Chapter 2: Analyses

2.1 *défraîchir*

2.1.1 Introduction

Défraichîr was my first work composed for large orchestra and was written for the RCM Symphony Orchestra in 2006/07. My central idea for this piece was to depict the gradual deconstruction of a (musical) utopia. This utopia is symbolized by the high-pitched fragile gestures at the outset of the work, which are dragged downwards and eventually engulfed by complementary forces resulting in a loss of the delicate and frail purity of the beginning in favour of a series of conflicting dramatic processes. Over the course of the following sections various unsuccessful attempts to regain the initial state take place. Finally, these struggles lead to a different, inchoate lyric existence that ends the piece.
In relation to this dramaturgical idea, the confrontation of two different states of musical energy are of great importance, as the constant flow of (low) energy which characterizes the lyric sections at both the beginning and end of the piece stands out from the, at times dramatically, fluctuating energy levels that define the middle sections of the work.

2.1.2 Microtonal writing for orchestra

Microtonal writing for symphony orchestra with musicians performing on traditional instruments remains a particular challenge as there are not only substantial limitations to the *types* of microtones that can be applied but also to the *ways* in which they can be used. Most woodwind instruments are capable of producing reasonably accurate quarter-tones through the application of special fingerings (also smaller intervals such as eighth-tones or even twelfth-tones [on the C-flute] are possible).[5] Brass instruments can perform different types of microtones either through lip glissandi, subtle change of slide positions (trombone) or use of just intervals (horn), while the tuning of harps, pianos and certain percussion instruments can be altered prior to a performance (e.g., detuning of strings or the attachment of objects to, for instance, a gong). The most serious problems regarding the use of microtones arise with the strings even though it is possible to perform certain microtones on traditional string instruments. These include just intervals (through the application of natural harmonics), quarter-tones (or other micro-intervals) through the use of *scordatura* (non-standard tuning of the strings), microtonal glissandi, and even the careful application of microtonal fingerings. All these techniques, however, feature significant drawbacks: a continuous application of natural harmonics, for instance, limits the pitch material to a certain number of just intervals based on the fundamentals of the open strings while also significantly

[5] The well known American flautist Robert Dick introduced a set of fingerings for the twelfth-tone scale.

limiting the number of different timbres a composer has at his disposal. The application of quarter-tone *scordatura* is, at least in theory, quite effective for the realization of quarter-tone systems. This method, however, requires meticulous tuning (ideally on a second instrument that is not used for standard tuning) prior to a performance, and even then strings tend to detune further after being played on for a while. The use of standard fingerings requires *each member* of the string section to have an accurate idea of what various microtonal intervals sound like – something, that, from a pragmatic perspective, simply cannot be expected. One problem that all these techniques have in common is that there tend to be varying degrees of imprecision regarding the intonation of micro-intervals when, for instance, 10 violinists are asked to play the same quarter-tone step. These different degrees of imprecision that occur simultaneously usually lead to severe harmonic beats (meaning that the waves of sinusoids with similar frequencies are out of phase). It is true, of course, that a string section rarely ever performs non-microtonal intervals with perfect precision (and thus without beats) when playing traditional music (one need only think about the application of non-synchronized vibrato). The players do, however, have an idea of what a correct equitempered semitone should sound like and thus quickly adjust any imprecision. This is most frequently not the case when smaller and thus more "obscure" intervals are required. Furthermore, due to its relative size, a semitone remains recognizable as such even if, for instance, a wider vibrato is applied – here, the human ear adjusts for any intonational imprecision. This phenomenon, however, does not generally apply to microtones which are much more vulnerable to being perceived as an unspecific blur. This is not only due to their smaller size but also to the very probable lack of familiar harmonic and melodic contexts on part of the audience.[6] I would go as far as to claim that, when performed by a larger string section, microtonal pitches turn into more or less vague pitch regions rather than clearly distinguishable and exact intervals.[7]

With this in mind, I decided to declare the string section the "most vulnerable element" in the orchestra. I realized that for the construction of my pitch system the pragmatic realities of what this weakest element was capable of achieving had to be carefully observed. This meant that the application of a system generating various differentiated micro-intervals would be highly impractical and thus unsuitable. After further consideration I came to the conclusion that I could not realistically expect any *controlled* exact microtonal intonation when orchestral instrument doublings are involved.

