ANTON BRUCKNER
PRIVATUNIVERSITÄT
OBERÖSTERREICH

Eirini Mavrogiannaki

Matriculation Number: 61800498

Flute Extended Techniques
A Guide for Composers

Master Thesis

In partial fulfillment of the requirements for the degree

Master of Arts

in Composition

at the
Anton Bruckner Private University

Supervised by:

Univ. Prof. Dr. Lars-Edvard Laubhold
Univ. Prof. Norbert Girlinger

Linz, 10.11.2022

ABSTRACT

Flute Extended Techniques: A Guide for Composers

Many composers have considered the flute as their favorite instrument. Its tone is deemed by many composers as poetic not only for its soft tone in the low and middle area, but also for its brightness in the high area. The combination of its beautiful sound and the variety of many, different playing techniques give composers the opportunity to experiment more with this instrument in search for special sounds, speaking and playing or singing and playing.

My search, is about the contemporary playing techniques for the flute. For this reason, I am going to present not the common, but the extended playing techniques for the flute, accompanied with new music notation and giving a complete description with instructions to handle them. Furthermore, I am creating a guide for those composers who are interested in using the flute in a different way than the common one. This thesis includes not only definitions and instructions of the modern effects between 20th and 21st century, but also examples of notation for each technique. I am presenting effects that change the tone color of the flute, effects that change the vibration of the air steam, techniques that present the flute as a percussive instrument and others that include the voice of the flutist. The last pages complete my thesis with information about instructions and notation that should accompany the scores when it comes to electronic parts.

DEDICATION

I dedicate this paper to my mother, Vaso Frantzeskou, who always believed in herself and realized her dreams to become a doctor. Now, she believes in me to realize mine. Thank you mother for supporting wholeheartedly my master studies in Anton Bruckner Private University and you were always next to me as a doctor, as an audience, as a woman, as a friend, as a mother…

I also thank my Professor Erland Maria Freudenthaler who inspired me and gave me the strength to continue forward, improving my ideas in composition. Looking back, I can now realize how supportive you were to me. I can do nothing more, than to show you my ardent gratefulness for your commitment to me. Thank you!

TABLE OF CONTENTS

Abstract 2

Dedication 3

Introduction 6

CHAPTER ONE

The Background of Contemporary Notation 9

CHAPTER TWO

Extended Techniques 13

1. Tone Color & Special Effects 13
    1.1. Whistle Tones 13
    1.2. Multiphonics 14
    1.3. Bisbigliando 16
    1.4. Buzz Tone 17
    1.5. Bamboo Tones 18
2. Air Sound Techniques 19
    2.1. Aeolian Sound 19
    2.2. Circular Breathing 22
3. Percussive Effects 23
    3.1. Tongue-Ram 23
    3.2. Pizzicato 24
    3.3. Jet-Whistle 25
4. Vocal Techniques 27
    4.1. Singing and Playing 27
    4.2. Speaking and Playing 29
    4.3. Vocalization of Phonemes / Syllables 31
        4.3.1. International Phonetic Alphabet (IPA) 31
        4.3.2. Description of syllables without the IPA 34
        4.3.3. Changing vowels 35
        4.3.4. Consonants 36
        4.3.5. Repeated Phonemes 37

4.3.6. Humming 38
4.3.7. Falsetto 38

CHAPTER THREE

Approaching the Notation of Electronics 39
Afterword 48
Bibliography 50

INTRODUCTION

"The first thing you see on looking into a deep well is your own face and this is at least disconcerting. Longer looking reveals what is further in the well. Even there are vexed to discover another face which is also yours. Even while you are bearing your idea for your next composition, the past may come up, total recall without pretense, and not always pretty. You need to adjust to the fact that there will be more of this in the future – bad critics, not well-performed concerts etc. If you want to leave, is understandable, but is still a matter of regret, because you are just on the point of getting to know yourself." [1] The wise composers, instead, would smile quietly, develop their creativity idea while thinking all the music on its all.[2]

It often takes time to create a good work. However, the deadlines that are given from the companies or the universities and the composition contests that direct your creativity make composers forget their purpose by making them limiting their freedom. I agree with Matthew Ketly who says in his book *Flute solo* that "many people may tell you to hurry on, to move on, to come on – if you surrender to guilt and agree with the voices outside, then the heart returns to its old unhappiness, the old fare, the old routine. And only for a while, just long enough to taper off the din of a world come in with you. It does not take long. Sometimes a quiet craft, or a drawing, or a painting. Sometimes a candle will help. Some darkness. It is the dark that gives point to our ears, for in the dark not yet used to, we see too much.[3]

The past two centuries, some composers required performers to learn new playing techniques of producing sound with the flute. One problem that had not been entirely solved at that point was how to notate many of those new techniques. Some techniques had been required of all performers, including tapping on the instrument or on some other surface, whistling, and a wide variety of vocal sounds. In these cases, the performer had the role of a percussionist, whistler, or vocalist, instead of a flutist.[4]

Allow me to believe, that the creation of new music is often "computational". Music is not so simple anymore. We believe that our purpose today, is to experiment with technology and compose something brand new, that wasn't heard before, aiming to become at last pioneers. We forget that this is not the case, is not a purpose to compose something new. For me, composition is my voice to communicate with the audience and express ideas that plague today's society. Who is able to understand, understands.

According to the flutist Eftihia Victoria Arkoudis "the classical and avant-garde aesthetics blended with emerging Jazz idioms, the songwriting business of Tin Pan Alley, and the music of Broadway and movies, bringing forth a bustling commercial industry".[5] She continues saying, that "the concurrence and merging of so many

[1] Matthew Ketly, *Flute Solo*, Kansas, 1979, p. 5.
[2] Ibid.
[3] Ibid., p. 3.
[4] Ibid., p. 222.
[5] Eftihia Victoria Arkoudis, "Contemporary music Notation for the Flute: A Unified Guide to Notational Symbols for Composers and Performers", Ph.D. diss., West Virginia University, 2019, p. 1.

different musical styles gave rise to new genres of music across art and popular musical traditions, later often in combination with the construction of electronic and computer music instruments, which inspired composers of the mid- and late-twentieth century to reimagine their compositional methods and make music that is both relatable and thought-provoking."[6]

My Thesis aims to present the extended flute techniques with music notation and symbols indications, creating a guide for composers who wish to explore the contemporary flute notation and broaden their horizons to the sound of modern music, with the unique aim to explore some new colors in modern flute repertoire and hopping to add them eventually in their compositional palette for their future compositions. For this reason, there will be mention to special techniques. A special technique may use a different-shaped note head to distinguish it from ordinarily played notes, as long as the notation has verbal qualification. Unconventional techniques can be described with conventional notation and verbal explanation.[7]

This paper includes some unconventional techniques used commonly from composers between 20th and 21st century. The first chapter deals with the historical context regarding to the new compositional techniques of the mid-twentieth century with its notational experiment and innovation. For this reason, I am referring mainly to composers who used or even invented different notation for new methods of composing. Erhard Karkoschka's *Notation in New Music* (London: Universal edition, 1972) catalogued many of these strands, which showed a lack of a common language. Kurt Stone's *Music Notation in the 20th century: A Practical Guidebook* (W. W. Norton, 1980) standardizes the 20th century new notation symbols. Some of Stone's proposals have been adopted widely, while others have not been found so useful.[8] In this thesis, I am presenting the music notation that I believe, according to my experience as a composer and collaboration with other flutists, is more practical and memorable.

The second chapter is considered as the main part of my thesis. Here, I categorize the techniques in a detailed hierarchy of headings that aims to help the reader navigate these pages and find information quickly. Each topic is structured according to definition and use from the elementary to the complex. Definitions are given where terminology is deemed confusing. Of course, a basic knowledge of music theory is assumed. In overall, I have been pretty selective in the choice of extended flute techniques including in this thesis, and this should give the composer the facility to create notation for some of the most uncommon techniques. A familiar technique can be read and understood quickly and without doubt there are already so many different ways of notating the same thing. An unfamiliar notation takes much longer for the reader to understand it. I totally agree with the author Elaine Gould, who says that "the

[6] Ibid.
[7] Elaine Gould, *Behind the Bars: The definite guide to Music Notation*, London: Faber Music, 2011, p. 248.
[8] Stefan Kostka, *Materials and Techniques of Twentieth-Century Music*, 3d Ed., New Jersey: Pearson Prentice Hall, 2006, p. 175.

more complicated the notation is, the greater the possibility is to create a barrier to the reader".[9]

The modern composer knows very well that a composition does not only apply in theoretical aspect, but also in practical. So, when it comes to the practical situation, a composer interacts also with other people in charge, such as technicians, sound engineers etc. Here, the reader is informed about the basic notational requirement as a performance tool, especially when it comes to electronic sounds. The function of notating electroacoustic sounds (pre-recorded or processed live) is to describe them with as many points of reference as are necessary to co-ordinate performers and electronic component, giving all necessary information to the technician. This kind of information, I believe, is of highly importance because a composition is complete when it comes to the performance. Of course, the knowledge included in this chapter, can also be applied to other instruments as well, since this chapter provides information about the coordination between performers and other people involved in a performance either in a studio or in recording.

I am going to explain these techniques through specific examples that witness also the music notation. Unless otherwise stated, the examples are mine. A composer can be fully informed not only about the extended techniques and the sound they produce, but also how to notate a specific technique on the score, giving specific instructions to the flutist in order to achieve the willing outcome. Finally, I am going to compare each technique with each instrument of the flute family.

My views, in overall, are based on the last eight years of my studies in Greece and Austria, my experience as a composer, my participation in seminars, festivals and collaboration with other composers and performers. It is my aim to present the extended flute techniques with the contemporary flute notation, creating a user-friendly guide for composers who are interested in adding and expanding those new sounds in flute repertoire.

[9] Gould, p. xiii.

CHAPTER ONE

The Background of Contemporary Notation for the Flute

Tartini was the one who discovered the influence of difference, who was able to demonstrate that two notes of equal strength and timbre produce a third note below the other two.[10] This way of analyzing acoustical facts led to the discovery of chords on the flute. Claudio Sebastiani stated: "when playing some part on a wind instrument, one must sing simultaneously the bass, the tenor or another voice in a soft murmuring manner that is easy to learn".[11] Georg Bayr, on the other hand, has perfected his invention of producing double notes on the flute to the point where the procedure applies to all scales and every flutist was able to produce simultaneously audible thirds, fourths, fifths and sixths. In order to understand Bayr's chords, one must use a 13-key flute. The chords derive from the unstable equilibrium of the air column between notes whose fingering is related or between different overtones of the same fundamental. The exercise is difficult, but the result is surprising. Although composers rejected these strange notes and considered them to be unusable, today they are frequently employed on account of their novel character.[12]

Some effects for the flute derive from the contemporary string repertoire. Unquestionably, these techniques are not an invention of the 20th and 21st century, but they are used much more often in modern scores, such as the use of harmonics, multiple stops, quartertones, or glissandi.[13] Berlioz stated that "it would be curious to try once, in a composition written for the occasion, the simultaneous use of all the musical forces that can be gathered together. Let us suppose that the conductor had them at his command, in a vast hall designed for the purpose by an architect familiar with acoustics and music."[14] Furthermore, his work *Treatise on Instrumentation* (1844) incorporates signs, that tend to be more familiar with the potential of orchestral instruments. In final chapter of his work *Treatise*, the composer describes a large orchestra counting up to 830 musicians. This proves that Berlioz was already thinking of a new approach for the art of composition, of music, but also for the audience to perceive another conception and approach.[15]

Wagner's approach, on the other hand, was to create smaller groups of instruments in order to create effectively an emotional state of mind by the absence of specific timbres during the action. In this way, the idea of a tonal center employing by chromaticism, remote modulations and dissonances was not there. So, a new world of possibilities appeared, which surely inspired other composers such as Bruckner, Strauss, Scriabin, and early Debussy. But an important feature of Wagner's concept, is the constant changing of instruments involved, leading to a certain use of color that

[10] Raymond, p.128.
[11] Ibid., p. 129.
[12] Kostka, p. 56.
[13] Ibid., p. 225.
[14] Pierre Boulez and Jean Jacques Nattiez, *Orientations*, Cambridge: Harvard University Press, 1986, p. 213-214.
[15] Ibid.

survived as an orchestral technique in the twentieth century.[16] Of course, Wagner did not inspire all the composers. Some of them were Tchaikovsky, Smetana, Dvorak, Leoš Janáček and Maurice Ravel, who preferred to use their traditional musical elements of their Russian and Czech heritage. Ravel preferred to base his music on the exotic and oriental elements found in Spanish, Greek, Italian and Hebrew folk music.[17]

What is common about the composers mentioned above, is that they did not repeat the "older" ways, but they searched for different means to pursue their dreams and their artistic vision. In other words, they added modern effects and instruments in their works in order to transform the art of instrumentation into an effective tool, through the unusual combination of instruments and the emerging of those new playing techniques, which is also of interest of this thesis. The modern playing techniques are also known as extended techniques, because they are deemed as "extensions" of the well-known, common techniques, which occur from a non-traditional playing way. An example for the flute could be the *flutter-tonging* effect. The flutist is asked to roll the tip of the tongue on the alveolar ridge by using the consonant [r], resulting to a tremolo effect. In this way, the flutist abandons the traditional articulation which requires the consonants [t] and [d].[18]

Pyotr Ilyich Tchaikovsky (1840-1893) was one of the first composers who used extended techniques for the flute. Let us have in mind, that one of the first extended techniques was the *flutter-tonguing* effect. Tchaikovsky inserted this technique in the second act of his ballet *The Nutcracker* in 1892 and also notated this technique as "frullato", repeating it throughout the movement as "sempre frullato". However, Richard Strauss (1864-1949) was the composer who first introduced this technique with his poem Don Quixote for cello, viola and orchestra in 1897.[19]

Claude Debussy (1862-1918) was the next composer, who established the flute as a solo instrument. He took advantage of the ethereal sound of the flute, creating melodies with dynamic variety. His use of bitonality, pentatonic and whole-tone scales transformed the flute's character in the eyes of future composers and sparked new musical ideas.[20] These transformations continued with the leader of the Second Viennese School, Arnold Schoenberg (1874-1951) and his innovative twelve-tone system. Schoenberg's dodecaphony accepted all twelve pitches of the chromatic scale as significant and treated them equally. Even though the concept of microtonality has its roots in ancient Greece, it became an integral part of contemporary music. By adding intervals smaller than a semitone on the harmonic palette, the number of pitches composers could use increased. As a result, came the need for a new notational system able to depict these quarter-tones and microtones. Nevertheless, a standardized notation

[16] Heinz Hans Stuckenschmidt, *Twentieth Century Music*, Richard Deveson (trans.), New York: McGraw-Hill, 1969, p. 28.
[17] Ibid., p. 29.
[18] Arkoudis, p. 10.
[19] Ibid., p. 11.
[20] Ibid., p.12.

for all quarter-tones and microtones remains yet, decades later, a non-standardized technique, as composers prefer to choose their own personalized language.[21]

