MY ARTISTIC RESEARCH ON MICROTONALITY

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Degree Project, Master of Fine Arts in Music, Composition
ABSTRACT

Key words: microtonality, diatonicism, chromaticism, just intonation, Byzantine music, Psalmodia, tetrachord, mean tone, reference note, pitch classes, melodic figuration, rhythmic figuration, prototype, structured microtonality, formal simplicity.

The subject of this thesis is my artistic research on microtonality with some insights on related topics.

The aim of this work is to achieve integration of the microtonal language with the equal temperament, which has been the dominant tuning system of western music scene since 1700. This investigation arose from a personal experience; it has intensified over time through direct contact with Byzantine music, which has left an indelible mark on my compositional style, and later on through a confrontation with contemporary western music. The method of conducting the research is essentially based on experimentation. Taking examples from literature, particularly from twentieth century microtonal composers and from direct experience with musicians, I developed and evolved a method over time. The results achieved so far in this work have encouraged me to continue to pursue this direction, and in particular the following themes: the exploration of new sounds (or dissonance), the acquisition of an expanded capacity for expression in the microtonal musical language, and its integration in a structured system. What I have observed in my journey is a potentiality as yet unexpressed, and it is my hope that it will inspire, in the future, a greater interest in the topic, and also a movement towards the development of new expressive possibilities. My research has not been without problems and obstacles, but overall has been a positive experience that has perhaps opened some food for thought for future developments.
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INTRODUCTION

This essay relates to the general topic called 'microtonality'. In this work my intention is to explore microtonalism as approached by both western and eastern music traditions and to consider each of them in relation to my personal experience. The topic is obviously very wide and has already been well explored by many theorists and composers. In his book, *20th-Century Microtonal Notation*, the American composer and musical scholar Gardner Read draws attention to some established microtonal composers of the last century, as well as listing three approaches to microtonalism of our time:

> The history of microtonal speculation during the first half of the twentieth century displays six names above all others: Julián Carrillo, Adriaan Fokker, Alois Hába, Harry Partch, Ivan Wyschnegradsky, and Joseph Yasser. All six contributed extensive studies on microtones – historical, technical, and philosophical ... It is generally agreed that microtonalism has been rationalized in our time from three diverse standpoints: (1) as the logical evolution and progress of diatonicism to chromaticism to atonalism to serialism, (2) as a purely acoustical science and an argument between advocates of equal temperament and of just intonation, (3) as one expression – at least for certain creators – of a mystical concept of pantonalism, a philosophy embracing existing tonal systems. (Gardner 1990: 2).

Curiously enough, it seems to me, a movement has recently been started for towards a reacquaintance with the lost sonorities of the past centuries, where predominance of a sole tuning system did not exist. Gardner emphasises the need for an overall look at the historical music context underlying our tendency to think of microtonal music as an exclusively twentieth-century phenomenon. He goes on to explain that, on the contrary, experiments with pitches outside of the traditional seven-note diatonic and twelve-note chromatic gamuts have gone on since the development of classic Greek music (Gardner 1990: 1).

In this research, I engaged with these issues on a personal level and after years of investigation and experience I have developed various conclusions and outcomes. This topic always generated in me a deep interest, which evolved through time, together with the awareness that such a compositional tendency could be further developed and become a concrete reality in the panorama of future musical creativity.

My aim in this essay is to focus in detail on how to structure microtonality and to integrate it in a logical manner within the eastern and western music traditions. Many compositions using
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2. SEARCHING FOR A NEW MUSICAL LANGUAGE WITH GREATER EXPRESSIVE CAPACITY

My attraction to complex melodies and harmonies has been evident since my childhood. It became an instinctive process for me to develop a deep interest in new dissonances and new forms among different music genres.

Though my ears were not accustomed to tuning sets other than the equal temperament, a place in my listening perception was instinctively ready to receive and enjoy other frequency relations.

A similar view is held by Gardner when he talks about the capacity of our ears to ‘stake in assessing the impact of microtonal expression.’ He goes even further, considering the aesthetic value of intervals smaller than a semitone. At the same time, he does not affirm the validity of microtonal perception for artistic purposes, even though minute differences in pitch can be perceived and identified by many musicians (Gardner 1990: 4).