[6] The accidental occurrence of microtones in poor performances of traditional tonal music does not affect the listener´s harmonic and melodic understanding because of his/her familiarity with the pitch contexts.

[7] The examination of numerous recorded and live performances of microtonal music confirms this observation.

This apparent "weakness" of the string section, its inability to produce exact microtonal sounds in actual unison, therefore had to be transformed into a constructive element. In other words, the intonational impurity of sounds had to become an intentional part and perhaps even the purpose of the work.

With this in mind I developed the general discourse for the piece, which dealt with processes of deconstruction. One of the parameters for these processes was microtonality functioning as a "sound contaminator", meaning that microtones distort and destabilize pitch points by turning them into pitch regions.

For practical reasons I limited the microtonal material to quarter-tones. I then introduced two principle methods to generate the pitch material:

- Expressive expansion or contraction of certain intervals: a primarily intuitive use of micro-intervals predominantly serving expressive purposes.
- Derivation of quarter-tones from clarinet multiphonics. These multiphonics generate the pitch material for both harmony and melody.

By means of orchestrating these multiphonics (which never appear in their original form; instead similar multiphonics are played by flutes and oboes) the orchestra is occasionally transformed into a meta-instrument. This technique represents a simplified form of re-synthesis of complex instrumental sounds. However, results of spectral analyses were not considered, once again due to the impossibility of an adequate performance of such pitch nuances.

2.1.3 Form and musical discourse

The macro-form of *défraîchir* consists of five sections:

- Section I (bars 1-59) presents the first sound-world, its deconstruction and the transition to the next material;
- Section II (bars 60-84) features the second sound-world and a transition to the preliminary climax;
- Section III (bars 85-106) contains a preliminary climax and the build-up to the main climax;
- Section IV (bars 107-122) presents the deconstruction of the climactic material;
- Section V (bars 123-149) features further deconstruction and finally the disintegration of the orchestra;

The title (meaning "to pale") suggests the basic discourse of the piece by describing the gradual and inexorable loss of a (musical) utopia which is briefly presented at the very beginning of the piece. The high-pitched fragile gestures at the work´s outset (bars 1-19) are

dragged downwards and eventually engulfed by complementary forces (bars 20-52); the frail purity of the beginning becomes “contaminated” and finally assimilated by another identity.

The static purity of the initial musical material – defined by melodic fragments developed from the major third ´D - F sharp` – undergoes a process of subtle but constant destruction throughout the first section (bars 1-56) of the piece. The dark voluminous chords, first introduced in bar 23, slowly “pull down” the original material. This way tension is created through the colliding of two different forces: the major thirds striving upwards are eventually being pulled down by the low and heavily accented chords. The work´s first climactic moment (bar 50) marks the loss of the initial material and any further reference throughout the piece shows those motives and gestures only as a fleeting memory.

This basic concept can be observed on both micro- and macro-levels in the following sections of the piece. Section two (rehearsal letters [4] to [11]) introduces a textural exploration of the second material (i.e. low accented chords). Here, the initially static textures are set into motion and thus develop a more directional sense. A composed accelerando begins at rehearsal letter [9] followed by a build-up to the main climax ([10]). Once again, the upward striving sounds are absorbed by the much stronger force of the low sonorities.

The penultimate section ([11] to [12]) presents a gradual decay: the work´s energy has been exhausted to a great extent, and the harmonic progression of the previous climax is presented in reverse order and stretched time. In the final section ([12] to end) the forces ensuring the cohesiveness of the orchestra cease to exist, and the orchestra disintegrates into small soloistic chamber ensembles. At the very end, the music fades away, and a final subtle recollection of vivacity ends the work.

2.1.4 Section I

The aforementioned purity at the outset of the piece is predominantly expressed by a small gesture which assumes motivic character over the course of the piece: the major third ´D – F sharp`. Throughout the first section this gesture is extended by means of adding further pitches and is thus transformed into various forms of melodic fragments. This constructive process, however, simultaneously becomes thwarted by deconstructive processes that aim at the destruction of the stability (unambiguousness) of pitch.

