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Tongue Articulation on the Recorder: An Interpretation of Ganassi's 'Lingua laquale nõ proferisse sillaba niuna'

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Abstract: Teaching and learning tongue articulation are usually done through analogy with phonetics. The syllables used become biomechanical metaphors that depend on subjective and often imprecise interpretations both from the expert who is trying to describe his skill and the novice who is trying to acquire it. In Chapter 8 of Silvestro Ganassi's 1535 treatise *Fontegara,* there is an enigmatic description of an articulation where the movement of the tongue goes from one lip to the other. Since this movement is not present in normal speech, no syllable can be used as a biomechanical metaphor. In our opinion, most interpretations of this chapter have not been satisfactory. We have developed a tonguing technique that, although it does not follow precisely Ganassi's description, can be seen as an approximation to his apparent intentions. The tongue movement is similar to the one used in the *zaghareet*, an ululation common in Arabic culture. Two recorded examples of Jacob van Eyck's variations with demisemiquavers are included to illustrate the use of the technique in a musical context.
Keywords: Silvestro Ganassi; musical articulation; tonguing; Jacob van Eyck; Recorder

Introduction

> *The ineffable domain of skilful knowing is continuous in its inarticulateness with the knowledge possessed by animals and infants… We may say in general that by acquiring a skill, whether muscular or intellectual, we achieve an understanding we cannot put into words and which is continuous with the inarticulate faculties of animals. (Polanyi, 1997, p. 90)*

Michael Polanyi argues that all knowledge has a tacit dimension that defies explicit verbalization: 'We know more than we can tell'. (Polanyi, 1966, p. 4)
Teaching and learning a complex motor skill depend more on trial and error, modelling and experimenting than on explicit instruction. Nevertheless, there is a set of rules that can be verbalized, but knowledge of the rules does not guarantee success in acquiring the skill; and being expert on the skill does not imply explicit knowledge of those rules.
Skills held as tacit knowledge are taught through observation, imitation and practice.
Automatization of the subroutines involved in playing the flute, for example, involves building embodied knowledge, even when the knowledge is acquired with recourse to explicit instruction. Learning an instrument at an early age involves a pre-reflective, tacit embodied knowledge of how to act effectively.

Ericsson (2006) questions the extent to which experts are capable of explaining the nature and structure of their exceptional performance, or accurately describe their thoughts, behaviours and strategies in a manner that would allow less-skilled individuals to understand how experts do what they do, and perhaps also understand how they might reach expert level through appropriate training. Inconsistencies between observed behaviour and concurrent descriptions or explanations are frequent. Playing a wind instrument or singing demand control of breathing mechanisms that are mainly commanded by the autonomic nervous system and shaping of internal cavities for resonance, both of which defy direct conscious influence. Gärtner (1981) demonstrated that the vibrato originates in the larynx despite many flautists' conviction that it is done with the diaphragm or the abdominal muscles. The blind pianist Raymond Thiberge unable to observe his teachers' demonstrations, asked for permission to place his hands on

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their backs and arms while they demonstrated. Thiberge concluded that their actions often did not coincide with their verbal explanations (Taylor, 1994). Teachers try to describe their sensations, but as the voice pedagogue Cornelius Reid states:

> Instruction based on subjective experience is worthless…. it implies that an individual other than the one describing these sensations can duplicate such an experience on an imitative basis. Further, it wrongly assumes the description to be accurate and valuable, and in accord with functional logic and nature's laws. In addition, it fails to bring out the fact that the only way another singer could possibly find relationship with a subjective experience of this kind would be for him to possess an identical status of technique (Reid, 1965, p. 189).

In order to help a student, the teacher must be able to hear functionally. In Reid's words (1965, p. 7), 'functional listening is that which recognizes tone qualities for what they are, the aural equivalent of muscular coordinations occurring as a response to mental concepts'.

Throughout the ages, many musicians have struggled to put their practical knowledge into words. In the absence of an oral tradition or modelling, their words have been subsequently subjected to controversial interpretations as musicians, eager to revive music of the past and the techniques of old instruments, read ancient treatises. The French harpsichordist Monsieur de Saint Lambert (1702, p. iii) was overly optimistic when he wrote:

> The aim of a man who writes a book to teach some Science, or some Art, is that one can learn that Science, or that Art in his Book without any help from anyone; assuming that they are of nature that can be learned in this way.[2]

But soon he contradicts himself by writing that matters concerning performance need to be shown orally, or by hand, almost absolutely.

