ISSN 1512-2018

UDC – 78.01

Three perspectives of the continuum in music C. Nancarrow, J. Carrillo and J. Estrada *study of sound-memory inside the macro timbre*

Manuel Antonio Dominguez Salas

Academy of Music in Krakow, ul. św Tomasza 43, 31-027 Kraków, Poland
PSM I i II st. im. K. Szymanowskiego, ul. Kolegialna 23, 09-402 Płock, Poland

Abstract:

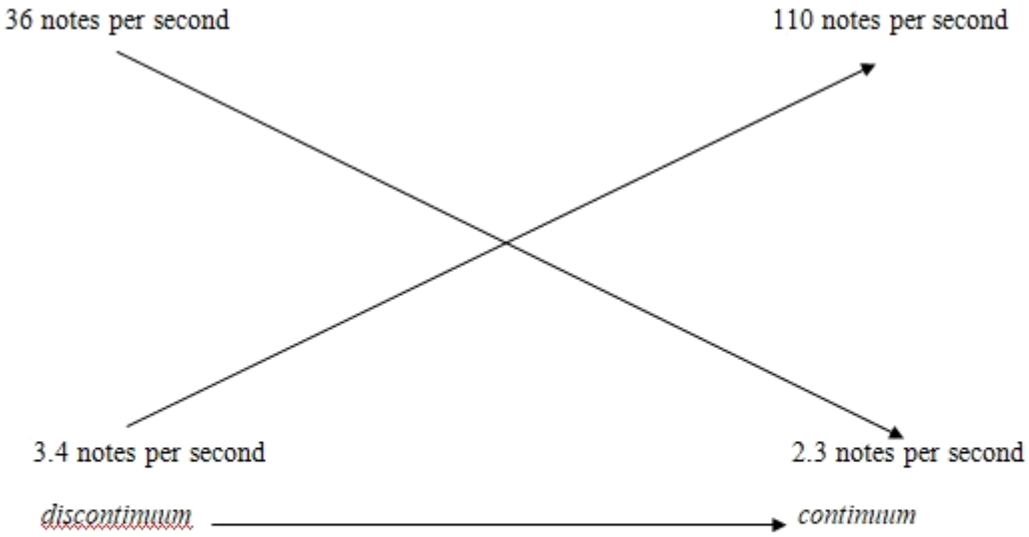
The paper deals with two aspects in music that began to appear during the course of the XX century in Mexico: Continuum and Macro Timbre. Nevertheless both aspects were not intentionally applied by any previous composers which involves this study (J. Carrillo and C. Nancarrow). It was not until the year of 1994 that the theorist, composer and performer Julio Estrada in his doctoral thesis "Theorie de la composition: discontinuum-continuum", described macro timbre in a detail investigation related with the aesthetic and philosophic aspects of both phenomenas. Previous to Julio Estrada's contribution in the continuum Carrillo and Nancarrow were influenced by different sources of investigations. Independent from each other their researches diverge from their musical aesthetics and experimentations; paradoxically converge in the result of ***micro transits****. The first case -* ***micro durations*** *with C. Nancarrow – secondly -* ***micro tonality*** *with J. Carrillo.*

Keywords: *Continuum, Julio Estrada, Contemporary Mexican music, Macro timbre.*

Micro durations - Conlon Nancarrow (1912-1997) - American-Mexican composer exiled in Mexico city since the year 1940 until his dead in 1997. Since the beginning of Nancarrow's exile to Mexico city began the process of his own decided musical isolation after several disappointments situations during the difficulties that instrumentalist had in order to perform his musical experiments related with *poly-tempi*. This new aspect in music and composition was influenced by new conceptions from the theorist and composer Henry Cowell (1897-1965) in his book *New Musical Resources* [1], the author discussed the aspects of several *tempi* which were equally balanced to the over tones produced by a single pitch. Nancarrow got familiar with Cowell's book in 1939, by that time he was preparing to emigrate to Mexico. *Poly-tempi* became so obsessive in Nancarrow's research that by the year 1948 in Mexico city, got a mechanic piano and began his life time musical work almost dedicated entirely for his personal instrument. *Micro durations* - are the result of several studies of *poly-tempi* originated by superimposition of several voices in different *tempi* with *canon* imitations and *isorythmical* games, achieving a continuum of transits in rhythm-sound obtaining results of perception that go beyond the limits of temporality. He was able to concentrate in a *micro-instant* of time a high amount of pitches that generates the micro transitions in the continuum. I would to take as an example *study no. 21, Canon X*, one of the most significant in Nancarrow's compositions, not by the complexity of several voices integrated the poly-temporality like *study no 37. Canon X* offers one of the most fascinating in terms of perception in the transits in the *macro timbre*. With a basic line of 54 notes, the composer organized it in two main layers; 1) the lowest one at the beginning of the piece perform 3.4 note per