I applied two main principles in order to control these deconstructive processes:

- Pitch contamination through the application of microtones.

- Establishment of reference points (i.e. non-microtonal passages) which serve the purpose of "pointing out" the degree of pitch disintegration ("out-of-tune-ness") to the listener by directly "comparing" microtonal and non-microtonal elements.

The deconstructive processes set in already at the very beginning of the piece, if only, for the time being, in a very subtle way. The very first statement of the ´D – F sharp` gesture (bars 3-4) contains several elements which affect the clarity and stability of pitch: the second violins perform a glissando to connect the two pitches while the flutes perform the same gesture without glissando (the space between the two pitches is, for a brief moment, filled with a pitch continuum). The pitches themselves are affected as well: several techniques responsible for changing both timbre and pitch of the sounds are applied; this includes different harmonic fingerings for the same pitch (´F sharp`) in the violins and violas, changes of vibrato speed in the flutes, transitions from *ordinario* to *sul ponticello* on the violas, the ´F sharp` produced both through harmonic and *ordinario* techniques on the harp as well as by bowed crotales, resulting in a set of combinations which most likely creates an altogether imprecise and fluctuating intonation of the ´F sharp`.

An additional element is introduced the second time this gesture (a variation of it) appears in bars 5-7. The multiphonic played by the second flute features an additional pitch (a slightly low ´C sharp`) and by doing so adds further dissonance: the ´F sharp` in this multiphonic sounds slightly lower than the ones performed by the other instruments while the ´C sharp` and the ´D nat. ` are either lower or higher than the ones played by the harp (bars 6-7). These subtle pitch distortions create beatings and thus reduce the impression of purity. In addition, two oboe multiphonics are presented which, at this point, provide further timbral complexity without being directly involved with the relevant pitches of this passage.

The third time this gesture appears in bars 9-11 all previously mentioned methods of sound contamination continue to be employed. Furthermore, the original identity of the ´D nat.` is being questioned as it now becomes juxtaposed with a ´D quarter-sharp` (played by violas and the clarinet in ´E flat`). The level of pitch ambiguity is raised further through procedures of instrument doublings as the glissando connecting the ´D` and the ´F sharp` in bar 9 is now performed by both second violins and cellos which provides an "imperfect unison". A similar effect is achieved by the additional multiphonic (octave ´F sharp`) performed by the piccolo in bar 10.

The gesture is melodically extended for the first time at its fourth entry (bars 12-14) which features an added ´G sharp`. Here, the microtonal element is used not only as a distortion device but also as a means of expression. On the one hand, the ´G three-quarter sharp` in the second violins and E flat clarinet opposes and contaminates the ´G sharp` in the other instruments; on the other hand, it also simultaneously adds an elusive "longing" expression

to the motive, a quality of "unattainability" which is intensified by the fact that the ´G three-quarter sharp` quickly returns to the ´G sharp`. This idea is repeated in bars 16-18 (see fig. 1), however, before this takes place, it is briefly stated *without* the microtonal extension of the G sharp (bars 15-16). This is one example of the aforementioned pitch contextualization which is achieved by the provision of a non-microtonal reference point. It aims at heightening the listener´s awareness to these procedures in order to enable him/her to reflect about the qualitative differences between microtonal and non-microtonal events.