In the following century we find the English flautist Charles Nicholson acknowledging the inadequacy of the written word in teaching instrumental sound production:

> Convinced, however, how very inferior all written precepts are to oral instruction, in so nice a matter, and willing as far as possible to be serviceable to those amateurs who may follow the course of this Perceptive Lessons, he will have much pleasure in giving a Lesson gratis on the formation of the Embouchure &c. to all who may possess this Work. (quoted in Wye, 1988)

Teaching and Learning Articulation

The term 'articulation' refers primarily to the degree to which a performer detaches individual notes from one another in practice (e.g., in staccato and legato). Articulation represents one of the chief ways in which performers, and consequently listeners, may make 'sense' of a flux of otherwise undifferentiated sound, and convert precise time into musical time.

On most wind instruments, articulation is intimately connected with the tongue.[3] Notes are

[2] 'Le but que doit se proposer un homme qui fait un livre pour enseigner quelque Science, ou quelque Art, est que l'on puisse apprendre cette Science, ou cet Art dans son Livre sans secours de personne; supposé qu'ils soient d'une nature à pouvoir s'apprendre ainsi.'

[3] Two notable exceptions are the Japanese bamboo flute shakuhachi, which in its traditional technique uses air

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articulated with tongue strokes allowing for different note durations and different intensities of attack. The tongue can release the air more or less abruptly and, for certain effects, more or less explosively, causing the air flow to move by its own movement. The movement of the tongue cannot be directly observed, so wind players rely mainly on sensations and aural cues.

Since the sixteenth century, wind instrumentalists have resorted to syllables as biomechanical metaphors to describe the movements of the tongue. Those syllables have varied according to the instrument and to the type of the musical effect intended. Teaching or learning the desired movement of the tongue by a set of muscles that we cannot ordinarily observe has been done by analogy.

Analogy learning is designed to minimize the amount of information being consciously processed by reducing a number of task-relevant 'rules' into a simple, all-encompassing biomechanical metaphor. For example, the metaphor of imagining oneself moving the bat up the hypotenuse of a right-angled triangle in hitting a top-spin forehand stroke in table tennis, encapsulates all the biomechanical requirements of executing such a stroke. Liao and Masters found that the performance of learners given an analogy was unaffected by the imposition of a secondary cognitive load, whereas the performance of a group who received copious verbal instruction was impaired by the secondary load (Durso et al, 2007, p. 348), supporting the claim that explicit learners exert conscious control over their movements, whereas analogy learners use a more implicit (unconscious or automatic) mode of movement control.
In the film *The Karate Kid* the master delays teaching the real martial art until the biomechanical metaphors he wants to use are practiced by the student. The student polishes a car and paints a fence until the gestures become second nature. After a week, the student complains that the master has not taught him any karate movements. The master shows him that he has been practising defensive strokes. Pretending to punch the student the master orders him to polish the car! The student quickly, effortlessly and without fear stops the blow of his teacher by performing the movement he had been practising in another context for several days.

The articulatory syllables used by many treatises and teachers over many centuries have been (more or less) effectively used as pedagogical biomechanical metaphors. Taste has evolved, and some syllables were discarded. Devienne dismissed the Baroque bi-syllabic tonguing (*tu-ru*) as defective, sounding like an unpleasant roll (*rouli désagréable*) or stammering (*bredouillage*) (Devienne, 1794, p. 9). The Early Music revival recovered some of the old ones, such as *te-re, de-re, le-re*' and *did'll*.