ISSN 1512-2018

second, continuous increasing the speed and amount of pitches until arriving to 110 notes per second. 2) The upper layer began with 36 notes per second and in opposition to the lowest, this one start to decrease the speed and amount of pitches until arrive to 2.3 notes per second. The crossing of voices occurs in the system 32, nevertheless is not perceptible by human ear because of the density of information in all layers.



Study no. 21 Canon X, graphic of the crossing layers, increasing and decreasing the amount of pitches. Transit from *discontinuum* to *continuum*.

The base of poly-temporality in Nancarrow's composition lands in the most simplest conception of *tempo*: *duration* and *speed*. Nancarrow dedicated with precision to register all the measure of the speed and metric that he obtain during all his musical life work. In such catalogue it can be observe the metrical combinations and, in some of them, the percent in the curve of acceleration in time; in other words, the transition *discontinuum-continuum* of rhythm-sound. Probably Nancarrow did not want to proved any physical law related with the curves of time and space, which was indeed the Theory of Relativity that Albert Einstein proposed in his observations and theory in the year 1915. It is of interest to observe what was indeed the idea of the composer related with *time* in his music, as once Nancarrow was questioned by Julio Estrada about his feeling on time, Estrada asked: "You have a physical or mathematical idea of time, what You prefer?, he said: I prefer time as it should be, not at it is" [2].

Micro tonality - Julian Carrillo (1875-1965) - Mexican composer and theorist. His musical background which differ entirely from Nancarrow's, consists in a musical aesthetics connected with neo-romantic from the last decade of the XIX century together with an organization of musical material completely innovatory for his time. He had a futuristic approach for the musical system known until his days. His fascination for the micro tonality covers almost all his musical research since the year 1895, where he began to observe the existence of a micro tone that derives from the over tones, which he calls: *sound* 13, related with the thirteen over tone, different from the twelve tones from the chromatic scale. In the year 1926 in New York he wrote his book: *pre sonido* 13, published later in 1930 in Mexico. In his comments, Carrillo claimed that since the XVI century and later, with the consolidation of the temperate musical system in Bach's *Das wohltemperierte Klavier* (1722), until his day (1926) there has been no a musical theory together with an proper instrumentation able to support such