Schoenberg's exploitation of the flute's capabilities paved the way for the instrument's vast registral, dynamic contrast and articulation range. He successfully used the flute both in a traditional and progressive way with the theatrical *Sprechstimme* technique in his *Pierrot Lunaire* (1912). At the same time, Italian futurist Luigi Russolo, began to experiment with ways to translate the noises of modern industry into music. In his book *The Art of Noises* (1913) he presents six groups of noises, such as roars, thunderings, whistling, hissing, muttering, gurgling, screeching, rubbing, shouts, screams and noises by beating on metals, skins, woods.[22] Edgar Varése, on the other hand, envisioned his works sounding "unlike anything that had ever been heard".[23] For years, he advocated for the necessity of building new instrument's able to produce unheard sounds and his composition *Density 21.5* (1936) for unaccompanied flute was his chance to demonstrate his authenticity as an artist in regards to the flute.[24] In his work, Varèse gave the flute an industrial and metallic quality. He took advantage of the instruments full range and dynamic capacity accompanied by complex rhythmical motives, and incorporated the first percussive effect a flutist ever had to demonstrate – *key clicks* (added in 1946). Varèse's addition of key clicks, which require the flutist strongly clicks the keys of the instrument to produce a pitch resonance, signaled the beginning of a new era for the modern flute, which would take off in the 1950's. After Varèse's landmark composition *Density 21.5*, the number of composers and performers who wished to specialize and integrate new performance techniques in their compositions for the flute escalated significantly.[25]

The technique of simultaneously *singing and playing* was the next popular technique that was used around 1950's. This technique was used by the rock band Jethro Tull and by jazz bands, such as *Sam Most Quintet*.[26] Joyce Mekeel (1931-1997) was a composer and flutist, who incorporated this technique in his work *The Shape of Silence*. In this work, the flutist is asked to speak specific words across the embouchure hole sustaining low register notes.[27]

Among other composers, Luciano Berio (1925-2003) added the earliest notated multiphonic for the flute, a perfect fourth G-C interval, in his *Sequenza I per flauto solo* (1958). In *Sequenza I*, Berio also incorporates flutter tonguing, extreme register leaps, and stark articulation.[28] Burt Levy (1936-2010), however, preferred to use a conglomeration of percussive effects, timbral tremolos, harmonics, glissandi, and multiphonics in his work *Orbs with Flute*.[29] Other composers, such as Kazuo

[21] Read Gardner, *20th-Century Microtonal Notation*, New York: Greenwood Press, 1990, p. 3.
[22] Luigi Russolo, *The Art of Noises,* New York: Pendragon Press, 1986, p. 28.
[23] Nancy Toff, *The Flute Book A Complete Guide for students and performers*, 3d Ed., New York: Scribner's Sons, 2016, p. 140.
[24] Ibid., p. 141.
[25] Ibid.
[26] Arkoudis, p. 17.
[27] Ibid., p. 19.
[28] Ibid., p. 20.
[29] Ibid., p. 21.

Fukushima (1930-), preferred to incorporate characteristics of their traditional music. Fukushima, for example, used techniques like bending technique, glissando and overblowing in order to bring in the mind the traditional Japanese bamboo flute.[30] Nevertheless, many flutists were asked to use different flutes of the flute family. Karlheinz Stockhausen (1928-2007), for instance, asked from the flutist to bridge the changes of instruments with sung or hummed notes, kissing noises, keyclicks or tongue clicks, while alternating with whistling, varied vibrato, timbral trills and quarter notes.[31]

The flute music of the avant-garde has been making use of chords, microtones, noises made by the keys, tongue clicking, and so on. These special effects have existed for a long time, though traditional methods deemed them to be incorrect. Today there is a different approach that includes these sounds in performances. Some playing techniques used in contemporary score are not entirely new but represent an intensification or development of earlier usages. The technique of playing polyphonically is also old. Wind players have for a long time tried to sing and blow simultaneously, a practice which must have been fairly widespread in folk music.[32]

In conclusion, there are plenty symbols in flute repertoire. The future musicians need an efficient modern notation system that may help them understand the modern sounds. For this reason, composers, flutists or musicologists become writers in order to collect those symbols and try to describe the sound or even teach the way of the execution categorizing them according to the timbre, voice, breath or any other category may help the musician understand more.

[30] Ibid., p. 22.
[31] Ibid., p. 22.
[32] Kurt Stone, *Music Notation in the Twentieth Century*, 1st Ed., New York: Norton, 1980, p. xvi.

CHAPTER TWO

Extended Techniques

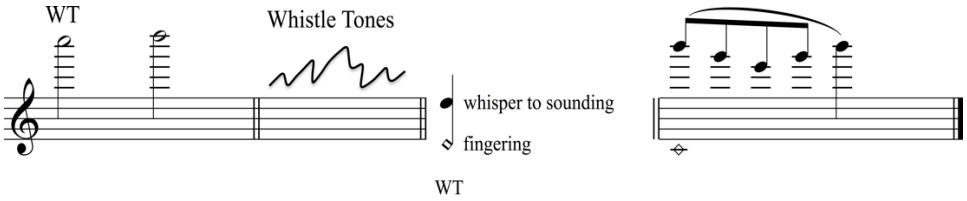
1. Tone Color & Special Effects

1.1. Whistle Tones

Whistle Tones are known also as Whisper Tones and sound like whistling. As individual partials of notes, these are high and pure sine tones. Based on the harmonic series, the flutist can produce this sound using the fingerings of the first and third register. With the fingerings of the third register combines to a gentle exhale, the air is moving with very low pressure. In addition, they may also be produced inside the flute by completely covering the embouchure hole with the lips while inhaling or exhaling air. Whistle tones are notated with the full word "whistle tones" or by the initials "W.T.".[33] William Kincaid is credited with the first official use of this technique as a teaching method.[34] He used whistle tones as a warm-up exercise designed for lip control and relaxation. Whistle tones are soft, high and clear individual upper partials of the fingered note. They usually involve the fifth through tenth partials with some lower notes capable of producing up to the sixteenth partial, or four octaves above the fundamental (Figure 2). This allows for between five to fourteen available sounds. Whistle tones are possible on every fingering but the lower fingerings are more quick to produce the desired effect.[35] The actual register of the whistle tone is controlled by raising or lowering the tongue, just as if you were whistling, hence one possible source of its name.[36] Commonly, W.T.[37] is printed over the note with an * and an explanatory footnote. Some composers use the diamond shaped note with a footnote and employ the method of notating the fundamental and the desired whistle tones.[38]

Notating the sounding pitches is very nice on paper, but whistle tones are very unreliable. They are not easily isolated as they tend to oscillate between pitches very readily. Also, their dynamic range is limited. The tones are barely audible beyond twenty feet. Many performers have discovered that sustaining whistle tones is difficult and articulation nearly impossible. This technique can be used on all flutes (Picc/Alto/Bass).[39]

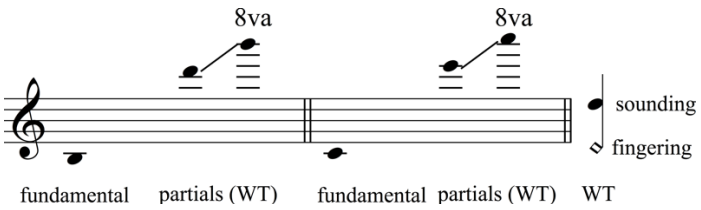
Figure 1: Notation for the technique of *Whistle Tones*.[40]



[33] "Flutexpansions", *https://www.flutexpansions.com* (accessed in November 28, 2022).
[34] Gould, p. 97.
[35] Thomas Howell, *The Avant-Garde Flute*, Berkeley: University of California Press, 1980, p. 26.
[36] Willis Morya, *Notation and Performance of Avant-Garde Literature for the Solo Flute*, Florida: University of Florida Press, 2001, p. 52.
[37] W.T. stands for *Whistle Tones* and can also be written without the dots, as WT.
[38] Ibid., 53.
[39] Gould, p. 249.
[40] Arkoudis, p. 22.

Some works which include Whistle Tones are *Sequenza I* by Luciano Berio, *Écrít* by Heinz Holliger, *Honami* by Wil Offermans, *Monodie IV Pour une Espace Sacré* by Antoine Tisne, *Soliloquium No 1* by Jeney Zoltan.[41]

Figure 2: The upper partials of the fingered note produce Whistle Tones.[42]



1.2. Multiphonics

A flute technique with complex nature is Multiphonics. They are multiple sonorities that have been used in modern flute repertoire since 1958.[43] Multiphonics can be produced by either over- or under-blowing a fingering for a single pitch, or by using special fingerings. A flutist can produce two, three, four, and up to five pitches simultaneously while maintaining the optimal lip opening size and a focused air stream at an angle in order for all sonorities to be heard. The result is a complex pattern of vibrations in which two or more pitches are perceived simultaneously, the pitches being of unequal quality. Due to their complex nature, composers should carefully examine the fingerings they provide performers with. For example, there are instances of sources in which the provided multiphonic fingerings do not produce the pitches displayed on the staff. Therefore it is more helpful to describe verbally the type of sound required than to prescribe a chord that may or may not be realistically attainable, or where the pitches may be obscured by predominant timbre noise.[44] For a non-specific multiphonic (or non-preferable) it is sufficient to indicate that a multiphonic should be produced, and to show the approximate pitch area required – or the outer extremes, if control of the upper range is required. Use a contrasting notehead such as crosses or diamonds: diamond notes are more legible for minims and semibreves. This technique can be used on all flutes (Picc./Alto/Bass). Some fingerings may be different between the flutes.[45] When trying to sustain a multiphonic, the aiming between notes to achieve the sonority tends to increase the effect of one tone becoming predominate. Multiphonics are at times slow to respond and tricky to execute. This often leads to unintentional starts and stops on the part of the newer performers of this effect. Use an ordinary notehead to indicate the pitch of a multiphonic based on a given fundamental (a), or one that is to include a specific pitch or pitches (b) (Figure 3). Either give a verbal instruction to play

[41] Rogier Pijper, "Whistle Tones", *https://www.flutecolors.com/techniques/whistle-tones/* (Accessed in December 2021).
[42] Ibid.
[43] Arkoudis, p. 22.
[44] David Cope, *Techniques of the Contemporary Composer*, Belmont: Schirmer Books, 1997, p. 138.
[45] Gould, p. 257.

a multiphonic or for repeated use place an "M"[46] through the stem (the "M" requires definition at its first appearance) (Figure 4).[47]

Figure 3: Use of ordinary noteheads to indicate the technique of *Multiphonics*.[48]

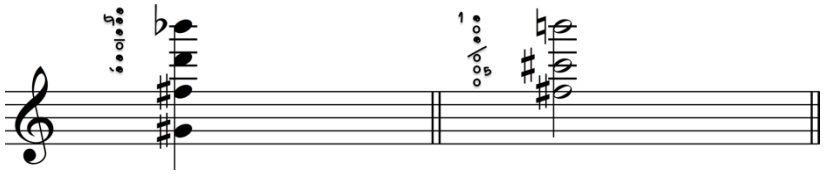
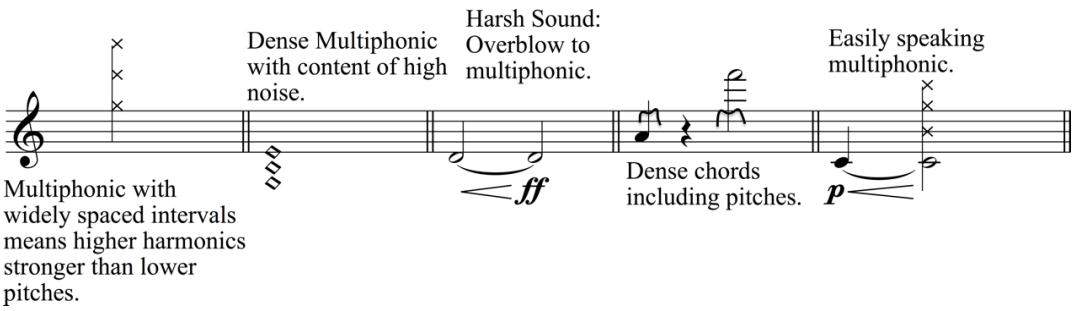


Figure 4: Different shapes of noteheads or written instructions for *Multiphonics*.[49]



What is of highly importance is to remind the composer that before using a specific contemporary technique in a new composition, a very positive attitude is to think also of the performer. Many times the performer determines the work through the successful execution and interpretation of it, by giving a complete image and a specific atmosphere of the work, according to his/her experience. When the performer tries to sustain a multiphonic, the aiming between notes to achieve the sonority, tends to increase the effect of one tone becoming predominate. When alternative fingering for a single pitch is required in order to produce contrasting timbre, the fingerings are usually best left to the player, since those most suitable depend on the instrument, the player and the embouchure. Fingering is best given as a chart for the keys and/or holes. The symbols for fingering should be placed directly above or below the relevant note (Figure 5).[50]

Some works which include Multophonics are *Sequenza I* by Luciano Berio, *Solo für Flöte* by Edison Denissow, *Dorset Street* by Robert Dick, *Honami* by Wil Offermans, *Voice* by Toru Takemitsu, *Three Dances* by Alexander Wagendristel.[51]

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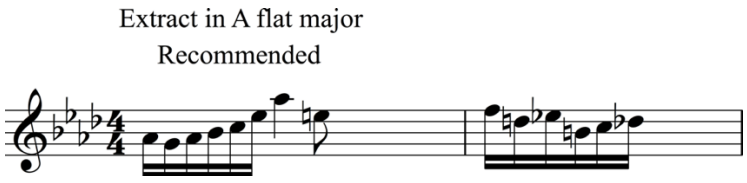
[46] "M" stands for "Multiphonics".
[47] Gould, p. 256.
[48] Ibid.
[49] Rogier Pijper, *https://www.flutecolors.com/techniques/multiphonics/* (accessed in November 2022).
[50] Ibid.
[51] Rogier Pijper, "Multiphonics", *https://www.flutecolors.com/techniques/multiphonics/* (accessed in November 2022).

