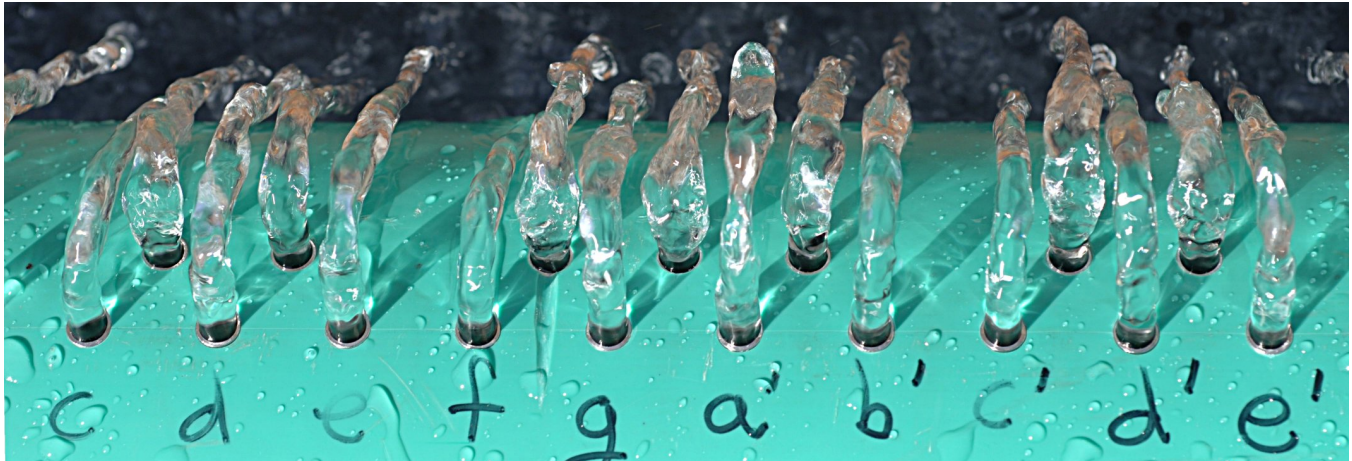


## THE HYDRAULOPHONE: A FOUNTAIN THAT'S A WATER-PIPE-ORGAN-FLUTE

To hear the hydraulophone, download video from <http://wearcam.org/hydraulophone/>

# This water fountain is more than just a piano!



88 spray jets each provide rich tactile/haptic control for one note on the keyboard. Each note sounds different depending on how you touch it (from above, versus from one side, or the top).

### 1. THE HYDRAULOPHONE: A TRULY HYDRAULIC MUSICAL INSTRUMENT

The word “hydraulics” comes from the Greek word for “water organ”, a musical device consisting of hydraulically blown wind pipes used to imitate the chirps (“songs”) of birds. A similar ancient Greek device, the *Hydraulis*, was a water-powered pipe organ, in which water power was used to blow air into organ pipes. To the extent that waterfalls are often now used to produce the electricity that runs the air compressors and blowers in modern pipe organs, a modern pipe organ is a water organ in the sense that a waterfall such as Niagara Falls turns a turbine that produces the “hydro” to run the blower fan. The term “hydro” is slang for electricity, and we often speak of the “hydro meter” when we refer to our electricity bill, and to the electricity we use to power modern pipe organs.

The hydraulophone (alternate spellings “hydraulaphone”, or “hydrauliphone”), invented by Steve Mann in the 1980s, is a truly hydraulic musical instrument, that uses water as the form of interaction with the instrument, not just as a means of powering the instrument.

The hydraulophone is a pipe organ having hydraulic action. Most notably, it is played by directly interacting with the hydraulic fluid.

Other instruments use air for sound production, and since we can’t see the air, it is harder to understand what is happening.

The hydraulophone uses water, resulting in a highly visible form of musical expression that can be learned simply by observing where the water splashes when the instrument is played by a skilled hydraulist.

### 2. HOW TO PLAY THE HYDRAULOPHONE

To play the hydraulophone, you form a hydraulic bond between your finger(s) and one or more of the hydraulophone’s water jets, to restrict, divert, obstruct, or modify the flow of the water. This action on the water flow diverts it elsewhere inside the instrument to make

a sound that varies widely depending on the manner in which the restriction, obstruction, diversion, etc., is performed.

#### 2.1. The hydraulophone as an instrument with continuously flowing expression

The hydraulophone looks like a giant flute. It’s basically a big pipe with holes in it, except that water gushes out of the holes, rather than air.

Many woodwind instruments have a row of holes, wherein, to achieve each note, there is a particular somewhat complicated fingering pattern that must be remembered. Since the holes are used in various combinations of this sort, these instruments are purely monophonic.

The hydraulophone, however, associates one hole to each note. The hydraulophone’s holes can be (and usually are) arranged in a pattern akin to a piano-style keyboard.

