STUDIA UBB MUSICA, LXIX, Special Issue 2, 2024 (p. 61 – 89)
(RECOMMENDED CITATION)
DOI: 10.24193/subbmusica.2024.spiss2.06

GYÖRGY LIGETI: *HAMBURGISCHES KONZERT FÜR HORN UND KAMMERORCHESTER MIT 4 OBLIGATEN NATURHÖRNERN*. ASPECTS OF A CRYSTALLINE MICROTONALITY

MANFRED STAHNKE[1]

SUMMARY. This is a study on the microtonal aspects of György Ligeti's *Hamburgisches Konzert für Horn und Kammerorchester mit 4 obligaten Naturhörnern,* with special reference to its relationship with the American composer Harry Partch. The special mixture of equal temperament versus just intonation is analyzed for longer passages and adhoc chords in the concept of Ligeti. The movement "Choral" is confronted with Harry Partch's idea of "tonality flux". The "*Hamburgisches Konzert für Horn und Kammerorchester mit 4 obligaten Naturhörnern*" by György Ligeti, composed in 1998-2002[2], joins a long chain of exploratory forms of thought in his compositional work long years before he had pondered meloharmonics that would illuminate the great theme of tonality in a novel, personal way. In the *Horn Trio* (1982), melodies containing natural tones appear for the first time in the movement "Alla Marcia." Previously, in the same work, Ligeti used the 11th harmonic as a precise quarter tone. Yet in the *Horn Trio*, these microtonal events are transverse to the other voices of violin and piano. Ligeti spoke of three "autists," each living in his world of moods/tunings. In the works that followed, microtones take up an ever wider space, up to the *Piano Concerto* (1985-88) with 5th, 7th or 11th harmonics in trumpet, horn and trombone, and then to the *Violin Concerto* (1990-92), where two solo satellite strings from the orchestra, violin and viola, are retuned in natural interval relationships. The *Viola Solo Sonata* (1991-94) contains in the first movement "Hora lungă" a sign world new to Ligeti for natural thirds, natural sevenths and the 11th natural tone. He adopts these signs for the *Hamburgisches Konzert*, on which we will now focus.

Keywords: Ligeti, microtonality, Hamburgisches Konzert

[1] *Emeritus Professor, Hochschule für Musik und Theater, Hamburg, Germany. E-mail: ms@manfred-stahnke.de*

[2] The score of the *Hamburg Concerto*: Schott Music. Example of a recording: The Ligeti Project IV, Marie Luise Neunecker – Horn, Reinbert de Leeuw, ASKO Ensemble, 2003.

The Sketches

We find in the "*Hamburgisches Konzert* ...", hereafter *Horn Concerto* for short, a double world: On the one hand, non-Central European influences flow into this work to a considerable degree. On the other hand, it is embedded in many inventions from Western culture, from the Renaissance to the end of the 20th century. To describe this, I turn shortly to Ligeti's sketches, which Alessio Elia translated from Hungarian and annotated in his dissertation.[3] Here Ligeti notes down, as it were as a notepad, possible mental connections during the creation of the work. He says about his sketches in general, in order to prevent misunderstandings:[4]

> ''I write my sketches in pencil, at first only approximately, as words that are only addresses for me and stand for certain musical thoughts. If you read "Scriabin" in one of my sketches, it doesn't mean "Scriabin," but something that occurred to me in Scriabin's 10th Sonata. These are computer addresses, so to speak.''

Alessio Elia, at the time a composition student of Ligeti's former student Sidney Corbett in Mannheim, presented a meticulous philological-sonological analysis of the *Horn Concerto* in his doctoral dissertation in 2012. Here we will attempt to trace Ligeti to the finest ramifications of his constructions in the *Horn Concerto*.

A general search by Ligeti for music that would not necessarily and immediately belong to the Western European avant-garde context is reflected in his mentions of non-European or non-central European music. His sketches for the *Horn Concerto* do contain names of historical or still living composers of the Western periphery, but also very substantial references to distant peoples. Ligeti, however, vehemently opposes any classification of his works as "world music":[5]

> "Today, "world music" is such a big fashion. If you go to Tower in New York or FNAC in Paris, you have sections like "World Music" or "Musique du monde." That's an invention of the record industry. I'm against that, because that's where certain European-American clichés are commercially enriched by exoticisms, whether from Trinidad or from Guinea or from Bali. I am against "world music" and against crossover - that would be another commercial trivialization."

---

3 Alessio Elia (Diss. 2012, published 2022)
4 Wilson / Ligeti (1998), 45. Interview from April 15, 1998.
5 Wilson / Ligeti (1998), 45

It is with this background that we must read the following excerpts from Ligeti's sketches for the *Horn Concerto*, in which he mentions places, peoples and their music. Alessio Elia's translations are in square brackets.

Ligeti mentions Central African and Ethiopian polyphony several times:

> "Aka" (Central African Republic),[6]
> "Pigmeus polifón erdő (Aka, stb.)" *[Pigmy polyphony of the Forest (Aka, etc.)]*
> "AKA - PIGMY SZIGNÁLOK" *[AKA – PYGMY SIGNALS],*[7]
> "Banda Linda + Tonga + Etióp polifón erdő" *[Ethiopian polyphony of the forest],*[8] "Baka" (a neighboring people of the Aka).[9]

The alphorn is mentioned from the following areas:

> "Bucium" (alphorn) among the "románok, huculok" *[Romanians, Hutsuls],* the Hutsuls in the Carpathians,[10]
> the alphorn in the Swiss "Muota Valley".[11]

In addition, Ligeti notes scattered other musical suggestions:

> "Blues",[12]
> "Balkani szekundok" *[Balkan second],*[13]
> the mountain people of the "Ma" from Vietnam,[14]
> Peoples from New Guinea: "Bougainville",[15] as well as from the middle "Sepik" river.[16]
> Not to be identified is "Bu - Ky 4,8".[17]

---

6 Elia 289, 292. The Aka polyphony was introduced to Ligeti in the early 1980s by ethnologist and horn player Simha Arom.

7 Elia 292

8 Elia 291. The music of the Banda Linda was the essential discovery of Simha Arom. In 1979, Ligeti student Roberto Sierra had brought the record to the class. "Tonga" refers to a people in Zambia and Zimbabwe, not the Pacific Island. "Ethiopian music" also already flows into the beginning of the *Violin Concerto* with the retuned satellite strings, according to Ligeti, private communication.

9 Elia 292

10 Elia 289, 292, 293

11 Elia 292

12 Elia 292

13 Elia 293. This style of singing, which produces hard beating, is often found in the Balkans. It is incorporated as a central idea in Ligeti's *Horn Concerto*, for example in the parallel seconds of the natural horns.

14 Elia 292

15 Elia 292. Ligeti collected this music as early as the 1980s.

16 Elia 292

17 Elia 292

Ligeti sometimes links names from Western culture with descriptive details such as “metallic spectra”, “sighs”, “chaos”:

> “FÉMES SPEKTRUMOK?” *[METALLIC SPECTRA]*:[18]
> “ 1. TÉTEL = LASSÚ (‘Grisey’)” *[1st PART = SLOW (‘Grisey’)]*,[19]
> Murail,[20]
> Vivier.[21]
> Partch[22] (the number 43 appears before, probably a reference to his tonal system).
> Schubert “C-dur Quintett lassú tétel” *[slow movement]* Adagio.[23]
> Weber.[24]
> Haydn “Schöpfung = Chaos” (written with the German title).[25]
> Gesualdo:[26]

E.g. 1

Mention of Gesualdo in the context of Ligeti’s sketches, transcription Elia, his translation again in square brackets.

