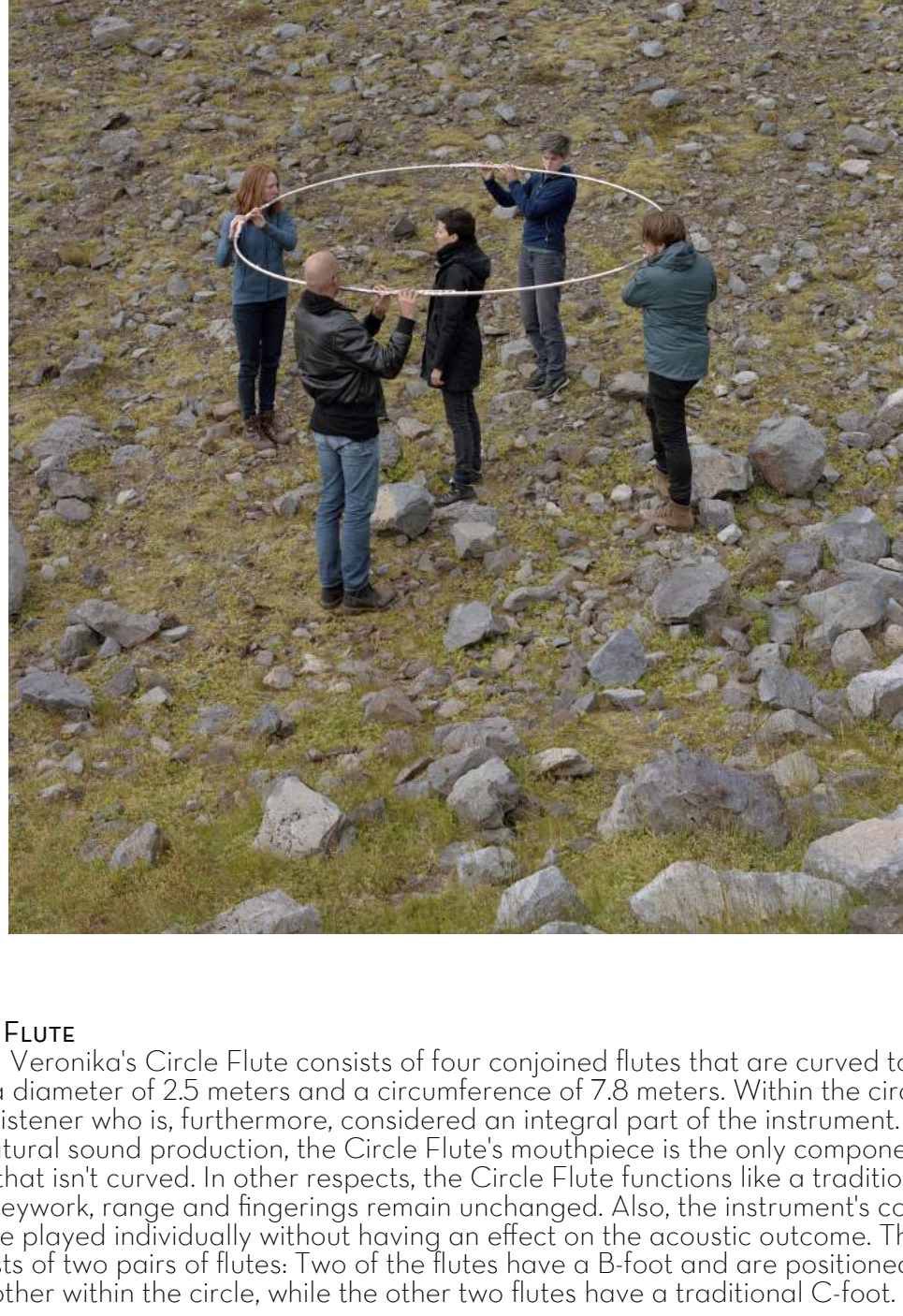


OBJECT'S MUSIC: ON STUDIO BRYNJAR & VERONIKA'S CIRCLE FLUTE

Dráinn Hjálmarsson

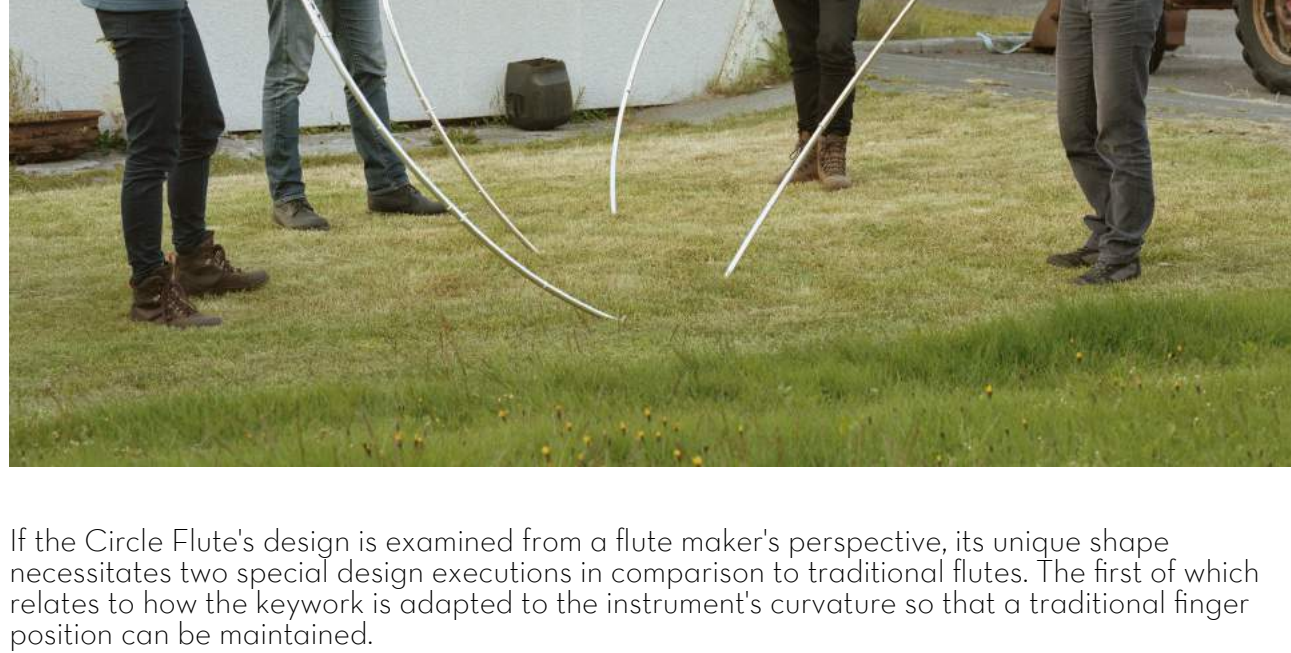
The "Circle Flute" is an instrument created by the design duo Brynjar Sigurdarson and Veronika Sedlmair (Studio Brynjar & Veronika (<http://bino.is/>)) as commissioned by the Fondation Galeries Lafayette in 2016 and premiered at the collaborative exhibition "Joining Forces with the Unknown" (Faisons de l'inconnu un allié) in Paris in October, 2016. The only extant Circle Flute was built by the French flute maker Jean-Yves Roosen² and is owned by the Fondation Galeries Lafayette.

This article will discuss the instrument, special executions in its design, the ideas that the instrument evokes with regard to musical thought and it will also give an account of unique instrument techniques which trace their origins to the instrument's design, and were discovered during a workshop held by the flutists Bettina Danielle Berger, Bjørnar Habbestad, Marieke Franssen and Michael Schmid in Flateyri during the summer of 2016.



THE CIRCLE FLUTE

Brynjar and Veronika's Circle Flute consists of four conjoined flutes that are curved to form a circle with a diameter of 2.5 meters and a circumference of 7.8 meters. Within the circle, there is room for a listener who is, furthermore, considered an integral part of the instrument. In order to ensure a natural sound production, the Circle Flute's mouthpiece is the only component of the instrument that isn't curved. In other respects, the Circle Flute functions like a traditional flute, where the keywork, range and fingerings remain unchanged. Also, the instrument's component flutes can be played individually without having an effect on the acoustic outcome. The Circle Flute consists of two pairs of flutes: Two of the flutes have a B-foot and are positioned across from each other within the circle, while the other two flutes have a traditional C-foot.



If the Circle Flute's design is examined from a flute maker's perspective, its unique shape necessitates two special design executions in comparison to traditional flutes. The first of which relates to how the keywork is adapted to the instrument's curvature so that a traditional finger position can be maintained.