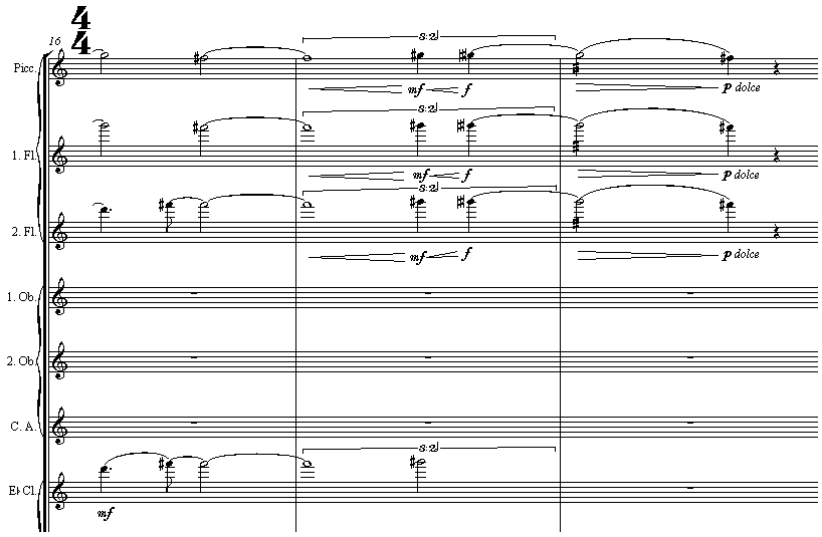

Fig.1: bars 16-18

All these techniques remain in use throughout the rest of the section which features the previously mentioned interplay of construction and deconstruction. Ultimately the pitch material becomes so instable that it virtually collapses in on itself.

The second central motivic element of the first section could be described as a complementary force. It mainly consists of various low chords that eventually drag down the high-pitched melodic fragments and therefore serves as an additional de(con)structive layer. The chords are first introduced in bar 19 and remain harmonically stable until shortly before the "collapse". In those six bars (bars 39-44) the chords eventually lose their pitch stability as well, which is achieved by the following method: the strings apply a quarter-tone vibrato to their pitches while the same pitches are performed more or less unambiguously by wind instruments and the harp. Fig. 2 shows the implications of this procedure:

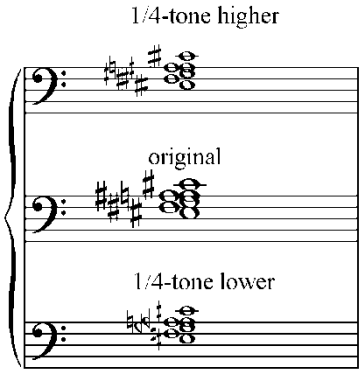

Fig.2: bar 39

❶,Tr. 1

The original chord is rather dissonant in itself (note the agglomeration of semitones); however, the ambiguous thirds ´A natural – C sharp` and ´A sharp – C sharp` respectively, also lend the chord some mellowness of expression. The application of 30 different quarter-tone vibratos (there are 30 instruments involved in this procedure) leads to an irregular fluctuation of additional pitches within and outside the borders of the chord. The original outlines become blurred, and the chord thereby turns into a harmonic field whose constituents could be described as flickering pitch regions. This effect is heightened by the addition of noise elements generated by fast tremolo. Furthermore, as the audio example shows, this procedure causes different degrees of beats which become particularly evident when the three versions of the chord sound simultaneously.

2.1.5 Section II

The second section further explores the harmonic fields that determined the second material. These harmonic fields are presented in two different ways: (a) directional or (b) non-directional. The main focus (with regard to the pitch organization) of this section is to further explore the contextual (structural) use of microtones. Two new variants are introduced:

- Microtonal change *within* a harmonic field whereby pitches of the same field serve as vertical reference points.
- Horizontal reference points but, unlike the previous section, based here on two *different* chords.

