

Extended techniques on the traverso (part 2): the case of the flutter-tonguing and microtones in the post-modernist repertoire for the one-keyed flute

Matteo Gemolo¹
Cardiff University, U.K.

Abstract: Further to my previous article in the last issues of ÍMPAR - Online Journal for Artistic Research, on the *flattement* and glissandos, I deepened my exploration of the post-modernist use of other extended techniques on the traverso with the study of flutter-tonguing and microtones. The most recent works written by Masahiro Arita, Hans-Martin Linde, Vasco Negreiros, Rodney Sharman, John Thow and Jukka Tiensuu demonstrate how resourcefully these extended techniques can be employed on this instrument. The section entitled 'the effect' explains how to execute them, while their musical meanings and expressive components are analysed in the section called 'the affect.'

Keywords: traverso; affects; effects; contemporary music; postmodernism

Introduction

Driven by a thirst for purity and simplicity, architectural modernism took its first steps into the 20th century by dismissing ornaments and decoration as unnecessary, immoral and degenerate. In *Ornament and Crime* (1908), the Austrian-Czech architect Adolf Loos (1870–1933) observed that the only 'acceptable' garnish was the one intelligible by the maker himself, such as the subtle moulding on a piece of furniture (Rykwert, 1982). Invisible to the eyes of consumers and accessible only by those of keen intellect, this type of adornment was useful to convey the 'moral' message of the artist without sliding into complacency. For modernism, what counted was the naked structure of the artwork; any attempt to cover it with the aid of any conventional embellishment was dismissed as an attempt at censorship or, alternatively, as a nostalgic *memento* that bordered on kitsch.²

In order to overcome the mainstream culture and distance themselves from the hypocritical, conservative and bourgeois academicism, the early 20th century technological determinist³ and positivist theories⁴ inspired an increasing number of artists to seek innovation, foster groundbreaking technology and employ experimental means: 'Our intellect has to follow its natural movement, after the lightest possible contact with experience, in order to go from discovery to discovery, sure that experience is following behind it and will justify it invariably' (Bergson, 1983: ix).

¹ matteogemolo@gmail.com / www.matteogemolo.com

² Originating at the end of 19th century, 'kitsch' is a German term that refers to something cheap and popular, in opposition to the true and *auratic* Art. The German philosopher Walter Benjamin (1892-1940) began describing 'kitsch' with particular reference to Surrealism in the late 1920s. He compared 'kitsch' with 'dream' in order to highlight its inner falsehood when confronted with reality. Later in 1936, he went further on: 'Kitsch is nothing more than art with 100 percent, absolute and instantaneous availability for consumption. Precisely within the consecrated forms of expression, therefore, kitsch and art stand inconsolably opposed' (Benjamin, 1973: 395).

³ The pursuit of progress has been often regarded as one of the most defining characteristics of humankind, especially by technological determinists. The French philosopher and social theorist Jacques Ellul (1912–1994), in writing *The Technological Society*, took Bergson's assertions a step further: 'Our civilization is first and foremost a civilization of means; in the reality of modern life, the means, it would seem, are more important than the ends' (Ellul, 1964:19).

⁴ Influenced by Darwinian evolutionary theory, as in the case of Herbert Spencer's early sociology theories.
<https://proa.ua.pt/index.php/impar>

The elitist cult for ‘newness at any cost’ (Cabell Pronko, 1966: 2) later encouraged post-Webernian composers to promote research into new sonic experiences and languages by means of experimenting with series, microtones, electronics and many extended techniques. Therefore, the traditional ornaments such as trills, turns, appoggiaturas and mordents were tolerated only at the expense of their initial rhetorical function: deprived of their *Affektenlehre* context and prevented from conveying any specific ‘affect’, all these embellishments were aligned with other extended techniques and considered as mere ‘effects.’

However, with the increase of post-modernism from the early 1960s and the reversion to tonality and modality (in combination with microtonality and atonality), both ornaments and extended techniques got a chance to (re)gain a decorative and expressive function. ‘Decoration’ and ‘expressiveness’ are terms which are often related to each other: ‘decoration’ has traditionally represented a way to amplify and make more visible (or audible) the emotional content of an artwork (or a piece of music). For instance, Johann Joachim Quantz described the use of grace notes as follows: ‘The embellishments or graces which I have described (...) are in accordance with the temper of the piece, to excite cheer and gaiety, while the simple appoggiaturas, on the contrary, arouse tenderness and melancholy.

Since music should now rouse the passions, now still them again, the utility and necessity of these graces in a plain and unadorned melody is self-evident’ (Quantz, 2001: 98). In the hands of so-called ‘post-modern’ composers, extended techniques have also proved able to become tools to suggest, provoke and accentuate a broad palette of different feelings and musical ideas.

Arising in the early 1960s, postmodernist tendencies aborted the avant-garde’s noble mission to ‘purify’ the art world, and challenged the modernist need for grand metanarratives and absolutes, by employing a multiplicity of codes and destabilizing long-established hierarchies, as experienced in the aftermath of WW2.

The term ‘post-modernism’ carries a futurist and quasi-prophetic allure that suggests a distant and rather blurred destination to which we are all bound. But unlike modernism and its praise for a revolution,⁵ ‘post-modernism’ wishes to improve and enrich our contemporary condition without necessarily disavowing and turning it upside down. However, thanks to its indissoluble relationship with technology (Jencks, 2007: 23) and its borrowing of several modernist techniques,⁶ post-modernity could be regarded more as a continuation rather than a breaking point with modernism. Such a continuation of modernism can take different forms and leads to a wide spectrum of various aesthetics and styles.

⁵ ‘The unprecedented divergence between contemporary serious music and its listeners, on the one hand, and traditional music and its following, on the other, is not accidental and- most probably- not transitory. Rather, it is a result of a half-century revolution in musical thought, a revolution whose nature and consequences can be compared only with, and in many respects are closely analogous to, those of the mid-nineteenth-century evolution in theoretical physics’ (Babbit, 1958).

