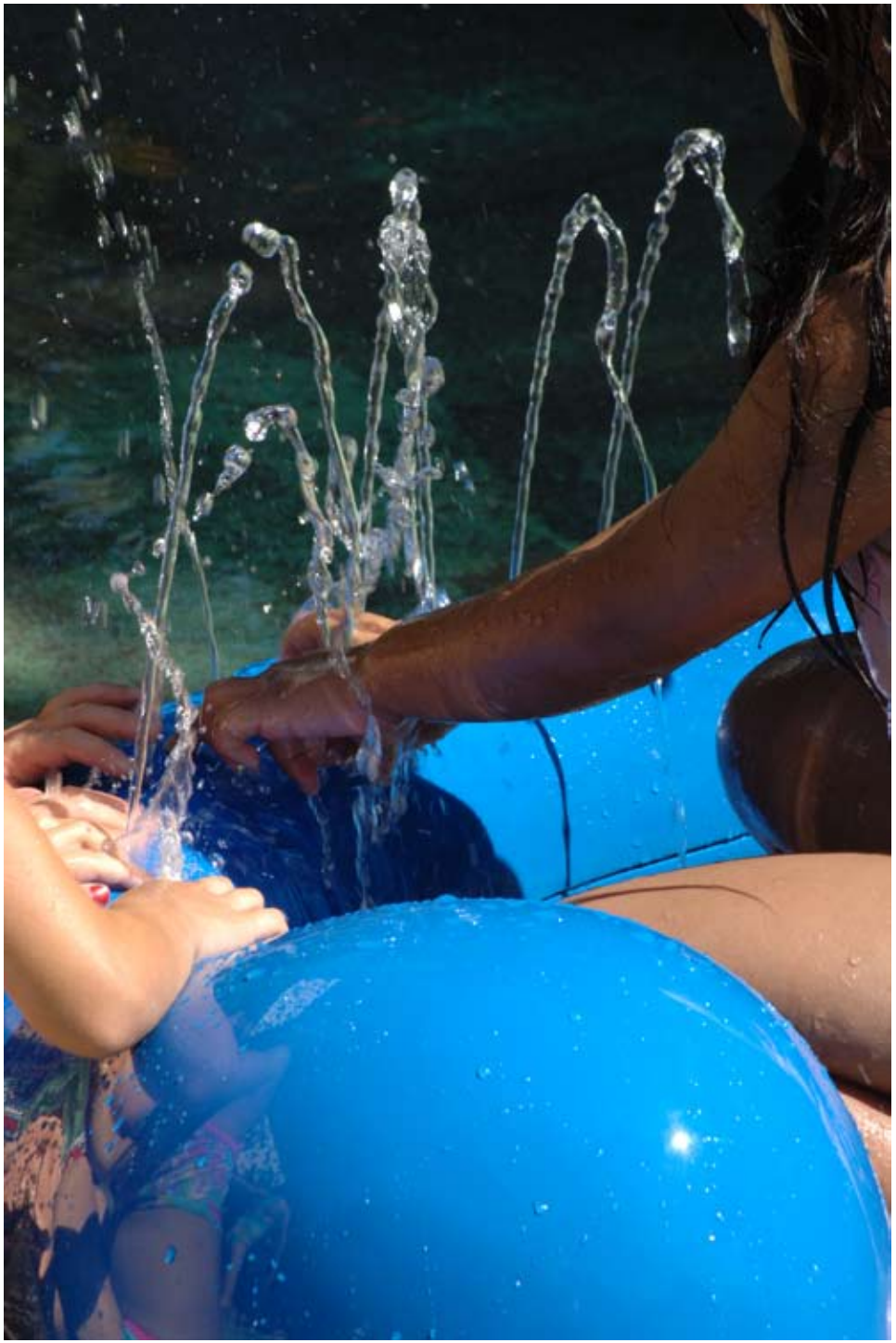
FUNtain Hydraulophone

Steve Mann and Chris Aimone