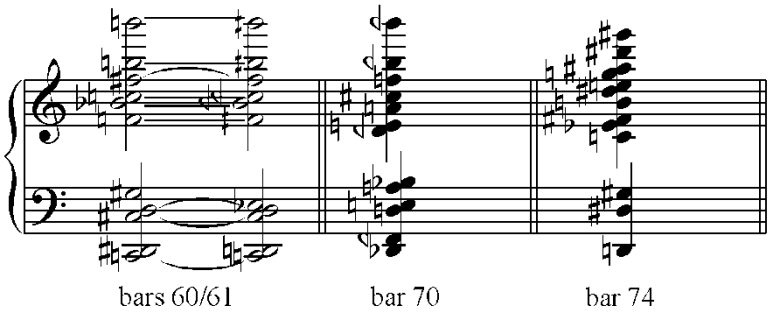

Fig.3: Vertical and horizontal reference points

The first chord pair in fig.3 is used at the beginning of section II (bars 60-62). One can see that four of the altogether eleven pitches remain unchanged while five are lowered or raised by a quarter-tone; another two are altered by a semitone and augmented third respectively. The microtonal changes to the chord are achieved exclusively by glissandi thus providing for fluent transitions. This way, the harmonic field becomes a hybrid structure: on the one hand, its character obviously changes due to the introduction of different pitches while on the other hand, it also appears to have become a contaminated version of its previous self which is due to the fact that several of its original pitches remain indeed unchanged whilst those that change do so in a gradual manner. The properties of the original thus remain a vertical reference point.

The other two chords depicted above serve as an example for creating horizontal reference points through utilizing different chords. Both chords in bars 70 and 74 respectively mark short climactic outbursts played by the full orchestra. Even though they are based on the same material as the adjacent events they are nevertheless clearly set apart from them. This way it was possible to introduce a pair of *discontinuous* horizontal reference points: the first chord is strikingly impure (note in particular the effect that the major thirteenth ´D quarter-flat – B quarter-flat` creates in context with the other pitches) while the second one contains no microtones whatsoever. Due to their elevated position it is nonetheless possible to distinguish between the contaminated and non-contaminated sounds despite their being separated by three bars in which another harmonic field is explored.

A further element of pitch destabilization – a variation of the previously mentioned quarter-tone vibrato – is the fast succession of chromatic quarter-tones which is, however, precisely notated. Fig. 4 shows a destabilized bass note played by the double basses:

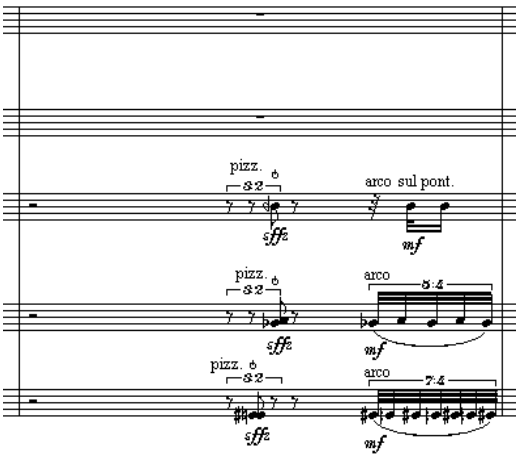

Fig.4: Bar 75

2.1.6 Section III

Section III features, among other things, the build-up to the main climax of the piece. This transitional section presents variations of the two main motivic ideas which dominated the beginning of the work: melodic fragments and low-pitched chords. The material determining the former is derived from several clarinet multiphonics. Starting in bar 92, the pitch progressions become increasingly more microtonal towards the climax of the piece. The woodwinds initially introduce the microtones (at first, only one at a time: for instance, the ´E quarter-flat` in the 2nd oboe or the ´C quarter-sharp` in the bass clarinet, both in bar 92; then followed by two: ´F quarter-sharp` and ´A quarter-flat` in the 2nd flute in bar 95; followed by three: ´D quarter-flat`, ´F quarter-sharp` and ´E quarter-sharp` in the 1st clarinet in bar 97), which are then picked up by the strings (1st violins) in bar 97. The violins perform a rising sequence of melodic fragments whose interval progressions contain many quarter-tones. In order to increase the effect of blurriness and sound contamination the motives in the violins are juxtaposed with further different microtonal motives in the woodwinds. Both layers are performed by several instruments thereby using instrument doublings – the pitches are thus once again turned into pitch regions – while both layers (strings and woodwinds) also operate in a very similar pitch range which creates further harmonic tension. This development peaks at the end of the build-up (bar 100) when the step-wise interval progressions in the violins are abandoned in favour of increasingly rapid glissandi. The musical effect of this overall arrangement is that of a rather "sickly" and distorted force which constantly (and somewhat paradoxically) gains energy and thus leads to the climax.