The second design execution relates to a hole that is traditionally located at the flute's foot end, and which affects the instrument's intonation. The Acoustic behavior of the flute are predicated on the same premises as open tubes³. If the foot end of the tube is closed, its fundamental frequency is halved (is lowered by an octave).⁴ In order to imitate this hole, additional holes have been added as a continuation of each individual flute unit. The placement of these aforementioned holes is located where each flute's foot end is traditionally located, approximately 66 centimeters⁵ beyond the top of the mouthpiece. These air holes are open by default but they can be closed with a special key that is located next to the G[#] key and is within reach of the fifth finger (pinky finger) on the flute's left hand (Photograph 3).

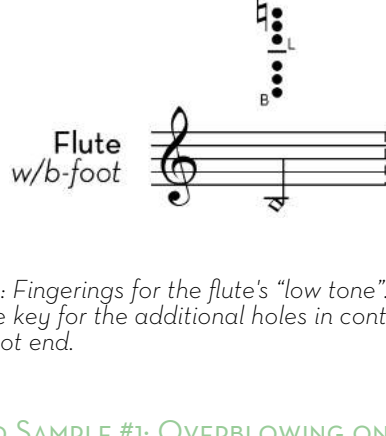


Photograph 3: Close-up of one of the four flutes, with a B-foot, where the added key that controls the air holes, which comes as a continuation of the flute's foot end, can be seen.

THE LOW TONE

As a continuation of each flute's foot end, an "extension" connects one flute within the circle to the next and is attached to the adjacent flute's mouthpiece. These extensions are approximately 125 centimeters long and hollow, possessing the same curvature as the flute itself. Thus, the entirety of this tube length, about 195 centimeters, can be played by closing all of the keys. The fundamental frequency of a tube of that length is approximately 44 Hz⁶. This length can, however, be adjusted, with the Circle Flute coming with four additional "stoppers" that can be moved within this intermediary space. These stoppers allow the flutist to moderate the length of this tube within each individual flute.

As previously noted, if the foot end of the flute is closed, its fundamental frequency is halved (is lowered by an octave). However, in such cases, the flute's mouthpiece has some difficulty in producing such a low tone⁷, making it easier for the player to overblow to produce harmonics of the fundamental. Owing to the low frequency of the fundamental, the mouthpiece is capable of producing harmonics significantly higher in the harmonic series in comparison to traditional flutes. At best, this would be around 7th or 8th Harmonic played on the lowest tone on the traditional c-flute.

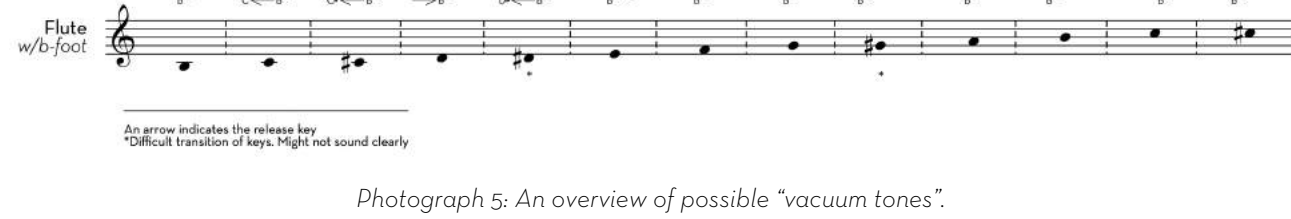


Photograph 4: Fingerings for the flute's "low tone". The "L" represents the key for the additional holes in continuation of each flute's foot end.

LINK: [SOUND SAMPLE #1: OVERBLOWING ON A LOW TONE](#)

VACUUM TONES

As this is a closed tube instrument, players can create a vacuum within the flute by covering the hole of the mouthpiece with their mouth and by closing all keys. So-called "vacuum tones" can be produced by opening the keys and by leveling the vacuum inside the flute. This produces a brief sound caused by decompression (a breaching of the pressure between the inside of the flute and outside) when the air is sucked into the flute with a cork popping. This results in brief white noise, with a certain pitch, similar to the sound of a gas popping from a bottle of champagne. The pitch of these tones can be manipulated, with each key possessing a unique tone.



An arrow indicates the release key "D" (cut transition of keys might not sound clearly)

Photograph 5: An overview of keys possible "vacuum tones".

