

2006-20...MODERNISM. A FUTURISTIC VIEW ON CONSONANCE-DISSONANCE.

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abstract

Basing on the classical distinction between Descartes as thinker and Pascal as inventor, the author finds some analogy in the divergence between composer of partitions and musician-composers. On several levels he sees the form of the classical sonata as a development from the dichotomy: dissonance-consonance of Gregorian chanting, and applies this in contemporary music, aiming at a fundament for a more relativistic system than a dichotomy.

However, the history of contemporary music after World War II has been a pluralistic movement away from the rules of classicism, not a movement in one direction. To find a common denominator for such anarchic movements is difficult; the trained individual ear before theory, decides, whether a sonance in a context is con-, dis- or neutralsonantic, through mental effects. Does a dichotomy help the listener, or is it an anachronism?

Mathematics in the essay are surrealistic, and comprises the notion repetition; the lesson has a tendency in the direction of popular science.

Keyword (for 526-108, changed to 526-109) c5-b3-d2-d4 chess

WHAT CAN I WRITE, AND WHY

Did not the daughter of Gunnar Berg (Swiss-Danish composer 1909-89) tell that this modernist composer always talked about his calculations? The distinction between cognitive philosophy and empirism characterizes Descartes and Pascal, that in the 16th century reformed philosophy, and inventing techniques, respectively. The classical notions for modes of life, Verum quia factum for Descartes and Verum quia faciendum (1) for Pascal is another expression for the different relationship to mathematics of the two French geniuses of the 17. century. For the composer there is a relationship to numbers and sound, most primitive in the identity in the row of harmonics and pitch in Hz and inner ear.

Let us now state that tax collection as helped by Pascals calculus machine and classical composition are both activities in contemporary society that can be characterized as very human activities; i.e. activities that in themselves bear no witness whatever about any godly providence. They rather stand for curriculums of economical and spiritual life, spirituality as not in and by itself material activity, like partitionwriting without performance. The composer of today, after the dawn of modernism in the 50'es often want to meet his audience in an image of himself like an engineer, that finds and applies formulas for his compositions in an analogon with building constructors and architects, the imaginative energies of whom are limited by gravitation and other laws for construction, that are incontestable; his are as spiritual activity NOT, but are choices. A serialistic approach to the parametres of contemporary composition, that departed away from the natural symmetries and

harmonics in harmonics, scales and harmonies of late expressionist origin, rarely leads the composer into apprehension of the gnostical knowledge that any music played by classical instruments with their favour for different combinations of harmonics in different pitch registers only avoids the dichotomy between the spectral harmonics of each instrument of the orchestra and the abstract “godly” pitch notation in the partition of the composer, (Schoenberg: “Farben”), if the composer standardizes sound itself by engineering sound processing in the studio, ie if he does not apply the classical acoustical instruments of the orchestra. Only there he can get rid of the stinky human sound of classical instrument tradition, destroy the traditional notions of music aesthetics, and make free parametres upon the soundspectres, parametres which do not have any relation to tradition; he then faustically might heave up any evaluation of sound as beautiful or ugly, in favour of the unlimited and infinite possibilities of sound parameters, as a deliberately abstracted conception, ruled by parameters derived from whichever mathematical formula or formulation that is wanted and applicable on scalings and sound spectres. Such aesthetics or rather anti-aesthetics are the ultimate dissolution of every aesthetic notion, if the formula it self is not regarded as aesthetics; contrary to engineering of austrostradas, bridges and other big constructions for solving secular problems, infrastructure, housing a s o, engineering of music in analogy with practical engineering does not in itself serve any practical or aesthetic purpose. They are manifestations of human spirit, of the *volonté!* and the constructive skill of the artist. To their credit serve that they are free, do not force their values and standards upon our small globe, nobody needs to read the partitions, even less listen to the music, whereas autostradas, building of concrete houses and dams force their standards and sounds upon animals and human beings.