⁶ The technique of collage offers a perfect example of this phenomenon. The term ‘collage’ was coined by George Braque and Pablo Picasso; the technique has been seamlessly employed from the early 1900s, firstly adopted by European cubists and surrealists and later spreading and being adapted worldwide in the era of pop and digital art. Nonetheless, collage has also proven able to become an essential feature of postmodern art: concepts such as hybridity and pastiche/assemblage ‘open windows on ideas of culture and being as dynamic rather than static’ in line with the postmodernist attempt to challenge ‘modernist concepts of identity based on notions fixed cultural essences’ (Gall, 2014).
<https://proa.ua.pt/index.php/impar>

The employment of a plurality of means and languages, the reconciliation with forms and styles of previous traditions, the attempt to bridge the gap between high and low art, are all at the very core of its existence. Quotations of historical elements, employment of idioms and motifs from the past, irony and sarcasm as a means to exorcise the present and the cohabitation of different genres and aesthetics are only a few of its innovative forces.

Post-modernist attitudes might be longing for the past as much as becoming utterly futuristic: what really counts is the rapprochement between minds and souls, rationality and emotions and ultimately between art and its public.

One of the most persuasive and fascinating insights into the troubling meaning of post-modernism was given through a highly romanticized metaphor by the Italian novelist and literary critic, Umberto Eco:

I think of the postmodernism attitude as that of a man who loves a very cultivated woman and knows he cannot say to her, 'I love you madly', because he knows that she knows (and that she knows that he knows) that these words have already been written by Barbara Cartland. Still, there is a solution. He can say, 'As Barbara Cartland would put it, I love you madly.' At this point, having avoided false innocence, having said clearly that it is no longer possible to speak innocently, he will nevertheless have said what he wanted to say to the woman: that he loves her, but he loves her in an age of lost innocence. If the woman goes along with this, she will have received a declaration of love all the same. Neither of the two speakers will feel innocent, both will have accepted the challenge of the past, of the already said, which cannot be eliminated; both will consciously and with pleasure play the game of irony... But both will have succeeded, once again, in speaking of love (Eco, 1984: 67-8).

Following my previous article on glissandos and *flattements*,⁷ I wish here to highlight the post-modernist reevaluation of two other extended techniques, namely flutter-tonguing and microtones. The section entitled 'the effects' introduces their employment and suggests how to execute them on the traverso, while their musical 'meanings' and expressive components are analysed in the section called 'the affects.'

Flutter-tonguing: the effects

Flutter-tonguing is a type of wind instrument tonguing in which the performers roll the consonant 'r' on the tip of their tongue while playing. When produced with the back of the tongue is called uvular flutter-tonguing or 'roar-flutter'.⁸

The flutter-tonguing is generally marked as follows:

- 1) standard tremolo markings;
- 2) 'flz.' or 'flt', the German abbreviations for *flatterzunge*;
- 3) 'frull', the Italian abbreviation for *frullato*;
- 4) 'f.t.', the English abbreviation for 'flutter-tonguing'.

⁷ Gemolo, M. (2018). Extended Techniques on the Traverso: the case of the glissando and the flattement. *ÍMPAR Online Journal for Artistic Research*. Vol. 2 No. 2. 30-47.

⁸ The latter results in a particularly intense and loud sound.
<https://proa.ua.pt/index.php/impar>

The first uses of flutter-tonguing can be traced to the end of the 19th century. In Tchaikovsky's ballet *The Nutcracker* (1892), (Wiley, 1997) flutter-tonguing is introduced with the intent of evoking the sound of a cascading river. One other early example is found in Strauss's *Don Quixote* (1897) where the roaring effect serves the purpose of imitating the sheep's bleating. Mahler employed the same technique in the *Rondo-Burleske* from his Ninth Symphony (1909): here, the flutter-tonguing executed by the flute, together with violin tremolos and a cymbal crash, creates the surreal and dreamy atmosphere typical of this movement (Floros, 1997).

The different flutter-tongued effects can vary according to the speed and the intensity of their pulsations. While the air pressure influences the speed (for instance 'when loud notes are flutter-tongued, the pulsation will be slightly faster than the pulsations of soft flutter-tongued notes' (Dick, 1975: 128), the position of the tongue has an impact on the intensity of the pulsations. When the intensity of the pulsations increases, 'the note sounding is heard less for the interruptions in the sound become more marked' (Dick, 1975: 128). The dynamic of the flutter-tongued effect is mostly influenced by the air pressure, while its 'timbre' or texture is strictly related to the position of the tongue. When the tongue progressively moves back towards the throat, the sound becomes more 'uvular'; on the contrary, the more the tongue moves towards the teeth, the more it sounds 'harsh' and 'penetrating.'⁹

These two variables (speed and the intensity of the pulsations) have a direct impact on the global effect the performer wants to produce.

Over the following pages, I will illustrate a number of musical examples in order to showcase different ways of coordinating the air stream and the position of the tongue within a variety of musical contexts.

Flutter-tonguing on one or a few notes

Quite a number of flutter-tongued effects are marked on the score with no further indication: no explanatory signs to suggest how to perform them, at what speed and how intense they should sound. Under these circumstances,¹⁰ the flutter-tonguing is conceived as a simple way to break down a linear and more traditional sounding line: the inner quality of the flutter-tongued effect itself and the choice of how to execute it are entirely up to the performer.

A few examples of such a simplistic approach to the *flatterzunge* can be found in pieces such as *Anspielungen*¹¹ by Hans-Martin Linde (b. 1930) and *Traverso poema* by Vasco Negreiros (b.1965).

⁹ Flutter-tonguing can be applied to many other sonorities (such as jet whistles, residual tones, harmonics, microtones, glissandos etc.) which have a further impact on its timbre.

¹⁰ An exception is *Legende* by Masahiro Arita, see fig. 5.