1.3. Bisbigliando

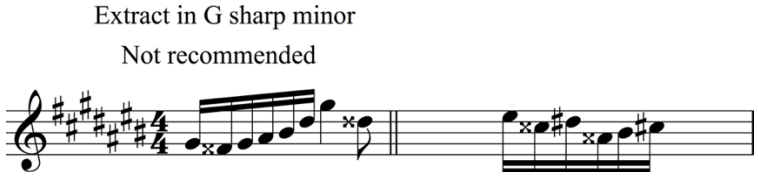
The other technique that deals with the color of the note, is Bisbigliando, which is also known as *enharmonic trill*, *timbre trill* or *klangfarbentrill*.[52] It is a tremolo between different fingerings of the same pitch and is possible in the second and third octaves.[53] The purpose of a bisbigliando is not to change the pitch of the note, but the color of the note, resulting a fast, shimmery change of tone color that resembles playing a trill. The technique is often indicated in the score with the word *bisbig*. along with a wavy line, or by specifying the fingering to be used. It is important to give the indication of *key trill* or *alternative fingerings* in order to clarify that this is not a conventional trill with the upper neighbouring note.[54] When writing enharmonic notes, it is recommended to use the key with the least number of sharps or flats in order to reduce the number of accidentals.[55]

When the enharmonically equivalent key has an equal number of accidentals (as in F#/G flat), allocate the sharp key signature for instruments in sharp keys (in G, A etc.), the flat key signature for instruments in flat keys (in F, B flat etc.) However, in case that a transposed part has more accidentals that contradict the key signature than confirm it, consider writing it without a key signature, instead placing accidentals in front of the relevant notes as they occur.[56] In music without key signatures, the literal transposition of a sharp-key line into a flat-key instrument leads to greater numbers of accidentals and frequently to double sharps or double flats. To simplify reading, reduce the number of accidentals by judicious use of enharmonic equivalents (Figure 6). Avoid double sharps and double flats, except in a tonal context that cannot easily be rewritten enharmonically. It is often better not to respell isolated notes enharmonically if this creates diminished and augmented intervals that are awkward to read.[57] Some composers who used the technique of Bisbigliando in their works are Robert Dick, Ian Clarke, Greg Patillo and Harvey Solberger.[58]

Figure 6: The same melody is presented with less accidentals to simplify reading.[59]



[52] Arkoudis, p. 44.
[53] Ibid.
[54] Gould, p. 256.
[55] Ibid., p. 243.
[56] Ibid., p. 244.
[57] Ibid., p. 245.
[58] Emi Ferguson, "Bisbigliando", *https://www.emiferguson.com/flutes-extendedtechniques* (accessed in November 2022).
[59] Gould, p. 249.



1.4. Buzz Tone

Another technique that demands much pressure, is the technique Buzz Tone. Buzz tone is a technique meant to imitate the sound of a trumpet.[60] It is also known as *trumpet-embouchure*. The sound is produced through the combination of lip tension, air pressure, and the space in the oral cavity, while either blowing into the embouchure holes or removing the head joint and blowing into the upper part of the flute body, as if it is a trumpet. It is usually notated with the words *trumpet attack*, *buzz* or *BZ* and its notation is considered standard.[61] This special technique uses a different-shaped notehead to distinguish it from ordinarily played notes, as long as the notation has verbal qualification. It is extremely important to explain a special technique in words (Figure 7). Non pitched sounds are clearest placed at the top or bottom of the stave. If groups of non-standard noteheads are difficult to read, use crosses through stems instead (Figure 8).[62]

Figure 7: Explanation of the technique of *Buzz Tone* in words.[63]

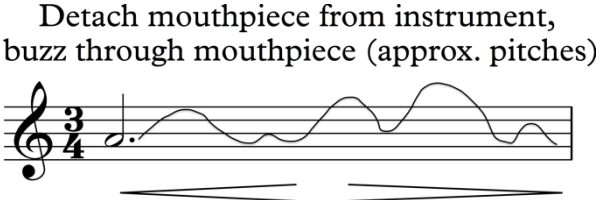
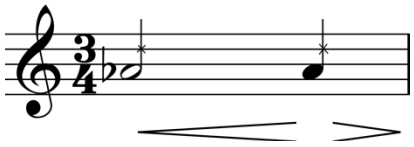


Figure 8: Alternative notation of *Buzz Tones*, using crosses through stems.



1.5. Bamboo Tones

If a composer would like to add a warm, windy sound to the flute, then the technique of *Bamboo Tones* will do the magic. According to composer-flutist Wil Offermans, who has published a book including studies devoted to practicing this extended technique, bamboo tones have a warm, hollow, windy sound and are produced

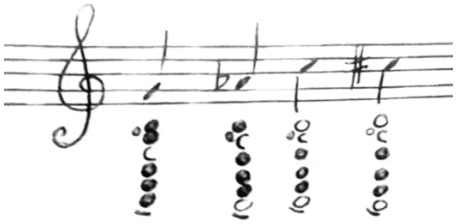
[60] Howard Risatti, *New Music Signs for contemporary Music*, Illinois: University of Illinois Press, 1975, p. 28.
[61] Ibid.
[62] Gould, p. 249.
[63] Ibid.

with different fingerings to get a different timbre. They sound like tones of a bamboo flute. The fingerings of quartertones/microtones can be used. Composers will usually provide the flutist with the fingerings, but if that is not the case then Robert Dick's *Tone Development through Extended Techniques* and Wil Offerman's *For the Contemporary Flutist: Twelve Studies for the Flute with Explanations in the Supplemen*t are two manuals that include that information. The notation for bamboo tones is considered standard. This technique can be used on all flutes.[64]

Some works which include Bamboo Tones are *Nachtfaltergedanken* by Friedgund Gottsche-Niessner, *Drigo's dream, Honami, Studie No 4: Bamboo tones* and *Working Song 2* by Wil Offermans.[65]

As a composer, I strongly recommend this kind of flute technique. I remember clearly the excitement of my flutist playing Bamboo Tones, who also advised me about the notation of this technique. My flutist also recommended to add text above the technique, giving instructions also about the embouchure and the register. Namely, the technique is also manageable in every register. The same is with the technique of *Aeolian Sound*. I asked my flutist to blow air inside the body of the instrument and she recommended me to choose register, as the air in high register is sounded differently than sounded in the middle or low one.

Figure 9: Notation of the Technique of *Bamboo Tones*.



2. Air Sound Techniques

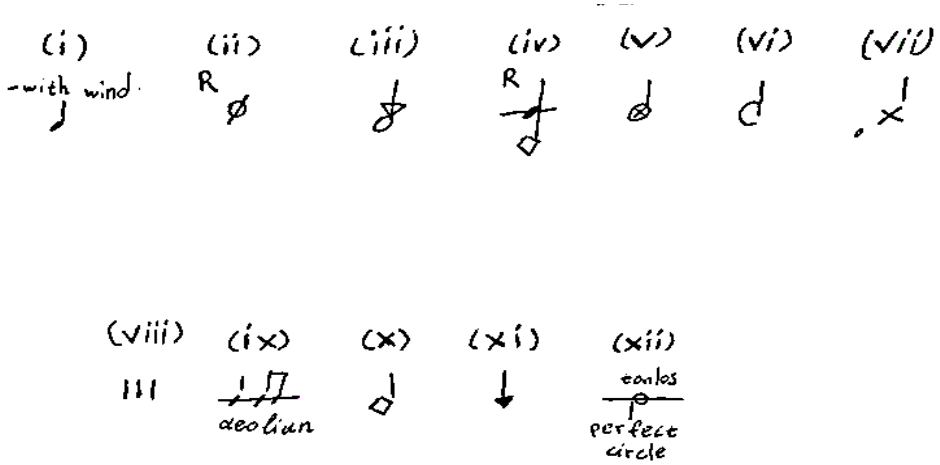
2.1. Aeolian Sound

An air sound technique is the *Aeolian Sound*. This effect can be also named *Residual Tone* which resembles the sound of the wind.[66] This colored air sound is produced when the flutist blows across the embouchure hole with a relaxed and unfocused embouchure. The air sound can range from extremely soft to very loud or explosive by varying the shape of the oral cavity with the use of vowels, the distance between the teeth, and the speed and angle of the air stream.[67]

[64] Ibid.
[65] Rogier Pijper: "Bamboo Tones", *https://www.flutecolors.com/techniques/bamboo-tones/* (accessed in November 2022).
[66] Ibid.
[67] Ibid.

More and more composers have developed an amount of different symbols in order to explain and describe this colored effect coming from the flute (Figure 10). The composers usually choose a shape of a notehead that they believe that suits best the technique and aims to help the performer understand the way of performing this effect according to the shape of the symbol. For example, a composer can choose the shape of a balloon as a notehead[68] to describe the effect of aeolian sound, as the balloon contains air. In this way, this symbol can help the flutist remember that the shape of the balloon corresponds the aeolian technique. Other composers have developed different shapes of noteheads in order to describe the same technique.

Figure 10: Symbols that indicate the technique of *Aeolian Sound*.



The above symbols were used in many works by composers who wanted to add the effect of Aeolian Sound. In fact, the signs **(i)** and **(ix)** are already used in many compositions composed for the flute. The composition *Etude op. 20: Shadows* (1979) by John Heiss, is an example where he used successfully this notation. Other works with this notation are also Shulamit Ran's *East Wind* (1988), Michael Culquhoun's *Charanga* (1993), and Christos Hatzis' *Departures Concerto for Flute and Strings* (2011). The composer Ian Clarke used a different symbol to indicate this effect. He used the capital letter R, which is the sign **(ii)**, in all of his compositions, like *Zoom Tube* (1999) and *Great Train Race* (2000) to notate a residual tone - as he calls. Karlheinz Stockausen is another composer who follows the same notation, who has used it in his work *Flautina for Solo Flute with Piccolo and Alto Flute* (1989). Robert Dick's symbol for the technique of aeolian sound is the sign **(iv)**, which shares the letter R with Ian Clarke's notation, in order to indicate that it is a residual breathy tone. In Donald Erb's work *Music for Mother Bear Song for a Mother Bear* (1977) there has been used the sign **(v)**, while sign **(vi)** is considered Takemitsu's way of notating aeolian sounds in *Voice for solo flute* (1971). Sign **(v)** has been used by Anže Rozman in the *Dance of the Nuraghi Warriors* (2017), who has also used sign **(x)** with the accompaniment of words in his *Little Suite of Mythological Beings* (2010). Sign **(viii)** is in works by Wil Offermans and sign **(iii)** and **(xi)** can be seen in Artaud's *treatise*.

[68] See symbol (vi) in Figure 10.

Finally, sign **(xii)** is Kaija Saariaho's way of notating aeolian sound and has also been used by Robert Aitken in *Plainsong* (1977).[69]

A symbol that has not been included in the table above, but is also for air sounds is the one used by Maggi Payne in her work *Reflections* (2003). It is a square-spaced empty notehead, indicating that the player should produce an air pitched glissando. She also uses sign **(x)** for humming. The common symbols for air tones that the most composers prefer, are the diamond-shaped signs or triangle-shaped noteheads, namely the signs **(iii)**, **(x)** and **(xi)**. However, the diamond-shaped note heads may cause confusion, as those noteheads can also been considered as *harmonics* or *whistle tones*.[70] For this reason, it is the best that to be rejected from this discussion. Furthermore, the signs **(vi)** and **(ix)** shall also be excluded, because they can be confused with half notes and can confuse the performer when it comes to rhythmic matters. This is a very logical request, which further explains why a total of five signs have been eliminated in this process.[71]

According to my opinion as a composer, the most ideal signs that describes best the effect of aeolian sound, are the symbols **(i)**, **(ii)**, and **(viii)**. Even though sign **(ii)** is an empty notehead, it is combined with the letter R, which stands for Residual Tone. Nevertheless, the best way to notate *aeolian sound* successfully is to use the words "with wind" or "aeolian" or "residual tone", because the exact name of the effect on the score help the flutist understand immediately the technique and is not so confusing, in case there are more than one symbols on score. In case the composer wants to combine air with pitch, there is also developed notation. Some composers prefer to use stripes underneath the note. No sound should be used, only air.[72] Other composers do not use the stripes, but a triangle instead. This triangle sign can also be combined with a note in order to indicate the height of the note that should be played without sound.[73] This technique can be used on all flutes.[74]

[69] Arkoudis, p. 67.
[70] See symbols (iv) and (x) in Figure 10.
[71] Ibid., p. 68.
[72] Rogier Pijper, "Wind Tones", *https://www.flutecolors.com/techniques/wind-tones/* (accessed in November 2022).
[73] Ibid.
[74] Ibid.

Figure 11: Alternative Notation of *Aeolian Sound*, use of Stripes to indicate air with pitch.

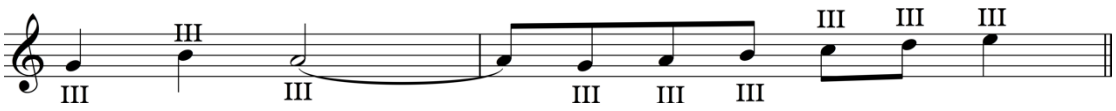


Figure 12: Alternative Notation of *Aeolian Sound*, use of triangle as a notehead.

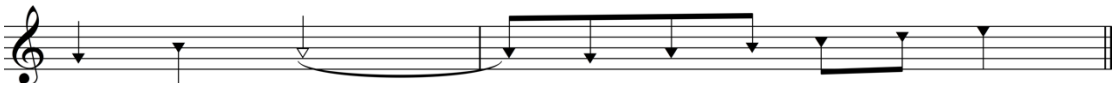
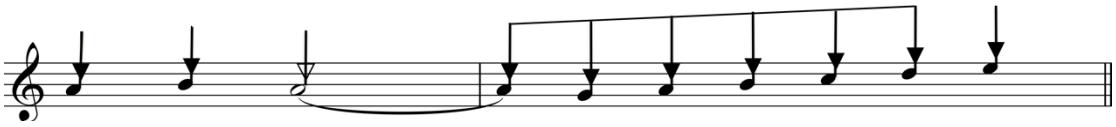
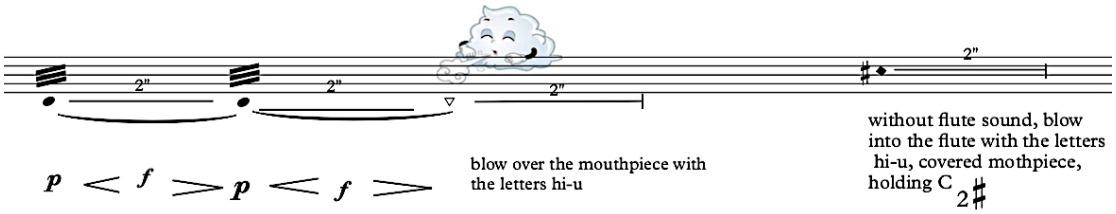


Figure 13: Alternative Notation of *Aeolian Sound*, combination of a note with a triangle through stem.



As a composer, I created my own way of describing the technique of aeolian sound. I have been experimented for some years about the techniques on the flute, thus the subject of this thesis. I thought it would be much better to insert a graphic or a drawing on the score in the shape of a cloud, in order to lead the flutist directly to the specific technique. The title of my work for solo flute is “Duo for One” and composed in 2018.

Figure 14: Alternative Notation of *Aeolian Sound*, indicated with a graphic.



In fact, the graphic is accompanied with the written instructions “blow over the mouthpiece with the letters hi-u” (Figure 14). In this way, the flutist knows exactly how to play this technique. My professors also advised me to give the instructions, not on a separate sheet, but directly on the score, in order to ease the sight-reading of the musician and make it much easier to remember the instructions during the performance.