Rather than the anti-aesthetic notion defined by a freedom with no other boundary than what follows from a translation of a mathematical formula into musical language, only the historical development of musical instruments, and with this the ideals of the instrumentmaker guarantee some relevance to the ear of what is compo-sed and played, and with that some aesthetics, how offensive it even may be to the free antiaesthetic composer; the experimental technological composer, that is more interested in the formula than in the ear can research in and search for relevant proportions in efficiency of his technological product and aesthetical value to the ear and through that to the psyche of a homo erectus. However, such projects implies that he, intuitively or by tradition, has some notions of aesthetics, if not a negative notion of anti-esthetics is claimed. (To some degree proportionate to a situation where an invention quite simply does not work, or by later research turns out to be false assumptions about wellknown phenomenons, eg the ether, seen from the point of human psychology). Such scientific method, if not intuitively mastered by the composer, makes the procedure of composing so longlasting and dependant upon experts in psychology, technology and other sciences, that the composer cannot avoid to become a neurotic, sooner or later addicted to a psychoanalyst in order to understand himself and regain his intuitions as a better and independent way for experimental composition than belief in other sciences, but with the background of these! And there we are now at the end of a long excursion, developed from distinctions between the spontaneous primitive sound- or number composer and the apparently far more advanced technological, and start the essay over again.

*)The most primitive mathematical formulas: the formula for the well-tempered scale, and those for symmetries and other constructions in music have to the ear to-day such laden aesthetics, that they to the conscient listener hardly belong to the term: formulas.

**) Iannis Xenakis and his work is an example of a farreaching employment of mathematical formulas.

ANOTHER START

When I was invited to write about music by WSEAS, I gave myself a lot of time in the planning of the essay, vast periods of time where I did absolutely nothing but look at Buddha and his resting son carved in fishbone marble: I felt and realized that I in musicology would have to sort out what had been a passion for music for a very long time of my life, I had to overhaul my passion for music, and sustain a long-lasting silence, leave that feeling back in Denmark.

That passion with its ups and downs, its almost sexual maintenance of an indifferent professional peak at ups in performance; and the downs of where to find the next job, which led me into philosophy, composition and mathematics. After several months at my remote place in Sweden, I was able to change my mental habitus, leave performance behind. I was convinced that I could and had to enter the glass cupola dome of systematic academic musicology, only partly schooled in method and affection for the musical oeuvre, but felt so naked in passion after several months of absolute silence, that I understood Anton Webern as a precursor in music of sudoku; this puzzle upon natural numbers $N(1-9)$ has, I think, very much in common with the distinguished method of the Wiener School composer, and with serialism. The undynamic mental state of rigid composition has in Sudoku a popular equivalent, that can be experienced in every alphabet in civilisation. Why music for the ears, when sacred numbers may provide a similar result in mentality? Passion for music, but here of a superhuman order; in Sudoku the method was all when solved, in serial music the beauty of the superpersonal solution is handed over to partition readers, musicians, then audience: Notation, interpreters in sound, and ear. Neutral sonorances as synthesis of consonance and dissonance.

Many questions remain: Which were rigid parameters, which free when some composer started; did free parameters become rigid, rigid free, during the compositional process, in that case when? Which contingencies existed in the oeuvre between freedom and rigidity, when and how were they necessary for the composer, and how were such compromises obtained through the realm of traditional instrumentation, harmony, metrum, dynamics and melody, to the benefit of the composition as sounding reality, after Pierre Schaeffer "objet musical", and as aesthetics for the listener, "Nachdenken", more in psychology than just the humming of a theme.

The musicologist and the skilled instrumentalist both express the logic of a composition; the musicologist in categories distilled through the history of music, or/and new music, in search for objectivity; the instrumentalist may be very sensitive toward psychological notation, very subjective, even pedagogical, when he promotes this theme, suppresses that line of counterpoint; he is by necessity medium for the composer for often very heterogeneous audiences, that may listen to the oeuvre only once. He need not perform any definite interpretation; he may stick to parameters for interpretation, when he in the concrete situation relies on his more or less spontaneous, intuitive communication with the audience that day, based too on the acoustics of the hall.