I clearly realized what my hidden curiosity concealed in the very moment I met Byzantine music for the first time. Afterwards I decided to investigate more extensively into this music genre, which characterizes the Greek Orthodox Church. In this musical experience I recognized what was actually my intuition about new dissonances, furthermore it was able to fulfill my expectations.

My inner need was for some sort of over-extension of any of the harmonies produced within the equal temperament, a new language capable of deeper expression, and consequently, capable of expressing new emotions and feelings.

In this prospective we can consider the statement by Alois Hába, Czech composer and musical theorist, when he talks about the logical extension of Arnold Schoenberg’s serial technique being a further division of the twelve notes of the row, or set, into still smaller intervals. Alois Hába, who promotes integrated microtonal systems rooted in the equal temperament, considers these additional pitches of equal value to each other and to the basic twelve pitches (Gardner 1990: 6).

Schoenberg describes his idea of art and expression: “The shaping forces of art are inherent in the imaginative process of the artist himself. Art is expression.” Schoenberg uses expression in its narrowest sense: something is pressed out (Schoenberg 1995: 5).
During the research process my awareness of the idea of dissonance gradually became clearer. Although the concept of dissonance has different meanings, according to a personal interpretation, I would rather call it color or just feeling. Cowell expresses his opinion concerning its future development as a continuation from the past when he states that, since its early history, music progressed directly up the overtone series. He continues with the idea that it will be a strong possibility that the next development may be to add to music the next highest overtone after the half-step. If we compare half-step with the quarter-step we find the following ratios: 15:16 and 30:31. For Cowell it would seem that, from an acoustical or historical standpoint, the quarter-step is not the next interval for use; instead, because of the technical ease of dividing the half-step into two parts, it has been regarded as the most applied subdivision. The simpler intervals are possible to play, thus one of the main difficulties, that of performance, can be solved (Cowell 1996: 19).

An argument arose in 1927, at the very epicenter of the intense microtonal ferment and the propagandizing of such theorists as Carrillo, Hába, Wyschnegradsky and Yasser. The Russian musicologist Leonid Sabaneev apparently disputed this trend, while the Russian-American organist, music theorist and musicologist Joseph Yasser more optimistically saw a growth in its popularity in the very long term, when a new type of music would become sufficiently convincing to profoundly alter the musical psychology of mankind, and consequently overshadow the magnificent musical achievements of past centuries. Sabaneev declared, in a Modern Music article: “The chronic failure of the ultrachromatic idea after fifteen years of testing leads to the conclusion that something is fundamentally wrong with it”. He expresses his opinion of the impossibility of enriching music through a purely theoretical departure, instead supporting the introduction of new fractional sounds only if linked to older and related melodic colors. Yasser stated that it would be rash to believe that our present musical scale will be replaced in the near future by a more complex one, as soon as such a scale, he continues, has been theoretically found and is accessible practically. (Gardner 1990: 11).
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6. EXPERIENCE WITH MY WORKS

It was with my graduation in composition, where I composed the piece for symphony orchestra
mentioned above, that I realized the possibility of extending microtonality in a vertical direction.
This generated within me further hopes for exploring concrete possibilities in this field.

The birth of the equal temperament tuning system has usually been considered a necessary
attribute for polyphonic writing and its subsequent development. Specifically my research will
explore the possibility of combining polyphony with different alternative temperaments, for
instance the 24-tone scale. The passage from a microtonal horizontal writing to a vertical
approach was a crucial point that allowed me to consider these two factors, equal temperament
and polyphony, not as inseparable anymore but as independent.

The use of independent polyphonic lines in a well defined microtonal gamut can be found in an
example by the Australian composer Warren Burt (1993), 39 dissonant etudes for piano. He
explores a great deal of variety in these scales, 39 different subdivisions of the octave.

In my three works for orchestra I have been searching for a certain inner balance. This is also a
means of keeping my feet on solid ground. Notwithstanding its weak balance in the harmonic
structure, the concept of simplicity in my microtonal attempts captured my attention; they stand
on the edge between banality and overcomplexity. Their simplicity, however, is expressive of a
powerful effectiveness.