ISSN 1512-2018

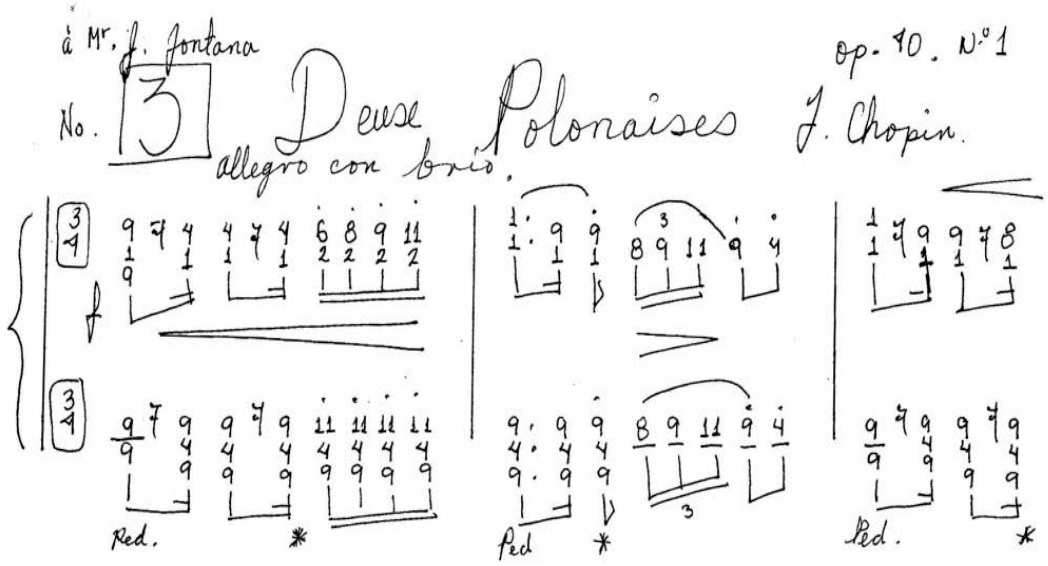
musical system, because in fact the system was not correct using results that were not related with the natural relation of the intervals. After his systematically observations with mathematical calculations he could be aware of the presences of several differentiations in the frequencies of each tone, and as a result he observe the problematic that the musical theory in schools had done to the musical teaching, as he explained [3]: "most of all intervals produce by strings instruments, are not in fact equal to what correspond for the wind instruments, not for the physic as well as the temperate […], all musical theories as well as all harmony theories use in all around the world are based on no equal semitones and because this do not exist in the actual musical system is evident that all the musical texts used to teach music are entirely wrong". In the following example Carrillo in his book *per-sonido 13*, showed how in the chromatic scale that is uses by almost all musicians around the world, we work with a no equal temperate system, where it is found seventeen tones and without the presences of any halftone [4].

DO		256
DO	sostenido	266.6
RE	bemol	276.5
RE		288
RE	sostenido	300
MI	bemol	307.7
MI		320
FA		341.3
FA	sostenido	355.5
SOL	bemol	368.6
SOL		384
SOL	sostenido	400
LA	bemol	409.5
LA		426.6
LA	sostenido	444.4
SI	bemol	460.8
SI		480
DO		512

Example 1: Carrillo J., chromatic scale from the physics Cheston, Gibson and Timmeman.

Carrillo concentrate his new theory in order to organize into a **temperate system of micro tonality** in parallel with a research of notation and construction of instruments that were able to perform the high amount of micro tones that he obtained, arriving to 96 different sounds in one octave of the piano. Carrillo proposed the name *dozavos de duplo* , for the mistaken halftone, which in fact it does not exist in music. Also he proposed a new system of notation which simplifies the musical reading from the score, avoiding the mistakes in the temperate system of the twelve-tone scale. The following example shows his transcription of the *Polonaises* no. 1 opus 40 from F. Chopin [5]. It can be observed the same rhythmical patterns as Chopin composed, but it is clearly the absent of the pentagram, instead, is use a numeral system that Carrillo created in order to organized all micro intervallic relations of the tones.