¹¹ The double meaning of the German root word *anspielen* (from which the title of this work comes from) can be translated into English as both 'allude to' and 'try out.' While the first meaning stands for the dense conglomerate of musical quotations from the traditional traverso literature (such as the music of J. S. Bach, C. P. E. Bach and W. A. Mozart) and reworked throughout the whole piece, the second refers to the large use of extended techniques employed in the piece (such as the singing and playing, the flutter-tonguing, the glissandi, the slap tonguing, different types of vibrato etc.)
<https://proa.ua.pt/index.php/impar>

A flutter-tonguing marking appears at the end of the last section of *Anspielungen* [see fig. 1]. The main motif of this section is characterized by two elements:

- 1) a fast sextuplet arpeggio in d minor (marked staccato);
- 2) its resolution consisting of a number of more relaxed and cantabile triplets.

The motif is repeated four times and modified each time by a few variations such as rhythmical changes. The flutter-tonguing is marked as a tremolo and serves the purpose of breaking down the linearity and the repetitiveness within the last section of the piece (*Presto*). Due to its rapidity and dynamic, the flutter-tonguing needs to be executed rapidly and intensively. The high speed of the pulsations requires fast air pressure in order to let the flutter-tongued notes resonate as loud as possible. The position of the tongue can vary from one person to another; but generally, the tongue may be preferably placed not too far back towards the throat, since no special uvular flutter is asked by the composer.

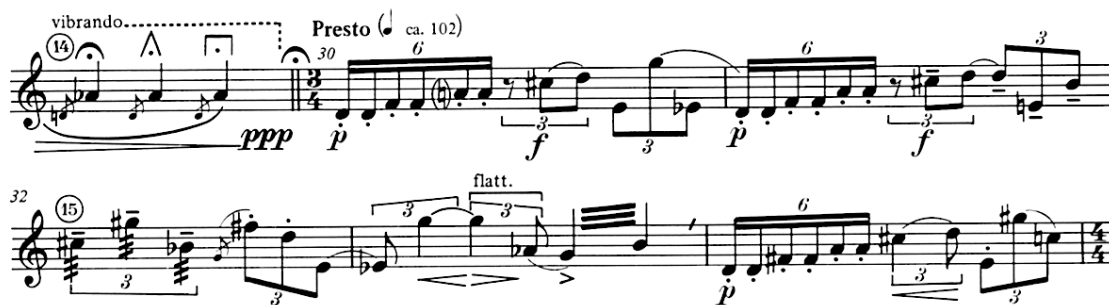


Figure 1. Excerpt from *Anspielungen* by Hans-Martin Linde.

Audio sample: from *Anspielungen* by Hans-Martin Linde – Matteo Gemolo, traverso.

<https://soundcloud.com/matteogemolo/excerpt-from-anspielungen-by-1?in=matteogemolo/sets/impar-audio-samples-for-extended-techniques-on-the-traverso-part-2>

One more example of such a textural employment of the flutter-tonguing can be found in *Traverso poema*, a solo piece for traverso, written by the Portuguese composer Vasco Negreros in 2013. The structure of the piece is rather traditional: it begins with a melancholic modal melody that keeps on chromatically swapping from one mode to another. It is conceived as a written improvisation based on Messiaen's modes (Messiaen, 1956). These modes are employed quite freely, as the main theme is already a combination between the whole-tone scale (e-f#-g#-a#-c-d-e) and the octatonic scale (e-f-g-g#-a#-b-c#-d-e). This subtle and repetitive harmonic oscillation contributes to the piece's mysterious and dreamy atmosphere, recalling Claude Debussy' *Syrinx*, which was composed exactly a century earlier, in 1913. In *Traverso poema*, no extended techniques are employed, with the exception of one short instance of flutter-tonguing in the middle section. In terms of performance practice, the flutter-tonguing effect is preferably executed as softly as possible

(from *piano* to *pianissimo*). As with the many trills¹² scattered throughout the whole piece, the flutter-tonguing may be here regarded as a simple embellishment. In order to play it consistently within the delicate soundscape created by Negreiros, the tongue would be better placed not too close to the teeth, avoiding an aggressive and biting sound: with the air pressure diminished, the speed of the pulsation will decrease and the flutter-tongued note will sound as soft as asked. [see fig. 2].



Figure 2. Excerpt from *Traverso poema* by Vasco Negreiros.

Audio sample: from *Traverso poema* by Vasco Negreiros – Matteo Gemolo, traverso.

<https://soundcloud.com/matteogemolo/excerpt-from-traverso-poema-by?in=matteogemolo/sets/impar-audio-samples-for-extended-techniques-on-the-traverso-part-2>

Flutter-tonguing on more notes

The difference between placing a flutter-tongued effect on one or a few notes and applying it to a longer line has to do with the musical meaning the composer wishes to transmit. As seen above, a subtle and isolated use of the flutter-tonguing can be regarded as a simple embellishment. Its decorative employment overcomes its structural function. In this case, it serves the purpose of providing shape and character to certain pitches in order to counter a sense of repetitiveness and to surprise the audience with a transient special effect.

Nevertheless, the use of flutter-tonguing can be extended to longer melodies or motifs and become more systematic and organic to the piece. An example of this approach can be found in *To Invoke the Clouds* (1995) by John Thow (1949–2007), composed in 1995 in honour of Luciano Berio's seventieth birthday. In this work, Thow employs the traverso as a means of evoking 'exotic' timbres. The piece, originally written for the traverso and live electronics (and later revised for solo traverso or alternatively for two traversos - or modern flutes - without live electronics), is inspired by the rainmaking rituals of Native American tribes. In particular, Thow wrote the piece keeping in mind the sound of the Hopi flute.¹³ The Prelude of *To Invoke the Clouds* is based on a recording of a Hopi flute from the beginning of the 20th century. The softness of the traverso's timbre together with the incessant use of a colourful palette of microtones, tremolos and *flattements* gives a sense of fluidity and lightness to the piece. In contrast with the general mood of *To Invoke the Clouds*; the flutter-

¹² The trills have to be played from the upper note, in Baroque fashion.