2.2. Circular Breathing

As far as the technique of *circular breathing* is concerned, the flutist continues breathing in air without disrupting the melody for a long time.[75] Someone who has mastered this extremely challenging technique will be able to perform longer phrases, with essentially one breath. What is mainly involved is the mouth, the tongue, and the cheeks. For a more detailed and educational approach to circular breathing, an invaluable source is Robert Dick's *Circular Breathing for the Flutist* (1987).[76] This technique can be used on all flutes. Some other repertoire which include circular breathing is *For the contemporary Flutist* by Wil Offermans and *A practice book for the flute 6* by Trevor Wye.[77]

Figure 15: Symbols of Circular Breathing.[78]

The above three signs indicate the effect of circular breathing. The first symbol shows that the flutist should breath through the nose. The second sign indicates that the flutist should start inflating the cheeks the exact moment. The third sign describes the same as the others, but it functions also as a reminders for circular breathing because of its circular shape.[79]

Of course this technique can be also performed with sound. For this reason, there are some symbols that help the flutist understand whether to combine this effect with or no sound. Some composers, as we explained earlier in aeolian sound, prefer the capital letter R for Residual Tone, the letter "aeolian" written above the notes or even the combination of a triangle with a common note. However, when it comes to the air without pitch, they prefer to use the stripes, the triangle notehead or a perfect circle as a notehead.[80]

It is of highly importance to remember that there is not a standard name of this flute technique. This effect, as some other techniques, has different names. The air with pitch can be seen as Residual Tone, Aeolian Sound or Souffle, while the same effect without sound can be seen as Wind Tone, Ghost Tone, Air Tone or Breath Tone.[81]

[75] Arkoudis, p. 82.
[76] Ibid.
[77] Rogier Pijper, "Circular Breathing", *https://www.flutecolors.com/techniques/circular-breathing/* (accessed in November 2022).
[78] Ibid.
[79] Arkoudis, p. 83.
[80] Ibid.
[81] Ibid.

Figure 16: Air sound with pitch.[82]

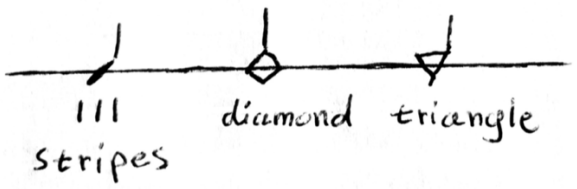


Figure 17: Written instructions for *Aeolian Sound* (from my composition Duo for One).

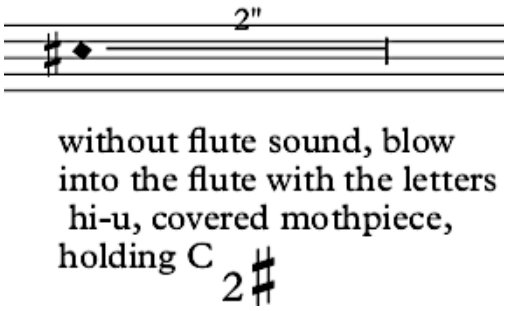
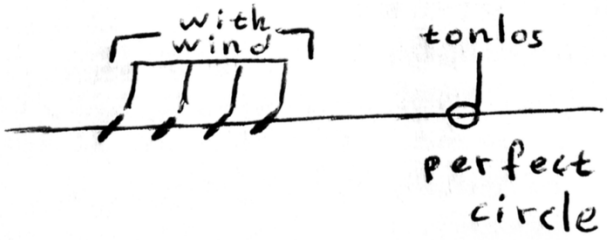


Figure 18: Air sound without pitch.



3. Percussive Effects

3.1.Tongue-Ram

Apart from the air sounds, there are also the percussive sounds. Tongue-Ram is one of them. This technique has also other names, such as Tongue Stop or Tongue Thrust and is produced by completely covering the embouchure hole with the lips and rapidly extending the tip of tongue into the embouchure hole.[83] This technique is the most successful when the movement of the tongue is accompanied by a forceful exhalation of air, like a thrust. The sounding pitch will be a major seventh below the fingered note for a concert C flute, a major or minor seventh below the written pitch on an alto- and bass-flute, and a minor ninth below for the piccolo. Many flutists find it helpful to think of the word "Hot" or "ht" in order to achieve the "pop" sound that derives from the technique. For this reason, some composers may use the letters H.T.

[82] Arkoudis, p. 94.
[83] Gould, p. 252.

to notate it, among many other notational signs that have been developed throughout the years, making its notation non-standard.[84]

This technique can be used on all flutes. However, the sound is weak and sounds a minor ninth lower that the fingered tone on piccolo. Regarding the C-flute, the technique is also weak and sounds a major seventh lower. This effect is ideal on alto flute and sounds a major seventh lower that the fingered tone. Finally, this technique is very suited on bass flute and sounds a minor seventh lower that the fingered tone. Tongue Ram becomes difficult to play when it comes to fast or long passages. It becomes even more difficult to execute if it is alternated with the regular sound.[85]

Figure 19: Notation fort the technique of *Tongue-Ram*.

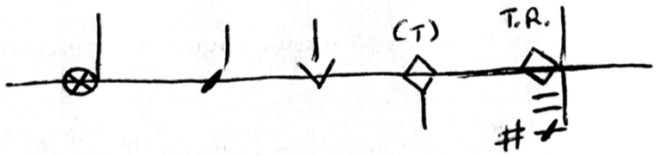
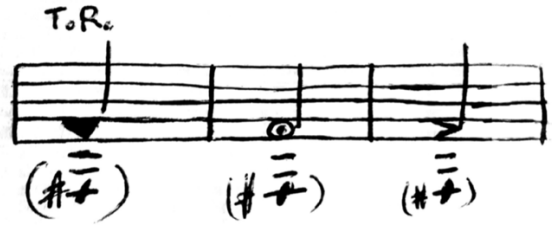


Figure 20: Notation for the technique of *Tongue-Ram* with embouchure hole covered.



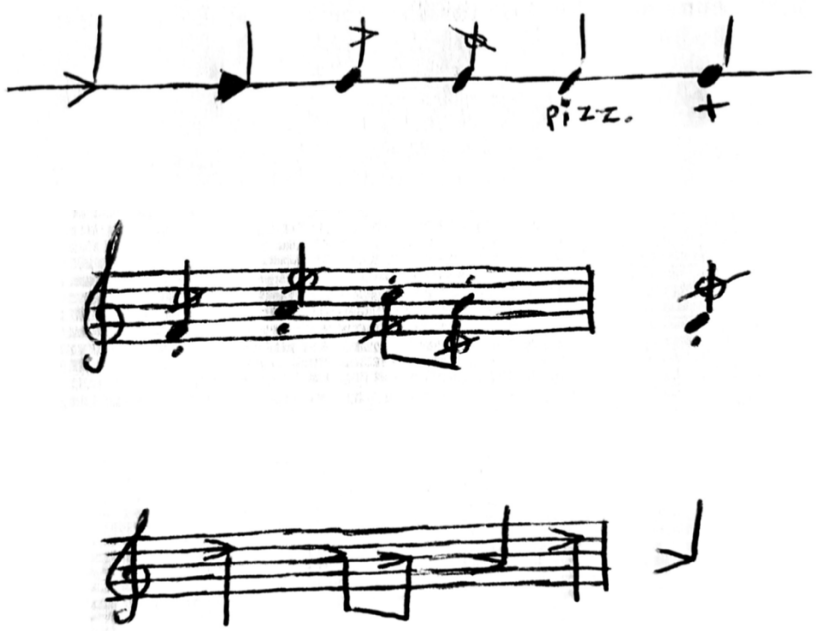
3.2. Pizzicato

Another technique that deals with the tongue is the pizzicato effect. Pizzicato, or also known as tongue slap, is a percussive effect inspired from the pizzicato technique for the strings.[86] There are two kinds of pizzicato: tongue pizzicato and lip pizzicato. With tongue pizzicato, the tongue produces a hard articulation (letter T) by being placed between the lips or against the hard palate behind the teeth. The sound produced has a dry quality. With lip pizzicato, the flutist must press the lips hard against each other and allow the air to separate them apart, to produce a [pa] percussive sound. This sound should have more of a wet quality. For both, there is no air stream from the lungs involved; therefore, this technique produces a pitch resonance in the first octave

[84] Ibid.
[85] Pijper Rogier, "Tongue-Ram", *https://www.flutecolors.com/techniques/tongue-stopram/* (accessed in November 2022).
[86] Arkoudis, p. 94.

only, low B- middle D#. Composers very rarely will define a preference towards either of the two techniques in their scores. Therefore, the choice depends on the performer's mouth physiology and playing abilities, as well as the nature of the work. Even though the word pizzicato is often used to notate this technique, it has acquired multiple signs over the years, making it yet another technique with no standard notation.[87]

Figure 21: Alternative notation for the technique of *Pizzicato*.



Pizzicato can be used on all flutes. However, it can be used in the first and second octave of the flute. The composer writes "l.p." in the score for *lip pizzicato* and "t.p." for *tongue pizzicato.* This effect becomes difficult to play when it comes to fast or long passages. Specifically, *lip pizzicato* is more exhausting if it is alternated with the regular notes.[88]

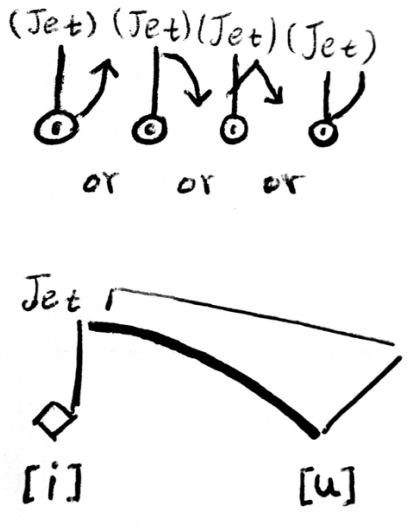
3.3. Jet-Whistle

If the composer wants to create a loud sound on the flute, then the technique of *Jet-Whistle* is ideal. This effect is also known as *jet* and *air jet* and is a loud attack of air reminiscent of a jet plane.[89] The flutist must seal the embouchure hole of the flute with the lips while forcefully exhaling a thrust of air into the tube. The pitch, tone quality, volume, and duration of the jet whistle are affected by the choice of fingering, breath pressure, vowel shape of the mouth, and angle of the embouchure hole relative to the lips. Composers should have in mind, that the lower the pitch that is fingered, the

[87] Ibid.
[88] Rogier Pijper, "Tongue Ram", *https://flutecolors.com/techniques/pizzicato/* (accessed in November 2022).
[89] Arkoudis, p. 98.

richer the frequencies that are produced. Its notation is usually the words themselves combined with a downwards or upwards line. [90]

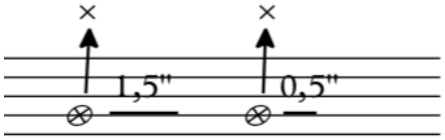
Figure 22: Alternative notation for the technique of *Jet-Whistle*.



This technique can be used on all flutes. However, it becomes more difficult to play at the end of a phrase, especially when it comes to repeat the technique (breathing) or in case it is alternated with regular sound. Some works which include this effect are *Flute solo 2* by Heinz Holliger, *Studie No 9: Diverse for the contemporary flutist* by Wil Offermans, *Three dances* by Alexander Wagendristel.[91]

In case of my work "Duo for One" for flute and voice, I prefer to indicate the technique of Jet-Whistle with an arrow above a circular shape of notehead with an X inside. What I did differently, was to indicate also the time from the one Jet-Whistle to the other (Figure 23), because if there more than one Jet-Whistle on the raw, the flutist may find it difficult to breathe and get dizzy. The best way to avoid it, is to leave time and let the flutist breathe normally. The ideal solution would be to discuss it with the flutist.

Figure 23: The technique of *Jet-Whistle* with time indication.



If the composer wants to indicate how much pressure or strength the flutist needs to put, then it is a good choice to give direction to the arrows. If the arrow goes up, it means to start with low pressure and increase the airstream progressively (Figure

[90] Ibid., p. 89.
[91] Rogier Pijper, "Jet Whistle", *https://www.flutecolors.com/techniques/jetwhistle/* (accessed in November 2022).

24). However, if the arrow goes down, the flutist understands to start playing with a lot of pressure and start decreasing the airstream progressively (Figure 25).[92]

Figure 24: Low to high pressure indication of *Jet-Whistle*.

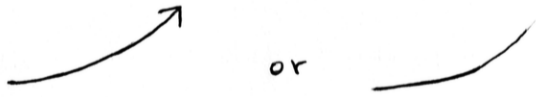


Figure 25: High to low pressure indication of *Jet-Whistle*.

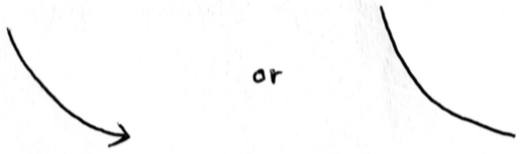
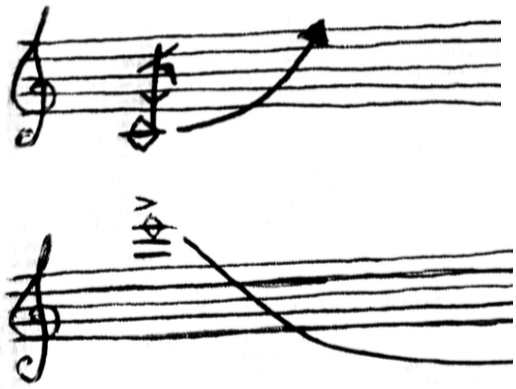


Figure 26: Combination of arrows with notes.



4. Vocal Techniques

4.1. Singing and Playing

In my work "Duo for One" the flutist is called to combine her voice with the flute sound in such way that both voices – flute voice and human voice – are combined harmonically creating a musical duo. When the flute is combined with human voice, the outcome can be very impressive. Carin Levine and Christina Mitropoulos-Bott describe singing and playing simultaneously as an effect that is produced when "the vocal chords rub against one another (as in speaking) while simultaneously exhaling; air flows out through the larynx into the flute."[93] The effect is one of multiple sonorities as the producing sound can vary because of the flute pitch and vocal range of the flutist. Composers will often choose which intervals the flutist should finger and sing at the same time, especially when they are aiming to emulate a specific sound effect.[94] This effect can happen either singing and playing the same pitch (unison or in octaves),

[92] Ibid.
[93] Gould, p. 64.
[94] Stuckenschmidt, p. 162.

which is called parallel singing, or singing a separate melody and playing another (usually in intervals of thirds, fourths, or fifths), known as polyphonic singing, or holding a steady flute pitch as a drone while moving through a sequence of pitches in the voice.[95]

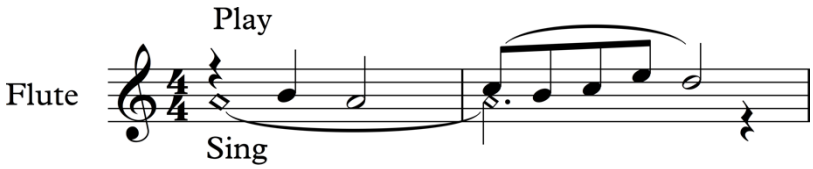
Generally, in singing and playing, the voice has the leading role, which is also preferable, while the flutists should mind the intonation between the voice and flute pitch, if they wish to avoid producing a "noisy" timbral sound.[96] Of course, this would be an exception if the composer requests that kind of timbre.

