, was also outspoken in his criticism of the dogmatic orthodox, of tain zealot disciples, labelling them the "Dodecaphonic police" (Fox 200 Another member of the school, Konrad Boehmer, states

There never was, or has been anything like a "serial doctring" an iron law to which all who seek to enter that small chose band of conspirators must of necessity submit. Nor am I, for one, familiar with one Ferienwoche schedule, let alone concert programme, which features seriality as the dominant doctrine of the early fifties. Besides, one might ask, what species of seriality is supposed to have reached such pre-eminence? It did, after all,

<sup>&</sup>lt;sup>1</sup>in his 1958 lecture "Die Entwicklung der Reihentechnik" (Nono 1975, 30; Fox 1999)

<sup>&</sup>lt;sup>2</sup>the three composers Nono specifically names in his lecture, along with himself

<sup>&</sup>lt;sup>3</sup>Pierre Boulez, Par Volonté et par Hasard,

vary from composer to composer and anyone with ears to hear with should still be able to deduce this from the compositions of that era. (Boehmer 1987, 45)

The denomination "Darmstadt School" was even used by commentators IK L. Kurt Honolka (a 1962 article is quoted in Boehmer 1987, 43) to de ril any music written in an uncompromising style.

How c one should bear in mind that composers such as Boulez, Stockhausen, and Yono were composing their music soon after World War II. The dominant Geman music, like Richard Strauss or Richard Wagner has been extensively politicized by the Third Reich.

In an attempt to avoid this again, and to keep art for art's sake, the "Darmstadt School" attempted to create a new, para-national style of music to which no false mean recould possibly be attached.

# Critique of To . Serialism

On comparing the writing of Boulez spanning to some 50 years, for example Penser La Musique Aujourd'hui<sup>1</sup> and Leçons de Musique<sup>2</sup> we witness an interesting shift in the polemic. The indequacies of the total serialist methods, specially when applied to dynamic and partly for durations (rhythms) as well were sharply mentioned by the author.

In  $Leçons\ de\ Musique^3$  he wrote:

We have been applying almost blin iv a es to dynamics, articulations and instrumentation without king into account the specifics of each instrument and the we for many problems by having parts covered by other parts or volving impossible rhythms...

Creating series "in the abstract" for parameters lik dynamics, articulation and instrumentation lead to many dead-ends. Some "fullations were not possible in some dynamics, tempi and ranges, assigned domains were conflicting between instruments and instrument groups so that in the performance parts were covered by each other.

Iannis Xenakis<sup>4</sup> and György Ligeti<sup>5</sup> soon discovered that an "hyp—or 'nization" of the sound-space when the density of events increased above some discovered that an "hyp—or 'nization"

<sup>&</sup>lt;sup>1</sup>Mediations, Éditions Gonthier, ©1963

<sup>&</sup>lt;sup>2</sup>edition?

<sup>&</sup>lt;sup>3</sup>kitap...

<sup>&</sup>lt;sup>4</sup>Musique Formelles

<sup>&</sup>lt;sup>5</sup>His analysis of Structures Book 1 by P. Boulez, published ...

provitive level resulted in a "chaotic" sounding environment and first Xenck wought after methods for organizing that "chaotic" environment without the trouble of getting through series.

The wave developed the "nuages" of Xenakis and the (to some extend) the "man probablony" by Ligeti.

Boulez air elf soon recognized the fact too. But he never gave up the sharp structural y v of thinking of music. His roots were too deep into the French Cartes. In allosophy and his life-long references to Baudelaire make him remain in the structuralist field.

I can also add or mis, Boulez's high degree of "metier" and "savoir-faire" (know-how) on the art and craft of composing, probably never equaled by any living (or recently dead) composer of today, comparable only to Anton Webern in some sense, are his unrivaled precision of musical "écriture" skills is an important factor in his keeping his position against tendencies he considers, I believe rightly, "interest al laziness"

In his book, cited above, Per. — Lo Musique Aujourd'hui, 1963 depicting the various "methods" based on num' s 'hich flourished after the Darmstadt School's last years and its dispersion. Le wrote<sup>1</sup>

[...] The "dilletantism" was jubbal", under a new pretext, by a sort of pact renewed with mental "  $\omega$  ess and intellectual inconsistency.