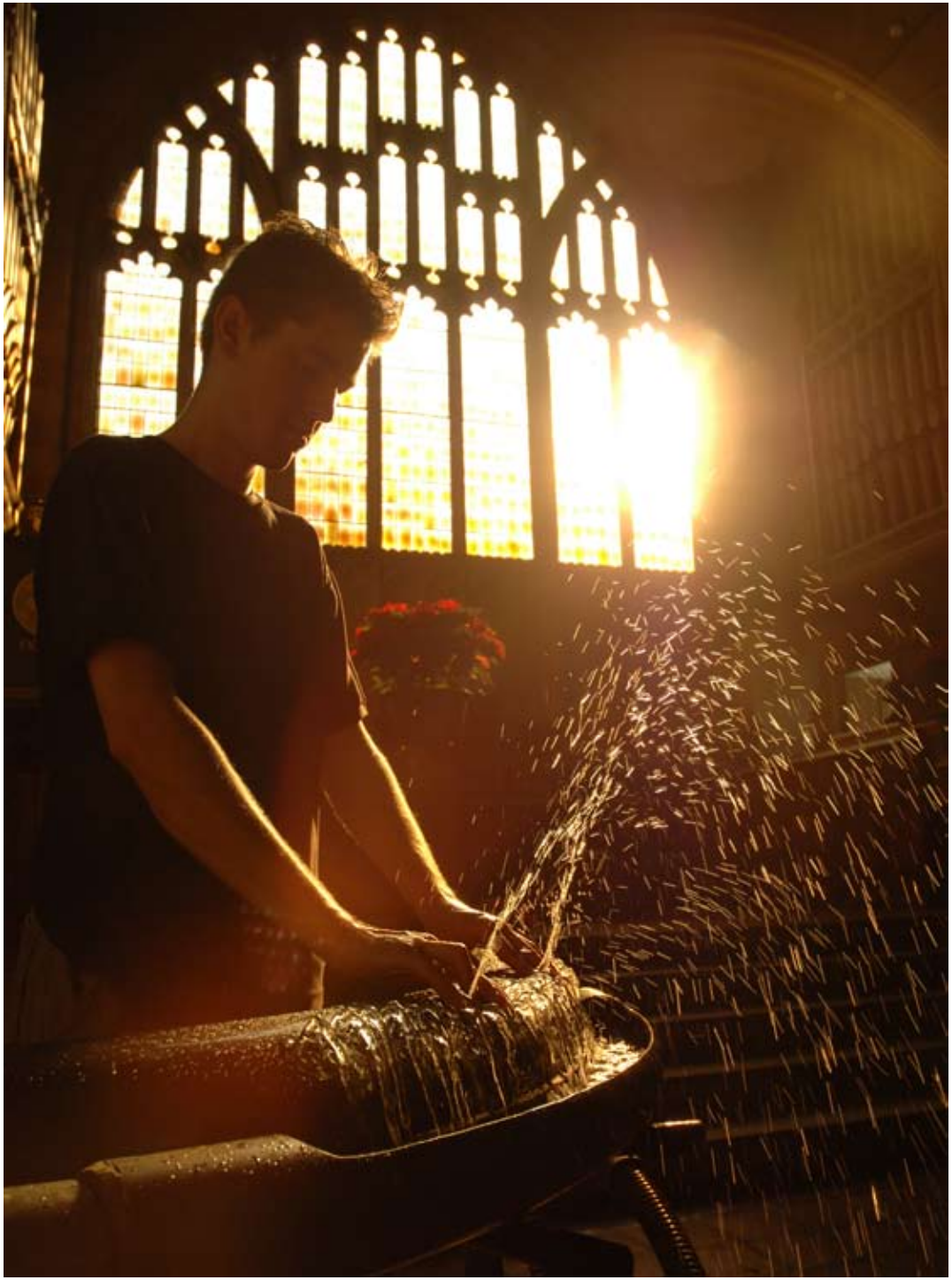
Timeless civic sculptures bring people together like the village well