1. The Mountains

When Ligeti had just premiered his *Horn Concerto*, I talked with him about C.M. von Weber, among other things. In this context, I invented a word: “Das Waldische”. He apparently felt this to be an apt word not only for Weber, but more broadly for his own engagement with the horn. Switzerland, the

[18] Elia 289
[19] Elia 289. Gérard Grisey
[20] Elia 289, 292. Tristan Murail
[21] Elia 289, 292. Claude Vivier
[22] Elia 294, 295. Harry Partch, U.S. composer, instrument maker, and (re)inventor of a natural tuning system, lived from 1901-1974. Ligeti visited him in California in 1972.
[23] Elia 291. Franz Schubert
[24] Elia 292. Carl Maria von Weber
[25] Elia 291. Joseph Haydn
[26] Elia 291. Carlo di Gesualdo

Carpathians, Vietnam, New Guinea, and Africa with music from the forests all come together here. In a 1998 interview with Peter Niklas Wilson, Ligeti said of the emerging *Horn Concerto*:[27]

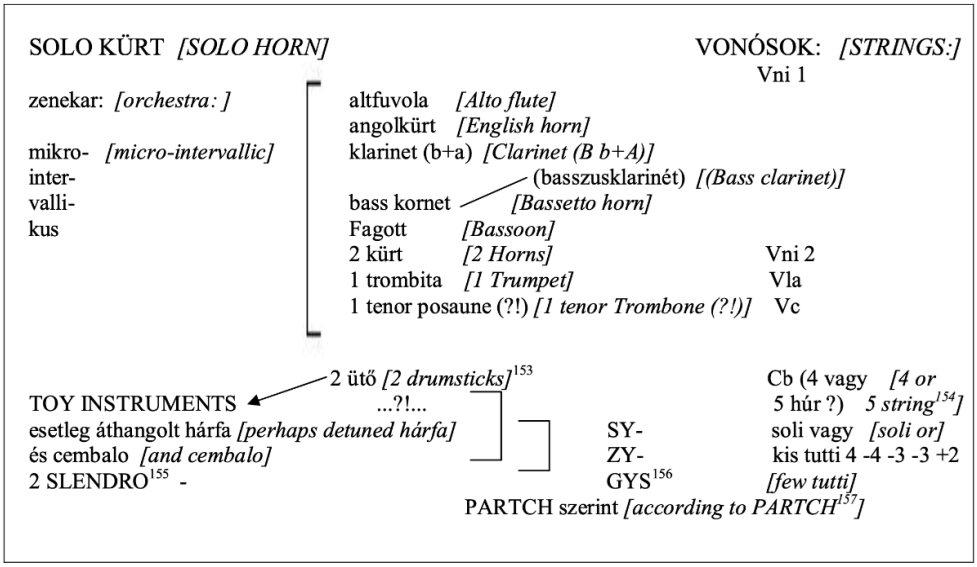
> I am now writing a horn concerto. I use valve horns and natural horns - because of the beauty of the overtones, which I then do not have corrected with the right hand. I've already done that in the Horntrio. But where does that come from? From my childhood experience… When I was three years old, I spent three months in a small town in the Carpathians with an aunt. A Hungarian-speaking area, but there were some Romanians there. And there I heard for the first time the *bucium*, the Romanian alphorn, slightly different in form than in Switzerland, but identical in function. It goes up to the 16th overtone. I heard it with amazement, and I got my love for natural tunings when I was three years old, through living folk music.

Numerous recordings from the Alps or the Carpathians show, despite the actual natural overtones, many deviations, beatings which in ensemble playing give the charm of this music. This becomes a supporting component in Ligeti's work. Other elements from the "forest" also find their way directly into the *Horn Concerto*, see for example the "signal" idea: apart from Africa, alphorn or *bucium* are also used in the Alps or Carpathians to signal across large spaces. Virtuoso folk music such as from the Swiss Muota Valley, finds its way into horn solo passages. Ligeti also writes quasi-folk songs, for example in the "Choral" of the 2nd movement, perhaps close to Carpathian melodies?

Ligeti obviously began in his mind with instrumentation where the four natural horns do not appear at first.[28] In the sketch B6/2 transcribed by Alessio Elia, Partch, retuned harp and harpsichord, as well as "toy instruments" play a role. Since the 1980s, when in Ligeti's composition class there was much speculation about Partch with his natural intervals. Ligeti was also deeply influenced by alternative meloharmonic possibilities. Harmonics, aside from first approaches in the 50s, appear with him, as mentioned, in the *Horn Trio*. In the *Horn Concerto* sketch B6/2, referred to, Ligeti apparently speculates about a multi-universe of tuning systems. His orchestra should contain an instrumental section for microintervals (Alessio Elia always places his translations from Hungarian in italics and in square brackets):

[27] Wilson / Ligeti (1998), 45
[28] Elia 295

E.g. 2



B6/2

Ligeti's sketch with an alternative set of instruments, transcription by Elia.

SYZYGYS is a pop duo from Japan with composer Hitomi Shimizu, who always tunes her keyboard in Partch's 43-tone scale. Louise Duchesneau told me in 2022 that in sketches for the *Violin Concerto*, Ligeti mentions the title of a Shimizu work, *Fauna grotesque*, which Mari Takano brought to the composition class.[29]

[29] Duchesneau 139, footnote 70. *Fauna grotesque* can be heard at https://www.youtube.com/watch?v=HkYWccNb0-4 (visited Dec 27, 2023). See also Elia 295. In his footnote 156 he describes the context of the word syzygy:
"SYZYGY is a word which has different meanings according to the field it is applied. In *Astronomy* it has the following meanings:
a. Either of two points in the orbit of a celestial body where the body is in opposition to or in conjunction with the sun.
b. Either of two points in the orbit of the moon when the moon lies in a straight line with the sun and Earth.
c. The configuration of the sun, the moon, and Earth lying in a straight line.
In poetry syzygy is the combining of two feet into a single metrical unit in classical prosody. In mathematics, a syzygy (from Greek συζυγία 'pair') is a relation between the generators of a module *M*."

Ligeti's sketches are without date, so we don't know when he switched to the present version with four natural horns and to the classical double horn F/B*b*, omitting all toy instruments and the retuned harp / harpsichord / electric instruments. I recall that at one point he mentioned the soloist Marie Luise Neunecker's desire not to play a natural horn herself because it required a style of playing with which she was unfamiliar.

Ligeti then chose a meloharmony that is binary between 12-tone temperament and just intonation. This gives him a wide range of possible exotic intervals anyway. He can thus easily do without electric piano, electric organ, retuned harp, retuned harpsichord.

By using the naturals 2, 3, 5, 7, 9, 11, 13, 15 for the five horns (including octaves 4, 8, 16; 6, 12; 10; 14), Ligeti obtains a very wide range of pitches, some of which are far removed (up to a quarter tone) from the tempered tones. Ligeti calculates very precisely with the deviations, and he invents signs for the 5th harmonic, natural third (-14 cents), the 7th harmonic, natural seventh (-31 cents), the 11th harmonic (-49 cents, almost a quarter tone), and the 13th harmonic (+41 cents, in Ligeti's case -59 cents, because he notates the next higher semitone). Apart from that, Ligeti uses microtones in the rest of the ensemble. Thus, he by no means has a "microtonal system", neither in natural nor in tempered tuning, unlike Harry Partch, to whom we must refer briefly.

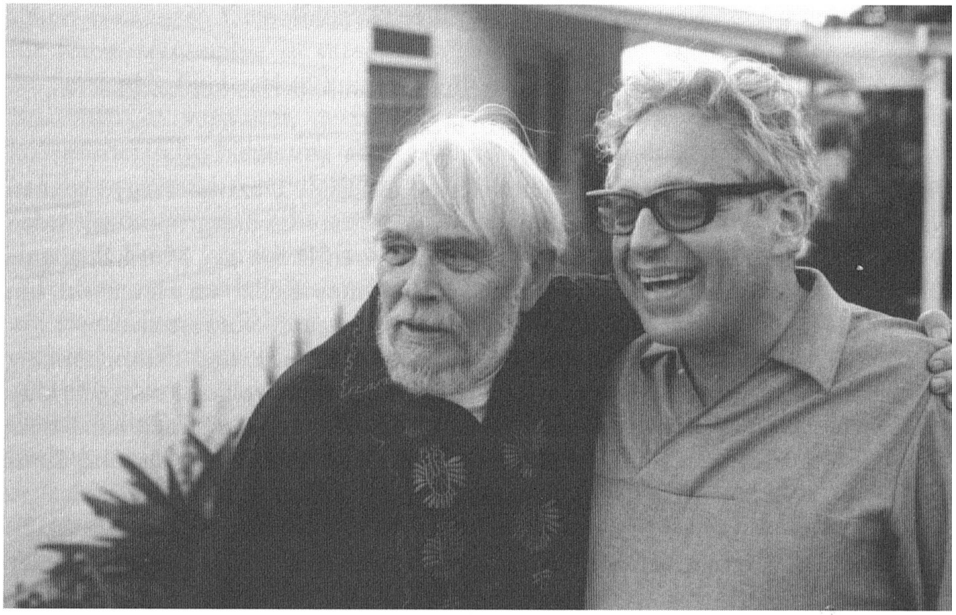
2. The Other Clochard

In 1979-80 I studied with Ben Johnston, a friend, collaborator and patron of the American maverick Harry Partch, and became intensively acquainted with his music and theory. Harry Partch, the composing hobo (only in his 30s) and instrument-tinkering philosopher, lived from 1901 to 1974. The first German performance of one of his works with homemade instruments (the dance opera *The Bewitched*) did not take place until 1980 in Berlin. In the years before, Ligeti had propagated bringing Partch to Germany. The first attempts failed due to the complexity of such an undertaking, because Partch's instruments are sometimes so large (Marimba eroica) that they only fit into the garage at Partch's own home, which was left to him by Betty Freeman. Ligeti told of this after his Partch visit in 1972.[30] In the Ligeti volume of writings, there is a beautiful picture of these two part-twin / non-twin mavericks, these

[30] Excerpt from a conversation with György Ligeti on March 5, 2001, in: Stahnke (2017), 294ff

unconditional musicians / music explorers.[31]

Picture 1



Harry Partch und György Ligeti 1972, Photo von Peter Andersen (Schott Music, Mainz).