One was updating the most degenerate, in this of a cheap romanticism: by re-establishing the supremation of the "fantasy", of the "inspiration" one was letting oneself slice to and being absorbed by the "event" by the "revelation"

This statement, formulated in 1963 stands very true tode. To better understand this position we must first define its principal target:  $\alpha$  .imalism in music.

## **Minimalism**

An euphemism for "minimal intelligence created music"?

The word "minimalism" first used in music in 1968 by Michael Nyman in a review of Cornelius Cardew's piece *The Great Digest* was later expanded by Nyman himself in his book *Experimental Music: Cage and Beyond* (1974).

 $<sup>^1</sup>Penser\ La\ Musique\ Aujourd'hui,$  1963 page: 24, translated from the French original by M. Okonşar.

Tom Johnson, one of the few composers to self-identify as minimalist, also claims to have been first to use the word as new music critic for "The Village Voice." He describes "minimalism"<sup>1</sup>:

The idea of minimalism is much larger than most people realize. It includes, by definition, any music that works with limited or animal materials: pieces that use only a few notes, pieces that o 'y a few words of text, or pieces written for very limited instrumints, such as antique cymbals, bicycle wheels, or whiskey glassed includes pieces that sustain one basic electronic rumble for a long time. It includes pieces made exclusively from recordings of rive s and streams. It includes pieces that move in endless circles. It includes pieces that set up an unmoving wall of saxophone sound includes pieces that take a very long time to move gradually from the kind of music to another kind. It includes pieces that per it all possible pitches, as long as they fall between C and D. It includes pieces that slow the tempo down to two or three notes per relate.

The most prominent minimal; c mposers are John Adams, Louis Andriessen, Philip Glass, Michael Nymar Steve Reich, Terry Riley, and La Monte Young.

Deliberate "poverty" of the materia and gain deliberate "poverty" of its treatment stand as an absolute refusal of a mons of the Western world's "art-music" concepts. In this sense minimalism on be looked at as a truly revolutionary way of music composing, at leas to ten more revolutionary than the music and theories by Arnold Schoenberg or and a Webern.

Some examples of minimalistic music is enoug - prove that point.

The first identifiably minimalist work is probably 1958 String Trio by La Monte Young. The piece is written using twelve-to sechnique, but the notes are extended to tremendous length of time; the first are is sustained (at the notated tempo) for four minutes and 33 seconds. So section to the String Trio, he began making other musical works based on long drones and harmonics played above them, culminating in his improvisation group The Theater of Eternal Music.

In 1960, Terry Riley wrote a string quartet in "pure", C major. In 19  $^\circ$  Riley made two electronic works using tape delay, *Mescalin Mix* and *The C n* which injected into minimalism the idea of repetition. Next, Riley's  $^\circ$  e

<sup>&</sup>lt;sup>1</sup>Johnson, Tom. 1989. The Voice of New Music: New York City 1972-1982 A Collection of Articles Originally Published by the Village Voice. Eindhoven, Netherlands: Het Apollohuis. ISBN 90-71638-09-X.

Ir  $\sim$  (1964) made persuasively engaging textures from repeated phrases in  $\chi$  remains. The work is scored for any group of instruments. The idea of repeating patterns was probably deemed very effective and very easy to set into we k.  $\chi$  in 1965 and 1966 Steve Reich produced three works It's Gonna Rain a. Gome Out for tape, and Piano Phase for live performers that introduced the dea of phase-shifting. This is two nearly identical phrases or sound satures the slightly differing lengths or speeds repeating and going slowly of phas  $\chi$  each other. Starting in 1968 with 1+1, Philip Glass wrote a series of wor's that incorporated additive process: forms based on sequences such as  $\chi$  1, 2, 1, 2, 3, 1, 2, 3, 4...) into the repertoire of minimalist techniques; these works included Two Pages, Music in Fifths, Music in Contrary Motion, and others.