Waging of elements in a composition is hard work for the musician, that in performance works in proportion 1 between interpretation-time as result of his thought about the work, and "objet-musical"-time. The musicologist has much more time; he uses his written or spoken language whenever, in order to suggest such balancing between categories or elements, where relevant.....in which case he may base his argumentation on the life of the composer, music history, the development of instrumentation, composition techniques, even political history, whatever may be relevant from work to work.

With the IT-revolution it is obvious for musicologists to develop analytical tools in software; to mention this here is in order to call for a flexible tool that can match the imaginative modernist minds of composers, with the pluralistic direction away from tradition, and in order to point to difficulties in such creative endeavour.

ABOUT TERMINOLOGY AND CLASSIFICATION

When the Belgian musicologist Celestin Deliège in his gigantic “historiographic contribution to a critical musicology”: *Cinquante ans de modernité musicale: de Darmstadt à l’IRCAM*. (3) analyses the modernist project, he emphatically points out, that “the roots of the works exist in the concepts that have motivated them: The idea about the work has preceded the style”.....” a situation that has generated a sum of a priori under the contemporary algorithmical forms of the cybernetics.” (3: s. 23). His endeavour is, as mentioned, to contribute to a critical musicology about modernist composers, not to find common denominators for them, that by IT-experts can be transformed into relevant software tools for analysis. (4)

How do a priori in the modernist period differ from the a priori choices of key, themes and instruments the classical or neo-classical composer made in that nostalgic good old days musicologists and universities over the whole world seek refuge under, when they dare not venture out in the versatile climate of the modernist revolution? Thunderbolts cleanse the air; away from harmonic relationship and dissonance-consonance dichotomy. When classic consonance is tabu in the works of Anton v. Webern, it opens for another harmonic world, that is easily interpreted in a triadic way:

It is an exploration of the antithesis to classical consonance-dissonance with its imperfect world of acoustic commas and developments: A in Cartesian respect “godly” world of mathematics understood as everlasting mathematic laws in this world; the antithesis has the equally tempered notation system as limit for exploration of the “Musik-an-sich”. The extended formal element of symmetries and repetitions covers melody too. There is no relationship to harmonics, which is the skeleton on which harmony, melody and as harmonics transposed into natural numbers N metrum and rhythm is built upon in classical music. A somehow eccentric translation done by me in order to find a uniting factor! EINHEIT! In the music of AW these numbers from harmonics only remains as metrum from “die wienerische Zeit.”

This antithesis can be seen in two ways: A statical and a more dynamical. The statical is the $(12 - C(\text{consonance})) \cdot 2^n$ praxis of two-voice counterpoint, that in more-voice counterpoint with Webern is extended into the tabu against harmonies from the first numbers of the harmonic row, that basically in a complex number system $(n, -n)$ of N forms functional harmony. a) This in a Hegelian respect triadic system (thesis - antithesis - synthesis) opens for a harmonic system consisting of all harmonies, including those deriving from the first 8 harmonics in this row, a system that is a kind of modified dis-consonance dichotomy; with his long unisons I would think of the Italian composer Niccolò Castiglioni as a representative of such synthetic thought within a constructivistic *faciendum*.

In a far more revolutionary respect the Webern harmonies within the system of equallytempered pitches $(2^{n/12} : 2^{q/12})$ are all supposed to be thought and heard neutralsonantic, which is praxis in contemporary solfege pedagogics. Whoever took part in conservatory studies in the sixties could not avoid to feel an impact of the change in that direction of solfege teaching. But where is then dissonance? Not in solfege teaching from that period.

Having defined two levels on which con-dissonance operates: The level of N defined already 500 bC by mythical Pythagore, and the level of the equaltempered scales, the definition of sonances becomes more clear than in these old days of Gregorian chanting and counterpoint rules, where the quart as difference interval between two harmonics with lower number $(3 - 2)$ was more dissonant than the third as interval between the higher $(h - (h - 1))$, h (number of harmonic) = 4,5,6). b) The industrial world and nature give a free hand for new levels in our world of sonances. Sampling adds to freedom with scaling of sound, and with micro - or macrosampling

of any sound, instrumental as well as complex. The sound system ends on the level of white noise (and coloured noise), which definitely is a synthesis of consonance and dissonance as having a qualitatively different sound allure, that is so much unlike classical instrumental sound, that dissonance or interference between this and that sound does not exist, if not artificially produced. In its new quality white noise is a “prime” as interval; only colouring of the sound may create intervals in sound. An analogy of what can be perceived by the ear with the categories in number theory as developed through the history of our western civilization could create the following categories for sound; with letters for traditional instruments and engineer constructs, numbers for concrete sounds and filterings thereof, the (analytical) hierarchy form complicated to simple is thus:

A) White noise and coloured noise.