Anyone who listens to Partch's music can hardly escape the peculiar appeal of his harmonicity. How it comes about, however, remains hidden from us at first. There is as yet no notation for this music beyond Partch's own intervallic proportional notation. Partch himself made a point of burning bridges to the contemporary music of the West.

In these brief remarks on Harry Partch, I will try to make his music perceptible to us in outline. Since Partch, on closer inspection, took chords familiar to us as the starting point of his harmony, nothing is more obvious than to first notate the basic structure of his chords in a way familiar to us. However, we will have to take into account that Partch firstly wanted non-tempered

[31] Ligeti (2007), 469. There from 462ff detailed, sometimes whimsical comments by Ligeti on Partch with some errors: 463 Ligeti claims that Partch lived as a tramp for 60 years (this was only true for the time of the Great Depression in the 1930s into the early 40s). 464 he thinks that the 43-tone scale results from down-transposed harmonics (but Partch calculates harmonics plus undertones). In 465 he forgets the 11th tone when describing O- and Utonality and stops at the ninth chord. 465/466 he knows nothing about the cello neck of Partch's "Adapted Viola" and speaks of a commercial viola.

intervals, secondly extended his harmony up to the interval 11/8, which is exotic for us (the “natural tritone”). Certainly, Partch has set up obstacles for us on the way into his private crystalline labyrinth. On the other hand, he offers paths in the form of numerous references to European music-theoretical thinking from the Greeks to the dualism of the 19th century, the mirror thinking between major and minor. For his “Tonality Diamond” he invents the words “Otonality” for his extended “major”, referring the overtone series and “Utonality” for its inversion, the undertone series.

The core of this goes back to the dualistic way of thinking in the 19th century, which Arthur von Oettingen[32] and Hermann von Helmholtz[33] took over from Moritz Hauptmann.[34] Partch, the self-made music theorist, had found Helmholtz in an English translation by Alexander John Ellis[35] in a California library. Helmholtz and von Oettingen like Hauptmann assumed integer interval ratios in overtones and undertones. This substantially nudged Partch’s Just Intonation thinking. The entire U.S. community of this school of thought is initiated by Hauptmann-Oettingen-Helmholtz-Partch. Ellis invents in the Helmholtz book translated by him complementary the cent calculation, where he divides the octave into 1200 logarithmically equal smallest steps, “cents”. Partch often explains his Just Intonation in his book Genesis of a Music using the cent values for the pure intervals.[36] Ligeti had heard of this and went to see Partch in 1972 in the course of his visit to the new computer music center at Stanford University.

Already the title of Partch’s book gives some information: He does not call it “Genesis of a New Music”, because Partch does not regard the principles of pure tuning and “corporealism” as new. Partch’s corporealism means emotional and directly physical “tangibility” and goes back to the ancient Greeks.

> Just how old this ‘new’ philosophy actually is having since been a continual revelation to me.[37]

Partch avoided emphasizing just intonation in the book’s title. He is not at all concerned with pure, simple intervals. *Genesis of a Music* means inventing a music (out of many possible ones) as opposed to inventing within the framework of an existing musical culture.

---

[32] von Oettingen (1866/1913)
[33] von Helmholtz (1863)
[34] Hauptmann (1853), 34
[35] von Helmholtz (1863), translated, expanded by Ellis (1895)
[36] Partch (1974), 127-179
[37] Partch 4

> Mine is a procedure more of antithesis than of simple modification.[38]

> The creative individual, in developing the man-made ingredients and in examining the God-given, finds the way to a special kind of truth.[39]

Partch described his system as a "play of relative consonance against relative dissonance."[40] It is in this, and not in the possible autistic ringing of pure intervals, that the exotic appeal of Partch's compositions lies.

Partch also mentions American pop music in this context, which, "despite some shortcomings, owes nothing to a half-educated and academic Europeanism."[41]

From one standpoint the twentieth century is a fair historical duplicate of the eleventh. At that time the standard and approved ecclesiastical expression failed to satisfy an earthly this-time-and-this-place musical hunger; result: the troubadour...[42]

Partch himself toured the U.S. for many years as a traveling singer, accompanying himself on his "Adapted Viola," a viola with a cello neck, with nail markings for the natural interval positions.

At this point it becomes necessary to go briefly into the details of Partch's scale. We cannot give a detailed account of the system and Partch's instruments here. But in order to indicate the possibilities that interested Ligeti, we must at least hint at outlines. Ligeti said in a 1973 conversation with Clytus Gottwald:[43]

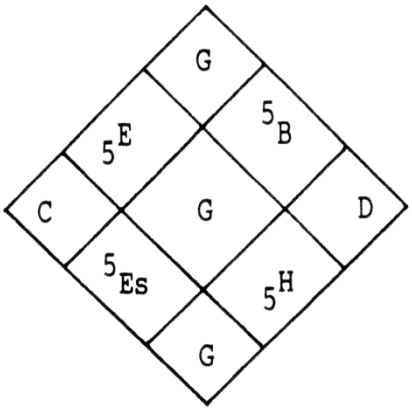
> The inner structure of these chords is always a major or minor chord, sometimes with seventh, ninth or undecimal. But the succession of the chords is very strange. The chord that is "normal" according to our rules suddenly slips into another chord that belongs to a completely different tonality, indeed to a completely different tuning system. Very soon one becomes aware that an adaptation to the Procrustean bed of our tempered-tonal music is completely inappropriate to Partch's music. With him, these are not different tonalities in one system, but different systems of tonalities that cross each other,

[38] Partch 4
[39] Partch, preface xvi
[40] Partch 154/156
[41] Partch 52
[42] Partch 52
[43] Ligeti (2007), vol. 1, 468. Edited version of a conversation with Clytus Gottwald for broadcasts by Süddeutscher Rundfunk Stuttgart on October 6, 1972 ("Die amerikanische Avantgarde") and April 27, 1973 ("Harry Partch - ein Randsiedler der Avantgarde"). First published under the title "Tendenzen der Neuen Musik in den USA. György Ligeti im Gespräch mit Clytus Gottwald", in *Melos/NZ*, (1975), no. 4, 266-272.

complement each other, relate to each other. So it is a tonal composition of "higher order". And it is not impossible that the musical ideas of the tramp Harry Partch will still prove fruitful in the future development of music.

Partch starts from a 1/1 fundamental G. Analogous to the mirror thinking of major-minor dualism, he first builds his small "Tonality Diamond". I note this with the note names known to us and add an index for the natural thirds as an indication of the comma deviation for the 5th tone of the natural tone scale, 5/4. Thus, for example, tone B as the natural third above G is approx. 21.5 cents lower than in Equal Temperament. The difference is the famous syntonic comma 81/80. "81" means the fourfold superimposed pure fifth, i.e., not counting the octave, 3^4. "80" refers to the natural third 5/4, multiply octavated. Analogously, the E*b* under G is 21.5 cents higher.

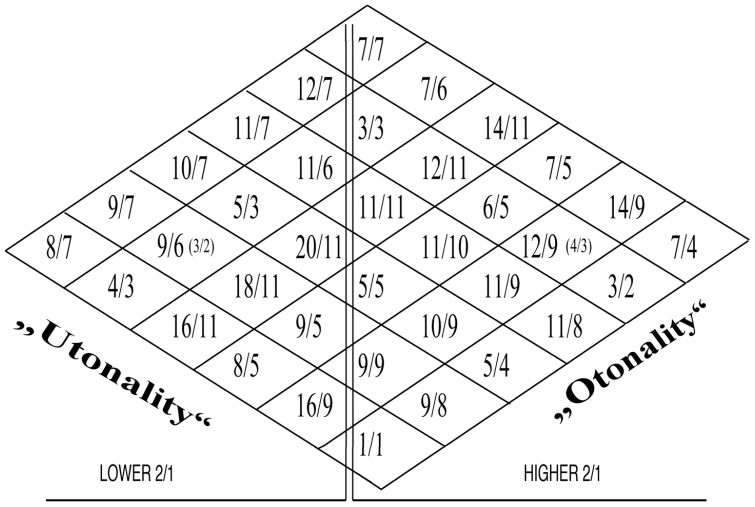
E.g. 3



Partch, Small "Tonality Diamond", in my transcription.