As it can be seen from those 'llustrious' examples we have perfect samples of what Boulez was calling a function to numbers", "mental laziness" and "intellectual inconsistency".

# Spectral Music

When the composer "refuses" to compositional decisions to be made by the analysis of sound spec" we get Spectral music.

By having computer spectrum analysis with all the shine of a "newly died of the died with all the shine of a "newly died of the died of th

Again numbers rushed in to rescue the helpless on t ser which had to map them into musical components such are pitches, at an and other.

Numbers provided by Fast Fourier Transform<sup>1</sup> pro dec the so-called "new" and, to some extend "scientific" base our "labeling—ose ed" society was looking for.

As a side note, I may add that this obsession with labels was incelled "the attitude of a grocery shop keeper for filling display shelves" of soulez again in his *Penser La Musique Aujourd'hui*, 1963.

This particular style of composition originated in France in the early '970s and the techniques were primarily developed, and later refined, at Institut de Recherche et Coordination Acoustique/Musique, Paris, by composers such & Gerard Grisey and Tristan Murail.

One must however acknowledge Murail who has described Spectral music as an attitude towards composition rather than a set of techniques, an "aesthetic" rather than a "style".

 $<sup>^1\</sup>mathrm{FFT}$  analysis

Paraphrasing Molière, "everyone who is talking is making *prose*, one can say every composer making sounds is actually making "spectral music". In that sense composers as varied as Messiaen, Varèse, Jolivet, Scelsi have been too idered by some making "spectral music".

One key-word Spectral composers were referring to is "structural timbre" or amt e as a structural element. Before dissecting on this we must first look. A value is a "structure".

# What is Structure?

Jean Piaget, from the Faculté des Sciences de Genève, in his book Le  $Structuralisme^1$  starts by first defining what is a structure.

A structure is 2 s, m of transformations, who has laws in itself as a system (as being differer from the properties of its constituent elements), who remains itself or g ws y those laws without metamorphosing itself to something else<sup>2</sup>.

Following this principle,  $\mathcal{L}$  the enumerates three essential properties of a structure: totality (self-containment); transformations and self-regulation.

Another very important dedu of from the above statement is that a structure can be and must be "formanz" ble". By this he means a structure can be described as a set of formal r

# Totality

A structure is a slef-contained entity. The structure is a slef-contained entity is a slef-contained entity. The structure is a slef-contained entity is a slef-contained entity is a slef-contained entity is a slef-contained entity. The sleft is a sleft entity in the sleft entity in the sleft entity is a sleft entity in the sleft entity in the sleft entity is a sleft entity in the sleft entity in the sleft entity is a sleft entity in the sleft entity in the sleft entity is a sleft entity in the sleft entity in the sleft entity is a sleft entity in the sleft entity in the sleft entity in the sleft entity is a sleft entity in the sleft e

It is most important to understand that the structure has rules which characterize the system as it is, and this is independent. from the constituting elements or their own "rules".

Those rules are different from the usually found assection rules or any cumulation of them. They thus give the ensemble (structure) properties which are distinct from its elements.

For example integer numbers constitute a structure, a grup which is distinct and does not have the properties of each of its constituent ments may have. They are not "discovered" one by one and then put in a "or ap". The set of integer numbers is a structure which exists only as such and denot have the properties like odd or even, prime or not-prime that each of semblers may have.

<sup>&</sup>lt;sup>1</sup>Collection "Que Sais-je?", Presses Universitaires de France, 1974

<sup>&</sup>lt;sup>2</sup>op.cit. pages: 6-7. Translated by M.O.

L'is implies formal rules on which the structure is based and those rules at the my and precisely defines if and how the constituing elements are part of or go not belong to it.

#### Transto, 116 tions

All strictly prompirical philosophical theories are included in the Structuralism. This government of Husserl and specially refers to Kant.

One fundamental aspect of structures which sets them apart from the concept of "group" or "set" is their ability to transform while keeping their "structural integrity".

Piaget goes even further and defines a "structuring act" as "creating a system of transformations".

In the above example of integer numbers a transformation like a simple addition of two such numbers (see section to the structure of integers because the result remains an integer. Towever division may create another kind of number (a real number) variable foreign to the structure of integers. This simple example denote the extend to which structure can carry transformational operations.