¹³ The Hopi flute is a native American traditional fipple end-blown flute, employed during the rainmaking rituals of the Hopi ceremony. This ceremony lasted allegedly nine days and was performed by two divisions of Flute priests; each division had an elaborate altar about which secret rites were performed. The earliest specimens of this flute are dated from 620 to 670 AD and were found in a cave in Prayer Rock Valley in Arizona, USA, during an archaeological expedition led by Earl H. Morris in 1931.

tonguing effect is added to produce a vibrant and eruptive stream of noise. By using it first on long notes and later on descending chromatic scales, the composer is able to halt the main berceuse-like rhythm that otherwise characterizes this duet [see fig. 3].

The image shows two systems of musical notation for two traversos. The first system starts at measure 91 and includes dynamics *ffp*, *ff*, and *f*. The second system starts at measure 95 and includes markings for *Poco più mosso* (with a tempo of $\text{♩} = \text{ca. } 92$), *poco rall.*, and *dim.*. The notation features complex rhythmic patterns, including flutter-tongued passages, and uses various articulation marks like slurs and accents.

Figure 3. Excerpt from *To Invoke the Clouds* for two traversos by John Thow.

The flutter-tongued effect is vibrant and loud; it is advised to execute it at a high-speed pulsation, sustained by strong air pressure. The sound quality that the flutter-tonguing takes on will depend on the performer's judgment. Nevertheless, Thow's flutter-tongued passages are often placed in the high tessitura and sound rather dissonant; therefore, the tongue may be positioned rather far forward to favour a harsh timbre.

In *Legende* by Masahiro Arita, the flutter-tonguing is essentially employed in two different circumstances:

- 1) in the final stage of an *accelerando* motion;
- 2) as a sonic wave that perturbs a linear and plain soundscape.

In both cases Arita brilliantly exploits the full potential of the flutter-tonguing to its limit.

The piece starts 'lento' with a series of repeated pitches, namely D'' and $E \flat'''$, each time modified as follows:

- 1) with alternative fingerings that create different micro intervals;
- 2) with grace notes that create a few syncopations.

The initial steady but slow pulse is employed in order to build up the tension through the reiteration of the same intervals and the increase of the dynamic level, from an initial *pp* to

<https://proa.ua.pt/index.php/impar>

the last *f*. The response to this tension arrives together with an *accelerando* that leads to a flutter-tongued atonal broken chord, played *fff*.

Later in this first section, the same ‘tension-release’ mechanism is repeated another time on two different pitches (*F#* and *B*). An advanced position of the tongue and strong air pressure could contribute to the powerful and noisy effect Arita wishes to achieve.

The second employment of the flutter-tongued effect is completely alien to the previous one and to the overall structure of the first section of the piece. This time the *flutterzunge* is isolated and detached from the surrounding soundscape, unveiling its explosive nature [see fig. 4]. While the reiteration of the same pitches helps to forge a warm and calm soundscape, a number of unexpected and rhapsodic motifs emerge as outbursts of energy. After a few quick grace notes and rapid chromatic scales (always loud, rapid and accentuated, in sharp contrast with the traditional pace and atmosphere of the first part of *Legende*), the last flutter-tongued broken chord puts an end to this section, introducing the new one: ‘Animato’ (as fast as possible). The flutter-tonguing function here is to exacerbate the rhapsodic and infuriating character of this section. This gesture is not a direct result of the dynamic motion as it was in the previous case. Here, the flutter-tonguing is applied to abruptly halt the plaintive previous part and to anticipate the opposing agitated section that will follow.

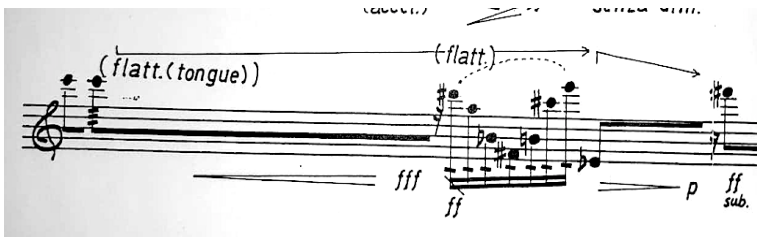


Figure 4. Excerpt from *Legende* by Masahiro Arita.

Audio sample: from *Legende* by Masahiro Arita – Matteo Gemolo, traverso.

<https://soundcloud.com/matteogemolo/excerpt-from-legende-by-1?in=matteogemolo/sets/impar-audio-samples-for-extended-techniques-on-the-traverso-part-2>

Uvular flutter-tonguing or ‘roar-flutter’

Later, in the second part of *Legende*, Arita requires the flautist to play a series of regular flutter-tongued notes in combination with the ‘roar-flutter’ effect. The latter is placed on a pitch marked *piano*, in contrast with earlier pitches, marked *f* and *ff*. The *piano* effect together with the ‘roar-flutter’ contribute to the intensity and depth of certain pitches such as *A b* which would otherwise sound weak, owing to the fork fingerings required to execute them.

Within this context, these two different flutter-tonguing techniques are applied in combination with other articulations, namely *tuku*, *did'll* and regular *staccato* [see fig. 5]. Here, Arita explores all the possible nuances that can be produced by modifying the effect on a single pitch while keeping the pulse constant and steady.¹⁴

¹⁴ Masahiro Arita is a Japanese flute, composer and conductor. He is dedicated to crossing the boundaries between period instruments and modern instruments, tireless in his search for new musical directions.
<https://proa.ua.pt/index.php/impar>

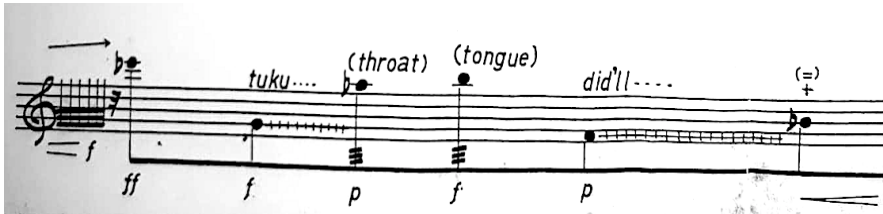


Figure 5. Excerpt from *Legende* by Masahiro Arita.