The hierarchies for the second material (the vertical layer) are once again organized according to the principles of vertical and horizontal reference points. Here several variations of that principle are introduced:

- Two successive microtonal chords that share some of each other´s pitches including their microtonal variants (e.g., string chords in bars 96-97);

- Non-microtonal chords following unrelated microtonal chords (e.g., string chords in bars 97-98);
- Non-microtonal chords followed by microtonal variations (e.g., string chords in bars 99-100).

Virtually all microtonal techniques used in *défraîchir* occur simultaneously in this section which therefore features the highest degree of distorted pitch material in the piece.

The following climax, however, features only very few microtones, as its purpose is to symbolize and express a process of cleansing and liberation from the previous musical existence.

2.1.7 Section IV

Section IV features another type of deconstruction process. Unlike the one in section I, this process relies on a different method, i.e. the loss of orchestral cohesiveness. The orchestra thereby disintegrates into various small chamber groups. Considering the fact that the phenomenon of microtonal sound contamination had been an inherent feature of the original musical state of mind, and that its destruction and subsequent liberation from it had led to the disintegration of the orchestra, I decided that this shattered existence should display a new type of purity which is why I dispensed of most of the microtones. This way the established general meaning and function of the microtones remain unchanged. In bar 119, however, right before the final collapse of the collective entity "orchestra", one more instance of microtonal sound contamination occurs (see fig.5) whose poignancy is mainly due to four factors:

- The horizontal reference point: this is the first clearly microtonal event after twelve bars containing almost exclusively non-microtonal sounds; in this context the microtones feature prominently.
- The vertical reference point: only one pitch changes (the gradual shift from ´D to D quarter-sharp`) while the other pitches of this harmonic field remain unchanged.
- The harmonic context: the initial chord is extremely dissonant (intervals include minor second, augmented octave, major ninth) and the microtonal shift further enhances this.
- The orchestration: the merging of *sul ponticello* strings, harp, muted trumpets, oboes and percussion creates a harsh sound-world. The combination of these four factors provides for a remarkably dissonant moment – a reminder of the state of decomposition the first material has arrived at – which then acts as a final impetus to the disintegration of the orchestra.