VENTILATION TONES

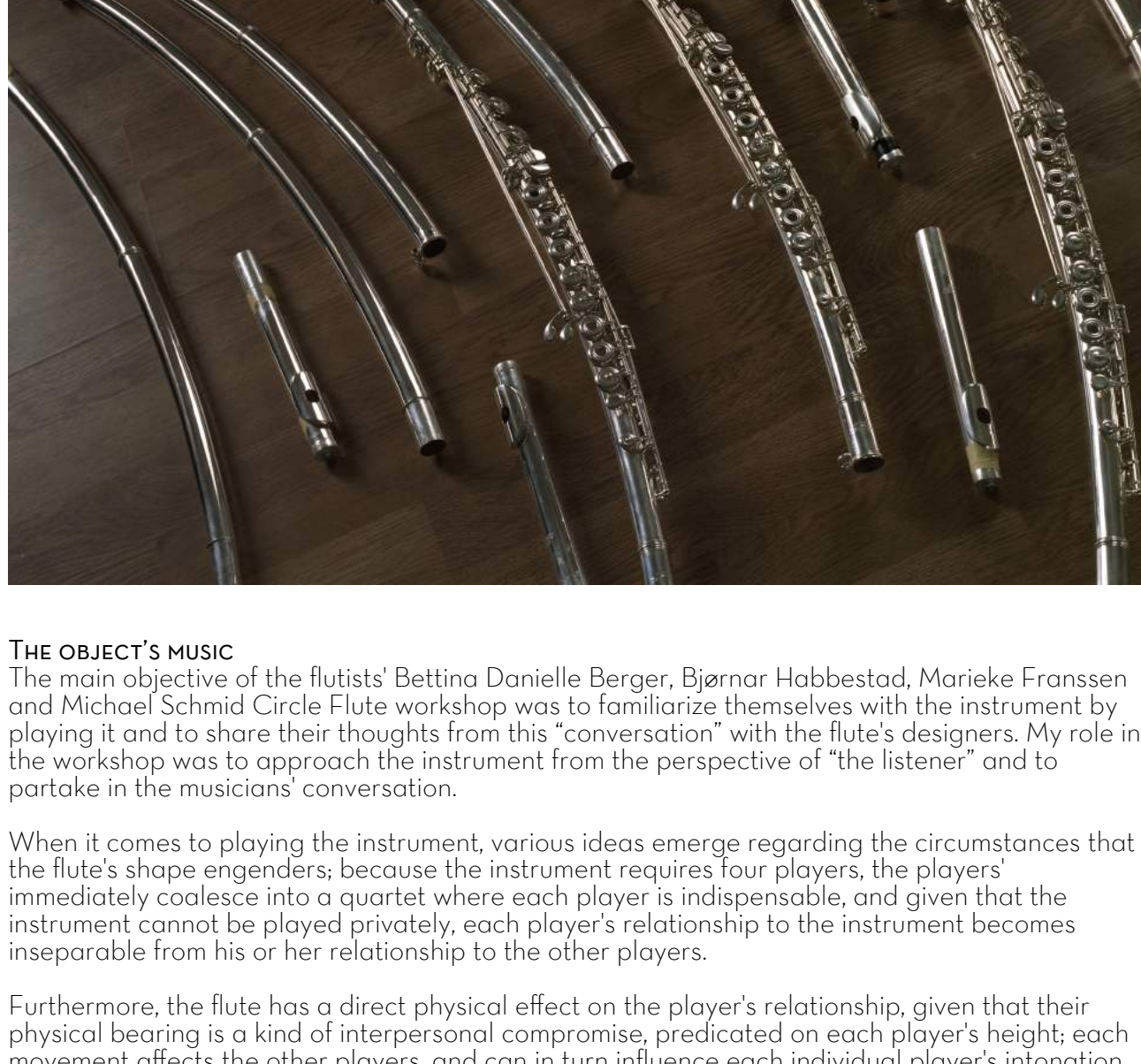
By closing all of the flute's keys and covering the hole of the mouthpiece with their mouth, players can also over pressurize the tube, by blowing air into the tube and controlling when the air is released from the instrument's keys. The result is a white noise comparable to the voiceless labiodental fricative, F, in the English language. There is a subtle difference between the sounds of different keys.