From this, Partch develops a large "Tonality Diamond" including the 7th and 11th naturals. Partch avoids our note names and writes only intervallic ratios. We find the further development of our "major" chord on the paths to the upper right, the "minor" chord on the opposite paths to the upper left. Partch calls his extended major "Otonality", his extended minor "Utonality":

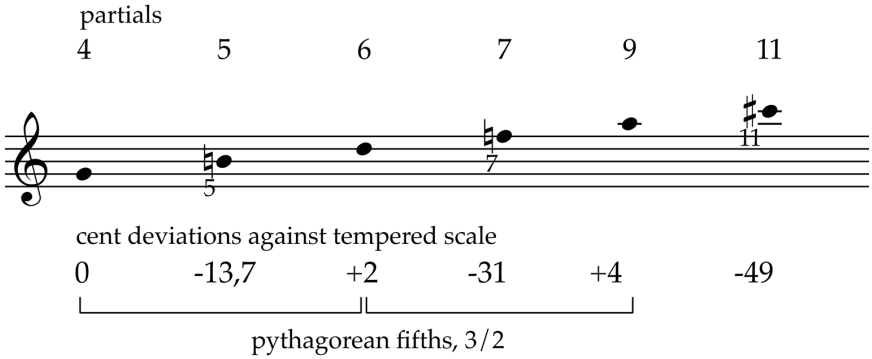
E.g. 4



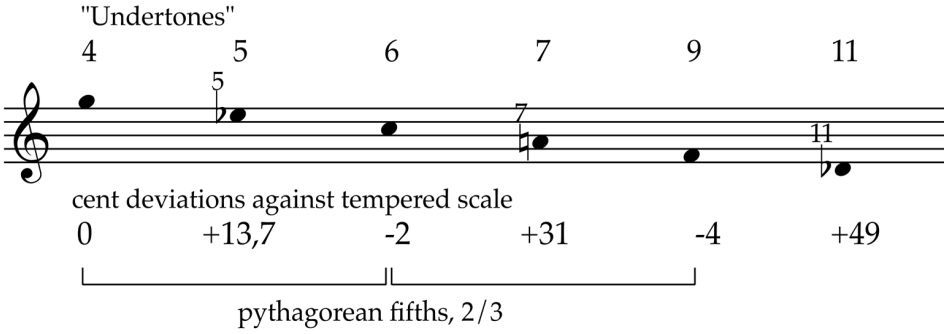
Partch, Expanded “Tonality Diamond”, in his proportional writing.

We can visualize these extensions using the natural tone series and its inversion. I note indices for the various commas, whose cent deviations against Equal Temperament are given below:

Otonality on G

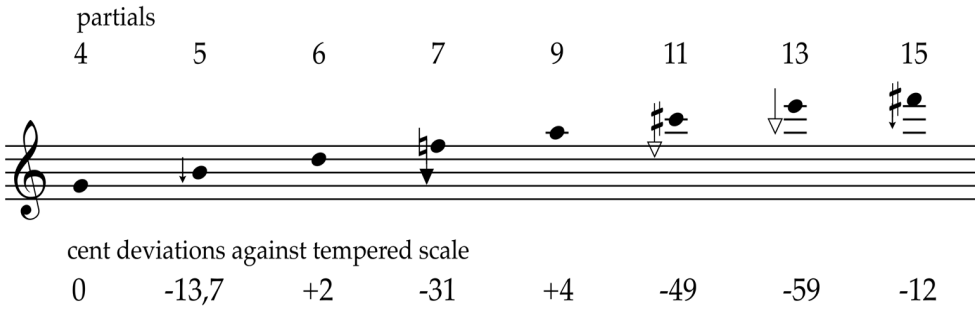


Utonality under G



Ligeti invented various arrows for his *Viola Sonata* that point to these commas. In the *Horn Concerto*, he goes even further in the natural tone series and notates like this:

3. Natural tone series on G with Ligeti's arrow accidentals and the naturals he used, without octaves



Ligeti's basic approach to a tonality that is no longer tempered is not at all dissimilar to Partch's. Ligeti writes:[44]

> The reason why I have written a concerto for solo horn and four natural horns (in the orchestra) lies in my interest in novel harmonies! Behind this is that I have - for many years now - rejected both total chromaticism and Equal Temperament. They have become more and more consumed in centuries of European music history - chromaticism since Wagner's *Tristan*.

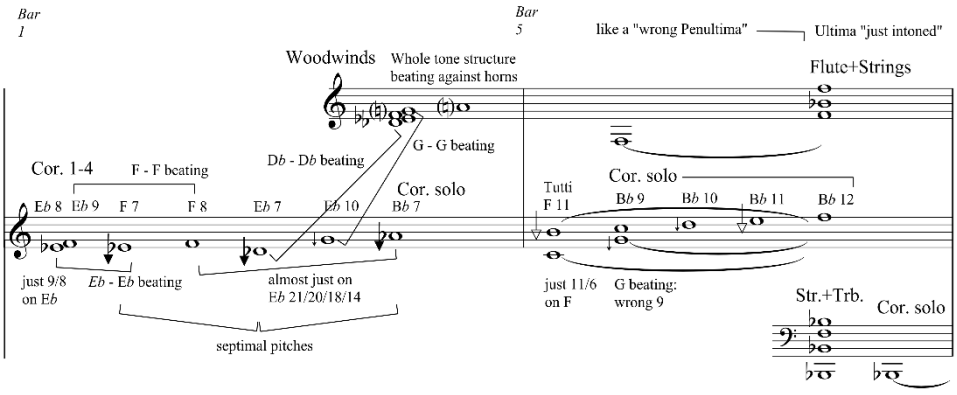
[44] Ligeti (2007) vol. 2, 311

In the 1990s, Ligeti's desire for a new quasi-tonal language seemed to grow stronger. It was even rumored that he wanted to have a 43-tone organ built in the Partch scale after a temporarily planned move to Paris. Nothing came of either.

The Beginning of the Concerto

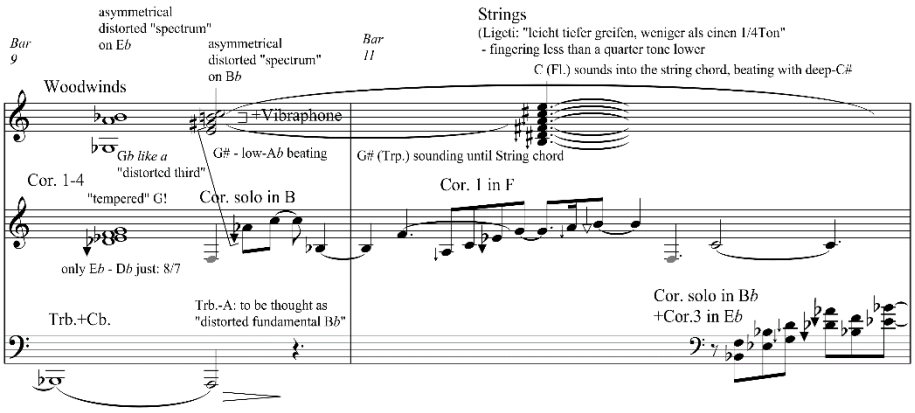
Ligeti does think of Partch and the possibilities of his "Just Intonation", but he by no means uses it systematically. He completely omits the inversion of the natural tone series, if we disregard the minor-oriented chords in his work. Instead, we find in Ligeti an again personal, "schräge (oblique)" harmony,[45] a constant asymmetry and freedom of pitch treatment. This is evident from the very beginning in his "Praeludium", the 1st movement of the *Horn Concerto.*

E.g. 4

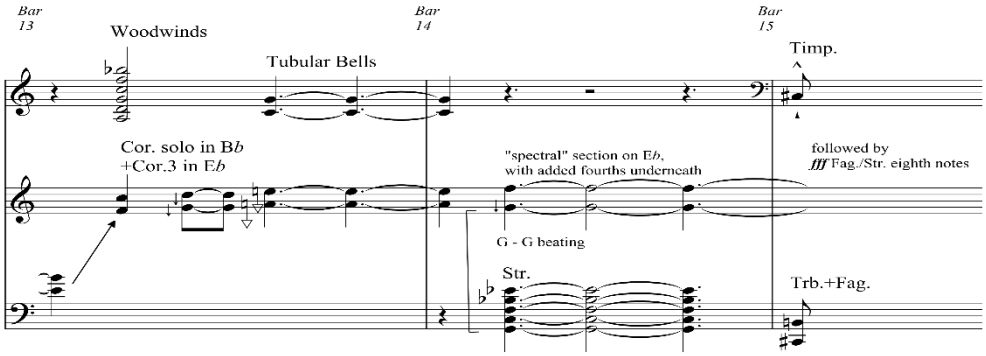


E.g. 4a: Beginning of 1st movement, "Praeludium". Excerpt from Ligeti's manuscript (with deviations from the printed score)

[45] Ligeti (2007) vol. 2, 312



E.g. 4b: Beginning of 1st movement, "Praeludium", continued. Excerpt from Ligeti's manuscript (with deviations from the printed score)



E.g. 4c: Beginning of 1st movement, "Praeludium", continued. Excerpt from Ligeti's manuscript (with deviations from the printed score)

Ligeti begins with the just intonation second 9/8 in the E*b* horns, but almost immediately creates a beating against the F horns by adding the septimally lower E*b* (7th harmonic, natural seventh above F). Also note F as the 8th harmonic of the F horn is not identical to harmonic 9 (also an F) of the E*b* horn. This idea of harmonic ambivalence will permeate the entire *Horn Concerto*. Natural spectra are implied and countered. In the "Praeludium," for example, the whole-tone structure of the woodwinds in bar 4 can be read as a distorted "spectrum" on E*b*: The septimally low D*b* (E*b* horn 4, 7th harmonic) becomes tempered D*b* (flute 2), the notes E*b* and F (tempered in basset horn 2 and flute 1) are still close to the natural notes of the horns, but the

natural note G (E*b* horn 3, 10th harmonic) is clearly set against the non-indexed, tempered note G (basset horn 1). Tone A (oboe) suggests an 11th harmonic on E*b*. This would have to be a quarter tone lower. However, this A could also belong to the scale on F that runs through the entire passage up to bar 5 with many asymmetries.