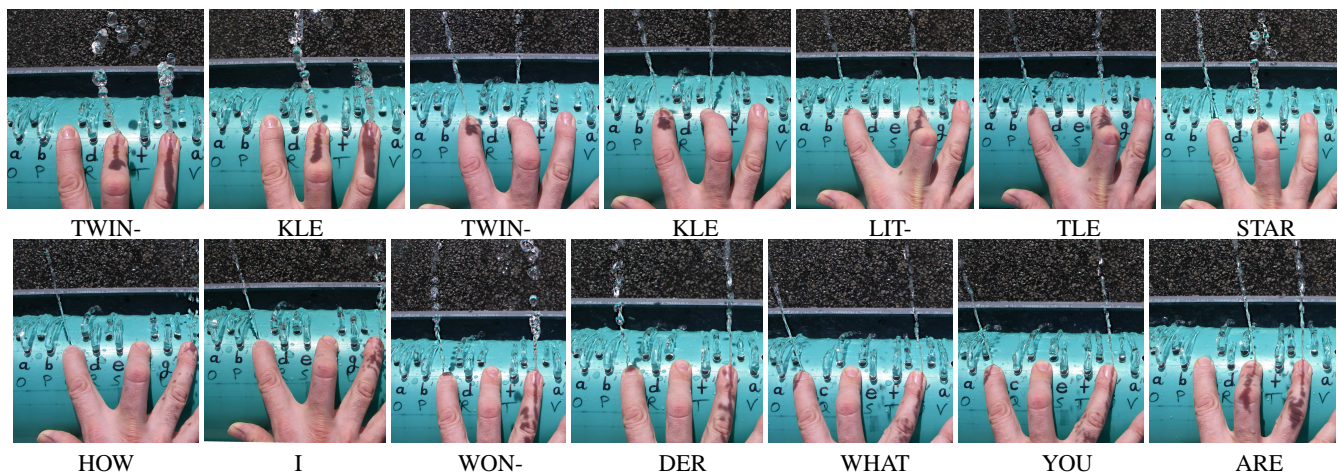
Another side-effect of the fact that each jet, together with its sounding mechanism, corresponds to only one note, is that the instrument is able to play chords, unlike wind instruments such as flutes, clarinets, saxophones, and the like.

Although other instruments like pipe organs can play chords, they do not allow finely intricate and continuous control over individual notes in the chord. Unlike a pipe organ, the hydraulophone allows fine and individual control over each member of the chord, because of the direct human interaction with the fluid.

Because of this fine control over each note, it is possible to play the instrument in such a way that the harmony can be played softly in the background, overlapping in the same space as the melody.

This combination of overlapping harmony and melody, in which the melody is embedded within the accompaniment, by way of continuous volume variations in the individual notes of the accompaniment, independently adjusting each note’s volume, as shown, by way of example, in Fig. 1.

Hydraulophone technique allows a musician to play a chord in which one note of the chord, corresponding to the melody note, is



**Fig. 1:** Example showing the two phrases “Twinkle twinkle little star” and “How I wonder what you are” being played with overlapping harmony and melody. A unique aspect of the hydraulophone is that the individual fine control over the sound of each note is visible, unlike other instruments that use air. Being able to see this “finger-jet embouchure” of the instrument’s many “mouths” simultaneously, makes it easy to learn, and useful for teaching the finger-expression control technique. Consider the upper leftmost two of the 14 figures. Here we see a C-major chord being played with emphasis on the first note of the melody, C (the flow of the C-jet is fully restricted), while the E and G jets are being partially restricted. In the next two figures, the same three jets are being blocked, but the emphasis is shifted fluidly and continuously toward the G jet, without any disruption in the harmony.



**Fig. 2: Example of hydraulophone installed in a public space:** This hydraulophone is the main centerpiece out in front of the Ontario Science Centre, the world’s first and largest science museum.

made to become louder than the other notes in the chord, and then, while sustaining that same chord, the loud note is made quieter and a the next melody note in that same chord is made louder, and so-on, dynamically, to follow along the course of that portion of the melody that falls within the chord.

## 2.2. Hydraulophones in public spaces

Some hydraulophones are housed inside heavy stainless steel pipes, for installation in public parks, as publically accessible art. Even

a piano left unattended in a public park could be easily damaged, whereas the hydraulophone presents new possibilities for bringing music to everyone, even those not fortunate enough to have a piano in their homes. See for example, the hydraulophone installation out in front of the Ontario Science Centre, <http://wearcam.org/osc/>

If you would like to commision the construction of a hydraulophone, as a bronze casting, or stainless steel sculpture, for your park, pool, or landscape architecture project, please contact [hydraulophone@gmail.com](mailto:hydraulophone@gmail.com) or 416.946-3387.