The use of vowels reinforces the success of the technique. Robert Dick has crafted exceptional exercises for this purpose and coined the term for this practice "throat tuning".[97] The most common form of notation is to notate this technique in two systems, with the system on top representing the flute. Nevertheless, it is also common for composers to notate both in one system, where the sung pitches may take ordinary note-heads, as long as each entry is labelled *hum* or *sing*.[98] However, it is often clearest to use cue-sized note-heads to differentiate the sung pitches.[99] If there is room among the systems, place both sung and played pitches on the same stave.[100] Where it would be confusing to have both parts on one stave, place the sung notes on a separate stave below the played notes and use ordinary notes for both parts.[101]

A verbal instruction must take it clear that the player fingers the pitches and speaks through the instrument.[102] According to my experience as a composer, it is better to avoid this way, as performers need to have the instructions written on score in order to memorize them efficiently and to function as reminding marks during the performance.

In case the composer indicates *singing* with a different shape of notehead, it is preferable to write the word "sing" below the note, as a written instruction.[103]

Figure 27: The word "sing" below the note.

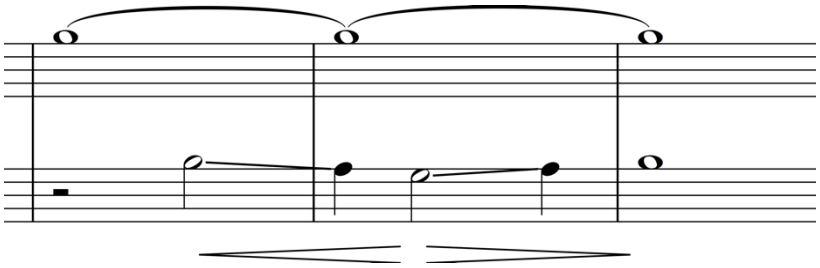


[95] Ibid., p. 163.
[96] Ibid.
[97] Gould, p. 250.
[98] Ibid.
[99] Stuckenschmidt, p. 163.
[100] Gould, p. 250.
[101] Ibid.
[102] Stuckenschmidt, p. 161.
[103] Gould, p. 250.

Other composers tend to use two different staves for the flute and voice, respectively. Others, on the other hand, prefer to use one stave, as long as there is enough space among the systems.[104]

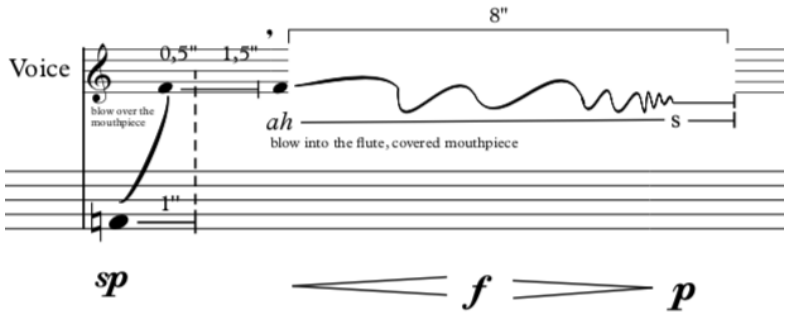
Figure 28: One stave for the technique of *Singing and Playing*.

Figure 29: Two staves for the technique of *Singing and Playing*.



In my work "Duo for One" I used two staves and chose to indicate the singing part with smaller notes, accompanied with the instructions "blow into the flute, covered mouthpiece", as shown below (Figure 30).

Figure 30: The singing part is indicated with smaller notes.



4.2. Speaking and Playing

For speaking and playing, it is ideal to use crossed noteheads to indicate speaking through the instrument. However, if groups of crossed notes are difficult to read, use a cross through stems instead.[105] In case of spoken text that is entirely independent of the instrument, also uses a different shape of note-heads (crossed) and should be labelled

[104] Ibid., p. 251.
[105] Ibid., p. 252.

spoken.[106] In case of sung text that is entirely independent of the instrument, also uses a different shape of noteheads (crossed) and should be labelled *sing*.[107]

Figure 31: Speaking and playing rhythmically.

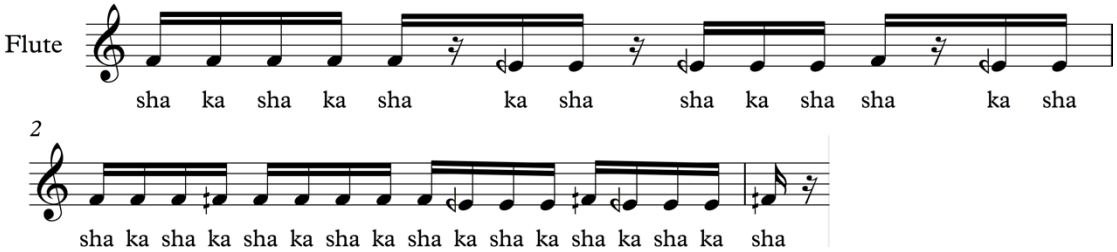


Figure 32: Speaking and playing in two staves.

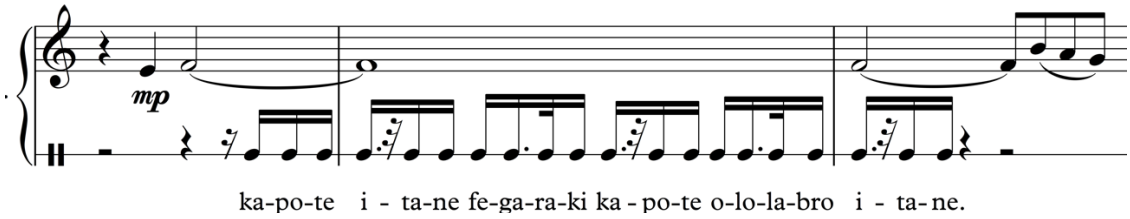


Figure 33: Combination of headless notes with letters for speaking while playing.

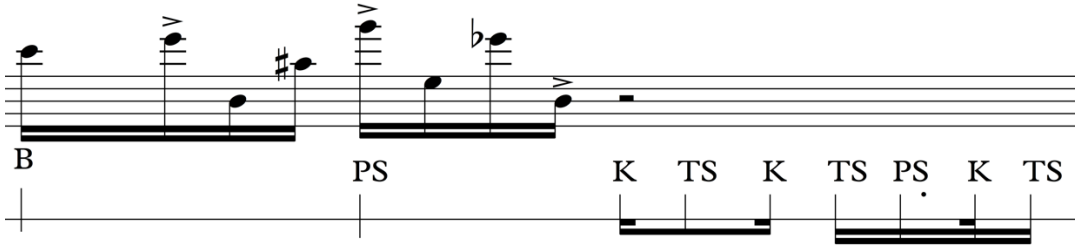
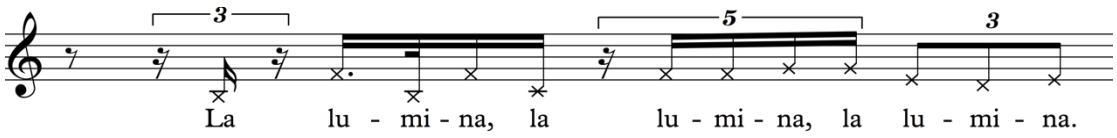


Figure 34: Spoken words over the mouthpiece with pitch.



[106] Ibid.
[107] Ibid., p. 250.

Figure 35: Speaking while blowing across the mouthpiece.

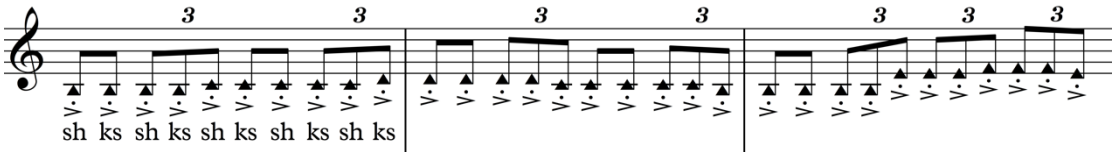
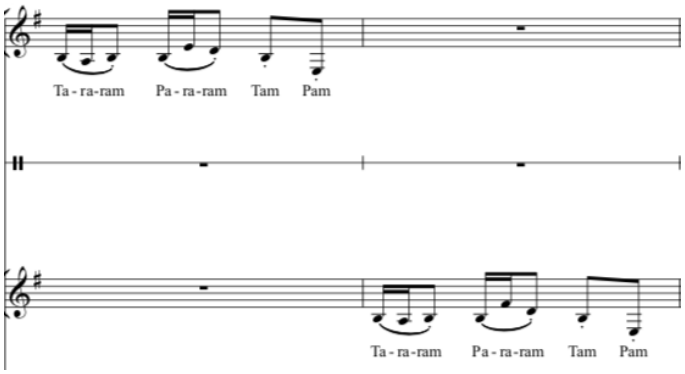
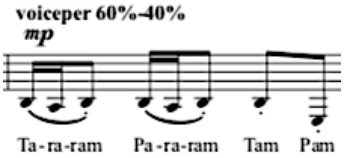


Figure 36: Speaking and playing (from the performance "The Silent One" of the Greek composer Dimitra Trypani).



Dimitra Trypani is a living composer, comes from Greece and she has been searching techniques about human voice for many years. She has developed, eventually, her own technique, which I personally find very clever, of combining whisper and voice at the same time. She named her technique "voiceper" from whisper and voice. When she teaches her musicians about this technique, she uses the scale of percent (%), describing both techniques as one, like 60% voice and 40% whisper, or 80% whisper and 20% voice. In this way, the musicians can imagine the desire of the composer, when it comes to the technique of voiceper.

Figure 37: The technique of *voiceper* by Dimitra Trypani in her work "The Silent One".



4.3. Vocalization of Phonemes / Syllables

4.3.1. International Phonetic Alphabet (IPA)

Nowadays, more and more contemporary composers tend to use a large range of phonemes in order to modify the timbre. A composer usually gives instructions to the flutist to whisper, speak, sing, hum or whistle through the instrument in order to modify or even amplify the sound. There is, of course, the combination between the techniques, like Jet-Whistle, and simultaneously changing vowels in embouchure.[108]

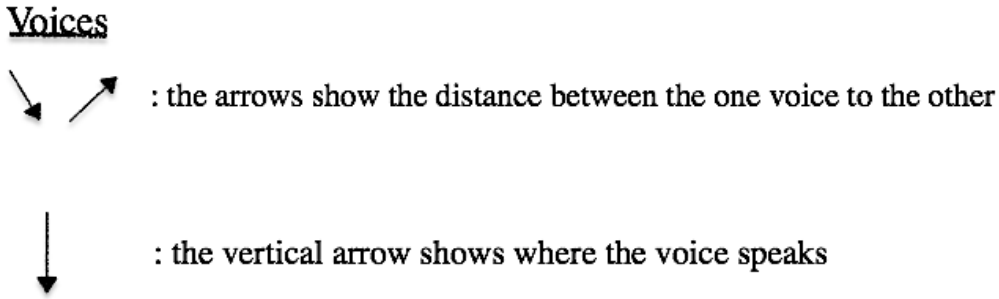
[108] Gould, p. 252.

What happens when it comes to international matter? The composer can use instructions according to International Phonetic Alphabet in order to describe the pronunciation of each word. In this way, a musician can speak or sing successfully greek, german, english, french or italic text.

The forming or changing of vowels or phonemes in the embouchure during a blown note, results in a change of tone quality. A composers can indicate the vowels or phonemes, that are to be used, below the stave in square brackets. In this way, the musician knows exactly which phoneme to speak or sing in each note. For better results, it is also advanceable to qualify in a footnote the pronunciation of vowel sounds with reference to a language familiar to the player (e.g. i = ee as *seen*, u = oo as *soon*).[109]

The Phonetic Symbols of IPA are equivalent to English, French, German and Italian sound.[110] As mentioned above, this system can also be adopted to other languages, like Greek. It is, namely, very easy to describe the pronunciation of almost any foreign words, as the vowels are divided into groups according to the neutral vowels, the front vowels, the back, the semivowels, the vowel glides, the laryngeal or oral migrations of vowels, the continuant fricatives, the affricates and last but not least the nasal migrations of vowels. That means, that if a composer desires to use foreign language or even the language of his/her nationality, it is very easy and also efficient to do so, as the description is based on the IPA, which also can be proved to be useful for the performer. An easy way to show the exact time that the performer speaks the vowels or phonemes, is the placement of arrows above the stave.

Figure 38: Meaning of arrows.



The International Phonetic Alphabet is very helpful when it comes to the description of a foreign alphabet and according to my opinion as a composer, I advise both the composers and performers to become familiar with this system.

[109] Ibid., p. 249.
[110] "International Phonetic Association", *https://www.internationalphoneticassociation.org/content/full-ipa-chart* (accessed in September 2022).

Figure 39: The IPA

INTERNATIONAL PHONETIC ALPHABET

Phonetic Symbols with Equivalent Sounds of English, French, German and Italian

IPA SYMBOLS			ENGLISH	FRENCH	GERMAN		ITALIAN	
			THE NEUTRAL VOWEL					
[Λ]	up	[Λp]	me	[mΛ]				
			THE FRONT VOWELS					
[i]	eat	[it]	fils	[fis]	viel	[fil]	si	[si]
[ɛ]	pet	[pɛt]	tete	[tɛ:t]	des	[dɛs]	bello	[bɛl:o]
[ae]	pat	[paet]						
[a]	lamb	[lam]	glace	[glas]	[habe]	[hab^{e}]		
			THE CENTRAL VOWELS					
[ɛ’]	early	[ɛ’]						
[α]	palm	[pαm]	âme	[α:m]	paar	[pαr]	amare	[αmαre]
			THE BACK VOWELS					
[u]	food	[fud]	fou	[fu]	tun	[tu n]	kura	[kura]
[ʊ]	foot	[fʊt]			mund	[mʊnt]		
[o]					so	[zo:]	otto	[ )t:o]
[ )]	all	[ )ll]	coq	[k)k]			motto	[m)t:o]
			THE SEMIVOWELS					
[w]	witch	[wit*S*]	oui	[wi]			uomo	[w)mo]
[j]	you	[ju]	hier	[jɛ:r]	ja	[ja]	ieri	[jɛri]
[l]	law	[l)]	les	[le]	legen	[leg)n]	la	[lα]
[r]	raw	[r)]			reiten	[rαitn]	ricco	[rik:o]
			THE VOWEL GLIDES					
[au]	now	[nαu]			haus	[hαus]	causa	[kαusα]
[ou]	no	[nou]						
[ei]	day	[dei]						
[ )i]	boy	[b)i]			fever	[f)ier]		
[αi]	lie	[lαi]			zeit	[tsαit]	mai	[mαi]
			LARYNGEAL MIGRATIONS OF VOWELS					
[h]	hop	[hαp]			hat	[hαt]		
[hj]	hue	[hju]						
			ORAL MIGRATIONS OF VOWELS					
[p]	pat	[paet]	pas	[pas]	pressen	[prɛsɛn]		
[b]	bat	[baet]	bête	[bɛt]	bett	[bɛt]	barca	[bαrkα]
[t]	two	[tu]	ta	[ta]	tal	[tαl]	tempo	[tɛmpo]
[k]	class	[klaes]	que	[k)]	könig	[k*θ*nic]	che	[ke]
			THE CONTINUANT FRICATIVES					
[f]	fife	[fαif]	femme	[fam]	fahren	[fα:rɛn]	facile	[fat*S*il]
[v]	five	[fαiv]	vous	[vu]	was	[vαs]	verso	[v rso]
[*θ*]	bath	[ba*θ*]						
[s]	sue	[su]	ses	[se]	das	[dαs]	si	[si]
[z]	zoo	[zu]	zele	[ze:l]	seele	[ze:le]	casa	[kazα]
[*S*]	mission	[mi*S*en]	creche	[krɛ:*S*]	spass	[*S*pαs]	fascisti	[fα*S*isti]
[ξ]	vision	[viξen]	jamais	[ξa’mɛ]	charge	[*S*αrξe]		
			THE AFFRICATES					