In bar 5, Ligeti builds considerable harmonic tension by mixing root F ("partials" 4, 6, 11, 12), then root B*b* (9, 10, 11, 12 in linearity) and E*b* (9, 10). Overall, Ligeti uses the whole like a "false penultima," which in Renaissance terms is the tension chord before the ultimate resolution: the "ultima" in Ligeti is the fifth B*b*-F. The "Penultima" is a real witty-quirky Ligeti setting, it contains in the bass the fifth fall F to B*b* ("bass clausula"), the "tenor clausula" C to B*b*, also the "soprano clausula" low/E to F in the solo horn. Interwoven into this clausula development is the foreign-tuned G as the 5th harmonic above E*b*, which still comes from the initial development and has somehow been left hanging from the possible initial root E*b* as a true 5/4 third.

Bar 9 brings a distortion of an implied "spectrum" on E*b*. Its 5th harmonic G is distorted twice, downward to G*b* in the bassoon, upward to G (9th harmonic) in horn 1. Note A in basset horn 2 distorts harmonic 11 of an E*b* "spectrum" upward by a quarter note. This is followed by a next distortion of a possible "spectrum" on B*b*, starting with the bass note A instead of B*b*, and "metallized" by the two higher components C and A*b* in vibraphone played ***ff***. The chord tones E-G#-B-C could refer to the B*b* harmonics 11-14-17-18: E -49 cents, G#/A*b* -31 cents, B +5 cents, C +4 cents. The horn solo fills a B*b* overtone melody whose 7th "partial" low/A*b* beats against G# of the trumpet.

In bar 11, the solo horn's B*b* line modulates to F in F horn 1, with Ligeti mixing in a specially tuned string chord. Here the basic idea is a neutral third structure with inherent asymmetry. Many components beat on the one hand against the F-"overtones" buildup of horn 1, and on the other hand manifestly against existing tones, e.g. the C of the flute against the low/C# of violin 1.

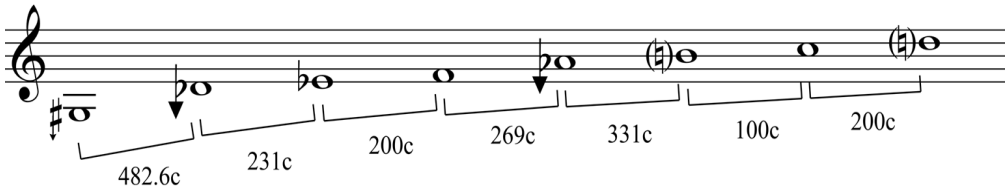
Bar 13 brings a chord of fourths in the woodwinds and a very special "neutral" C-G-A-E chord, with the neutral third low/E with its sub-fifth low/A suggesting a kind of misplaced pentatonic.

This first part of the prelude ends with a blend of the E*b* naturals 3, 4, 5, 9, real in the horns and imagined in the strings, with a sub-fourths layering in the strings in bar 14.

The brief *stringendo* that follows leads to a distorted, quasi-diatonic final chord that includes harmonics on the root notes E (Cb.), E*b* (Hr. 3 and 4), F (Hr. 1 and 2), and B*b* (Hr. solo), except for the "tempered" notes B*b* and D

in the basset horns. Here, the non-octave between double bass[46] and solo horn, low/G# to low/A*b* (-17.4c), beats especially, as does the non-octave low/D*b* to C (-69c).

E.g. 5



Cb. nat.third E-string — Cor.4 E*b* 7 — Cor. solo B*b* 7

Final chord of the "Praeludium", double bass low/G# according to the manuscript

This outlines the important meloharmonic events in the 1st movement. All scale or harmonic events known to us are skewed. It is true that we repeatedly hear familiar elements such as a pure, Pythagorean major second at the beginning of the movement. But it immediately gets into a beating by a microtone. Soon after, we recognize a whole-tone scale that contrasts microtonally against the overtone melody of the horns, whereby these natural tones are derived from different fundamental tones and seem to be shifted. We encounter the whole-tone scale as a remembered topos quite often in the *Horn Concerto*, mostly in distortion from Equal Temperament.

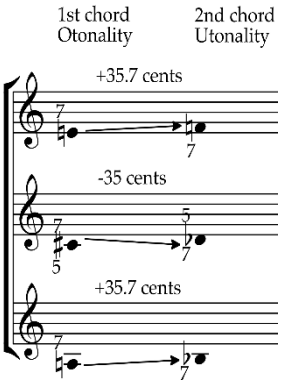
At the end of the phrase, we experience a "finalis", a fifth+octave chord with the aforementioned Renaissance-like cadence or clausula. We experience old vocabulary like the whole-tone scale or the octave+fifth chord. In retrospect, everything is somehow connected via a scale - though not simply tuned - on fundamental F in quasi-minor / quasi-major, leading to the octave+fifth chord. Everything swings in a spider's web and waits for us to adjust the meloharmonicity between Equal Temperament and Just Intonation.

[46] The remark to the double bass "nota reale" in the Schott score is incorrect and is not found in Ligeti's manuscript.

4. The Second Movement: Tonality Flux in "Choral"

The 2nd movement "Signale, Tanz, Choral" first leads over six bars into the world of overtone excerpts, except for a few echo-like overlaps. Here the proximity to European or African signal (horn) music becomes clear.[47] In the "Choral" from the 2nd movement, Ligeti places a melody "*in rilievo*" in the 2nd horn, i.e. in the foreground, which, charmingly harmonically disguised, is accompanied by the other tutti horns. Woven into this is a Partch technique that Partch called "Tonality Flux".[48] Here tones are often continued in microtonal steps. This creates a kind of tonal inflection, a kind of watery meloharmonicity. I give an example from Partch:[49]

E.g. 6



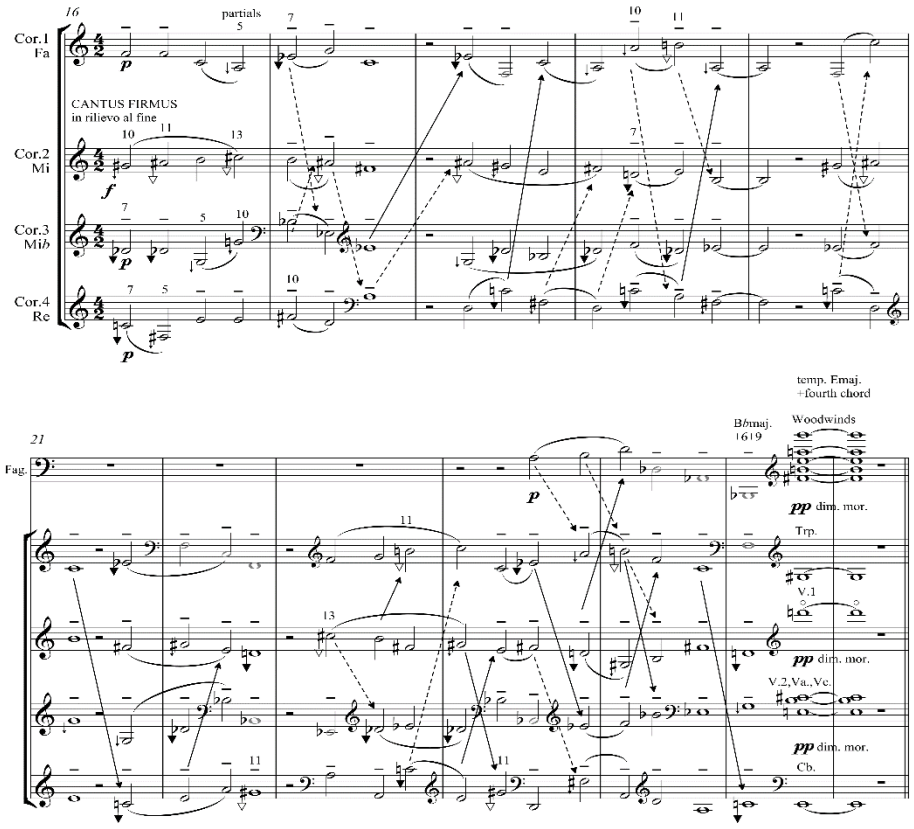
Tonality Flux, a Partch example is transcribed

The first chord is on A^7, which is the natural seventh below central tone G. The second chord hangs below F_7, the natural seventh above central note G which does not appear. Both chords contain natural thirds, either as 5/4 above A^7, or as 4/5 below F_7. We hear 1st a natural "major" chord, then 2nd a natural "minor" chord. All notes are linearly connected in sixth-note steps around 35-36 cents. In Partch's last work, his opera-oratorio stage work: *Delusion of the Fury*, such tonality flux connections play a major role.