LINK: [SOUND SAMPLE #3: VENTILATION TONES](#)

"THE BIRD"

Closely related to the "valve tones" is "the bird," which is produced by over pressurizing the tube and by letting out a small amount of air through the index finger on the left hand. Moisture on the key's padding causes a delicate sound with a high pitch, like a bird call in the distance.

LINK: [SOUND SAMPLE #4: "THE BIRD"](#)

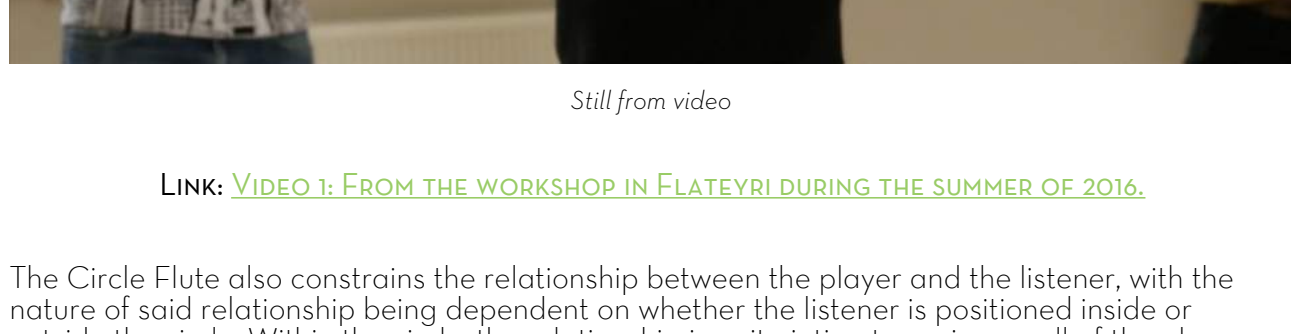


THE OBJECT'S MUSIC

The main objective of the flutists' Bettina Danielle Berger, Bjørnar Habbestad, Marieke Franssen and Dráinn Hjálmarsson on the French radio program "DUUUU - Unités Radiophoniques Mobiles where the flute's design process and the musicians' first impressions of the instrument are discussed: <http://www.duuuudio.fr/episode/season-1-0>

When it comes to playing the instrument, various ideas emerge regarding the circumstances that the flute's shape engenders; because the instrument requires four players, the players' immediately coalesce into a quartet where each player is indispensable, and given that the instrument could be played privately, each player's relationship to the instrument becomes inseparable from his or her relationship to the other players.

Furthermore, the flute has a direct physical effect on the player's relationship, given that their physical bearing is a kind of interpersonal compromise, predicated on each player's height; each movement affects the other players, and can in turn influence each individual player's intonation, if the flute isn't positioned at the requisite height. And so a continuous physical conversation takes place between the players while they play – a conversation that remains hidden from the listener, but manifests itself in a subtle dance between the players, and in the movement of the instrument itself.



Still from video

LINK: [VIDEO 1: FROM THE WORKSHOP IN FLATEYRI DURING THE SUMMER OF 2016.](#)

The Circle Flute also constrains the relationship between the player and the listener, with the nature of said relationship being dependent on whether the listener is positioned inside or outside the circle. Within the circle, the relationship is quite intimate seeing as all of the players face inward. Outside the circle, the relationship is less intimate given that the players turn their backs on their environment, and cannot see the listener except outside the circle and at a substantial distance. Similar to conversations that take place at these different distances, these conversations are affected by the distance, calling for different methods of communication and impacting the nature of the conversation.

This relationship between the flute's inner and outer environment creates an awareness to musical moments that either welcome the listener to step inside or step outside the circle or can possibly hinder the listener from stepping inside. Of course, factors such as the nature of the environment, the occasion and the attitude of the performance all play a role in this regard.

Likewise, these considerations about space afford one the opportunity of examining the more instrumentally subjective aspects of the instrument, such as the endeavor to transform the instrument through the listener's senses, i.e. in the listener's eyes or mind. For example, one can endeavor to make the instrument's inner layer an "all-encompassing environment" for the listener that stands within the circle or evens to make the instrument into a kind of formal and "physical sculpture" in the eyes and mind of the listener that stands without. When are these four conjoined flutes a perceptible whole and when are they not? When does the instrument's visual quality become more significant than the quality of its sound?