Audio sample: from *Legende* by Masahiro Arita – Matteo Gemolo, traverso.

<https://soundcloud.com/matteogemolo/excerpt-from-legende-by?in=matteogemolo/sets/impar-audio-samples-for-extended-techniques-on-the-traverso-part-2>

The subtle difference in articulation created by this obsessive changing of the tongue position transforms each note into a sonic world of its own. The uvular flutter-tonguing can be obtained 'by placing the tongue far back in the throat and fluttering as roughly and noisily as possible', as Robert Dick explains (Dick, 1975: 129).

Flutter-tonguing: the affects

As seen throughout several examples, the flutter-tonguing function can vary from being merely decorative to becoming essential to the basic structure of the piece.

If a decorative aspect prevails, it can be regarded:

- 1) as an embellishment (*Traverso poema* by Negreiros, see fig. 2);
- 2) as an articulation (second section of *Legende* by Arita, see fig. 5).

When essential to the structure, it serves:

- 1) as a resolution of a tension-release mechanism (first section of *Legende* by Arita, see ex. 4);
- 2) as a halt, to interrupt the linearity and the repetitiveness of a certain melody or motif (*Anspielungen* by Linde, see ex. 1 and *To Invoke the Clouds* by John Thow, see ex. 3).

Microtones: the effects

A microtone is any musical interval or difference of pitch distinctly smaller than a semitone. A wide variety of different subdivisions of intervals smaller than a semitone have been employed all over the world and over the centuries: from the Hellenic civilizations of Ancient Greece which left us only a few fragmentary records of their music including the Greek

Dorian mode,¹⁵ to Indonesian gamelan music, which has become a great inspiration for many composers in the West.

Instruments such as the archicembalo, described for the first time by Nicola Vicentino in 1555,¹⁶ were invented to explore microtonality and just intonation, by adding extra keys and strings to the keyboard in order to allow a system that could provide up to 31 equal divisions of the octave.

Due to its natural flexibility in tuning, the one-keyed flute was used to explore microtonality almost since its birth. In *L'Art de la flute traversière* (1760)¹⁷ the French flautist Charles De Lusse (ca. 1720–ca. 1774) presented what is considered the first complete chart of quarter-tones, writing in the appendix of his method a tune entitled *Air à la grecque* in which those intervals could be applied. A few years later, one of the best-known flute virtuosos of his time, Pierre-Gabriel Buffardin (ca. 1690–1768), referred directly to De Lusse's microtonal pieces, expressing his interest in the system of quarter-tones in a letter published in *Mercure de France* in September, 1764 (Kollpacher-Haas, 1962).

The employment of quarter-tones can be conceived in two opposite ways:

- 1) as an addition to the equal-tempered chromatic scale;
- 2) as a means of redefining musical intervals within the search for a better approximation than that delivered by the twelve tones equal temperament.

One of the earliest and finest examples of the first approach in the context of Western classical music comes from Charles Edward Ives (1874–1954). His *Quarter-Tone Pieces* for two pianos, composed between 1923 and 1924, show how fascinating and enriching the interaction between regular equal-tempered chromatic scale and microtones could be. While one piano is regularly tuned, the other is tuned a quarter-tone sharp. The inspiration for the piece came from a personal memory from the composer's childhood:

One afternoon, in a pouring thunderstorm, we saw him standing without hat or coat in the back garden; the church bell next door was ringing. He would rush into the house to the piano, and then back again. 'I've heard a chord I've never heard before – it comes over and over but I can't seem to catch it.' He stayed up most of the night trying to find it on the piano. It was soon after this that he started his quarter-tone machine (Wood, 1986: 328 - 330).

The melody played in the *Largo* of the piece refers to the church bells as heard by George Ives, the father of the composer. Between bars 7 and 12, the first piano plays a swinging and repetitive line which is then repeated more resonantly, between bars 18 and 24. These odd pitches create a few subtle dissonances in contrast with the melancholic motif played by the first piano, a tonal and quite romantic depiction of that idyllic rainy day from Ives's childhood.

¹⁵ Aristoxenus describes the enharmonic genus as the 'highest and most difficult for the senses' Its characteristic interval is a major third, called 'ditone', leaving the *pyknon* to be divided by two intervals smaller than a semitone called 'dieses' (approximately quarter-tones).

¹⁶ See Vicentino, N. 1555. *L'antica musica ridotta alla moderna prattica*. Rome: Antonio Barre. Retrieved from [https://imslp.org/wiki/L%27antica_musica_ridotta_alla_moderna_prattica_\(Vicentino%2C_Nicola\)](https://imslp.org/wiki/L%27antica_musica_ridotta_alla_moderna_prattica_(Vicentino%2C_Nicola))

¹⁷ See De Lusse, C. 1997. *L'Art de la flute traversière*. Florence: Studio per edizioni scelte. <https://proa.ua.pt/index.php/impar>

A perfect example of the second approach can be found in the music composed by Harry Partch (1901–1974). The American composer devised a system called ‘Monophony’ in which, instead of the 24 quarter-tones based on the traditional chromatic scale (as it still was in the case of Ives), the octave was divided into 43 unequal microtones, following in the footsteps of the Mexican composer Julián Carrillo (1875–1965).¹⁸

Quarter-tones

Due to its natural flexibility, the one-keyed flute has broadly encouraged the employment of enharmonic intervals. As early as 1726, J. J. Quantz invented a second key to enable flautists to play two distinguished enharmonic intervals, namely $E \flat$ and $D\sharp$.¹⁹

In the tuning systems generally used throughout most of the eighteenth century, the flat was played higher than its enharmonic sharp. $E \flat$ was sharper than $D\sharp$. Quantz’s system of fingering for the flute contains further enharmonic fingerings, four of which require the use of a second key operated by the little finger of the right hand. Quantz invented this second key in 1726. It closes a second slightly smaller hole bored beside the $E \flat$ hole. By Quantz’s own admission, the additional key never became popular, and only a few makers later in the century included it on some of their instruments, such as F. G. A. Kirst and Johann George Tromlitz (Solum, 1995: 46-47).