## Auto-regulation

This fundamental concept is the result of the example given above. One shall say "the set of integers are auto-regulating and rather operations of addition, multiplication and subtraction but not under vision".

Another important concept emerges here: it is that a ub-and-super structure.

While the structure of integers numbers are not self-regu' of gunder division they can be seen as part (sub-structure) of the super or of real numbers where they "transform" to when divided under cert of cumstances.

This "annexing" of a sub-structure into a "super-structure" is not 'n assimilation because the sub-structure retains its properties. To quote Praget: "it is more like a con-Federation rather than a straight annexing"

# **Musical Structures**

This concepts translate and enlighten points of view and compositional techniques when applied to music.

First the concept of "totality" or "self-countenance" is interesting from a musical view. Lets take a musical structure, which may be thought of like a "theme".

In the tonal domain this can not be considered as a *structure* because the relationship of its constituting elements (i.e. notes) is *associative* inside a man that is pre-established, set of relations, it is better called as it has always as theme. On the contrary, in a dodecaphonic environment the struct as reated based on formalized rules which are not associative, that is the series of whatever organizational principle the composer has set. This clearly established the structural way of creating music as it is done specially in the serialistic way of composing.

As to the second principle: transformations here the tonal grammar has a very similar looking occdure which is transposition. However under close examination is the analysis of transposition a transformation in a structural sense?

Tonal transposition is a fually not a transformation but rather a "transposition" in the mathem. the sense of the word. Adding a constant to a set of integer numbers actually do the "transform" them in a structural sense. Post tonal and specially serial composition techniques are a true transformation in a structural sense. The basic serial manipulations like inversion, retrograde are more like it. May be the sorest things to this are the contrapuntal and canonic operations as they were used in pre-Baroque and Baroque eras and this may explain why the Secon. Senna school composers have those procedures in such favor.

In the domain of transformation, one encomportant aspect of the musical structure is that the *structure* if 1, 's entry a structure carries "in itself" its transformational possibilities.

Specially the way serial composers handle hor some land vertical aspects of their music is revealing on this respect. A type all pries can be stated horizontally and vertically and in any combination of these. This point is of outmost importance when considering the struct call aspects of serial music as compared to tonal grammar. In a tonal but as cany modal or poly-tonal/modal music the "motives" are "groups" (sets) is add of elements of associative relationships and cannot be used as structure in horizontal and/or vertical ways.

The last characteristic of "self-regulation" can be partly seen in the total grammar. When parts are made of "motives" when they integrate in the parts one have something close to the sub and super-structure concept. It is ever there is still no structures but "motives-ensembles of associated the ments".

Probably the most advanced of such an integration in the tonal domain is the *Sonata* op.1 in B minor by Alban Berg. There every element in every

producing the whole work is "almost" structurally connected. After this the tense grammar was unable to "hold" such density.

### Min. malism and Structures

From the amples and definitions above it is clear that Minimalism can not be seen as — trictural way of making music.

This can be detaild in several statements:

- The "structures" of minimalistic music are too simple to be considered as structures. They can not have the "totality" requirement for a structure to be satisfied. By 'he same way they can not have formalized rules describing and d're tiating them.
- The "transformational" quity is not sought after by the composers. Even more the whole minimals" approach is against the transformational property of the musical "to cture. This simplistic and static nature, deliberately created by "the eminimalist composers is actually an impoverishment of the musical expression and language.
- The natural result of the above statem is that there is no "self-regulation" in a minimalist "structure" can be a thing like a minimalist structure.

One other point may need clarification. The so cal' a 'c mplex" or "super-structures" resulting from the compositional devices countral used by minimalist composers such as phase-shifting of repeated make of less identical sequences and so on, also fail to be structures in any real source of the word. This for two reasons, first their constituent structures are not properly at them together", second the resultant stacking of them is not obeying properly alized laws in its organization.

# Spectralism and Structures

Spectral music faces somewhat different structural problems. For the spectral composers' attempt to justify their approach and compositional techniques with numbers extracted from FFT analysis is more than questionable. No music need "justification" by a set of numbers or any other data nor formula foreign to music.