The attempts made by composers who are challenging themselves in new fields seems to be in
favor of Busoni’s opinion: “The function of the creative artist consists in making laws, not in
following laws ready made. He who follows such laws ceases to be a creator.” (Busoni 1911: 88).
7. ANALYSIS OF THREE SCORES FOR ORCHESTRA

These works for orchestra were composed within an explorative approach. A meticulous plan was made before starting to write the score, and the last two particularly were conceived as if in a laboratory process. Schoenberg, in his book, compares teaching the techniques of carpentry with the teaching of musical composition; both rest on “observation, experience, reasoning, and taste, on knowledge of natural laws and the requirements of the material”. He continues the comparison with the carpenter, pointing out that he could never understand his craft in a merely theoretical way, whereas the typical musical theorist often lacks any practical skills at all (Schoenberg 1995: 4).

7.1 Cantilena sul RE

This composition was my first approach to microtonality applied to an orchestra.

The idea was to explore dissonances produced by means of microtones, although the bone structure still retains a classical approach with the development of thematic material. This material is presented in the second movement, after an introductory texture section, then the motif develops into a theme that seemingly takes a sonata form.

The first and last tempos, therefore, are dedicated to microtonal texture, the chord voicing enhancing a dissonance produced with a big interval altered by a quarter tone: a “min 9th flattened” in a span of five octaves and placed between the bass and upper line of the ambitus created by the orchestral register; an inner voice, a minor 6th flattened by a quarter tone, is also placed in the middle of the register. In the second tempo, Vivace animato, two altered notes are applied to the melody (C and F three quarter sharp). Musicians did not find the task difficult to accomplish, and the result does not show uncertainties of any sort. In fact, to facilitate the execution I altered two notes of the scale and placed them carefully in a span no bigger than two octaves, so that musicians memorize only two positions.

In conclusion, this work was an attempt to include structured microtonalism in a conventional form, preparing the ground for a continuation in the second piece.
D 7  D 6
D 6  C# 6
C# 6  A, 5  C 6
F# 5  G 5  --
(A 5)  F# 5  --
D 5  D 5  --
(A 4)  C# 5  C 5
D 4  G 4  --
F# 3  F# 4  C 4
C# 3  --  C 3
C# 2  (C# 2)  C 2
C# 1  (C# 1)  C 1

Fig. 2 Harmonic disposition in a sequence of chords showing the voicing of the introductory section. Numbers indicate the octave, referring to each note. No. 4 refers to middle C on the piano. “#” Stands for three quarter tones up.

The figure above represents the first attempt at a vertical microtonal disposal. The tension has been placed mostly between the lower and upper line, making an interval of five octave augmented by a quarter tone.

7.2 image

In my second composition for symphony orchestra, I continued to apply the same idea used in the previous orchestral work. I tried to integrate micro-intervals within a functional tonal harmony.

This very elementary structure helped me at the same time in the search of effectiveness.
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As a result we keep the same proportion between the notes but all the intervals have been changed. For instance, the biggest interval between the highest and lowest register now forms a M 7th sharpened by a quarter tone.

Coda section:

In the coda (constituted by the end of section C and section D) we have a two chords extension of the row, a cadence after reference note C natural. This is done in order to give a sense of symmetry in the musical form.

<table>
<thead>
<tr>
<th>Section</th>
<th>A intro</th>
<th>A’</th>
<th>B</th>
<th>-</th>
<th>-</th>
<th>C</th>
<th>-</th>
<th>C coda</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval</td>
<td>m9th flattened</td>
<td>M7th sharpened</td>
<td>m9th flattened</td>
<td>M9th sharpened</td>
<td>p4th sharpened</td>
<td>p5th sharpened</td>
<td>M7th sharpened</td>
<td>M9th sharpened</td>
<td>m9th flattened</td>
</tr>
<tr>
<td>Upper line</td>
<td>C₇</td>
<td>C₇</td>
<td>C₇</td>
<td>A₇</td>
<td>B₇</td>
<td>A₉</td>
<td>B₉</td>
<td>D₉</td>
<td>C₇</td>
</tr>
<tr>
<td>Bass line</td>
<td>C₇</td>
<td>C₇</td>
<td>B₇</td>
<td>G₇</td>
<td>F₇</td>
<td>D₇</td>
<td>C₉</td>
<td>C₇</td>
<td>C₇</td>
</tr>
</tbody>
</table>

Table 3 Harmonic progression with 'Intro' and 'Coda'.

Making a sequence with the five predetermined intervals:

This is the harmonic structure of the piece, on which the chord progression will be constituted.

As mentioned previously, we have to choose the higher notes of the ambitus in order to ensure a certain sequence of intervals.