Quarter-tones are often employed in order to produce a series of small intervals that can be juxtaposed to each other and give a sense of fluidity and continuity of sound. This effect is very well illustrated in *Snares Harmony* by the Canadian composer Rodney Sharman (b. 1958). In this piece written for the traverso, string orchestra and harpsichord, Sharman is capable of achieving a strong destabilizing effect through the use of a microtonal language.

The first and second sections of the piece are characterized by a fluctuating rhythmical pattern performed by the strings in contrary motion and by harpsichord’s arpeggios; entirely consonant in their beginnings, the line played by the strings is slowly and subtly modified by the introduction of microtonal intervals [see fig. 6]. It results in a distorted lullaby, often interrupted by short traverso solos, typified by a series of microtonal glissandos, pitch variations on B'' [see fig. 7].

¹⁸ As early as 1895, Carrillo created the first division of the octave into 96 equal parts and began to compose extensively according to his microtonal system.

¹⁹ While at the time of its invention the double key failed to attract considerable interest, nowadays it might be useful.
<https://proa.ua.pt/index.php/impar>

Moderately ♩ = 72

Flute

Violin I
arco
mp

Violin II
arco
mp

Viola
pizz
mf

Violoncello
pizz
mf

Bass Viol
pizz
mf

Harpichord
Moderately ♩ = 72
8'+8' (coupler)

Figure 6. Excerpt from *Snared Harmony* by Rodney Sharman.

11 * fingered (see below) poco accel. a tempo poco accel. a tempo poco accel. a tempo

gliss. gliss. gliss.

mf 5 5 5 5 5 5 mp arco

pizz mf pizz mp

mf f mf

Figure 7. Excerpt from *Snared Harmony* by Rodney Sharman.

Audio sample: from *Snared Harmony* by Rodney Sharman

<https://soundcloud.com/matteogemolo/excerpt-from-snared-harmony?in=matteogemolo/sets/impar-audio-samples-for-extended-techniques-on-the-traverso-part-2>

The third and final parts of the piece are characterized by subtle microtonal dissonances overlapping each other: the reiteration of the same sonic masses gradually dissolves, 'until pitch disappears' as marked by the composer on the score [see fig. 8].

67 p normale (until pitch disappears) normale

p normale

p normale

p pizz arco

mp p p pizz arco

p p pizz arco

mp p mp p pizz arco

lute (lute) 8'

lute (8')

Figure 8. Excerpt from *Snared Harmonies* by Rodney Sharman.

Audio sample: from *Snared Harmony* by Rodney Sharman.

<https://soundcloud.com/matteogemolo/excerpt-from-snared-harmony-by?in=matteogemolo/sets/impar-audio-samples-for-extended-techniques-on-the-traverso-part-2>

As its title suggests, *Snared Harmonies* represents a utopian attempt to grasp ‘the elusive harmonies that are hidden in the piece; their faltering microtonal character leaves us with the final impression of an ephemeral timbre mirage.’²⁰

Another interesting way to employ the quarter-tones can be found in *Tiet/Lots* by Jukka Tiensuu.²¹ In its first movement, entitled ‘Opintie/Study drone’, the Finnish composer uses a series of clashing microtones on long notes in order to create an unstable and vibrant harmonic tension. For instance, in bar 21 the flute firstly plays a long A^{\flat} , then the viol follows a quarter-tone higher, succeeded by the violin a quarter-tone lower, and finally the harpsichord with a dissonant cluster made up of $G-A^{\flat}-B^{\flat}-B$ [see fig. 9].

The image shows a musical score excerpt for four instruments: flute, violin, viola, and harpsichord. The score is written in a single system with four staves. The flute part (top staff) starts with a long note marked 'p' and 'sempre legato', followed by a series of notes with various dynamics (mf, f, p, mp) and articulation. The violin part (second staff) also starts with a long note marked 'pp' and 'p', followed by notes with dynamics (f, mp) and articulation. The viola part (third staff) starts with a long note marked 'p' and 'sempre legato', followed by notes with dynamics (mf, f, mp) and articulation. The harpsichord part (bottom staff) starts with a long note marked 'p' and 'sempre legato', followed by notes with dynamics (mf, f, mp) and articulation. The score includes various musical notations such as dynamics (p, pp, mf, f, mp, cresc.), articulation (sempre legato), and fingerings (3, 5, 6, 8, 8+8). The harpsichord part also includes a trill marked 'tr (trillo accel.)'.

Figure 9. Excerpt from ‘Opintie/Study drone’ by Jukka Tiensuu.

Audio sample: from ‘Opintie/Study drone’ by Jukka Tiensuu – Europa Ritrovata.

<https://soundcloud.com/matteogemolo/excerpt-from-opintie-study?in=matteogemolo/sets/impar-audio-samples-for-extended-techniques-on-the-traverso-part-2>

The same kind of pattern is later relaunched, starting from bar 34 onwards: the flute executes a long B^{\flat} , followed by the violin playing A^{\flat} and the viol on a dissonant A^{\flat} . From bar 37, the previous tension is released by a fluctuation of the pitch made possible by a series of short glissandos (up- and downwards).