Castellani and Durante (1987) made a comprehensive study of the tonguing directions in Renaissance and Baroque treatises, together with an introductory description of the phonetics of each consonant. But the pronunciation of each consonant can vary with the mother tongue of the learner, and there are considerable individual differences that can impair the fluency of the tongue's movement. Research on speech production has shown that quite different articulatory configurations can be used to produce sounds with similar acoustic characteristics. Commands for speech are designed to achieve acoustic rather than spatial targets (Abbs, 1986). When we pronounce *too* we move the tongue in a certain way, normally by obstructing the air with the tip of the tongue near the upper teeth. But we can place the tip of the tongue

attacks, starting the notes by simply blowing, and the bagpipes, where the player has no possibility of using tongue articulation because he is actually blowing to fill up the bellows and has to resort to finger articulation, using a rich repertoire of grace notes in order to articulate the melody.

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on the lower lip or even move the tongue laterally and produce a very similar consonant sound. In Portuguese the sound *rr* is pronounced with the back of the tongue, but some native speakers pronounce the same sound with the tip of the tongue producing the same sound with negligible differences.

My experience and that of most teachers shows that the same consonant can produce very different articulatory results. Asked to articulate *ti*, beginners sometimes produce sounds that are too harsh. They are often advised to think *di* instead. When attempting to pronounce *te-re* their second syllable is so soft that they may need to think *te-de* in order to produce the desired effect. Between *te, de*, and *re* there is a continuum of gradations that different players, acting on their subjective perception, describe in differing and even contradictory ways. There are also consonants that are seldom mentioned but can be useful. For instance, *ne* may help to find an intermediate intensity between *re* and *de*. Thinking different syllables can help the fluency or the speed of the gesture; despite the difference in syllables, the movement and acoustic results are the same.

Personal Experiences

I would now like to share some personal experiences that illustrate the problems that thinking in terms of articulatory syllables may cause. My first recorder teacher, back in 1973, was an amateur recorder player who had given up his prospective career as an oboist when he realized that he was spending more time making reeds than playing his instrument. Of course, I was taught to start every note with my tongue. But as I played my first duet with another student who refused to use her tongue and was an expert in throat articulation, I remember doubting the usefulness of my awkward tonguing. My teacher never told me anything about the syllables mentioned in the historical treatises. I was taught to use only simple and double tonguing and to listen to the softness or harshness of the attacks.

In 1976 I went to the Summer School of the British Recorder Society where in a masterclass I heard for the first time the teacher mention the articulation syllables *tu-ru-tu-ru*. As soon as I found a free room, I picked my recorder and tried to utter those syllables into my recorder. To my surprise I realized that I had been using them in every semiquaver of my Telemann sonata. **I knew more than I could tell!** I had been unknowingly (tacitly) using an historical articulation all along. I was happy.

But soon problems arose. I began checking regularly the 'feeling' of my tonguing. Did I always tongue like that? I realized that I could consciously distinguish both syllables while playing in moderate tempos, but when I tried to play faster movements my tongue slowed down. There was a disruption because I could not distinguish the two syllables, or because I was not sure I was using them. I was a victim of paralysis by analysis! Also, I had become more alert to the sensations of the movement of the tongue rather than the sound result of the articulation. I was also a victim of the 'constrained action hypothesis' (Wulf, 2007), which proposes that when performers focus attention on their movements they may constrain or interfere with automatic control processes that would normally control the movement. Adopting an external focus on the effect of the movement, in this case the sound, promotes a more automatic type of control, taking advantage of unconscious and reflexive processes allowing them to control the movements to a greater extent (Wulf, 2007, p. 114). My new explicit knowledge of the syllables I had always used to articulate became a hindrance. Reinvestment of attention on the movement of the tongue disrupted the movement and caused a regression in my learning. The title of an article by Masters and Maxwell about this kind of problem clearly expresses my

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feelings: 'Implicit motor learning, reinvestment and movement disruption: What you don't know won't hurt you.' It took me a while to overcome the obstacle created by my novel explicit knowledge. In fact, my articulation had been more fluent when I did not know what I was doing.