ISSN 1512-2018

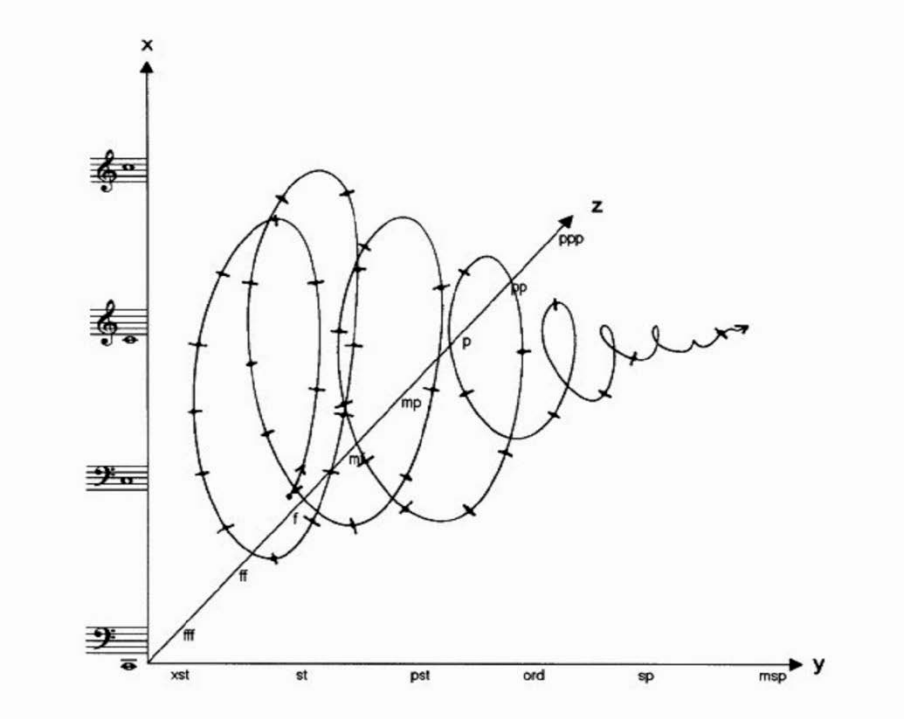


Example 2: Carrillo, J. transcription from *Polonaises* no. 1 op. 40 in A major, F. Chopin

One of the most interesting instruments are some harps for thirty-two tones and sixty-four tones which can reach the transits in the *continuum*. Carrillo did not apply his innovations of the micro tones into a new harmonic language which could support his new musical system. His contributions and investigations in the *continuum* arrived to the maximum resolution in the micro tonality, which derivate in the construction of special instruments that were able to reproduce with high precision the micro divisions of the octave. In the other hand, his musical work is a fusion of traditional aesthetics from the XIX century in the European music, melted in an intention to demonstrate that his micro tonality could be part of a musical era that did not evolved with the same temperate system.

Micro transits - *Continuum* – Julio Estrada (1943) - Julio Estrada's background during his musical activities as a student in composition and as an independent artist in Europe and Mexico (1967-actual time) help him to enroll in the musical investigation of the *continuum* with the French composer Ianis Xenaiks (1922-2001) with who he worked together in the process of complementation the well known UPIC. After Xenakis death in 2001, Estrada is invited to collaborated as director of the CEMAMU in Paris and worked together with the group of informatics in order to continue the process of UPIC together with Estrada's musical program **eua' oolin** (from nahuatl *eua*, to fly *oolin*, movement). The origin of the program *eua' oolin* began during his investigations related with the *continuum* based on the idea of *micro transitions* of all parameters contain in a fusion of the rhythm with sound: *macro timbre*. From this point, he generalized the treatment of rhythm and sound homogenizing all parameters respectively and propose an equal proportion of it: frequency – duration and pitch - , amplitude – accent and intensity -, harmonic contain – *vibrato* and *color* [6].