Beyond the quarter-tone

Microtones can be extended far beyond quarter-tones. Smaller intervals are made possible by gradually covering the holes of the flute with the fingers and tuning those pitches with an upward or downward rolling of the embouchure. Examples of how to employ such small intervals appear in *Legende* by Arita. In the final section of the piece, microtonal scales are introduced as soft and rapid gestures [see fig. 10]. These scales are anticipated by two long *flattements* in which the pitch freely fluctuates. It is important here to stress the different effects produced by the use of a *flattement* and the playing of a microtonal ladder, especially

²⁰ Sharman R., from a conversation with the author, dated 21 January 2019.

²¹ *Tiet/Lots* is a quartet for traverso, Baroque violin, viol and harpsichord composed in 2003 by the Finnish composer and harpsichordist Jukka Tiensuu (b. 1948).
<https://proa.ua.pt/index.php/impar>

when these are required to be executed one next to the other. The *flattement* - also known as finger vibrato - (Gemolo, 2018) produces an unpredictable and rather smooth oscillation of the pitch, while the chromatic microtonal scale has its development precisely notated in the score and, consequently, sounds more controlled.

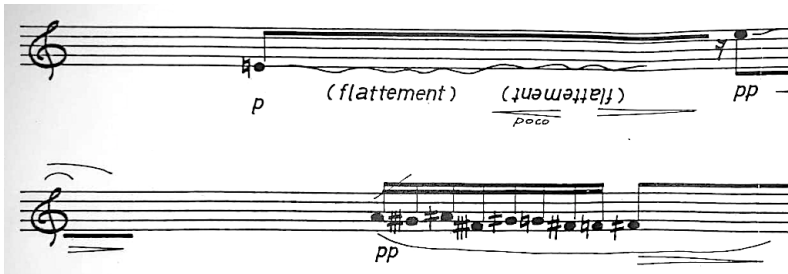


Figure 10. Excerpt from *Legende* by Masahiro Arita.

Because intervals smaller than quarter-tones are difficult to discern even by the finest ear, the subdivision of microtonal ladders in such tiny intervals would sound more interesting from an analytical perspective than from an aural point of view. In *Legende*, the rational component takes over from acoustic perception. Insofar as our auditory system can be trained, Arita's theoretical/arithmetical approach to microtones (according to which further ratios and smaller fractions of an interval can be constantly produced) represents a rather difficult challenge to average listeners, often unable to distinguish such tiny variations in the pitch. For performers too, the execution of intervals smaller than quarter-tones, especially on the one-keyed flute, is left entirely entrusted to their sensibility: the absence of an efficient and complete key system such as the one that the modern flute can offer, makes the control over the tuning of the instrument less systematic and more unpredictable. On the Boehm flute (open-keyed system), a more defined degree of precision over the variation of the pitch is made possible by the employment of all sorts of keys; varying from quarter-tones to thirty-second tones, in *The Other Flute* (Dick, 1975) Robert Dick is able to showcase a rather complex chart that incorporates up to two hundred and ten pitches. Nevertheless, despite the incredible effort made, such a meticulous subdivision might appear quite utopian. Within each microtonal segment that covers just a semitone, Dick is capable of listing from three to seven (!) different fingerings that might enable the player to fill the gap between one pitch and another, creating a chromatic ladder of extremely small steps which is 'a logical rather than an acoustic extension of the chromatic scale', as admitted by Dick himself.

The subdivision of the scale in intervals smaller than a semitone has been receiving severe criticism when brought to its extreme. For instance, the original version of the well-known *Le visage nuptial* (1946-7) has been denigrated for Pierre Boulez's rather 'engineering' use of micro-intervals:

The early version of the work, as is well known, contained sections written in quarter-tones and employed a rhythmic style at the limits of the performable. Though this appears to have been a not insurmountable problem with the early chamber version of 1946, the large orchestral and choral version of 1952 was, and is, virtually unplayable (Boulez himself, preparing a performance in 1980, apparently gave up after about three bars). The 1989 version is radically simplified (in the demands it makes of the performers at least):

there are no rhythmic values more complicated than the occasional quintuplet, while the quarter-tones have been entirely eradicated (Gavin, 1995: 225).

Microtones: the affects

Instead of giving up with the whole microtonal package of possibilities due to its complexity and elusiveness, microtones can be embraced by various performers when more freedom is assigned to them; an interesting example of how to combine aleatory techniques with a microtonal notation can be found in Lutosławski's use of 'limited aleatoricisms':

In *Chapitre I* there is an uncharacteristic example of Lutosławski deciding not to specify pitch and giving only an abstract contour of the required line; a footnote in the score explains that 'The xylophone plays arbitrarily, merely approximating the indicated pitch and duration' (Bodman-Rae, 1984: 112).

Late modernist and post-modernist approaches to microtones show the gradual change of perspective with regard to their acoustic perception: from their primarily modernist conception as 'mental gymnastics for a superior few' at the limits of the performable, to their relocation into a dimension where they become highly evocative and expressive:

- 1) microtones as a theoretical challenge in the subdivision of an interval into smaller fractions (*Legende* by Arida, see fig. 10)
- 2) quarter-tones as a precise mean to redefine musical intervals within the search for a better approximation than the one delivered by the twelve tones equal temperament (*Tiet/Lots* by Tiensuu, see fig. 9 and *Snared Harmonies* by Sharman, see fig. 6, 7 and 8).

Other extended techniques

The range of extended techniques is quite wide and constantly evolving. Techniques such as multiple sonorities, percussive sounds, whisper tones, jet whistles and singing and playing simultaneously represent valuable resources at the disposal of any composers who wish to enlarge the possibilities of the traverso's sound palette. Nevertheless, the different nature between the Boehm and the one-keyed flute should always help us to bear in mind that their sonic outcomes are different too. For instance, the whistle tone technique will produce less and much feebler individual partials of notes when applied on the traverso compared to what a modern flute could achieve. This is due to the simple fact that diameters of finger and mouth holes on the one-keyed flute are much smaller than the ones on the Boehm flute. We would be likewise disappointed to hear the weak percussive sound effects that can be produced on the traverso when compared to those obtainable on a modern flute, thanks to its heavy-duty material and set of efficient and noisy keys.