1) Complex unanalyzed concrete sound. (complex numbers)

2) Sound reduced to arbitrarily chosen non-equally-tempered fundamentals with harmonics (real numbers)

3) Sound reduced to equallytempered fundamentals with harmonics. (irrational numbers)

B) Sound reduced to fundamentals with “instrumental” harmonic content. (rational numbers)

C) Sound reduced to sheer fundamental (sinus) or other elementary waveforms. (whole numbers)

a) Negative numbers are sound reduced for acoustical phenomenons; we apply the Descartian world of philosophy, where sound exists as cognition (natural numbers N : no negative numbers), where sound is registered by measurement in oscilloscope and dynamometers, which is an empirical development of “pascalian” materialization, today even on a computer, the development of pascalian calculator, materializing eternal divine “cartesian” numbers for practical human use.

a) * -n is necessary, that the system can contain minor harmonies, too. The minor triad is then the negative interval from the 5th harmonic directed towards the fourth. Application of complex numbers is consistent for some 2-accords, too: eg $C^3 - B^b1 - G^2 - E^2$.

b)* A logical system for 2/2-tonescales exists from interval ($h^7 - h^6$): ($C^3 - B^b2$), seen from $h^0:C^1$; equally-tempered scales with commas may be built for 1/2-tonescales with starting-point in the harmonic row.

REPETITION: ELEMENTARY MUSIC AND MATHEMATICS

The world is just there to the naïve man or the child to draw experiences from, like the musical work for the alphabeth musician or listener. Silence is the fundamental note in the natural world, where the eye has priority, always unconsciously at work, when not closed, sleeping; sounds break silence, and stand for something to fear, storm, territory belonging to another animal, earthquake, danger; nomad, go away with your flock to safer places!

Against that future for honest music art in coming generations: How will a future ear and mind created by musical trends and passion for true music, react to the enormous amount of music.

Will it overwhelmed by the diversity on the market belong to a typical postmodernist city-dweller with his MP3 in the ear, knowing that nothing will ever surprise him; not less dull appears musicology in its perpetual hammering in the tradition in new disguises; lately computertechnology the application of which mostly are limited within boundaries accepted in classical and popular music harmonies, hardly neoclassical apart from form which almost is a tautology, absolutely never opening up for basic new interpretations of the classical dichotomies: Consonance – Dissonance, as the most important. We hardly have any daring musicology, always stopping with what has proved appropriate for the market, hammering for the eyes of the reader into dogmatic mechanistic musicology, emphasized by the IT-software

that now markets the traditional terminologies, like the steelpens of the rhythm group of a metal danceband equipment. Where several sciences developed away from the mechanical concept that created them, and in a reformulated universe incorporate the original mechanistic in its scope as some special case, - mathematic numbers from natural numbers N through real and irreal numbers into complex numbers is an excellent illustration of this historical process, - musicology never went through an analogue process, even if an experiment of that kind could seem very obvious. The world of the natural numbers $1-4N$ in gregorian chanting for music in hierarchies of consonance - dissonance with higher numbers for liturgical purpose, and later the question - answers and the genius of the classical musicologists (Riemann a. so. on) are still in the science so paralyzing, that not even musicologists at IRCAM (music and mathematics) develop software that are not an extension of these harmonicbased classical Beethoven- and Mozarttunes, that these anachronistical natural numbers in music are not in the newest software basis for software and not special cases thereof. Musicology is like a paralyzed field; nobody dares to modernize. Put Mozart in a software; the modernisation is the technology as extension, not the terminology that define the application of the software.