The second experience happened many years later, when I was helping one of my students with her double tonguing. At my request, she was able to pronounce *di-gi-di-gi* quite fast, clearly and with rhythmic regularity. But as soon as she tried the same thing with the recorder it became slow, irregular and unclear. Based on my experience I thought the problem was that something changed when she stopped vocalizing and started blowing. I asked her to blow against her hand and pronounce the same syllables first vocalizing and then blowing without sound. She seemed to understand the point, but as soon she tried to blow into the recorder the result was the same as before. If something changed in the movement of the tongue when she was blowing into the recorder it was because she was causing it inadvertently. I decided to repeat the experiment of articulating against her hand, but asked her to let me hold the instrument. While she was concentrated in the exercise, I suddenly placed the instrument between her lips before she could realize it. To her surprise the recorder spoke fluently and with precision. After a few more tries she began articulating into the instrument with the same speed and regularity that she had been pronouncing the syllables. From that moment on her double tonguing improved dramatically, but she could not explain what changed or what she was doing differently. Neither could I! This is an example of what can be called *one-trial learning*: instead of a load of explicit instructions, an unusual experience can elicit a sudden discovery that produces an immediate improvement.

This and other teaching experiences led me to question the accuracy of my description, or the way I was translating my articulation into syllables. I decided to invert the former experiment. I performed what I would describe as a fast *de-ge-de-ge* on a single note, without stopping the movement of my tongue. To be sure of what my tongue was really pronouncing, I laid down the recorder and started vocalizing. The result was unexpected. I thought I was articulating *de-ge-de-ge* but the sound that came out of my mouth was *de-ge-re-ge-re*. At very fast tempos it became *de-g'll-g'll*, something which resembled the elusive 'di-d'll' articulation described by Quantz. I realized that I could not always trust my perception to guide my teaching.
These experiences, together with my usual difficulty in expressing phonetically the articulation effects that I managed to perform, led me to explore all sorts of tongue movements that transcended the boundaries of ordinary speech.

Silvestro Ganassi's La Fontegara, Chapter 8
The first recorder method ever published, Ganassi's *Opera intitulata Fontegara* (1535) sets out from the totality of a technique which had never been described before, breaking it down to its basic components: blowing, fingers and tongue. It discusses the most minute and extreme variations of sound and their different shades, including intervals smaller than a semitone and the dynamic extremes and shades which can be achieved by breath and fingerings.

Ganassi proposes a wide range of articulation syllables combining consonants with all the vowels. With a sound pedagogical sense, Ganassi gives all the syllable combinations and advises the student to try them all and decide which work best. In chapter 8 Ganassi mentions another articulation that has been the subject of speculation and, in my opinion, misinterpretation. Two translations more than 40 years apart are very different. The first is, not surprisingly, very inaccurate since Ganassi's Venetian dialect was translated into German and

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then the German text was translated into English. The 2002 French translation is, in my opinion, more reliable.

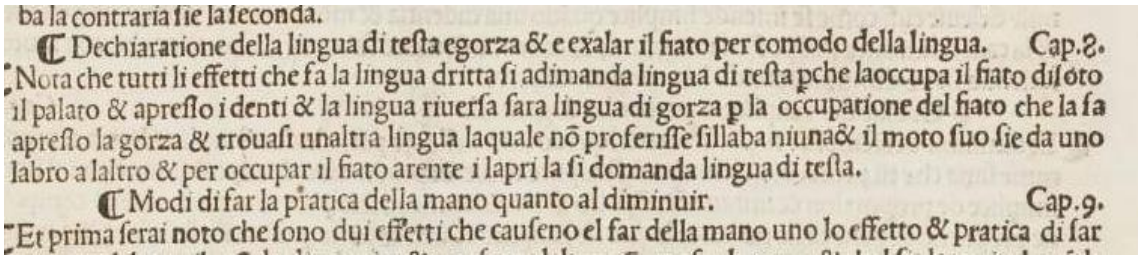
ba la contraria ſie la ſeconda.
℄ Dechiaratione della lingua di teſta egorza & e exalar il fiato per comodo della lingua. Cap.8.
Nota che tutti li effetti che fa la lingua dritta ſi adimanda lingua di teſta pche laoccupa il fiato diſoto il palato & apreſſo i denti & la lingua riuerſa fara lingua di gorza p la occupatione del fiato che la fa apreſſo la gorza & trouaſi unaltra lingua laquale nõ proferiſſe ſillaba niuna& il moto ſuo ſie da uno labro a laltro & per occupar il fiato arente i lapri la ſi domanda lingua di teſta.
℄ Modi di far la pratica della mano quanto al diminuir. Cap.9.
Et prima ſerai noto che ſono dui effetti che cauſeno el far della mano uno lo effetto & pratica di ſar

Figure 1. Silvestro Ganassi's *Fontegara*, chapter 8.