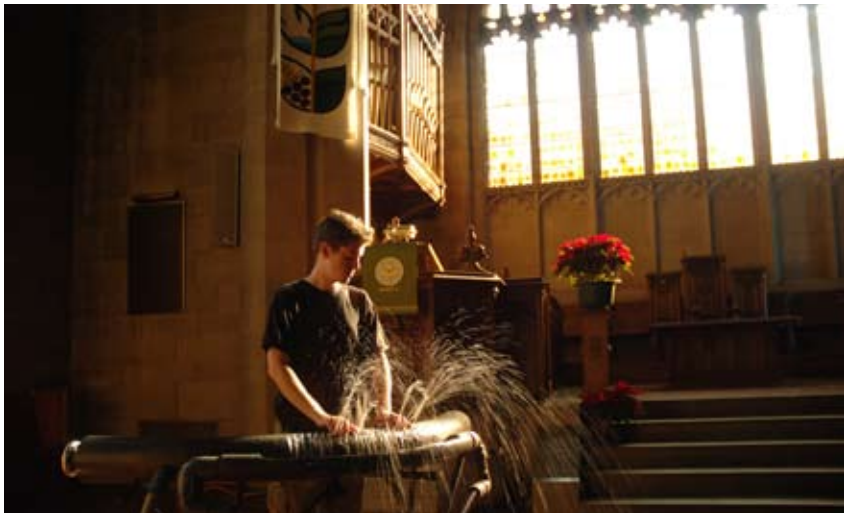
As an architectural landmark, the hydraulophone takes PLAYing in a fountain to a sophisticated enough level that adults are not afraid of seeming too childish when they frolic in the fountains. Even senior citizens flock to these Global Village Fountains to enjoy the soothingly therepeutic flow of water past their fingers while enjoying the combined effects of music therapy and water threapy.



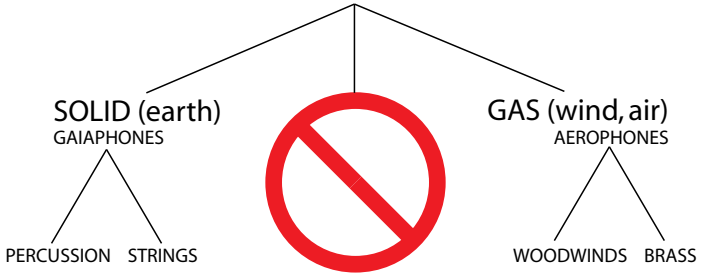
Water reaches the primal heart and soul within us

Hydraulophones appeal to people of all ages, young and old alike.
Left: Children frolic on hydraulophone installation in a public park.
Right: Hydraulophone installation at retirement home combines water therapy with music therapy to create a healing environment in an outdoor garden.

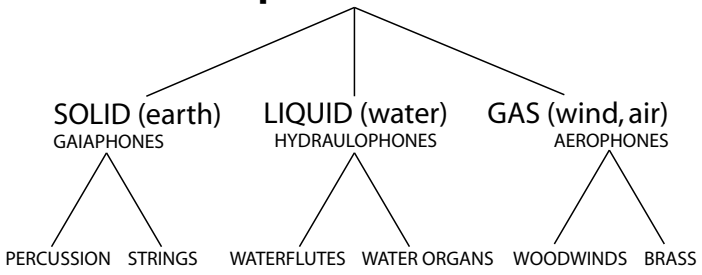




Typical Orchestra (incomplete)



Complete Orchestra



The Hydraulophone:

Typically acoustic instruments produce sound by matter in its solid state (percussion or string instruments), or by matter in its gaseous state (by air in wind instruments). The hydraulophone is a new musical instrument invented by Steve Mann that is liquid-based (hydraulic), suggesting that the space of known acoustic musical instruments should be broadened to include all three states of matter: solid (percussion or strings), gas (wind), and liquid (a new category of musical instruments).