ISSN 1512-2018

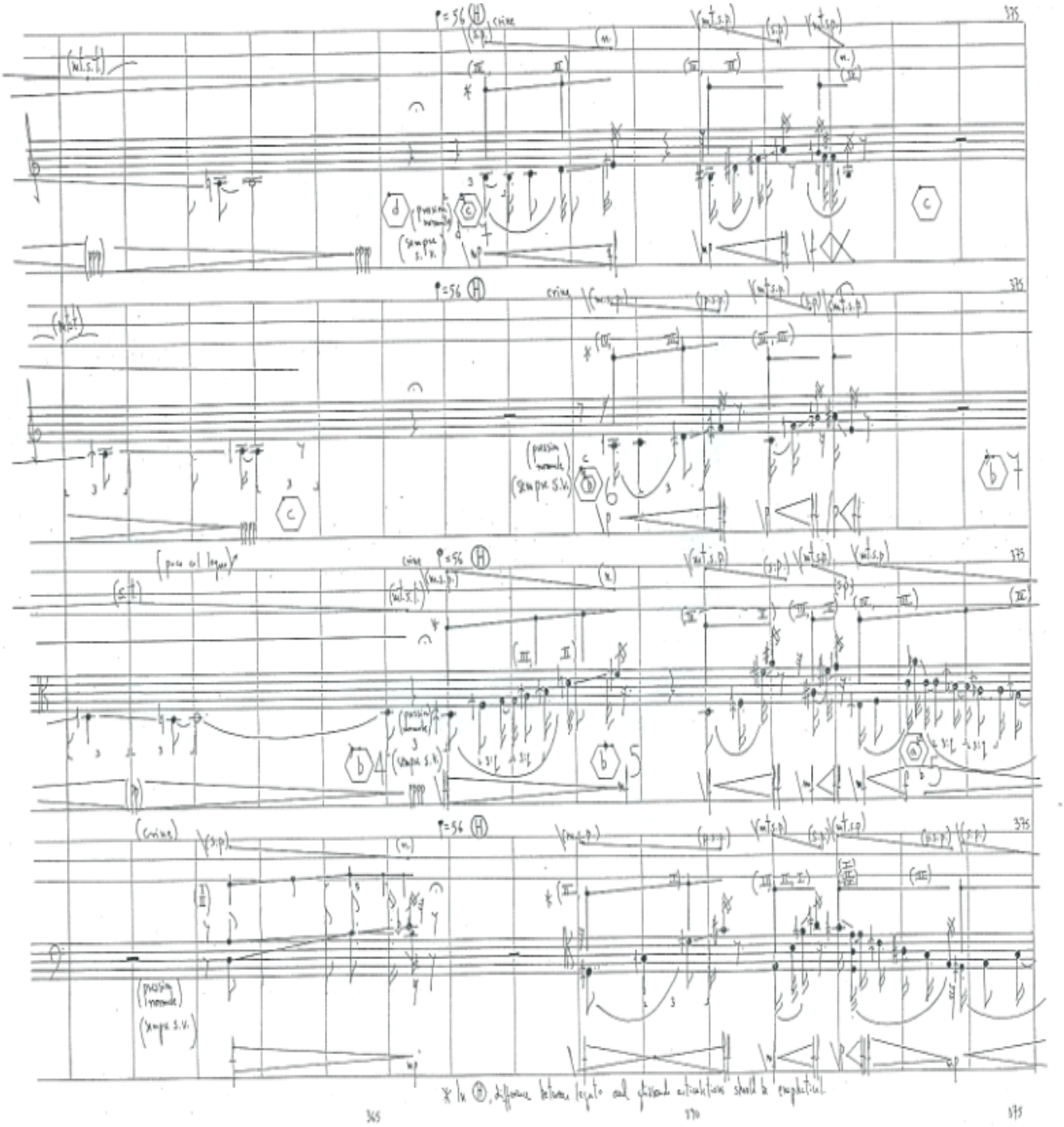


Example 3: Three-dimensional trajectory: **X** – frequency; **Y**: harmonic contenet; **Z** - amplitude. The rate of changes is indicated by the distance between identical time units (I) inside the trajectory.

By this method Estrada achieve a three-dimensional system that allows him to capture three parameters of sound where *time* is integrate in each trajectory, obtaining transitions of topological order, in difference with UPIC where *time* is the second of two Cartesians parameters and such transitions are not possible.