Other techniques can be surprisingly efficient on both instruments, such as singing and playing at the same time. Besides its use in folk and jazz music, one of the earliest examples in modern playing of such a technique can be traced back to *The Shape of Silence* for flute, by the American composer and harpsichordist Joyce Mekeel (1931–1997) composed in 1969. As described by John Heiss: 'spoken words, sharply enunciated, are used both to

articulate and to sustain low-register pitch with a predominantly wind-like sound, which are obtained by blowing rapidly *across* rather than into the blowhole.²²

Following the line of Mekeel's piece, in 1988 the same technique was employed by Hans-Martin Linde in *Anspielungen* for the one-keyed flute: by pronouncing nasal consonants ('n') in alternation with short syllable ('mo' and 'nu') the traverso player is able to create rhapsodic and mumbling effects that help to sustain the low-register pitches.

Nevertheless, the acknowledgment of the organological differences between the Boehm and the one-keyed flute is essential to avoid misjudgments. On one hand, experimentation with techniques that have been borrowed from the modern flute's contemporary techniques baggage should be encouraged, in order to find out how differently the same techniques might work on an earlier instrument; on the other hand, it might be interesting to look back at the past and try to rehabilitate all those effects used in the Baroque time such as the *flattement* or articulations as *did'll* in order to try them out in a different musical context.

²² Heiss, J. (1972). The Flute: New Sound. *Perspectives on New Music*, Vol. 10, No. 2 (Spring – Summer). 153-158. <https://proa.ua.pt/index.php/impar>

References

- Babbit, M. (1958) Who Cares if you Listen, High Fidelity February 1958. Retrieved from: <http://www.palestrant.com/babbitt.html>.
- Bartolozzi, B. (1967) *New sounds for woodwind*. Oxford: Oxford University Press.
- Bayr, G. (18?) *Schule für Dopplertöne auf der Flöte* Wien: F. X. Ascher Antiquar.
- Benjamin, W. (1973) *The Work of Art in the Age of Mechanical Reproduction in Illuminations*. London: Fontana.
- Bergson, H. (1983). *Creative Evolution*. Lanham MD: University Press of America.
- Bodman Rae, C. (1984) *The Music of Lutosławski*. London: Faber and Faber.
- Cabell Pronko, L. (1966). *Avant-Garde : the Experimental Theatre in France*. Berkeley and Los Angeles: University of California Press.
- Dick, R. (1975) *The Other Flute: A Performance Manual of Contemporary Techniques*. Oxford: Oxford University Press.
- De Lusse C. (1997) *L'Art de la flute traversière*. Florence: Studio per edizioni scelte.
- Duteurtre, B. (1995) *Requiem pour une Avant-garde*. Paris: Les Belles Lettres.
- Dick, R. (1975) *The other flute: a performance manual of contemporary techniques*. Oxford: Oxford University Press.
- Eco, U. (1984) *Postscript to the Name of the Rose*, trans. William Weaver. San Diego, New York and London: Harcourt Brace Jovanovich.
- Ellul, J. (1964) *The Technological Society* (New York: Vintage Books).
- Floros, C. (1997) *Gustav Mahler: The Symphonies*. Montreal: Amadeus Press.
- Gall, A. D. (2014) Fragments of What? Postmodernism, Hybridity and Collage. *Journal of Art for Life*, University of North Carolina Charlotte: Vol. 5 Issue 1
- Gavin, T. (1995) Work Not in Progress in *The Musical Times*, Vol. 136, No. 1827.
- Gemolo M. (2018) Extended Techniques on the Traverso: the case of the glissando and the flatterment. *ÍMPAR Online Journal for Artistic Research*.
- Gemolo, M. (2018) New Music for the Traverso: “Affects” and “Effects” in the Music of Jukka Tiensuu. In *The Flutist Quarterly*. Chicago, The National Flute Association, Vol. 43 Winter.
- Heiss, J., (1972) The Flute: New Sounds. In *Perspectives on New Music*, Vol. 10, No. 2 Spring – Summer.
- Jencks, C. (2007) *Critical Modernism. Where is post-modernism going?* Chichester, Wiley-Academy.

- Lincoln, D. B. (1997) *Musica Poetica: Musical-Rhetorical Figures in German Baroque Music*. Nebraska: University of Nebraska Press.
- Lion, N. (1990) New sounds for old flutes. In *Traverso* (Oshkosh: Linda Pereksta Editor, vol. 2 no. 2, April 1990).
- Philip, R. (2004) *Early Recordings and Music Styles*. Cambridge: Cambridge University Press.
- Pereksta, Linda H. (2001) *Twentieth-century compositions for the Baroque flute*. Florida: Florida State University School of Music.
- Quantz, J. J. (2001) *On Playing the Flute*. Boston: Northeastern University Press.
- Rykwert, J. (1982) *The Necessity of Artifice*. London: Academy Edition.
- Schenk, L. (1996) Reviewed work: *Requiem pour une avant-garde* by Benoît Duteurtre in *World Literature Today*, Vol. 70, No. 3.
- Solum J. (1995) *The Early Flute*. Oxford: Clarendon Press.
- Vicentino, N. (1555) *L'antica musica ridotta alla moderna prattica*. Rome: Antonio Barre.
- Wiley R. J. (1997) *Tchaikovsky's Ballets*. Oxford: Oxford University Press.
- Wood, J. (1986) Microtonality: aesthetics and practicality in *The Musical Times*, Vol. 127, No. 1719.

Discography

Gamba Nova: Contemporary music for baroque instruments and voices. Music by Jukka Tiensuu et al. (Markku Loulajan-Mikkola). Alba