Musicologists and theorists like Boguslaw Schaeffer (6) and C elestin Deli e (3) have made tremendous and important work in historiography concerning the explosion of modernism, but they remain descriptive and no analogy with classical musicology is possible: A point may be that modernism explodes the limits of musicology in a diversity of oeuvres that have one thing in common: The movement away from the classical tonal work in whatever direction it may be : Bi- or multitonalism, musique concr ete, serialism, musique eclectique with quotations from historical composers, in communicated music the improvised stream of music, provided by a DJ, sound landscapes, modal music, and whatever may be.

The relation between mathematics and music, may start with the most primitive kernel of dialectics: One - two - many, or with the mere repetition in it self of a rhythm, the song of the cuckoo, or a series of sung pitches, before any numbering is carried out, with the mental awareness of the fact that some quality has been felt, heard, seen, smelled before: recognition. According to Joachim Garff (5) the Danish philosopher in "Gjentagelsen." the repetition, "an essay in experimental psychology", depicted how "to grow one self again is to become another".

a) Such statement could easily, but superficially be transferred into the sonataform of that time, rather than in the theme with variations that the biographer states, as for the dramatic modulations in the central parts of sonatas, these influenced by circumstances from without, a third theme, or within, a tension between the two themes of an exposition. The most primitive notion of mathematics, repetition, is present at any level of analysis, because of its general psychological truth for every human being.

Before I present concrete research projects I've found it essential to tell about which world of music and thought I live in, that I'll try to redefine classical notions in it, aiming to create tension - relaxation, breathing in and out, question - answer, or whichever connotation of the phenomenon dis-con- neu(tral)-sonance over time is appropriate. Concrete compositional projects will relate to relativisation of con-dis-neutral sonances.

1) In his book Introduction to Christianity (1968.K osel-verlag, Munich. 1990 and 2004.Ignatius Press, San Francisco) Joseph Cardinal Ratzinger tells more about these life modes, the third of which, already created by scholasticism first, is *verum ens* (truth in being).

2) ACToolbox copyright by Paul Berg (1992 -2005). www.computermusic.org

3) Celestin Deliege: Cinquante ans de modernit e musicale: de Darmstadt   l'IRCAM. Mardaga. 2003, Sprimont Belgique.

4) Guerino Mazzola: The topos of music.2002. Birkh user Verlag, Basel,Switzerland

describes such practical transformation. Traditional classical common denominators and denotators are of course note, harmony, forms, tune.

5) Joachim Garff: SAK, Søren Aabye Kierkegaard. Gad 2005, København. pp. 210

6) Boguslaw Schaeffer: Introduction to composition. PWM Edition, Krakow 1976.

b) In my situation: With the WSEAS-lesson I do some recurs on and of the reformulations in LISP of the Verhulst equation on population growth, Paul Berg at the Koninklijke Conservatorium in Den Haag spent half an hour to make, but still using his Toolbox for Algorithmic Composition, the time in the Netherland is only part of my memory, (and of the memory of my computer)! I have a few photographs too, as for a materialization of some of the images I keep in my mind.

Then, in 1997-98 I applied the Verhulst formula with discrete values, not in a stream, with the purpose of finding recursive values to convert into musical harmonies, and found some patterns for where stability occurs.

FRACTAL RECURSION

From such intuitive mathematics: recognition as the platonic idea of recursion, there is a simple mainstream road into its earthly manifestation in music, recursion, a la mode a decade ago, where “fractal music” based on recursion had its big time in academic circles and on the net,

Most of the websites do not exist any more; some pieces have some beauty, I opened my ear for one about “The Big Bang”, where the composer explained what happened in the music, as of some beauty, most pieces like relaxation tapisserie with automatically generated minimalistic changes in the sound, analogue with the graphic fractals. Could we call composers like Terry Riley intuitive pre-monitors of fractal music? No, minimalistic music is a style, fractal music a technique, but they may overlap.

When the snow falls over Småland in Sweden, the wind, its direction, duration, intensity of the number of the snowdrops, and their size always change, even over small periods; it is mind-seizing to sit silently and look out of the window to see the snow falling.....so why not in music? This main road is eternal, the side road over limited time, carrying the drama of coming up that hill, down the next, getting from one point to the same point, the point of departure, in order to repeat, recognize, see and be new things and anew in the big form, walk or ski on two recursive legs in the small!