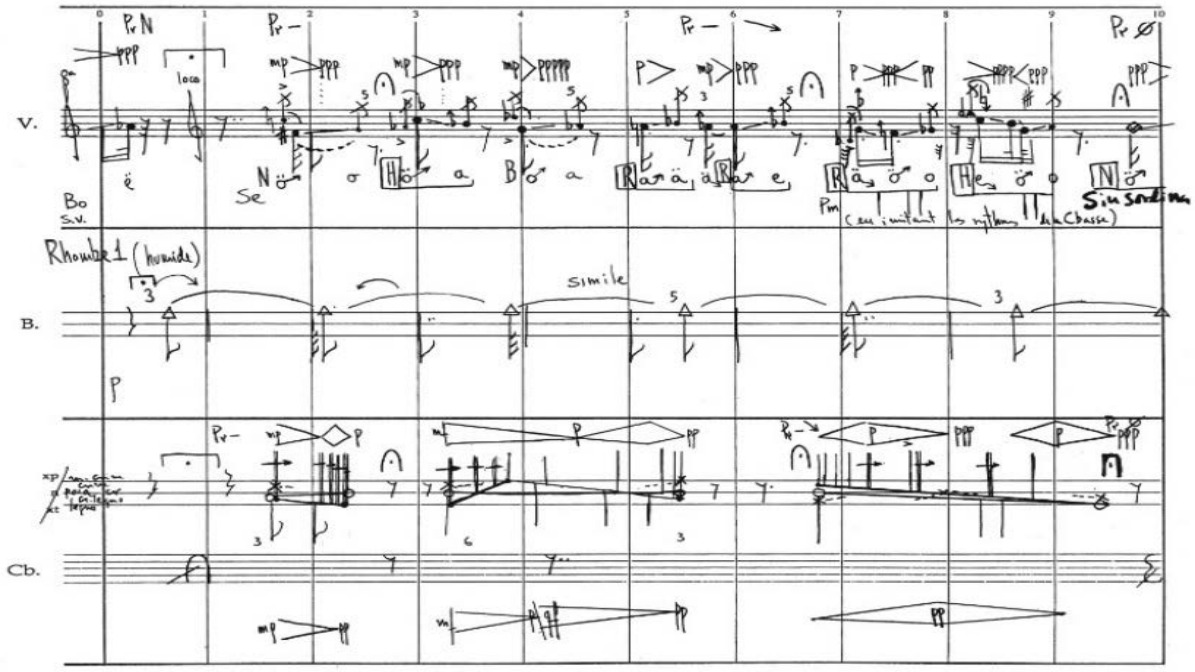
Macro timbre is strictly related for the creation of new instrumental performances as well as new notation where each composer is able to achieve by his own criteria all the possible parameters that can be obtain for instrumental or vocal music. Observe the evolution of the scores from the decade of 1980's in his string quartet *ishini' ioni* (1984-1990), opera *Murmullos del páramo* (1992-2006) and *yuunohui'ehectal* (2012) for wind/brass instrument solo or ensemble. A clearly intention of strictly procedures of notations all parameters is achieve in order to obtain a poly-parametrical counterpoint, where each parameter works independently from the rest during the micro transitions during the performance.

ISSN 1512-2018

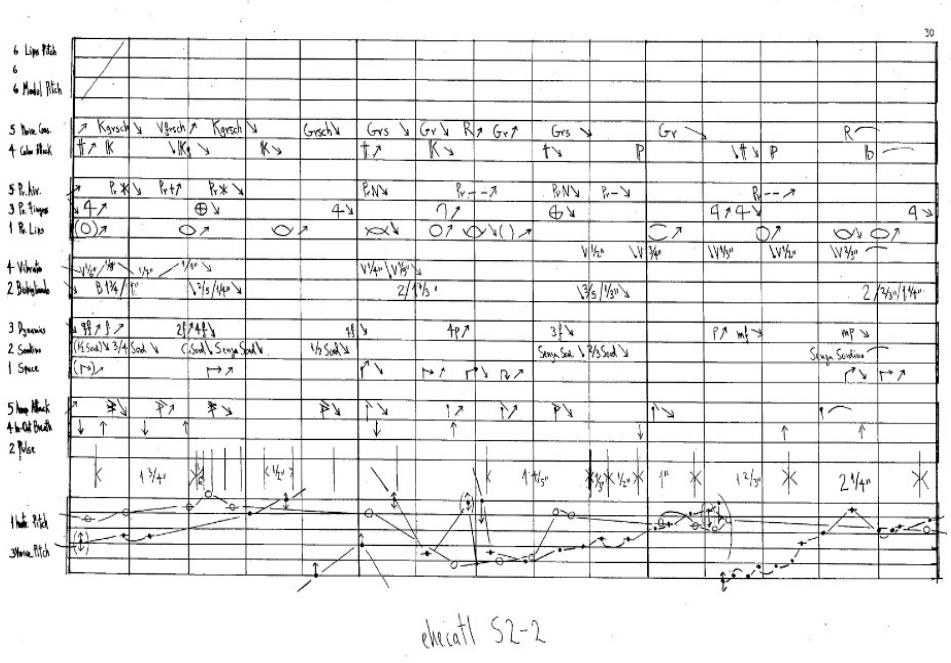


Example 4: Topological variations of a three-dimensional shape as used in the string quartet *ishini'ioni*. Section H, units 360-375.

ISSN 1512-2018



Example 5: Poly-parametrical counterpoint for female voice, noisemaker and double bass in *Mictlan*. Section B02, units 0-10.