The sentence that concerns us here is in the two last lines: '…& trovasi unaltra lingua laquale nõ proferisse sillaba niuna & il moto suo sie da uno labro a laltro & per occupar il fiato arente I lapri la si domanda lingua di testa'. Dorothy Swainson's English translation (1956) is based on Hildemarie Peter's German edition. This is her version of the above sentence: 'There is yet a third method wherein no syllables are pronounced and is called head-breath. In this, the lips control the breath which flows out between them.' The French translation by Jean Philippe Navarre in Ganassi's *Opera omnia* is more faithful to the original: 'Il existe un autre coup de langue qui ne produit aucune syllabe, et son mouvement se fait d'une lèvre à l'autre; il réclame la langue de tête afin que l'air se place près des lèvres'.

Now my own English translation: 'There is yet another tonguing which does not utter any syllable and its movement is from one lip to the other; and because the breath occupies the area close to the lips it requires head tongue'.

Castellani and Durante (1987), who obviously did not follow the English translation, first mention the hypothesis that Ganassi is talking about some kind of bi-labial articulation that is sometimes used in the flute, something like the 'pi' of Moldenit.[4] It makes sense on the flute but not on the recorder, because the lips are embrace the recorder embouchure. But the authors immediately conclude that it would be too artificial. So they say that Ganassi might be talking about some form of legato playing since *proferisse* implies pronouncing a consonant, then dismiss the problem by stating only that it seems inadequate to use the word *lingua* since the tongue is not operating. They prefer to ignore the second part of the sentence, which clearly mentions some sort of movement of the tongue. They seem to imply that if the tongue does not pronounce a syllable it must not move, but Ganassi was facing the problem of describing a tongue movement that is not present in normal speech. The idea that Ganassi meant some sort of legato became prevalent (Aguilar, 2008; Tettamanti, 2007).

More than 250 years later, another author was faced with the same problem. In John Gunn's *The Art of Playing the Flute on New Principles* published in London in 1793 a sentence shows how he tries to explain a tongue movement that is not present in speech:

> As we have hitherto begun by noticing the bad habits which have been mistakenly or unthinkingly contracted, we shall on this subject also remark one, that is by all means to be avoided; namely **a manner of tonguing, the articulation, or rather action, of which cannot, like the others be expressed by a syllable, but may be described to be similar**

[4] The amateur Danish flautist Joachim von Moldenit (1708?-1773?) criticized and quarreled with Quantz about tongue articulation stating that he used the lips as in pronouncing the consonant *p*. (Theodorson, 2005).

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> **to the action of the tongue in spitting saliva**, or any other thing out of the mouth, whereby the tongue is made to pass between the lips which greatly impedes the sound in passing through that aperture.

Although in a different context and to illustrate something that in his opinion should not be done, Gunn is talking about a movement of the tongue that cannot be described by a consonant or a syllable. In fact we can move our tongue in many other ways than the ones used in speech. In my interpretation, when Ganassi was faced with this problem he says that the tongue moves but in a way that is not used in speech and therefore does not pronounce a syllable. He tries to describe the movement as best he can, saying that the tongue goes from one lip to another, whatever that may mean! Unfortunately we cannot have a lesson with Ganassi, so we are left guessing. And my guess is that he meant exactly what his words say.

My Own Experimental Fast and Soft Articulation

As a child I used to tease my friends with a fast lateral movement of the tongue, accompanied by grimaces. Now if I vocalize while making this movement we will hear something like *lolol* or *lerelere*.

Sometimes I did this movement into the recorder as a joke, but for a long time did not consider it useful, because the tongue was too far forward, touching the mouthpiece of the recorder, and it produced a lot of salivation. I thought it would be too difficult to coordinate it with the fingers.