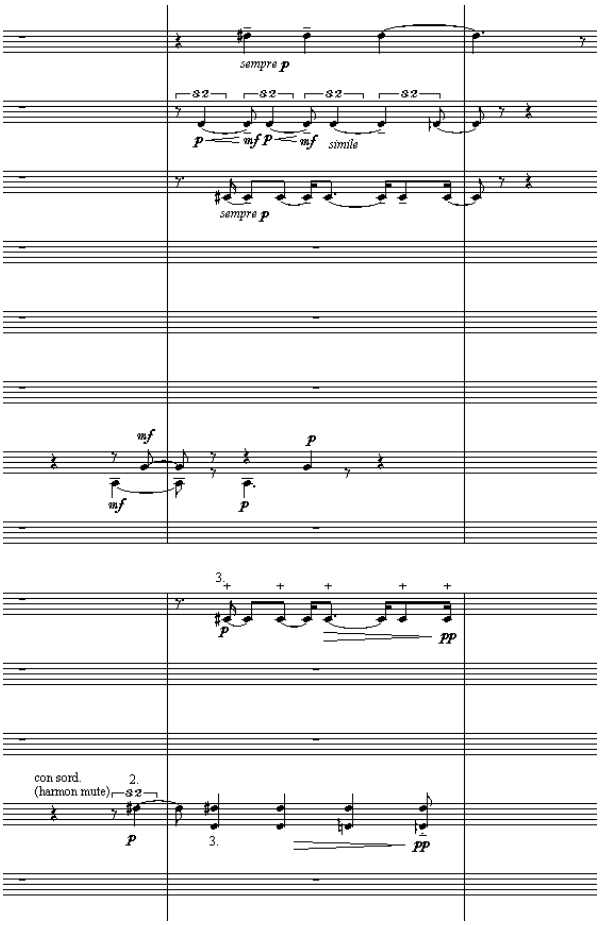

Fig.5: Bar 119

2.1.8 Section V

The final section features only very few precisely notated microtones. They are predominantly used as subtle and fleeting colourations in the string nonet section (bars 123 ff.). My main intention for the ending of the piece was to musically suggest a new constructive state of material which could potentially be established as a result of the disintegration of the orchestra. In other words, the energy behind all these destructive processes has eventually been exhausted with the collapse of the entity "orchestra". As a result of this state of exhaustion the new material had to be of a fragile nature. In addition to the element of fragility I also wanted to establish a double-ground which lies in the inherent difficulty to assign unambiguous meaning to the final section. This ambiguity also manifests itself in the use of multiphonics from bar 136 onwards. These multiphonics resemble (without being identical) those clarinet multiphonics that were re-synthesized by the orchestra in the previous sections while simultaneously displaying their own different identity (not only but also because they are performed mainly by oboes). These very same oboe multiphonics featured earlier on in the piece (bars 6-9), however, serving as a timbral element contributing to the background texture, whereas at the end of the piece the *harmonic qualities* of the multiphonics gradually shift into focus. Furthermore, these multiphonics are

both microtonal within themselves and towards each other, and could thus be interpreted as contaminated sounds. At the same time, however, this particular type of microtonality could also be interpreted as consonant and "pure" since I deliberately removed any clear reference points that could provide a different harmonic context and thus indicate that the multiphonics are in any way "out of tune". In fact, the sound palette of the orchestra is reduced almost exclusively to noises, while the multiphonics remain the only clearly pitched sound source. I believe that it is up to the listener whether or not he or she will "decide" to redefine the meaning of a microtonal chord in this piece; in other words, whether, after all the "negative" usage of microtones he or she will be capable of perceiving them as a pure, uncontaminated and thus "liberated" element, or whether the previously perceived context outweighs this new possibility. It is this *openness* of ending that I had intended to create, an ending that (hopefully) invites listeners to actively engage with the piece.

2.1.9 Quantitative microtones

When microtonal pitch regions are confronted with pitch points from the familiar context of precisely intonated non-microtonal ET, a sensation of "contaminated" out-of-tune-ness can be achieved, which, in the case of *défraîchir*, contributes significantly to processes of deconstruction and destabilization.

Contrary to that, the potential of composing with refined microtonal interval differentiation is not utilized in this work. Due to the inevitable imprecision of microtonal intonation that occurs whenever a multitude of players is involved, this "broad brush" representation transforms pitches into pitch regions which means that a *qualitative* use of microtonal intervals (including precisely intonated quarter-tones) is of virtually no relevance.

Consequentially, the organization of microtones in *défraîchir* is based only to a small degree on *systematic* considerations. Most of the microtones in this work are borrowed from the clarinet multiphonics, which represent the central harmonic framework for the piece. Microtones are, however, deliberately omitted at times in order to allow for moments of confrontation between microtonal and non-microtonal events. The most important factor therefore remains that of *contextualization*.

I believe this approach to be quite effective both in terms of practicality of performance and clarity of communication. In spite of a highly professional preparation on part of the orchestra for the premiere performance, the desired imprecision of intonation of the microtonal sections was achieved (it was not even necessary to communicate my intentions regarding intonation to the orchestra during the rehearsal time), while the intonation of the non-microtonal sections posed very few problems. The listener certainly benefits from the clear "broad brush" distinction between "microtonal – contaminated" and "non-microtonal – pure", which, to a degree, is analogous to a simplified outlook on the principle of

“consonance – dissonance”. I believe this is communicated quite clearly in the piece; the dramaturgical discourse is thus clarified which enables the listener to adopt a holistic listening mode even on a first listen of the work.

On a critical note, this approach inhibits a certain lack of control over the exact degree of microtonal sound contamination – at least theoretically, there could be a performance in which the interpretation of the microtones would be nigh perfect which would clearly interfere with my intentions for the piece. Also, to some performers and conductors the concept of deliberately allowing for “poor” intonation may seem quite unacceptable. Furthermore, the absence of precisely differentiated microtonal intervals prevents the creation of a pitch language capable of multi-faceted expression; this differentiation therefore needs to occur on other levels such as orchestration, rhythm, form and structure instead.