From the composer's perspective, the instrument requires a certain stance on notation and presentation. The mere fact of having four music stands within the circle immediately transforms the relationship between the players, but also that of the listener who stands within the circle. In some ways, the flute's role and character pale in such instances. Here, composers must ask themselves: Why not four traditional flutes?⁸ What is it that the Circle Flute adds? Likewise, if the audience cannot experience the instrument as a kind of space, but have a rather limited perspective upon the instrument, why not four traditional flutes? The instrument thus inquires of our relationship to our environment, our history and our "non-musical" ideas, which, despite everything, are an inseparable aspect of music.⁹

The Circle Flute and how a given piece of localized knowledge can be objectified and rechanneled. The Circle Flute reveals that all objects contain hidden narratives that are specific to certain worldviews. All objects possess secret voices that we converse with, consciously and unconsciously. It is from this conversation – with our environment, our spaces, our instruments, our attitude towards the audience and from our analysis of the music of others – that music emerges. The music is hidden in our perception of the world.

SOURCES

Carl R. (Rod) Nave. „Flute.“ Hyperphysics, 3rd of March 2017. <http://hyperphysics.phy-astr.gsu.edu/hbase/Music/flute.html>

Carl R. (Rod) Nave. „Resonances of open air columns“ Hyperphysics, 3rd of March 2017. <http://hyperphysics.phy-astr.gsu.edu/hbase/Waves/opecol.html>

PHOTOGRAPHS

Photographs by Emile Barret. Circle Flute/Hringflauta by Brynjar & Veronika, Lafayette Anticipations – Fonds de dotation Famille Moulin, Paris.

¹ Readers can listen to Maxime Guitton's interview (in English) with Brynjar Sigurdarson, Veronika Sedlmair and Dráinn Hjálmarsson on the French radio program "DUUUU - Unités Radiophoniques Mobiles where the flute's design process and the musicians' first impressions of the instrument are discussed: <http://www.duuuudio.fr/episode/season-1-0>

² Readers can listen to an interview with Jean-Yves Roosen about the project (in French) on Radio "DUUUU - Unités Radiophoniques Mobiles website. Hosts: Loraine Baud, Simon Nicaise & Simon Ripoll-Hurier <http://www.duuuudio.fr/episode/flutes-roosen>

³ Carl R. (Rod) Nave. „Flute.“ Hyperphysics, 3. mars 2017. <http://hyperphysics.phy-astr.gsu.edu/hbase/Music/flute.html>

⁴ Carl R. (Rod) Nave. „Closed Cylinder Air Column“ Hyperphysics, 3. mars 2017. <http://hyperphysics.phy-astr.gsu.edu/hbase/Waves/cloccol.html>

However, in this case, there is only one fingering that closes all of the instrument's keys (C4 on a flute with a C-foot, B3 on a flute with a B-foot) and thus only that tone that is an octave lower, on the condition that the mouthpiece is capable of the intonation

⁵ Carl R. (Rod) Nave. „Flute“ Hyperphysics, 3. mars 2017. <http://hyperphysics.phy-astr.gsu.edu/hbase/Music/flute.html>

⁶ Carl R. (Rod) Nave. „Resonances of open air columns“ Hyperphysics, 3. mars 2017. <http://hyperphysics.phy-astr.gsu.edu/hbase/Waves/opecol.html>

The calculation was performed on a calculator, under the item "closed cylinder," located on the above link.

⁷ It should be noted that the total length of each quarter of the Circle Flute is 195 centimeters, which means that the fundamental frequency of each individual flute's tube is predicated on the length from the middle of the hole of the mouthpiece to the flute's foot end. This means that the flute's fundamental tone is a bit higher than 44 Hz given that the length is shorter.

⁸ Here the flute's girth has, undoubtedly, some influence on its sound production. Piccolos, C flutes, alto flutes and bass flutes differ not only from the Circle Flute in length but also in girth.

⁹ This question is considered "natural," given that the Circle Flute breaks with tradition/habit and this carries a message/meaning, which is hard not to address.

⁹ Brynjar, Veronika and I have been taken by these inscrutable aspects of the instrument during the process of developing a new theatrical for the instrument and a fifth performer. During the process, we have explored how to invoke in (and with) the instrument different meanings and how to create different circumstances within the piece. In this respect, the instrument can both manifest itself as a kind of independent persona and as the piece's mise en scène.