The spectrum of a sound is not a structural entity, it is the sound itself. The properties of a sound can not be considered its structural elements. It may be argued to this that in Spectral music we consider one (complex) sound as others consider a "theme" or "motif" and we do work on that and energe developments, variations etc.

This argument does not hold for several reasons. In order to develop on Let'ing this brut musical material has to have characteristics as a struct Let' hat means, in music, properties which are quantifiable on some given scale. Internal rhythm are those properties. They are quantifiable, can be precisely measured and they are expressed in such ways that one can define structures with them, those structures may have formalized rules of organization and then we can derive other structures from them and also integrate them in large structures or break them into smaller ones.

Timbre is not such a component of a musical composition. It is not quantifiable as such, ir spectrum analysis can go the spectrum analysis can go the spectrum analysis can go the spectrum analysis is highly downdent on dynamics, range and articulation as well as on the surrounding acoustics. Second, this data is not scalable.

Any attempt to create a cohe of ructure by those methods are simply a way to hide behind some numbers are rive one's music an aura of novelty and "objectivity" which are not need to any way and can not be used for an excuse for a poorly organized composition

# **Analysis Tools**

Spectral composers often refer to newly developed. Spectrum analysis is one such tool.

A deeper investigation in the DSP technologies will: eal that those tools are only rough and blind ones. First the spectrum analysis as it is stated above, is very dependant on dynamic, range and surrounding accustics. Two recordings of the strings sections of the same orchestraplating the same piece in the same way in different acoustics will reveal different spectros, two similar strikes on two different tam-tams will give quite different regards and under some circumstances and with little trickery from the orchestration of a Mozart Symphony and an extract from a Xen k 's orchestral work may look very similar in spectral analysis!

Even simple monodic pitch recognition in computer DSP software is an will remain very elementary. This is due to the impossibility of discriminating "hearing" in a computer. Imagining the digital technology can or will one day

be a 'e to distinguish things in a musical performance is naïve science-fiction. Another the discrimination the data output by the computer can not be of use for a composer.

# The "\'\r' ten" and the "Sounding" Music

The written n. ...c actually differs from the sounding music, in the way it brings us information about the work, in a radical way.

Written music 1 not simply a set of instructions from the composer to the performer. If it was so, then the functionality of a score would end with the first recorded "perfec," performance. Is there a "perfect" performance? For most of the classical reperate, e, yes. In the absurd assumption of the end of the functionality of a musical score following a "perfect" rendition of it, following performers and researmer: (analysts) should have to refer to that "perfect" rendition instead of the scene.

Of course this is not the case. E<sup>-</sup> ... <sup>th</sup> ugh today a certain lack of creativity in musical performance is certainly—lue to the increasing use of recordings as musical references instead of the score t<sup>1</sup> ... is not the point here.

The written music is "the" music as the composer thought of it, while its rendition is "a" rendition of it, by some music; (which can be the composer himself).

Basing a compositional theory on the music so '+ ounds' is therefore a big mistake.

# Conclusion

A structural approach to the act of composing music is a  $v\epsilon$  important requirement for if not "good" at least a "working" composition.

During the last years and following the demise of the Darmsta Sc of several compositional trends appeared with one common aspect: the susual of the serial techniques.

Paradoxically, while they were accusing the *Darmstadt School* to be to much "mathematically" oriented, those groups, minimalists and later on the Spectral composers actually made more effort to base their workings on numbers.

Refusing a structural approach the resulting music, even coming from very talented composers, never attained a highly conceptualized level and led to dead-ends. Dead-ends in the sense that this offer very little to analyze and therefore fails to create a long lasting "spark" so as to fertilize other works and other composers.

The capital importance of the written score as a working tool for study, and yze and performance, as opposed of the "sounding" music has been quesoned for some time or may be it is still. This was possibly due to childish we dering in front of "new" technological tools. It is hoped that this bewilder. In faded and the inadequacy for musical composition or analysis of tools l'a ctral analyzers has been understood.

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