[47] Notes on sound examples are given in Appendix 1.
[48] Partch (1974), 187ff
[49] Partch 189, Diagram 13 transcribed.

In the following analysis of Ligeti's "Choral", the phenomenon of tonality flux is represented by arrows: Solid arrows indicate steps smaller than a quarter tone. Dashed arrows refer to "non-octaves":[50]

E.g. 7



2nd movement "Signale, Tanz, Choral", "Choral" analysis, notes according to manuscript

[50] A mistake in the Schott edition: the second note, measure 14, in the 3rd horn is a repeated low/D*b* according to the manuscript. The articulation marks are completed according to the manuscript.

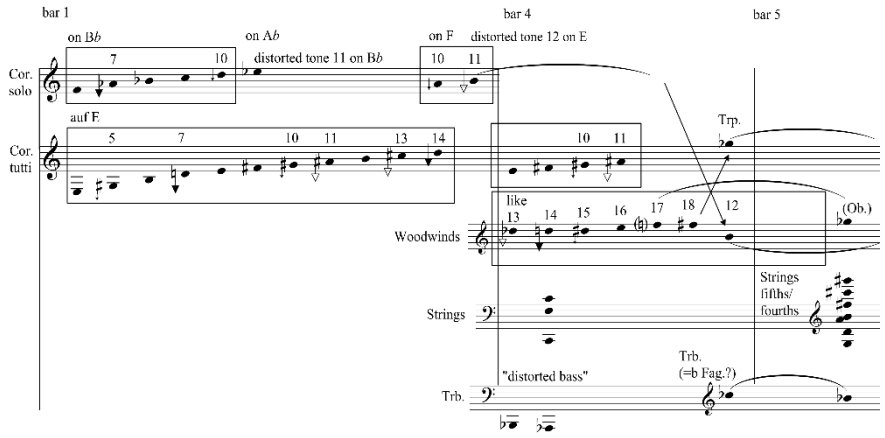
Ligeti's harmony in this movement also indicates a distorted major-minor tonality with an additional tone in each case. The chord descriptions with root and inversion, given for the upper line, are analytical approximations omitting the microtonal deviations. It is not unlikely that Ligeti had these classically or jazz-oriented chords in mind, since otherwise no non-tonality chords occur at all.

5. Spectra

The meloharmonically most complex movement is the fifth, "Spectra". The large-scale hoquetus idea is interesting to follow. On gap, Ligeti confronts steadily distorted, partially distorted, or not at all distorted spectra on various and mixed root notes.

Ligeti begins with a hoquetus scene of the horns on the root notes B*b* (solo) and E (four tutti hons). In bar 4 he uses an E spectrum, going from the 8th to the 18th "partial". This time the woodwinds also get the "right" arrows for the appropriate partials, undistorted. Cheekily, however, the trombone plays the wrong fundamental note B*b*, which still refers to the previous hoquetus between the fundamental notes B*b* and E. Ultimately foreign to this spectral event is the F minor chord in bar 4. Here, too, I suspect Ligeti's "Clausula thinking" in the direction of the Renaissance: the chord A*b*-C-F is a penultima to G-D-G, with added fifths in bars 5/6, even provided with a minor third B*b* in the trombone, and with the jazzy "major7" G*b*/F#, multiplied in the trumpet, oboe and strings.

E.g. 8

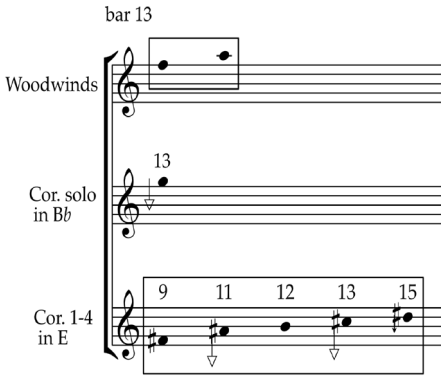


The 5th movement "Spectra", bars 1-6

In bars 4-5, we find the partials 12 and 18 from the E spectrum, enharmonically reinterpreted as C*b* and G*b*. C*b* goes "sighing" (Gesualdo!) to B*b*, foreign to a string fifth chain G-D-A-(E omitted)-B-F#-C#-G#. The omitted note E becomes, as at the beginning, the fundamental of a spectrum of the tutti horns, combined with fundamental B*b* of the solo horn. From bar 5 onward, this creates a double spectral world between E and B*b* as at the beginning, not shown in the example above.

The woodwinds "pollute" this double spectral world from bar 6. The low strings with the ending fifth A-E do not fit in, standing "dirty" to the low basset horns with F and A*b*. Tirelessly, however, the tutti horns blow their spectrum on E with now rapidly changing short spectra of the solo horn, which in bar 13 creates a fine non-octave friction with note F# of the 4th horn with the extremely high 13th partial of the spectrum on B*b* (note low/G). The extremely high F of the bassoon as well as the oboe-A form here together with the solo horn low/G an inharmonic "spectral" component to the tutti horns, which are all harmonically on E with the notes 9, 11, 12, 13, 15. A distorted whole-tone chord results from low/A#: low/A#, B, low/C#, low/D#, F, low/G, A immediately before the crash of bar 13 into the bass cluster A*b*-A-B*b*-B-C, not shown in the following example:

E.g. 9

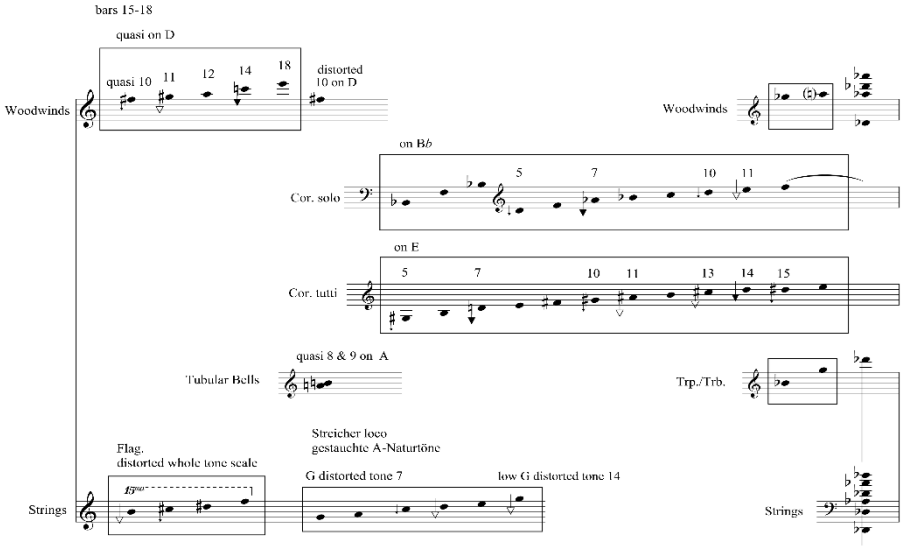


"Spectra", bar 13

This speculative meloharmonic situation is continued in bar 15: A spectrally imagined wind chord on D with D-low/F#-low/G#-A-low/C-E with corresponding arrow accents for the spectral tones 10 (low/F#), 11 (low/G#), 12 (A), 14 (low/C) and 18 (E) is provided with further high components by string flageolets, these being the spectral tones 13 (low/B), 15 (low/C#), 17 (D#) and 19 (F). The latter is also a distorted whole tone scale. Ligeti gives here

exact and correct deviation indications from the temperament for the strings, related to the fundamental D.

E.g. 10



“Spectra”, bars 15-18

In bar 16, similar to the final chord of the 1st movement, a partially compressed spectral chord on A appears in the strings: A-low/C#-low/D#-E is spectrally exact (notes 8, 10, 11, 12) with the corresponding deviation indications. Below this, however, the double bass with tone G does not fit (too high relative to the 7th partial), nor does the G above it (too low relative to the 14th partial).

The end of the movement, again similar to the 1st movement penultima/ ultima-like, is formed by the fifth D*b*-A*b*. But looking closely, these are only hints to old ideas of a “finalis”. In Ligeti’s reality a never ending “circle” is a better interpretation of his thinking. Ligeti was always looking for possibilities to cancel the arrow of time with its directional tendency and to form time like a static spatial structure.