[t*S*]	church	[tSɛts]				klatch	[klat*S*]	cera	[tSerα]
[St]	rushed	[ruSd]							
[dξ]	judge	[dξΛdξ]						gente	[dξenti]
		THE NASAL MIGRATIONS OF THE VOWELS							
[m]	mow	[mo]	mons	[mξ]	memel	[me:mel]			
[n]	no	[no]	non	[nξ]	nun	[nu:n]	vano	[vαno]	

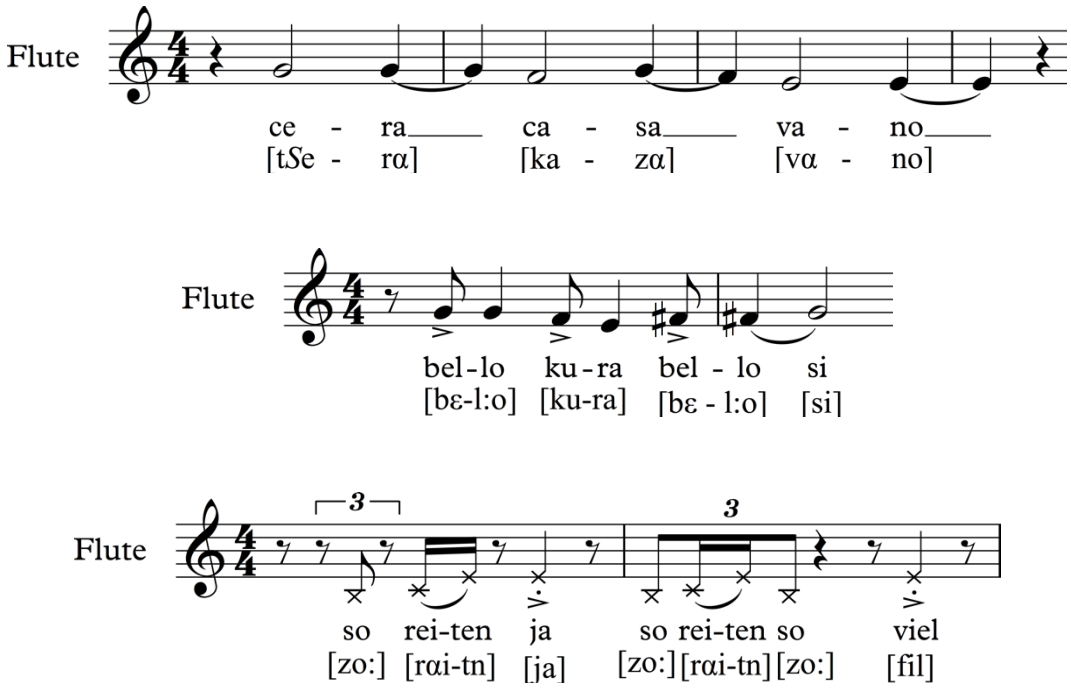
4.3.2. Description of syllables without the IPA

What is challenging for a composer who is not familiar with the International Phonetic Alphabet or an amateur player, is to describe the syllables successfully without using the IPA. What a composer can do, is to qualify the sounds according to a familiar language and indicate in the preface.[111]

When the syllables of a word are divided between different voice parts and the complete word is not obvious, qualify the sound of an isolated syllable by providing the whole word in a footnote, which ensures correct pronunciation.[112]

Text sounds without linguistic meaning (known as phonemes) that are independent from surrounding text, may be written in italic in order to avoid confusion with the text. However, if the composer wants to reserve italic for expression marks, then the phonetics letters may be placed in square brackets.[113]

Figure 40: Text based on IPA.



[111] Ibid., 452.
[112] Ibid., 453.
[113] Pierre Boulez and Jean Jacques Nattiez, p. 47.

Figure 41: Text or Phonemes without the IPA.

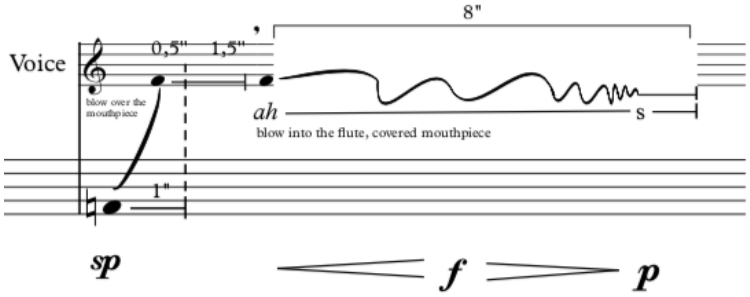
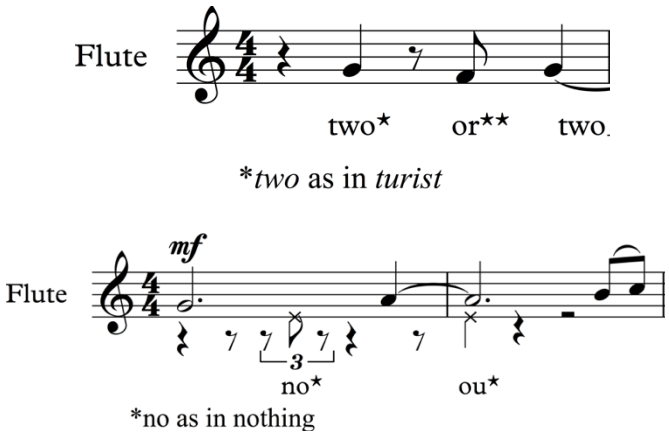


Figure 42: Text or Phonemes without the IPA, providing footnotes.



4.3.3. Changing vowels

To indicate a gradual change of vowel, place an arrow between vowels. The arrow also shows the length of the transition between one vowel and the next. Each note of unchanged pitch may be tied, to indicate that there is no separate articulation even though there is a vowel change.[114] In this way, clear and detailed instructions enable the flutist or any performer to navigate easily and quickly any work containing vowels or text. The composer succeeds in using and giving not only the definition, but also the placing and of course the use. Where practical, definitions are given where terminology is unusual or even confusing, while the text is handled as a progression from the elementary to the complex. Terminal text that is in a foreign language are used where they are in common usage in the English-speaking world (as shown above) and such terms are often presented in the usage in italic, although they might appear in roman type in a musical context.[115]

I agree with Elaine Gould, who says that "effective communication results from establishing a convention and adopting a consistent approach. Where new conventions are not established we make our own recommendations. Our aim is to raise awareness

[114] Ibid., p. 450.
[115] Gould, p. xiv.

of the many subtle and complex issues to be considered, and provide the tools to address them."[116]

Figure 43: Placing an arrow between vowels, while singing and playing.

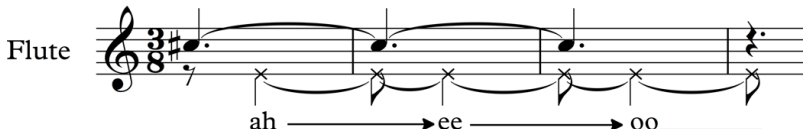
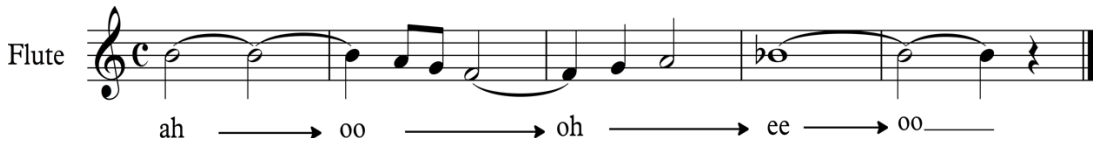


Figure 44: Changing vowels.



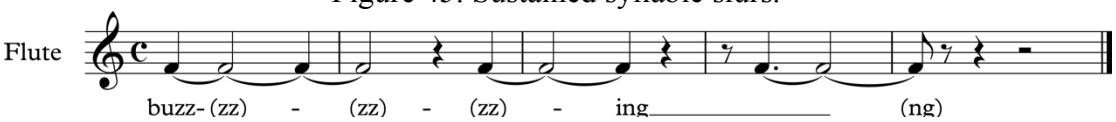
4.3.4. Consonants

The dividing of a single syllable instructs the singer to sing on the separated consonants. It is often clearest to notate the whole syllable first, so that the word is immediately intelligible, then to add the consonants in round brackets where they are to be placed.[117]

When the consonant sound has more than one pitch, use separate syllabic slurs to clarify the duration of the sustained consonant; a second set of slurs indicates that there is no break in sound from the previous vowel and makes it easier to see the whole syllable.[118]

For immediate transition to a sustained consonant, underline the consonant; this notation requires clarification in a footnote such as close onto final consonants immediately.[119] Alternatively, place the consonant in brackets after the syllable. This is especially useful when the consonant is not the final letter of the word.[120]

Figure 45: Sustained syllabic slurs.



[116] Ibid., p. xv.
[117] Ibid.
[118] Ibid., p. 453.
[119] Ibid.
[120] Ibid.

Figure 46: Underlined consonants for immediate transition.

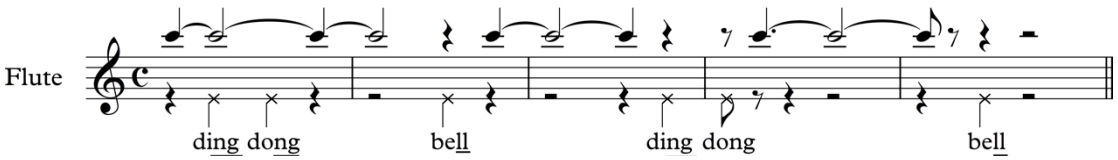
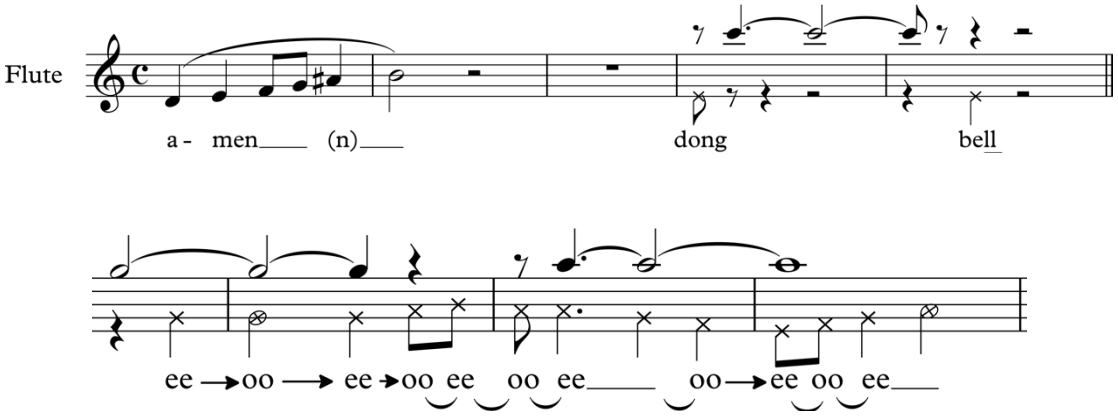


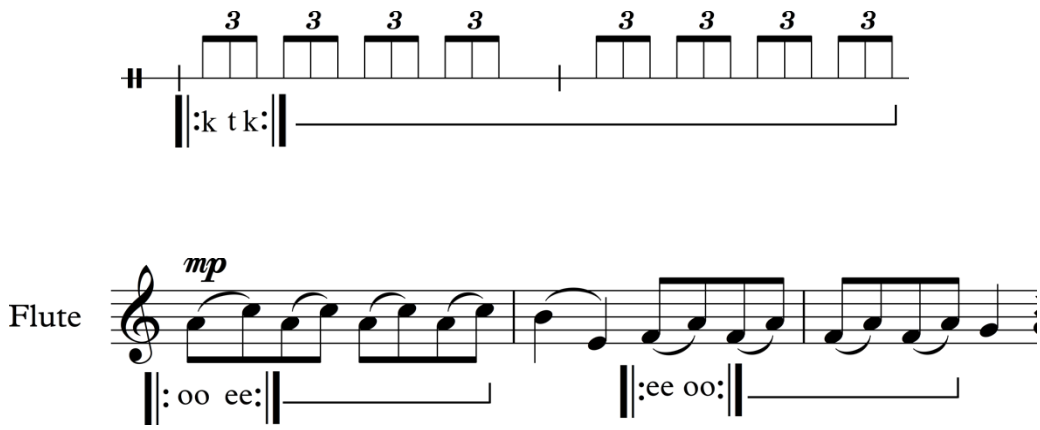
Figure 47: Consonants with more than one pitch.



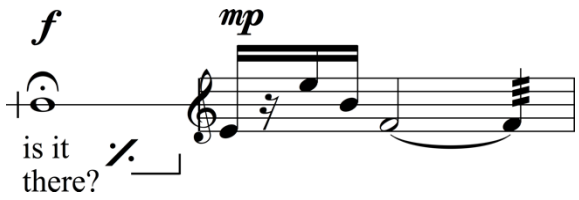
4.3.5. Repeated Phonemes

For compositions that include repeated fragmented syllables, a composer should take into account a much more unconventional way of treatment. The repeated text may be followed by repeating signs or be enclosed into repeated barlines. The best way is to enclose the text or syllables in repeated barlines and extend the bar length to accommodate the extent of the text, as shown below.[121]

Figure 48: Repeating text or syllables.