This movement can be very fast and not tiring at all. When hitting the sides of the lips the tongue bounces back. The more relaxed the tongue, the faster it can go.
More recently I tried to retreat the tongue a little into the mouth so I could hold the recorder with my lips. But then two problems arose. First, the movement did not interrupt the flow of the air, resulting more in a kind of tongue vibrato than a clear articulation. Second, the tongue missed the impact on the sides of the lips that helped accelerate its movement. I solved these problems by positioning the tongue more forward and by pouting the lips more. This created a channel that could easily be closed by the tongue in its movement.

The coordination turned out not to be a real problem. Since the articulation was very fast and soft, imperfections in the coordination of fingers and tongue were not too disturbing. Passages that I played sounded approximately like a very clear legato. Recently, however, I managed to make the articulation a little more distinct. Interestingly enough, with my new approach the articulation becomes more defined the faster it goes. This means that the coordination between tongue and fingers has become an important factor again. The fingers sometimes cannot follow the tongue, which is, at least for me, an unusual experience. In the video example (1) I illustrate the use of this articulation technique on a single note and on a scale.

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Video Example 1. https://youtu.be/oZos3KFs06M

The only reference that I found in the literature of a lateral movement of the tongue in recorder articulation was in Rowland-Jones (1992, p. 79). When discussing the *di-dll* articulation he writes that 'a lateral tongue oscillation may help to control fast passages'. In an exchange of e-mails I had with the French cornettist William Dongois he mentioned that in very fast diminutions he makes a sort of lateral sweep with the tongue. It seems that, among wind instrumentalists, we can discover tricks of the trade involving unusual tongue movements that have not found their way into the literature.
Nevertheless, my lateral articulation does not follow with precision the description of Ganassi. The tongue does indeed touch both lips but goes from side to side.

The *Zaghareet*
In Arab culture a *zaghareet* or *zaghrouta* (in Iran it is called *salguta*) is a loud trilling of the tongue that sounds something like *loo loo loo loo loo*…. and often ends with an *eee* sound. It combines a high-pitched, loud 'shriek' with the *loo loo loo loo* trilling of the tongue.

The sound is made in celebration at weddings, births and other auspicious events. Women usually cover their mouths while *zaghareeting*. Some say this prevents evil spirits from entering their mouths, others say that it's motivated by politeness and the impulse to hide one's open mouth.

It is an expression of joy, excitement, and encouragement. It is totally acceptable to do when a dancer is on stage or in a *zaffa* (wedding parade in front of the bride and groom). It lends an air of excitement and charges the environment with a lively electric current.

The following video explains two different techniques.

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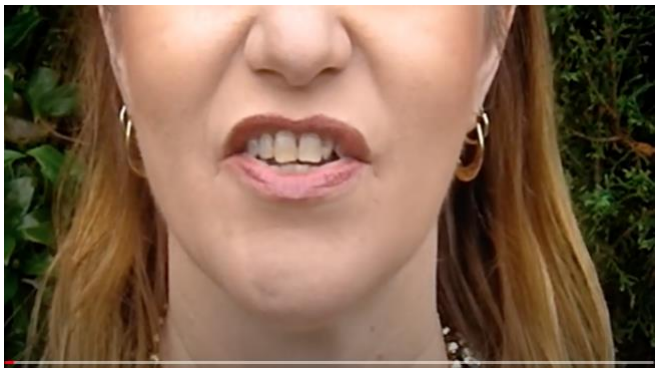
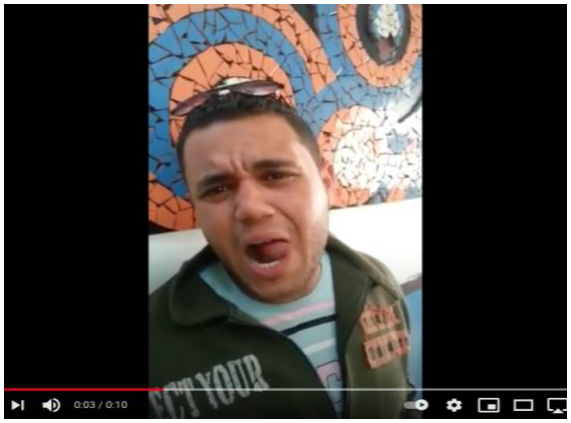


Video Example 2. Zaghareet demonstration
https://www.youtube.com/watch?v=tbcFbbsGVjk

Of the two techniques described in this short video, the lateral movement seems easier, at least in my experience. It is more effective in interrupting the air stream and benefits from the rebound of the tongue on the cheeks, making it easier to maintain the speed without fatigue. There are many videos on YouTube of women and men using both techniques in *zaghareeting*, although in many videos they hide their mouths with their hand. In the following examples the woman and the man display a high level of virtuosity using both techniques.