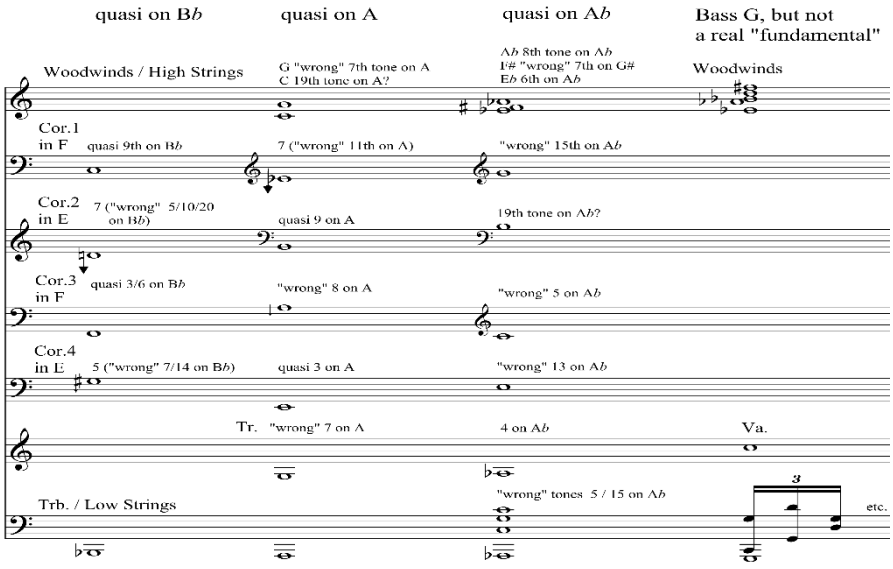
6. Summary of the Microtonal Procedures in the *Horn Concerto*

Ligeti takes a mischievously playful approach to the phenomenon of the "natural tone series". He uses various procedures to approach or distort it:

1. There are indeed "real" spectra in various orders of magnitude, from 2 tones (tones 7+8, 1st movement, beginning) to linear spectra (such as tones 5, 7, 9, 11, 10, 6, in the 4th movement, beginning solo horn) to 11 tones (tones 8-18, 5th movement, bar 4, here I add tempered tones with the correct arrow accidentals).

2. Spectra experience small, as if random microtonal changes or "pollution" in the course of the partial tone series, see the beating of the partial tones 7, 8, 9, 10 on E*b*, bars 1-4, movement 1. Another example is found in the 6th movement from bar 27, where a "spectrum B*b*" pretends to be one: neither tone 5/10/20 nor tone 7 are in tune with the fundamental B*b*. The next "spectra" on A and A*b* are also "faked":

E.g. 11



***Horn Concerto*, 6th movement from bar 27, quasi-spectra**

3. Deviating tones join around real spectral nests, example 5th movement, bar 16, where two "false" 7th resp. 14th tones G join the fundamental A around central naturals 8, 10, 11, 12. Immediately thereafter, the "wrong"

11th tone B*b* is added to E around central 14, 16, 17, 18, 19, as well as A, which is to be located as the "wrong 21st tone".

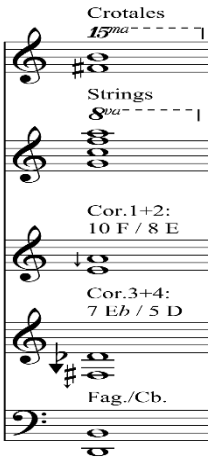
4. Linear spectra appear on top of each other in semitone intervals, with up to four fundamental tones. An example is the "Choral", 2nd movement, from bar 16.

5. Spectra on different root notes are nested in a hoquetus-like manner, as in the 5th movement.

6. Spectra are placed in a completely alienating environment of tempered anonymity, example 5th movement from bar 4.

7. Spectra are combined in such a way that new, distorted quasi-spectra are created. One example is the final chord of the 1st movement. Another example is the end of the 3rd movement, where a chord built as if "free" arises with partials on D: 5, on E*b*: 7, on E: 8, on F: 10. I suspect an overall logic, building up in the bass on G: partial 3, on B: 4, on D: 5, on Eb: 7, on E: 8, on F: 10. Above these are added fourths and major thirds with some omissions, all in all tones E A (D) G C F A (D) F#, B.

E.g. 12



***Horn Concerto*, final chord of the 3rd movement, combination of various spectra**

8. Ligeti's idea to build a sequence of virtually "classical" seventh chords and their inversions seems like a joke. This can be found in the 7th movement "Hymnus".[51]

[51] By the way, in bar 4 there is a wrong low/D in horn 1 in the Schott edition, which must be a third lower, a low/B analogous to the manuscript. The whole movement is badly edited, as Alessio Elia proved in his dissertation. ELIA 320ff

However, I have made an attempt here to analyze György Ligeti's *Horn Concerto*, a work with extreme use of integer ratios from the overtone series interlaced with tempered tones, in his hybrid language. The tempered, classical 12-tone way of thinking is confronted in Ligeti's work with five horns that blow natural harmonics throughout (except for stopped notes) and thus deviate from the temperament played by the other instruments. Sometimes they deviate extremely, up to a quarter tone, as to the 13th harmonic even by 60 cents. Ligeti's playful handling of the idea of a "spectrum" was demonstrated: spectral ideas are partly fulfilled, whereby Ligeti uses three categories of special accidentals, each for the different deviations from the tempered scale. In part, however, spectra are hybridized via deliberately "misplaced" accidentals or tempered tones that do not fit into the spectra actually thought of.

Ligeti's intention goes in the direction of a fuzzy harmony, which partly approaches a sound from the environment of non-central European music. From the sketches for the *Horn Concerto*, we can discern directions rather than manifest spheres of influence. These reach, in addition to European references from art music or ethnic music, as far as Africa and Southeast Asia.

Natural meloharmony is not used as a general supporting principle, but as only one component of a sound construction. This brings an overall coloration of the work towards a "oblique" sound world. In the sketches appear figurative words like "sigh", "chaos", "forest", "signal", which mix with more abstractly connoted words like "mosaic", "kaleidoscope". The interweaving of a pictorial world with a structural-musical world points to an essential core of Ligeti's composing. Ligeti rarely commented on this entanglement. Rather, his concern was to point to the structural level, even in texts specifically on the *Horn Concerto.*

Ligeti himself wrote about his *Horn Concerto* twice in program notes:

> ***Hamburg Concerto***[52]
>
> The reason why I wrote a concerto for solo horn and four natural horns (in the orchestra) lies in my interest in novel harmonies. Behind this is that I have - for many years now - rejected both total chromaticism and Equal Temperament. They have become more and more consumed in centuries of European music history - chromaticism since Wagner's Tristan. Several contemporary composers share my aspirations, but others have reverted to simple-minded tonality or modality. One of my former students, Manfred Stahnke, developed

[52] Ligeti (2007), vol. 2, 311f. Introductory text to the premiere at the concert cycle "Das neue Werk" at Norddeutscher Rundfunk, Hamburg January 20, 2001

fruitful paths to alternative tonalities. He followed the tradition ranging from Harry Partch to Ben Johnston to James Tenney to Dean Drummond. Tired of chromaticism, I look for a kind of non-tempered diatonicism, but one that allows for different harmonic linkages than those of historical European tonality.

Natural horns are the ideal instruments for alternative pitch systems. However, I do not write fashionable overtone music, but use the overtones for non-overtone chord combinations. I have not created a fixed ordered system but let the sounds loose so that - in self-organization - other kinds of tonal relationships emerge than those of tradition.

The four natural horns are joined by two basset horns, which play in temperament and blend with the horns to create a unified sound. The solo horn plays alternately valve horn F-Bb and the natural horn in F, and the four orchestral horns change their tuning from movement to movement. In this way, I have a rich variety of harmonic combinations at my disposal.

About the *Hamburg Concerto*[53]

I composed the Hamburg Concerto for solo horn and orchestra between 1998 and 2002. In this piece I experimented with non-harmonic, very unusual sound spectra. In the small-sized orchestra, there are four natural horns, each of which can produce harmonics 2 through 16. I can give some horns, or each horn, different fundamental tones and compose new kinds of sound spectra from the harmonics of these fundamental tones. These harmonics sound “oblique” in relation to the harmonic spectra; they are harmonics that have not been used before. I have worked out “weird” consonant harmonies, and also dissonant ones with complex beating. The degree of fusion of the horn notes is particularly high, and to saturate the sound the two clarinetists play basset horns. The sound mixture sounds soft, even the spectra with the strange beating.