There we are. and we have to recognize two totally different philosophicval methods: recurs et discours, recursion and discussion, and their dynamical intermediates: What does discussion of recursion over time lead into?, and recursion of discussion, a recursion of discours de la discours, which might lead into the German philosopher Hegel's concept of the triad (thesis - antithesis - synthesis), seen by him as Gods law for history.

As automatically generated phenomenon “Fractal music” does not contain much discussion over recursion in music; the recursive formula is just there as method for a technique on music, like two feet used to trample a fitness bicycle in a narrow dark cell-ar. Another expression for the lack of composition in so-called “fractal music” would be, recognizing the mathematical character of music, that the mathematical formula is only translated into a language used by our aural sense. The residual between the translation into sound waves, and the ear's ability to perceive mathematically could be denoted music, as a tribute to the beauty and aesthetics of mathematics.

And to what extent does the ear in it self perceive mathematically? A perfect perception and analysis in the ear might lead into strange ethnographical theories: What about this: Is it a proved fact that not one animal or ethnic tribe applies harmonics, specially, intervals for numbering, not necessarily in the row of correct

numbering: Octave, quint, quarter..... In these intervals exists a natural numbering obviously clear; a written sign need not to be developed for an intuitive extension of "one - two - many" - in a natural world where the number of ribs is too big to be necessary, where the ability to number of legs and fingers on a hand or a claw is sufficient for survival in the nature. The number of consonant harmonics called perfect or imperfect would suffice. Anyway, applied or not in nature, the 5 first harmonics would be a very clear natural sign system for numbers, as fit as repetition, a bit more distinguished! And to contemporary research, it could be as surprising if an clear primitive signal system for numbers is not used by some species or genus in nature, as if it is.

Complementary to intuitive use of numbers in nature and to the ideal formulas for natural laws with necessary "commas" and corrigations explored since the antique, is its total exploitation, carried so far in the IT-world that mathematics does not stop with exploration of nature, but in IT-technology becomes a language for any human purpose, any symbol, any endeavour, can be translated into IT, not as a means for the Gods in nature, but for the Promethean human being, for whom it does not suffice to learn law in nature, as the fractal formula translated into music, but in his hybris wants and needs to create the world as purpose for his genus and species; through IT he can create visions, models and media for this endeavour, and music with its "harmonic" commas can in the IT-world become a phantastic translation of the world, differing from film dominance by not being simulated ape -visions, but may become visions and phantasies of laws valid in nature, should become an art with contemporary aesthetics, when contemporary formulas from nature are taken as point of departure for contemporary creation.

Do translation of formulas directly from mathematics into music not in themselves comprise any beauty or drama seen from a musical point of view, they still in musical translation leave possibilities for instrumentation, and a multitude of free interpretations, segmentation of rhythmic structures and scales, that break the totalitarian translatorian one-to-one relationship between formula and music, in itself difficult because of the number of parameters in the formula: A free in its intuitive basis compositional adaption of parameters to the subjective aesthetics or anti-aesthetics of the ear, at its smallest expression understood as a choice between several values in one or several fixed parameters in formula and for the tempo of the change of the remaining independent variable in the applied formula, may result in a hesitating discussion of means and results made by who applies such formula in music, a discussion that in its essence and character is compositional. The true compositional work is, however, more constructive:

A discussion about the recursive method represented by the fractal technique and its application in different styles of music, eg.- minimal music, starts with recognition of the necessity of composition for creation of music, not only literally as put - together - , ponere - com, but as a cognitive and earsensitive result of creation in our whole western tradition. The composer can in his work confront recursive formulas like the classical Verhulst's equation for population growth with other automatic methods; that would make some composition, but remains eclectic and superficial; I prefer, with an analysis of a deeper analysis of the equation is carried out, the numbers of which is applied as the basis of composition. In this case, the numbers from the Verhulst equation are subordinated to the ordinary treatments of compositional praxis, from instrumentation to recognition of the classical dichotomy: dissonance - consonance on several levels.

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