Example 6: *Macro timbre* for fifteen parameters. *yuunohui'ehecatl*. Section S2-2, units 16-30.

ISSN 1512-2018

Conclusion - Three perspectives obtained during the course of the XX century in Mexico offers a diverse point of view of the phenomena *continuum.* As was observed before, each composer tainted to introduced a new system or method which allowed him to go beyond the borders of *discontinuum* in music. The study of time in Nancarrow's music introduces us to the knowledge of memory in music. Without the element of *space* we wouldn't be able to feel *time*. In Nancarrow's *continuum* the receptor experience the elasticity of space by the memory of several layers of speed running simultaneously. His highly organization of poly-temporality, generates one of the most richest contrapuntal techniques obtain after J. S. Bach in the polyphony. In contrast with Carrillo, *time* is stable, the receptor find himself now in the universe of the sound and the elasticity of the tones, going into the smallest micro space of intervals that can be perceive by the human ear. Estrada integrates both universes in the *macro timbre*, in a more elastic and subtle music, where the fusion of the sound and memory of the rhythm is now projected in a poly-parametrical counterpoint with free interpretation of the micro transits chosen by the instrumentalist, but visualized by the *space-memory* of the composer. In the following equation we can observe the contribution that each composer proposes during their research in this so call *continuum*:

Conlon Nancarrow – time: poly-temporality,

Julian Carrillo – space: infinity of the scales,

Julio Estrada – *macro timbre*: poly-parametrical counterpoint.

References

1. Cowell, Henry, *New Musical Resources*, with a preface and notes by Joscelyn Godwin, USA, Something Else press, Inc. 1964

2. *Rhythms of Nancarrow*, https://www.youtube.com/watch?v=E1bFm5l1yfk, 18. Dec, 2012

3. Carrillo, Julian, Rectificacion bascia al. Sistema musical clasico, Analisi fisico- musico "*Pre-sonido 13",* San Luis Potosi, segunda edicion, 1930, p. 12

4. Carrillo, Julian, Rectificacion bascia al. Sistema musical clasico, Analisi fisico-musico "*Pre-sonido 13",* San Luis Potosi, segunda edicion, 1930, p. 16

5. Carrillo, Julian, Transcription from *Polonaises* op. 40 no. 1, F. Chopin, p. 1

6. Estrada, Julio, Estrada, Julio, "Focusing on Freedom and Movement in Music: Methods of Transcription inside a Continuum of Rhythm and Sound", *Perspectives of New Music*, University of Washington and University of Princeton, vol. 40, No. I, 2002, p. 78

ISSN 1512-2018

Bibliography

7. Carrillo, Julian, Rectificacion basica al Sistema musical clasico, Analisis fisico-musico *"Presonido 13"*, San Luis Potosi, segunda edicion, 1930.

8. Cowell, Henry, *New Musical Resources*, with a preface and notes by Joscelyn Godwin, USA, Something Else press, Inc. 1964.

9. Estrada, Julio, Estrada, Julio, "Focusing on Freedom and Movement in Music: Methods of Transcription inside a Continuum of Rhythm and Sound", *Perspectives of New Music*, University of Washington and University of Princeton, vol. 40, No. I, 2002.

10. Estrada, Julio, Theorie de la composition: *discontinuum-continuum*, these en musicologie nouveau doctorat departamento de musicologie, Universitet de Strabourg II Sciences Huamaines, 1994.

11. Estrada, Julio *ishi'ioni* pour quatuor a cordes, juliusedimus, 1984-1990.

12. Estrada, Julio *yuunnuohui'ehecatl*, Collective score for solo woodwinds and/or brass instruments, juliusedimus, 2012.

13. Estrada, Julio *Mictlan*, for female voice, noisemaker and double bass, juliusedimus, 1992.

14. Gann, Kyle, *La musica de Conlon Nanacarrow*, UNIVERSIDAD AUTONOMA DE MEXICO, segunda edicion, 2008.

15. Velia, Nieto, *"Escuela del continuo en Mexico"*, Escuela Nacional de Musica (ENM, UNAM), Titular del Seminario de Musico del Siglo XX, Vol. 2 num. 1, noviembre 2007.

Article received: 2017-05-01