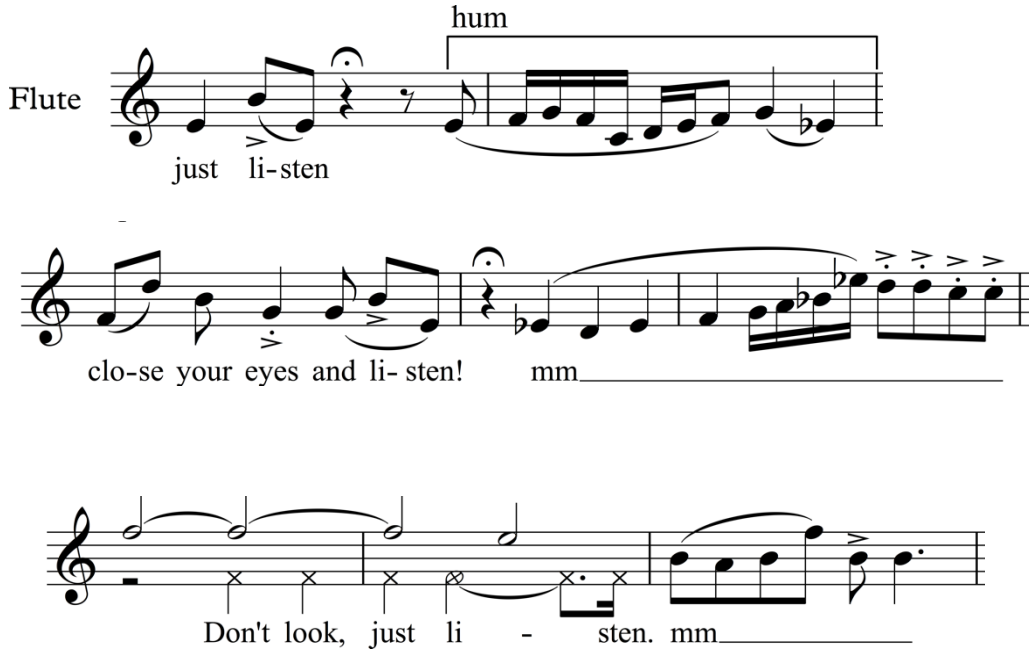
[121] Ibid., p. 454



4.3.6. Humming

Humming is another technique for voice, where the performer is humming through the instrument. Humming is indicated by verbal instruction *hum*. It is important to place the instruction.[122]

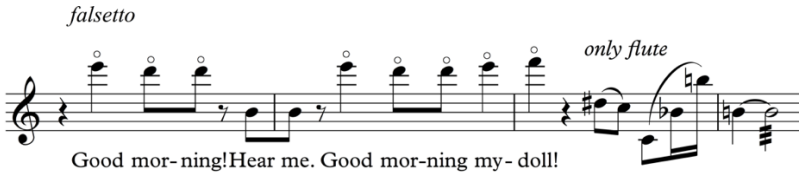
Figure 49: The vocal technique of humming.



4.3.7. Falsetto

Falsetto is most often used in the context of singing to refer to a type of vocal phonation.[123] The flute player can sing notes through his instrument beyond the vocal range of the normal or modal voice. A harmonic cycle should indicate falsetto over the relevant notes. For clarity use the instruction *falsetto* at its first appearance. It is also acceptable to use diamond noteheads for falsetto as long as there is an accompanying explanation.[124]

Figure 50: Harmonic cycles to indicate falsetto.



[122] Ibid., p. 455.
[123] Howell, p. 156
[124] Ibid.

CHAPTER THREE
Approaching the Notation of Electronics

"Our alphabet is poor and illogical. Music which should pulsate with life, needs new means of expression, and science alone can infuse it with youthful vigor. Why Italian Futurists, have you slavishly reproduced only what is commonplace and boring in the bustle of our daily lives. I dream of instruments obedient to my thought and which with their contribution of a whole new world of unsuspected sounds, will lend themselves to the exigencies of my inner rhythm"[125], are the exact words of Edgard Varèse, trying to express his thoughts that he is an artist ahead of his time, who explored the musical outer space reaching another aspect of music. More and more composers prefer to avoid the standard music notation and choose to follow a different way of scoring. The diagrams, the lines, the drawings or even the shapes such as big squares are chosen by the modern composers to describe the dynamic, the duration, the amount of notes and articulation of the melody. Sometimes an image means a thousand words.[126]

The notation of the electronics in the scores provide information on the treatments, the attacks time, the durations, the dynamics and, when possible, pitch information. In addition to the information on the process and notation of the technology, there is an effort to provide interpretative notation for the computer and performer, including description of gestures, fader control indications and relative dynamics for competing electronic effects. Not only does the score provide enough information to perform the work, but there is enough documentation or archival information to allow for an eventual translation to newer technology when the time comes.[127] Of course, there are also animated notations as a new direction for music notation. Many composers find this kind of notation very exciting and a revolutionary way of scoring.[128] In other words, the animated score is considered as a modern tool that excites not only the creators, but also the performers developing a great mood for rehearsals, as it is not so usual. These performance practices in new music are considered as the "third way" according to Gerhard E. Winkler, among standard scoring and improvisation.[129] Winkler's thinking is based on the realtime-score theory, that there is a computer screen as a traditional note-stand during a performance.[130] Things get even more exciting when the program becomes interactive. Animated notation can be presented as an interactive video or interactive application. In my case, as a composer, I created an animated video which contains a graphic score in puzzle pieces (Figure 51). The video shows one piece of the puzzle each time, in which every

[125] Richard Kostelanetz, Joseph Darby, Matthew Santa, *Classic Essays on Twentieth-Century Music: A Continuing Symposium*, London: Schirmer Books, 1996, p. 391.
[126] Brian Leo Fennelly, "A descriptive notation for electronic music", PhD. Diss., Yale University 1968, p. 8.
[127] Faia, p. 59-60.
[128] Fenelly, p. 127.
[129] Gerhard E. Winkler, *The Realtime-Score, A Missing-Link in Computer-Music Performance*, Salzburg, p. 1.
[130] Ibid.

musician interacts according always to his / her improvisation skills. Although this work of mine is not based on improvisation, I let some musicians improvise, according to the passages shown in the video. I also provided instructions to those musicians were afraid to improvise or feel insecure. In this way, the musicians learn their inner self in interpreting music. This work is an animated video, is entitled “Reminders of Life” and I gave specific instructions to the flutist to whisper the word “life” inside the flute, accompanying it with Whistle Tones. Sometimes the flutist speaks the words “father” and “mother” inside the instrument, because the parents create life which is considered a present by God, combining these words with the technique of Circular Breathing. Since this work is about life, I used the flutist’s voice and the ensemble’s breath to create a living environment, an environment that there is not just one life, but many other souls as well. All these instructions and techniques are given in a single animated video through synchronicity, symbols and the colors. It is very important as composers to understand whether to use standard notation or electronic notation. We need to decide which way is the best to communicate with the performers and give away our thoughts to the audience.

Figure 51: Instructions and Graphic Score for Animated Video “Reminders of life”.

	Voice	Flute	Violin	Cello	Double Bass	Vibraphone	Harp	Piano
Time remark	-	-	-	-	-	motor on (slow) hold pedal	-	hold pedal
3	All ensemble: 3 seconds pause/stop playing for 3 seconds							
	Ritardando with triplet: play only the last 3 notes in a triplet. Play the previous notes in ritardando. For ex: * play = sing (for voice)							
	acc. & *rit.* / Combine *acc.* with *rit.* / Play the first notes *acc.* and the last notes *rit.* For ex. * play = sing (for voice)							

What is efficient about graphic illustration, is the description of contrast and change of timbre, because it is difficult to get these characteristics fit into traditional notation. Through electronic notation a composer can illustrate duration of textures,

pitch and other aspects of sound using proportional spacing principles.[131] For instance, if a composer creates a work with all the kind of flute from the flute family, then the composer can change the ensemble's contour by changing pitch spectra. If a pattern can represent a line, then many patterns can represent a different texture by cross-hatching lines. This is nothing else than using shapes. Instead of notes, there are shapes like lines, squares, triangles or dots. It is not difficult to represent a pattern to a shape. The use of shapes is just a parallel language of music. If there is one pattern, there is one shape. For many different patterns there are many different shapes. A pattern is determined by the composer, who corresponds it to a shape, according to his/her desires. Of course, density plays an important role in electronic notation. The composer can play with the size of the shapes from enlargement to reduction in order to describe the dynamic. The bigger a shape is, the louder the sound is. For illustrating the pitches, the composer can also play with the width and height of the shapes. Especially the width, reflects the pitch range, as the high frequency is usually at the top.[132]

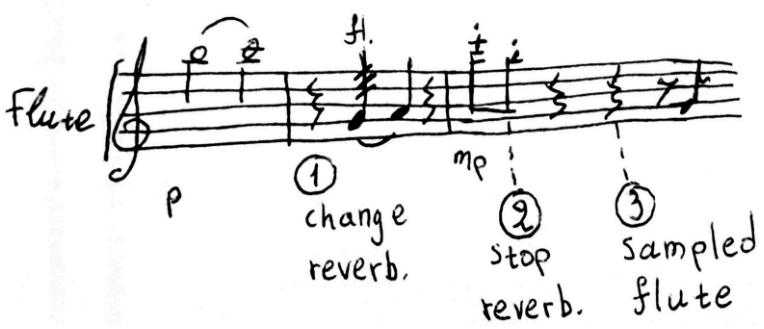
Of special interest are the lack of bar lines and the precise time which is given in seconds. This gives clarity, precision and ambiguity inherent in electronic notation.[133] If a composer creates a work for the flute – or any other instrument – that lacks discernible pulse or in case that the musical material does not fit into conventional metrical patterns, then using proportional spacing may seem ideal. In other words, time-space notation can simplify the electronic part and also help the performers read their lines at the same time. Proportional spacing is nothing else than leaving space between the notes, describing duration. Of course, everything depends on the function. If, for example, the time is important, a composer should take into consideration the use of stemless noteheads as an efficient notation. If, on the other hand, it is important to indicate sustained duration, then the use of extenders after noteheads is an ideal method.[134] Pattern-matching lists of notes and durations for motive recurrences and their variations can contribute to convincing iterations of today's music in established styles. Let us have in mind that a signature is a motive used by a composer in more than one work.[135]

In a score, the electronic component must be placed in an appropriate position, so that it can be easily seen and read not only by the performers, but also by the technician, if needed. But what is the best position to place the electronic part on score, when writing for flute and electronics?[136] The electronic part is usually placed at the bottom of the score when there are written instructions for the technician or when there is a pre-recorded part. Furthermore, the technician can see much easier how to balance the sound while following the individual parts. Nevertheless, if there are cues of electronic sound, place them above the line of the instrument.[137] Of course, the

[131] Gould, p. 595.
[132] Ibid.
[133] Carla Faia, *Notating Electronics*, London: Brunel University, 2019, p. 49.
[134] Gould, p. 595.
[135] Cope, p. 199.
[136] Not only for flute and electronics, but also for any solo instrument combined with electronic part.
[137] Ibid., p. 596.

representing configurations of software settings program changes, patch numbers) should appear at the point at which they occur. However, if there are separate instrumental parts, it is really helpful the program changes or patch numbers to appear at the end of the previous passage and at the start of the new passage, for rehearsal purposes. Another way would be to place them at the top of each page. If necessary, place a verbal description to help the performer and technician understand the content of the performance. Avoid to describe the textures on the score by adding too much information, because those information have a distractive part. For this reason, add only the basic information on the score and the extra on the preface.[138] The flute example below, shows the changes of footpedal program with short verbal description.

Figure 52: Operational Instructions.



Some composers prefer to put the electronic part between brackets in order to ease the eye of the performer and avoid confusion. In this way, they include the different timbres into brackets. In fact, many composers have used the square brackets to indicate the different texture. It is advisable to use a cue-sized stave to indicate the performer's part and distinguish it from the electronic part. In this way, the musician's line stands out.[139]

Regardless of the many varied developments around the fundamental elements of music, the flexibility of the music staff to bend to any use is a strong recommendation to the continued use of it for notating electronics.[140]

Notate normally the dynamics for electronic sounds, so that the technician can balance the volume levels. In case the work is about pre-recorded or live-processed sounds, a composer should also state whether the balance of performer and electronics should be equal. It actually depends on the composer's desires, because the performer's dynamics may affect the electronic transformation or maybe the pre-recorded sounds should be notated in fader levels adjusted by the technician.[141]

If there are important parts in the performance, a composer should include the relevant timing points above the electronic part in order to facilitate the rehearsal. If a graphic illustration is given, include just a timing at equidistant intervals across the page

[138] Ibid., p. 604.
[139] Ibid., p. 597.
[140] Faia, p. 45.
[141] Samuel Adler, *The Study of Orchestration*, New York: Norton & Sons, 2002, p. 795.

making the time-space relationship easy to follow. In my work "Mariana's Gaze" which consists of pre-recorded sounds, I used framed timings above the relevant staves. However, in case of a piece that requires co-ordination with an acoustic performer, a composer should use cumulative timings by following a stopwatch or equivalent. Since the player must follow a stopwatch, it is best to include the timings above the performer's line, framed into box for clarity purposes.[142]

Interactive compositional software usually incorporates modules for analyzing music and of course an interface between the human composer and the program. Such interfaces often take the form of standard notation or even of a graphic. The performer does not need to know how exactly interactive programs function. The aim here is to examine how the producing music fits together with the musician. David Cope said that "some composers feel that this kind of process, sharing composing responsibilities with computers, has a great potential as a future composition model".[143]

A composer can also find delay effects pretty fascinating and include them in his/her composition. In some works it may be possible to simplify the notation of delay lines as long as essential information is present for co-ordination. Take into consideration to notate the delay lines on cue-sized staves below the performer's stave. It may be sufficient to indicate where input (recording) and output (playback) occur, in case scoring is seemed to be very complex. As mentioned above, indicate the important instructions on the score, such as where to start and stop the recording or input levels, where to start or stop the playback or output levels and feedback levels, if employed. Processing parameters like filter frequency or reverberation need to be precisely synchronized with the acoustic sound. Ferneyhough prefers to use a continuous line to represent the control of each delay line, rather than notating the resultant sound, which would provide too much complex information and this would not be practical. In his work *Time and Motion Study II*, he uses a band of vertical shading above the line to indicate the recording level, a band of diagonal shading to show the playback level and a separate thick black line to represent the feedback level.[144]

It is very important to provide a detailed list of the equipment required for the performance. What plays a vital role, are also the diagrams which can help explaining how equipment is to be set up.[145] In general, a composer need to specify the complete technical requirements, like the number of technicians required, a diagram explaining how the equipment is to be set up, a diagram indicating the layout of loudspeakers and the position of the mixing desk and performers in the hall. Where computers are used, we need to provide specific details of both hardware and software and other information, such as the type of synthesizer (if needed), the keyboard range, the foot pedals, or the number and type of controllers (ex. pitch-bend wheel, sensitive keyboard, after-touch). In case of using a pre-recording material (fixed media), the technician activating the recording needs to know where to start or stop the recording and how long the recording lasts, including the dynamics, to balance with acoustic

[142] Ibid., p. 600.
[143] Cope, p. 203.
[144] Ibid., p. 603.
[145] Ibid., p. 602.

instruments or voices. In case of indicating the starting or stopping point of a recording, it is advisable to use brackets on the stave. Indicate the starting point by opening the bracket and indicate the stopping point by closing it. All the used sound files must be numbered and framed above the stave (① below = Track 1).[146]

If a MIDI sequence is included, it can be triggered either by a technician seated at a computer or the flutist by using a footpedal. To activate a midi sequence, indicate a framed instruction at the starting point. The only thing to do is just to align the framed instructions precisely there, where the sequence should start. What is also advisable is to divide rests, if necessary. Of course, a horizontal or wavy line on staves may be used in order to indicate the length of a sequence. If the conductor or flutist needs to follow a particular point in the sequence, indicate only as much of the sequence as is necessary for a secure entry. Normally, it is best to place the cue stave directly above the performer's line.[147]

In case of recording the flute to create a tape, there are three different types of notation for flute and flute tape. The first one is to record each flute part separately creating many melodic lines from one flute (Figure 53). Of course, a composer can add a spatial effect to this flute ensemble. The second one is to record the flute normally and then recording with changed speeds (Figure 54). Again, the composer can alter the recorded flute in a degree that might be unrecognizable. It is of highly importance to change slowly the part of the recorded flute from recognizability to unrecognizability, so that the audience can listen to the evolution of sounds. Modulation and interactions between acoustic flute music with a low tuba-flute playback or even with a piccolo-flute on the track, can also lead to an impressive outcome. The third way is to notate only the entrances of the tape part (Figure 55). Of course, the composer uses a wide palette of manipulative techniques coming from the recorded flute on such way that the tape sounds electronic. Sometimes the complexity and density of the manipulated sounds remind the listener that the sounds are derived from the flute.[148]

In spite of the experimental nature of the music and the advanced technology used, the performer will play, eventually, from a traditionally notated score. The same score will be used in rehearsals and performance. While this process is a valuable exercise in craft in the pursuit of artistic creation. As a work is based on feedback loops on a specially designed tape machine, the durations are calculated according to the length and speed of the tape recording. Of all the parameters that may be interpreted, by the performer, in this particular case is neither flexible nor interpreted.[149]

[146] Gould, p. 560.
[143] Ibid.
[148] Cope, p. 184-5.
[149] Faia, p. 51.