The logic behind the choice of sequence is as follows:

- The piece starts with one of the two most effective intervals (m9th ¼ flattened), although this is actually the closest altered pitch to the reference note.
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**Table 4** This table shows the disposal of the inner voices in the chord.

<table>
<thead>
<tr>
<th></th>
<th>C♭</th>
<th>C</th>
<th>C</th>
<th>A♭</th>
<th>B♭</th>
<th>A</th>
<th>B</th>
<th>D</th>
<th>C♭</th>
</tr>
</thead>
<tbody>
<tr>
<td>B♭</td>
<td>D♭</td>
<td>A♯</td>
<td>F♯</td>
<td>E♭</td>
<td>C♯</td>
<td>B</td>
<td>D♭</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>G♭</td>
<td>F♭</td>
<td>F♯</td>
<td>D♭</td>
<td>C♭</td>
<td>A♭</td>
<td>G</td>
<td>F♭</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>F♭</td>
<td>G♭</td>
<td>E♭</td>
<td>C♭</td>
<td>A♯</td>
<td>G♭</td>
<td>F</td>
<td>G♭</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>D♭</td>
<td>B♭</td>
<td>C♯</td>
<td>A♭</td>
<td>G♭</td>
<td>E♭</td>
<td>D</td>
<td>B♭</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>C♭</td>
<td>C♭</td>
<td>B♭</td>
<td>G♭</td>
<td>F♭</td>
<td>D♭</td>
<td>C♭</td>
<td>C♭</td>
<td>C♭</td>
<td></td>
</tr>
</tbody>
</table>

| 1st Chord | 1st Chord mirrored | Section B | - | - | Section C | - | Coda | - |

**Pitch (Frequency)**

Fig. 8 Geometric graph representing the shape/form of the piece.
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7.3 *tableaux surreal*

This piece has been conceived as a pedagogical work and structured completely according to my microtonality research. The wind instruments are particularly well suited to experimental music of this kind, and their characteristic timbre is capable of producing the suggestive sonority perceivable in unconventional music texture.

Woodwinds usually require a specific fingering for microtones, while brass instruments are more flexible, finding the proper technical device or adjustment themselves. In this piece it is possible to discriminate distinctly different layers involved in the microtonal process: the harmonic one, the melodic, the rhythmical and the figurative models.

Table 5 shows how layers are applied in the two distinctive movements.

In the first movement we find only intervallic material, i.e. the dissonance produced by the two voices is built in such a way as to create a continuous shift between microtonal and conventional temperament, giving the perception of a movement of waves. In the second movement the same microtonal dissonance switches into a triadic structure – we can call it ‘micro-harmony’ – and is dependent on how we do perceive it, with a feeling that can resemble the structures of cadence formulae that come from the conventional harmony.

**Compositional Process**

The first step in this work was to make a choice of a set of pitch classes. For this purpose I considered the ‘natural scale’ produced by the harmonic series. The first five closest partials of the harmonic series to the equal temperament are respectively: the 2nd, 3rd, 9th, 17th and 19th.

We are normally used to experiencing the equal temperament ‘sequentially’, but the natural harmonic series ‘instantaneously’. That means, in other words, that the musical language uses the equal tempered scale but each sound itself produces at the same time its harmonic series for every single tone, and our ear is able to catch this difference. We could also say we hear two scales at the same time and that this does not bother our ears.
Fig.10  Melodic Figurations I mov. Three prototypes.

Fig.11  Melodic Figurations II mov. Two prototypes derived from combining the previous three.

Harmony:

I have used the equal tempered 24-tone scale as a basis for the other conceptual scales in the piece for two practical reasons: firstly, because quarter-tones are normally easier to reproduce on an instrument; and secondly, because I wanted the piece to be somehow related to the standard temperate 12-tone scale. This relationship is realized in the equal subdivision that both scales use, and in the fact that the standard pitches are all present in the 24-tone scale, and therefore ready to use. As Gardner says: “All consonant and dissonant intervals in equal-tempered music are likewise equal in their frequencies, so they share common characteristics of tonal quality.” (Gardner 1990: 5).
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Thank you!
Fig. 13 Model figuration ‘horizontal-vertical’ for first movement. In this geometric graph is represented the ‘model figuration’ of tableaux surreal that ‘shapes’ the form. The model has been used throughout the piece, and is a combination of vertical and horizontal figures.

Fig. 14 Model figuration ‘horizontal-vertical’ for movement II.