Video example 3. Woman *zaghareeting* with vertical tongue movement
https://www.youtube.com/watch?v=Md7OvU5JIcI



Video Example 4. Moroccan *zaghrouta* with lateral tongue movement
https://www.youtube.com/watch?v=IckH6GkI3jg

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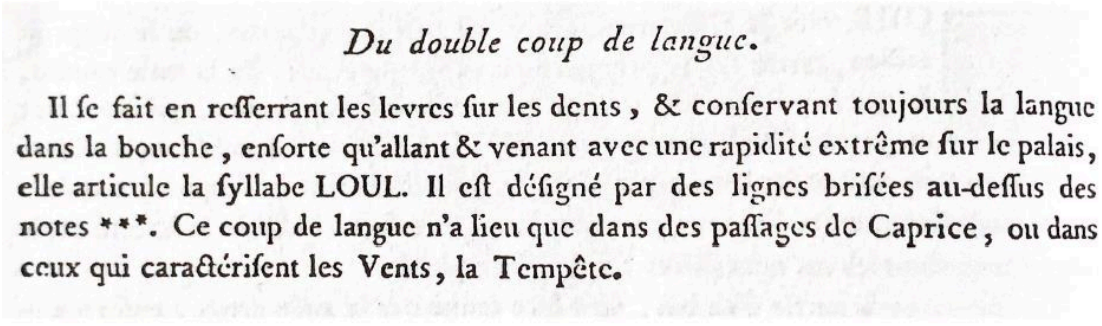
It is tempting to compare this tongue trill with the also elusive description of a double-tonguing technique in the 18th century French flute method by Charles De Lusse, a flautist, composer, editor and flute maker. According to De Lusse his technique is done by tightening the lips on the teeth and always keeping the tongue in the mouth, so that coming and going with extreme rapidity on the palate pronounces the syllable *loul*. It is not clear if the movement is sideways or up and down but based on the Arabic techniques it seems that both alternatives would be possible.



Du double coup de langue.

Il ſe fait en reſſerrant les levres ſur les dents, & conſervant toujours la langue dans la bouche, enſorte qu'allant & venant avec une rapidité extrême ſur le palais, elle articule la ſyllabe LOUL. Il eſt déſigné par des lignes briſées au-deſſus des notes ***. Ce coup de langue n'a lieu que dans des paſſages de Caprice, ou dans ceux qui caractériſent les Vents, la Tempête.

Figure 2. Charles De Lusse, L'Art de la flûte traversière (Paris, c. 1761) p. 4.

Venetian businessmen with ties with the Arab world must have heard women *zaghareeting*, but I have no evidence to support the idea that Ganassi was inspired by them when applying the technique to recorder playing. Probably it just happened by chance. With me it started by 'playing *with* the recorder' and then became 'playing the recorder'