Figure 53: Creating many melodic lines from one flute.

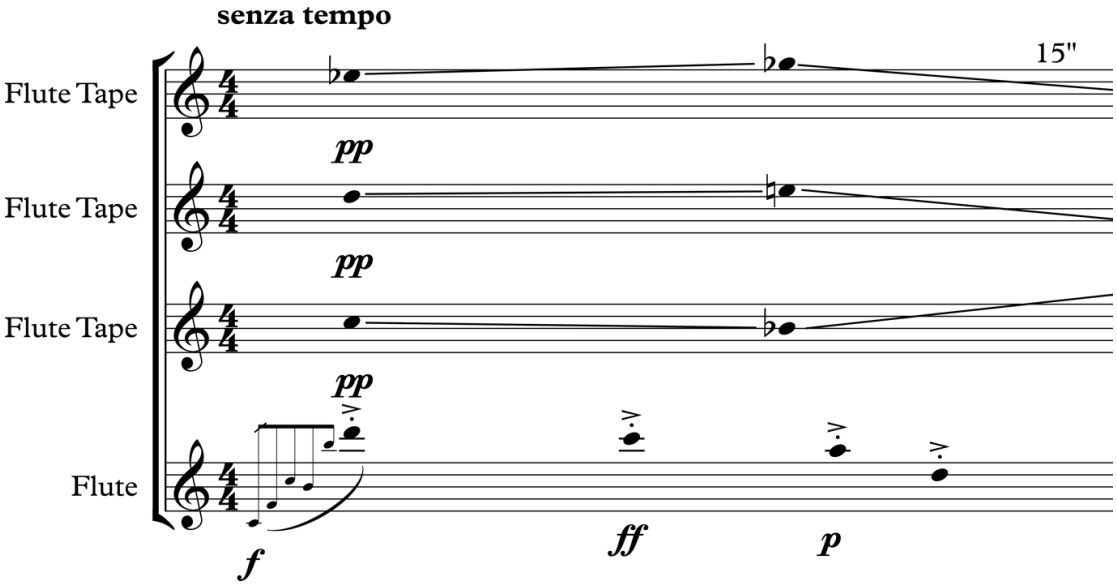


Figure 54: Recording with changed speeds.

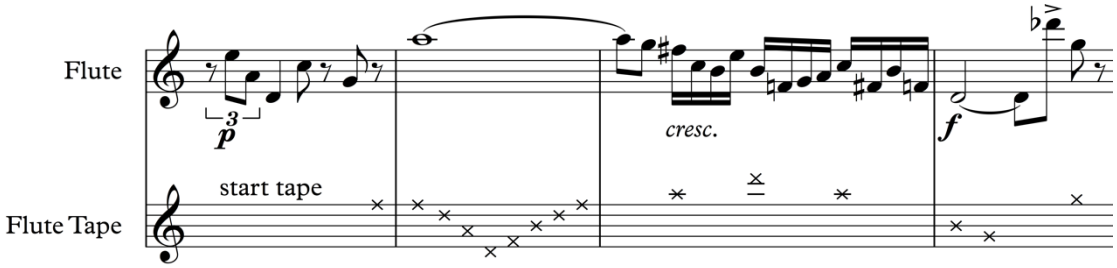


Figure 55: Notate only the entrances of the tape part.

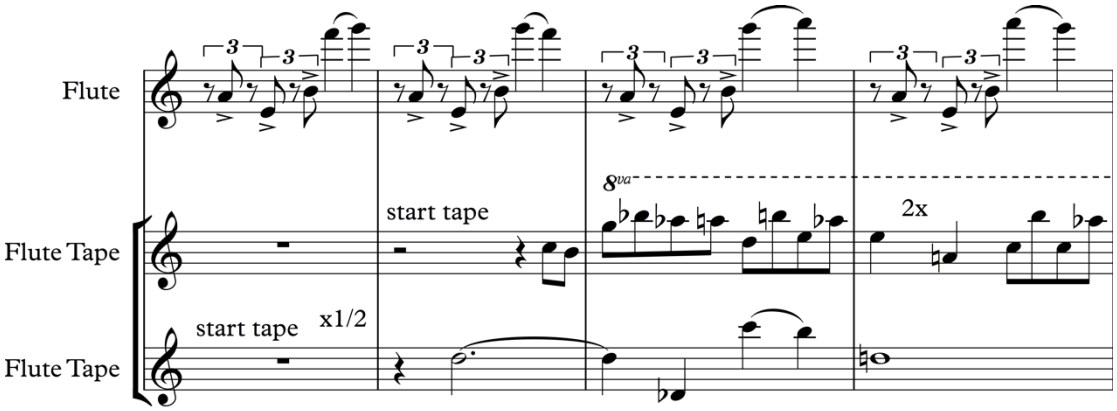


Figure 56: Framed cue for clarity purposes.

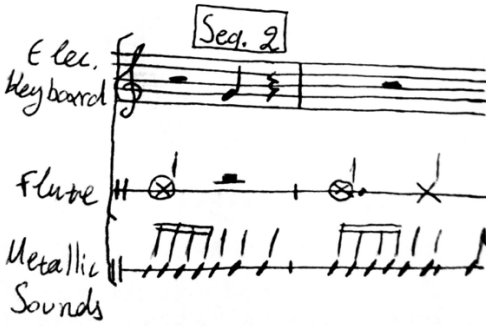


Figure 57: Stemless notes with lines.

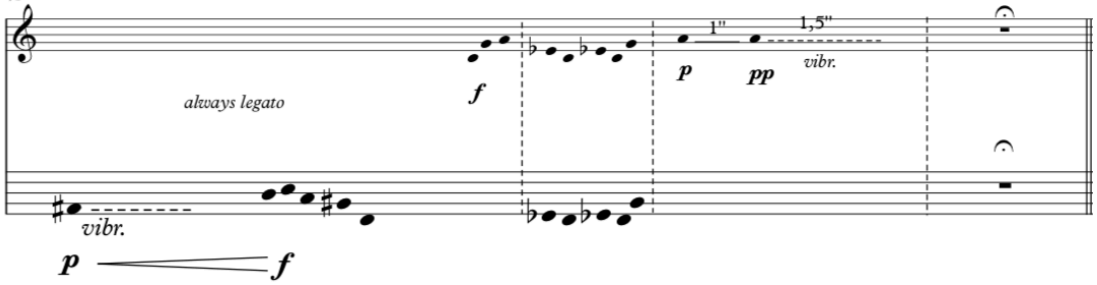
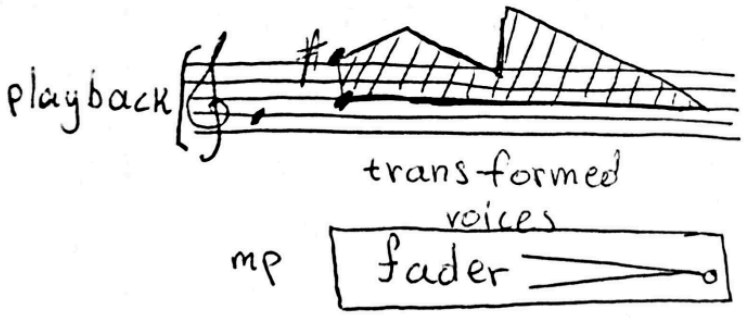


Figure 58: Different timbres/textures with dynamic indication.



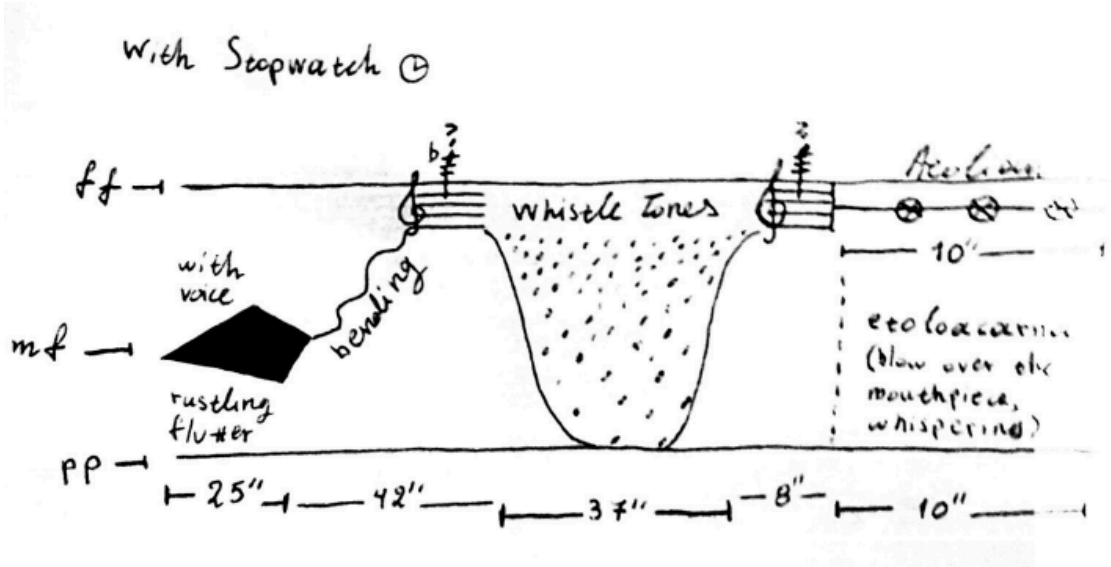
Having performance notes in a contemporary sheet music is nothing extraordinary, which usually describe the extended instrumental techniques or non-standard notation. The act of choosing, interpreting the symbols and constructing the final playable version, places the musician into the traditional role of collaborative partner. Allowing the musician this responsibility is a key element in practical notation that should not be minimized.[150]

[150] Ibid., p. 51-52.

However, transposing electronics to a new technology is not just depended on the gear. The most important aspect of any translation or porting is the detailed information of the processing employed.

There are a series of spatial movements designed with precise rhythmic characters for the treating the audio sources, such as short complex, ritardando/accelerando, strong character obtrusive, slow/fast moving contrasting.[151] It is of highly importance to provide as much information as possible about the technology and the process used to perform or transmitting a work. Of course, the descriptions are good, but there is no need to depend on words alone to explain the notation. The score is the best place to add documentation on the technology, equipment and processing of the electronics.[152]

Figure 59: Pattern density and different textures.



[151] Ibid., p. 58.
[152] Ibid., p. 64.

AFTERWORD

In all ages, composers and performers need to gain some knowledge regarding the principles of notation. A certain level of expertise can save time to both composers and performers in rehearsals and consequently lead to a good performance. Nevertheless, a bad layout, such as poor spacing or ill-judged page-turns, is usually the cause of a bad rehearsal or even performance, which also means that there is something wrong with the notation. Musicians hope to develop a good and healthy relationship with the composer and also hope to invest their time and energy in new music. So, spending rehearsal time with reading difficulties is not a professional and right way to gain the musician's trust, who eventually stumbles. Composers need to be careful with the notation in order to help the musicians devote their time and mind to the performance, avoiding deciphering the score or part. This letter from Mahler to his wife, Alma, is an example which highlights how important a good layout is regarding the right usage of notation: "Whenever an instrument has a longer passage of rests, instead of writing them out in full, it has been merely written *tacet* (which is normally done only when an instrument is silent for a whole movement). So, now, not only are the players unable to find their bearings, but when I, poor devil, want to change the orchestration, instead of simply writing in the necessary bars at the appropriate place, I also have to write out the entire *tacet* passage, and sometimes have to delete several lines to make room for it. This is wasting hours and hours of my time…"[153]

We need notation to pass our music on to the others. We also need scoring for pedagogy reasons and of course for creating, performing and learning. There is little that we can assume from a full score to the sound we hear. Training and experience provide the necessary tools to hearing a score, as the understanding notation requires the same tools to hear what is being represented in score.

The fact that it is practically unthinkable to imagine a world without the flute, is perhaps the greatest proof of just how important this instrument is to the music world. There is little doubt that this instrument will continue to expand past and present timbral revolution into future stages of musical expression. To oversimplify, there is no need to create new notation for the same playing techniques, unless the flutist needs different notation. Composers need to inform the performer about the aim of his/her work, as musicians tend to play better when they understand the meaning and purpose of a new composition. However, performers need also to reveal to composers their opinion and especially, when it comes to notation, how to symbolize more successfully the playing techniques. The best way, is the efficient communication between flutist and composer, so that it can be determined which way of notation suits the flutist best, according to each musician regarding the use of symbols or text descriptions.

As far as text descriptions are concerned, providing some documentation or archiving is another important aspect of the creative progress, not only for a better understanding of the work but also for the longevity of the music. As composers, we

[153] Ibid., p. xii.

need to have in mind that the archival process should also be part of the score, especially in the context of notating electronics.

The score is not the music. The score contains just a series of instructions addressed to the musicians, who eventually interpreter and create the music we composed. As composers, we need to respect the performer providing a score layout as good as possible in order to communicate successfully with the musician and, of course, not only to ease the way of sight-reading, but also to create an enjoyable environment in rehearsals.

The development of each and every art is determined by diverging forces and the dialectic of advance and retreat has a part to play, while the idea of the musical avant-garde is closely bound up with the term "progress".[154] My thesis incorporates definitions, specific instructions and examples of notation in order to help composers first understand and later use on paper and explain to the flutist each sound. Many composers were utterly convinced that experience was indispensable prerequisite of creativity, as beauty and truth are the two primary concepts of artistic theory. Beauty is the main subject in aesthetics, while truth is one of the primary issues in the philosophy of art.[155]

I agree with Faia who says that "as musicians we are trained to understand the musical context and develop our internal ear to endlessly practice eye/ear/finger or voice dexterity, to see invisible connections within a score, to hear timbre when we see a black dot on a staff. When a composer short circuits this process, performing practice needs to be recalibrated and rethought."[156]

[154] Constantin Floros, *New Ears for New Music*, Kenneth Chalmers (trans.), Germany: Peter Lang, 2006, p. 4.
[155] Ibid., p. 17.
[156] Faia, p. 63.

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