Aesthetics:
Fig. 10 The three prototypes, three possible ways of how to experience instability in the interval, by expanding and contracting it by a quarter tone.
For the feeling of “stability” I assume the ordinary temperament as the most familiar to our ears.
Fig. 15 Rhythmic Figuration, ten prototypes. Of the two types of syncopation, one is an anticipating syncopation figure and the other is a delayed syncopation.
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7.3.2 *tableaux surreal* - conceptual view

The piece has been written and conceived to realize some of the musical concepts that have previously been elaborated in a theoretical way. In the detail:

a. Structured-microtonality,
b. Formal simplicity,
c. Microtonal dissonance,
d. The energy expressed by new pitch subdivisions.

Indeed, in this regard microtonality (particularly the use of scales outside tempered systems) acquires and realizes a function, an integrated role in the structure of the piece, contributing in fact to the development of the other conceptual aspects.

**a. Structured-microtonality** is intended as a way of using the microtone integrated in the structure, i.e. with its own value and role, exactly like the other musical devices. For ‘structure’ I mean the harmonic, melodic and rhythmical aspects.

The harmony uses the microtonal pitch (derived from a tempered microtonal scale or an octave-based unequal division scale), with a specific degree function, to create a new harmonic set. I am still in favor, therefore, of retaining the notions of ‘scale degrees’, ‘resolution’, ‘cadence’, ‘harmonic progression’, and so on.

The melody, used within any microtonal scale, is considered in this case as each single note having its own function and degree. It is consequently involved with and affects the musical phrase and expression.

The rhythmical aspect also, although not directly involved with tones, contributes with effectiveness to enhance the microtonal language. This happens, in particular, in some important moments of the piece where the texture of the wind orchestra is more intense.

**b.** The term ‘formal simplicity’ expresses a tendency or a compositional style, which aims to dispossess the superfluous elements of the music. The purpose is to point towards the essence of the musical idea, which is also manifested in experiencing musical sound only as acoustic
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A particular note for singers: what I usually experience with them is a difficult task when we come to a tuning practice with quarter tones. In my experience western singers, or vocalists in general, have an ear structure suited for their music repertoire only. This might sound obvious, but surprisingly enough, when they are asked to overcome these borders they are unable to do so, even if they want to. Their tuning reference has been well fixed and unconsciously metabolized. What is possible to do in this case is to train the performer for a new ear perception that might eventually allow the vocal system to adapt to a new pitch production.

9. POSTLUDE

An interesting observation by Cowell casts more light on the issue of ‘temperament’. In his opinion no attempts have been made to discuss different sorts of temperament, or tuning, as it has been assumed that the tones of the overtone series are a natural criterion. Therefore, all temperaments, from this point of view, may be considered as an attempt to solve the problem of making some of the overtone relationships practical for musical use (Cowell 1996: xiii).

Hence, the possibilities of making new types of scale free from harmonic series theory, and possibly a practical solution for applying them on music instruments, has become a very fascinating field to explore and to practise in. My aim is to continue in this direction for the future until it becomes possible to establish a way to efficiently communicate music ideas within new temperaments.

Cowell again finds interesting and appealing relationships: the overtone series is a scale for the upper reaches, is a harmony for its lower reaches and is a basis for rhythmical co-ordination. Taking notes of these thoughts I would like to underline the importance of the exploring this acoustical phenomenon further; this has been an inspiration and support for my recent compositional activity.

Cowell also captures the fact that our modern acoustical instruments are capable of producing clearly audible harmonics even in the acute register. They themselves have a strong influence, conscious or subconscious, according to Cowell, on what we consider as acceptable in harmonic combinations (Cowell 1996: 5).
My aim for the future is, since microtonality contains a wide range of possibilities, to continue to work on a structured level to contextualize microtone in the western musical tradition with a functional role. As well as the aspect of integration with the equal temperament system, I also intend to explore and develop the material I have already collected.

A further step can be taken for the purposes of investigation, thus extending the borders of this field, leading more into a conception of aesthetic and musical form. In this regard, the realm of conceptual music can be used as a tool in highlighting the essence of microtonal dissonance. Conscious of the fact that an enormous work has already been done by esteemed composers throughout history, I am directing myself in a challenging new direction, which presumably musicians and music lovers would find hard to understand and appreciate, except through a long process of decoding, of new microtonal sonorities.
LIST OF SOURCES