Van Eyck's Demisemiquaver variations

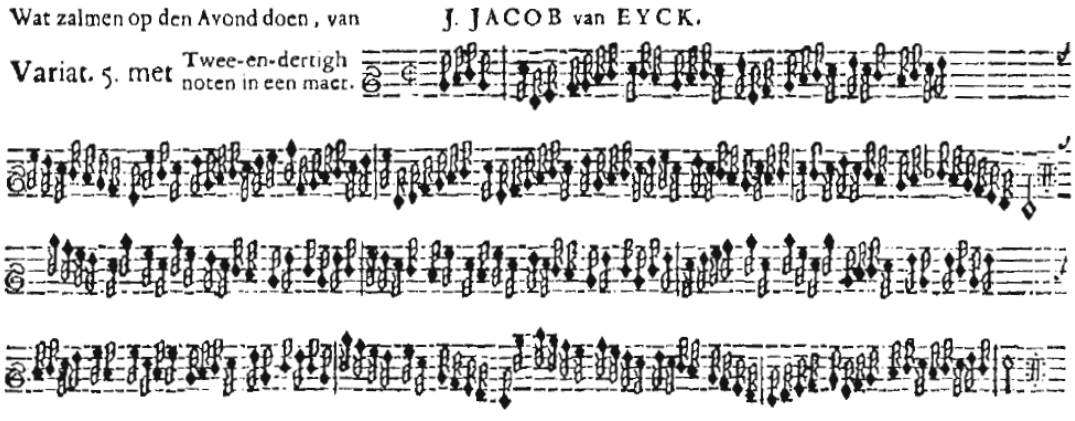


Figure 3. Jacob Van Eyck *Der Fuyten Lust-hof* Variation with 32 notes per measure.

I used this articulation technique in Dalla Casa diminutions on the madrigal *La Rose* and in some of the variations by Jan Jacob van Eyck (c.1590-1657). Van Eyck's *Der Fluyten Lust-hof* (1644-46) is the biggest book of solo pieces for recorder, or any wind instrument. Three pieces have variations with demisemiquavers where this articulation technique is suitable: *Amarilli mia bella, Wat zal man op den Avond doen* and *Doen Daphne d'over Schone maeght.*

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For me, playing the demisemiquavers in these variations with double tonguing never produced satisfactory results. Either the notes were not fast enough or the attacks were too strong. Legato playing lacked the clarity and crispness I was striving for. As a rule, according to most treatises, legato playing in wind instruments was scarcely used before the mid-17th century. Double tonguing sounded too mechanical and bi-syllabic articulation lacked the necessary speed. In order to play the melody in a tempo that suits its character and play the variations in the same tempo the *zaghareeting* technique seemed more suitable than conventional tonguing.

Chronologically the diminutions became increasingly elaborate, implying a slower tempo. Most madrigals and chansons that were ornamented in treatises from the 16th and 17th centuries were by composers from previous generations. Playing them at a tempo suited for vocal execution is almost impossible and artistically undesirable. One example is the motet *Pulchra es amica mea* by Palestrina (1525-1594). In a version by the ensemble *La Fenice*[5] the motet is sung at double the tempo of the version with diminutions by Francesco Rognioni (1570-1626). The same happens in ornamented versions of movement sonatas by Arcangelo Corelli (1653-1713) and in variations composed by the following generation of violinists, where the musical material seems to imply that tempos had to be relatively moderate. As the 18th century progressed, the notated ornaments for the sonatas from Corelli's Op. 5 grew denser. This prompted Zaslaw (1996) to conclude that the sonatas were being played ever more slowly.

Nevertheless, I decided that in order to keep the melodic theme perceptible in the Van Eyck's variations, the tempo should be maintained throughout the set. The text and tune of *Daphne* are found in early seventeenth-century England and *Wat zal man op den avond doen* a German secular import in *Der Fluyten Lust-hof* (Griffioen, 1991). The melodies were popular and easily recognized by those inhabitants of Utrecht who, on Sundays, strolled in the churchyard and listened to van Eyck's virtuosic recorder playing.

The recorded examples in this article are from the third variation of *Wat zal man op den avond doen* and the fifth variation of *Daphne's* third set.

Video Example 5. Wat zal man op den Avond doen
https://youtu.be/H8vG3-INFk4

[5] https://www.youtube.com/watch?v=VJayod12iCc

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Video Example 6. Doen Daphne, Variation 5
https://youtu.be/Xr0RHJsVNFg

Conclusion

It seems clear now that conceptual limitations were preventing a proper interpretation of Ganassi's explanation. Wind instrumentalists try to move their tongue according to the biomechanical metaphors that phonetics provide. Since in most languages the movements of the tongue are a combination of up-down and back-and-forth movements, lateral movements are usually excluded from the experiments.

I think the lateral technique I propose can also be used on the flute although I have yet to master it. The main problems are keeping the embouchure tension while moving the tongue in such an unusual way and the saliva that tends to accumulate between the lips. Most probably some flautists use it conscious or unconsciously.

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