The world premieres:

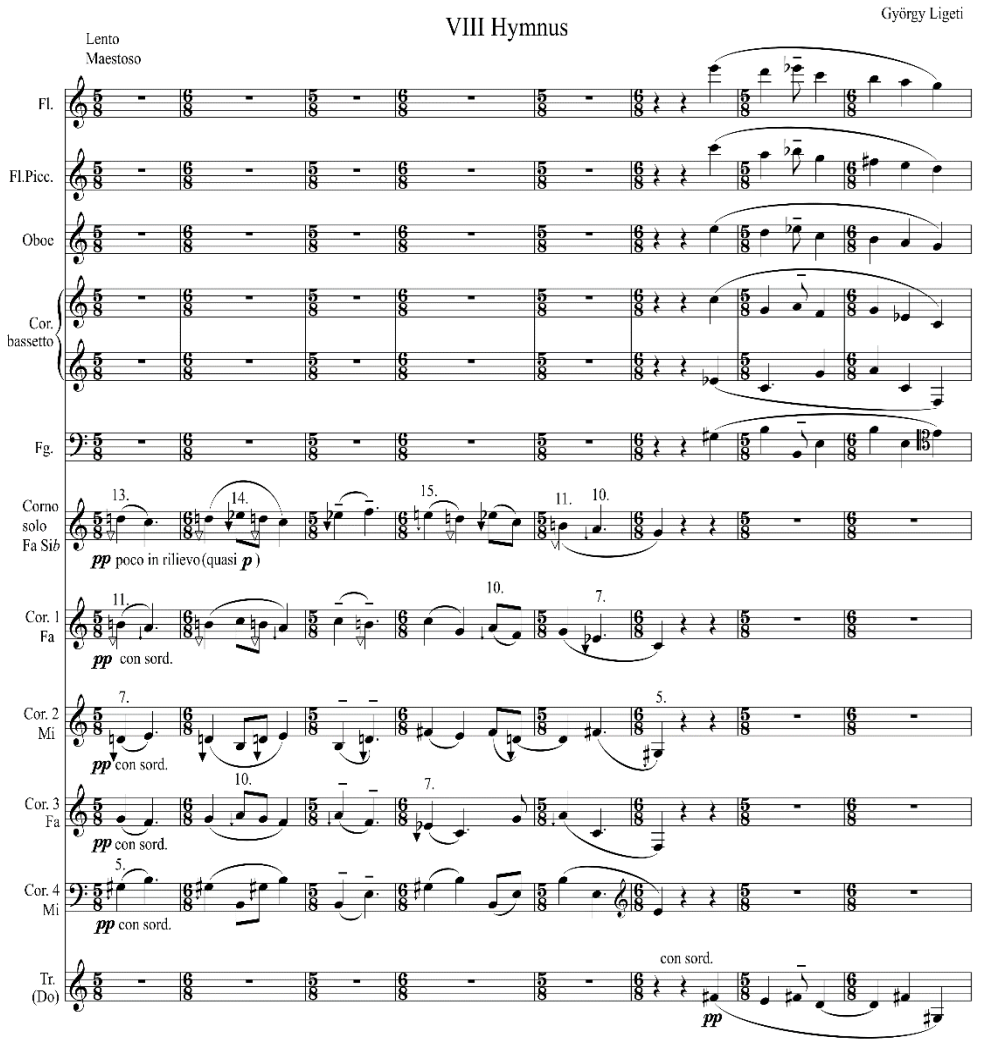
Commissioned by the ZEIT-Stiftung, Hamburg
January 20, 2001 Hamburg, NDR, Rolf-Liebermann-Studio (D) - Marie Luise Neunecker, horn - conductor: George Benjamin - ASKO Ensemble (premiere 1st-6th movement)The premiere of the complete work with the 7th movement “Hymnus” took place on September 30, 2002 in Utrecht, again with the ASKO Ensemble and Marie Luise Neunecker, this time conducted by Reinbert de Leeuw.

[53] Ligeti (2007), vol. 2, 312. Introductory text for the booklet accompanying the CD edition on Teldec Classics (The Ligeti Project IV, 8573-88263-2), Hamburg 2003.

7. Another "Hymn"

In Ligeti's sketches, Alessio Elia discovered an incomplete, sensual short alternative to the last movement "Hymnus" and added it to his dissertation. I was curious about the sound and realized this "Hymnus" alternative, which is unpublished, via MIDI. The following note example is based on Elias' transcription from the sketches and adds the articulation:

E.g.13



Ligeti's sketch of an alternative, ultimately discarded "Hymnus" version, obviously only the beginning

I essentially follow Alessio Elias' transcription and add the articulation.[54]

Soundfile as MIDI version to Ligeti's "Hymnus" sketch:
please ask the author for a link: ms@manfred-stahnke.de

This essay is a destillation from: Manfred Stahnke: György Ligeti – Eine Hybridwelt, Chapter 6, BoD, Norderstedt, 2022.

REFERENCES

Mentioned Scores:

Ligeti, György. *Hamburgisches Konzert für Horn und Kammerorchester mit 4 obligaten Naturhörnern*: Schott Music.
Ligeti, György. *Trio* für Violine, Horn (F/B) und Klavier, Schott Music.
Ligeti, György. *Konzert* für Klavier und Orchester, Schott Music.
Ligeti, György. *Konzert* für Violine und Orchester, Schott Music.
Ligeti, György. *Sonate* für Viola solo, Schott Music.

Writings:

Duchesneau, Louise/Marx, Wolfgang (eds.). *György Ligeti: of foreign lands and strange sounds,* Boydell Press, Woodbridge, 2011.
Elia, Alessio. *The "Hamburgisches Konzert" by György Ligeti. From sketches and drafts to the final (?) version. Musical structures, techniques of composition and their perception as aural phenomena*. Dissertation University of Rome "Tor Vergata", Rom 2012, Impronta – Edition, Mannheim, 2022.
Gilmore, Bob. *Harry Partch. A Biography*, Yale University Press, New Haven, 1998.
Hauptmann, Moritz. *Die Natur der Harmonik und der Metrik. Zur Theorie der Musik,* Breitkopf und Härtel, Leipzig, 1853.
von Helmholtz, Hermann. *Die Lehre von den Tonempfindungen als physiologische Grundlage für die Theorie der Musik*. Vieweg, Braunschweig, 1863.
von Helmholtz, Hermann. *On the Sensations of Tone as a Physiological Basis for the Theory of Music*, translation, notes and additions by Alexander John Ellis, Longmans, Green, 1895.
Knop, Frederik. *Retrospektiven. Die Inszenierung von Tradition in den letzten Kompositionen György Ligetis*, Schott, Mainz, 2017.
Ligeti, György. *Gesammelte Schriften*, Monika Lichtenfeld (ed.), vol. 1 and 2, Schott, Mainz, 2007.

[54] Elia 308f

von Oettingen, Arthur. *Harmoniesystem in dualer Entwicklung. Studien zur Theorie der Musik.* Gläser, Dorpat/Leipzig 1866, revised 2nd edition as: *Das duale Harmoniesystem,* Leipzig, 1913.

Partch, Harry. *Genesis of a Music*, Da capo, 2nd enlarged edition, New York, 1974.

Stahnke, Manfred (ed.). *Mikrotöne und mehr - Auf György Ligetis Hamburger Pfaden*, von Bockel Verlag, Hamburg, 2005.

Stahnke, Manfred. *Mein Blick auf Ligeti, Partch & Compagnons*, BoD, Norderstedt 2017 containing:

- Gedanken zu Harry Partch, 24ff, first in: *Neuland 2, Ansätze zur Musik der Gegenwart*, Herbert Henck (ed.), Bergisch Gladbach 1981/82, 243ff
- Ausschnitt aus einem Gespräch mit György Ligeti am 5. März 2001, 316ff
- Peter Niklas WILSON / György LIGETI: Vom Nutzen der Wurzellosigkeit: Notizen nach einem Gespräch mit György Ligeti, in: *Neue Zeitschrift für Musik*, September / Oktober 1998, vol. 159, no. 5, Schott, Mainz 1998, 42ff

Scores with sounds:

Babelscores, Paris: https://www.babelscores.com/ManfredStahnke

Books among others (in German):

(ed.): György Ligeti im Spiegel seiner Hamburger Kompositionsklasse (...in the Mirror of his Composition Class), BoD, Norderstedt, 2023.

Ligeti, György. Eine Hybridwelt (...A Hybrid World), BoD, Norderstedt, 2022.

Mein Blick auf Ligeti, Partch & Compagnons (My view on Ligeti, Partch & Compagnons), BoD, Norderstedt, 2017.

(ed.): Mikrotöne und mehr - Auf György Ligetis Hamburger Pfaden (Microtones and More – Tracing Ligeti in Hamburg), Bockel, Hamburg, 2005.

(ed.): Musik - nicht ohne Worte (Music – Not Without Words), Bockel, Hamburg 2000, contains p.121: György Ligeti und Manfred Stahnke: Interview 29 Mai 1993.

Struktur und Ästhetik bei Boulez. Dritte Sonate, Formant “Trope” - mit Mallarmé & Joyce (Structure and Aesthetics of Boulez...), BoD, Norderstedt, 2017.