The hydraulophone is like a woodwind instrument that runs on water rather than air. As the world's first instrument to run on water, it offers a unique and fun music making experience for people of all ages. In the hands of an experienced hydraulist, it is a fully capable and tremendously expressive instrument. It presently finds diverse use in jazz ensembles, as well as classical compositions. No orchestra is complete without a water section!

photo: Ontario Science Centre

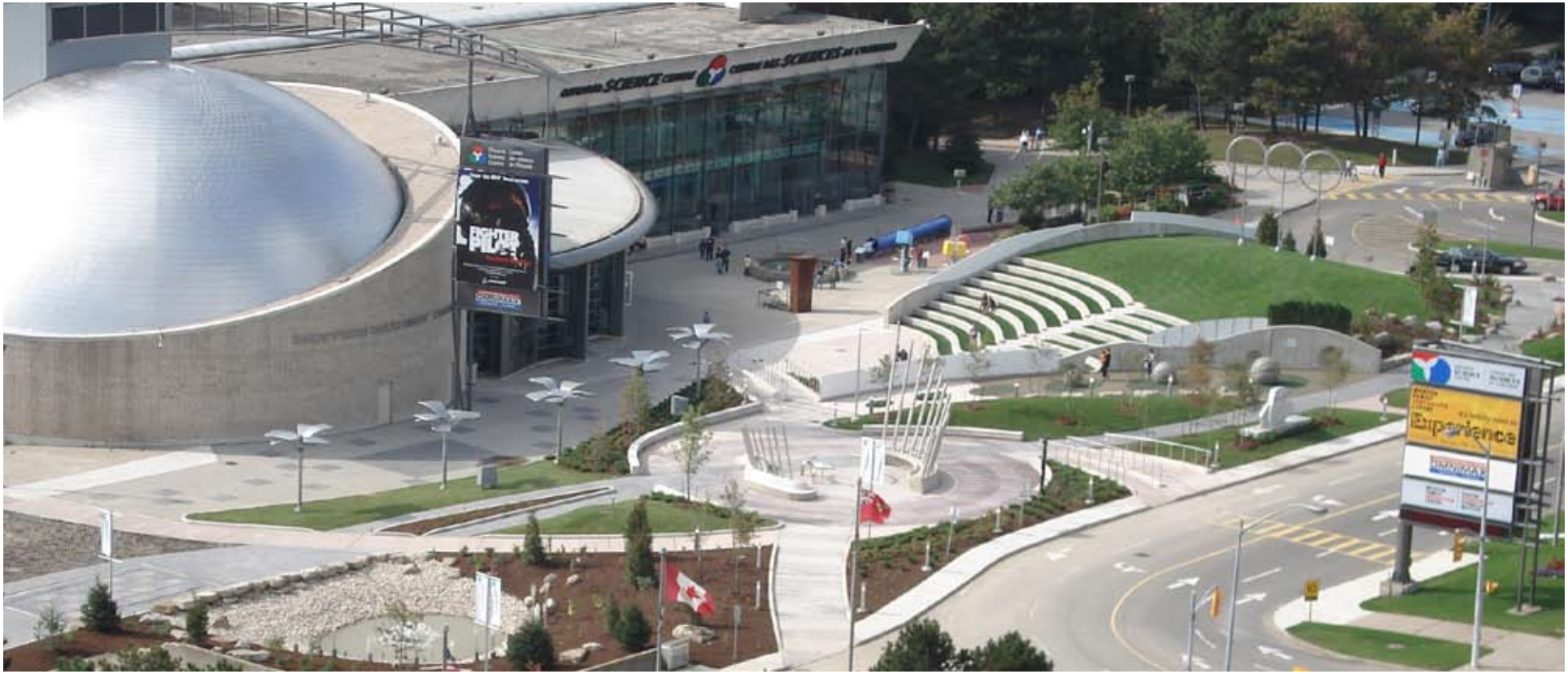
The FUNtain Hydraulophone at The Ontario Science Centre:

This hydraulophone installation is the feature centerpiece out in front of the Ontario Science Centre, one of Canada's landmark architectural sites. It is a musical instrument that is open to the public 24 hours a day and is capable of being run year-round. It was designed, engineered and built by Chris Aimone and Steve Mann.

This work was selected through an international juried competition, in response to a worldwide call for artist submissions in September 2004, on the theme of Earth, Water, Wind, and Fire (the ancient Four Elements that correspond to what we now know as the states-of-matter: solid, liquid, gas, and plasma).

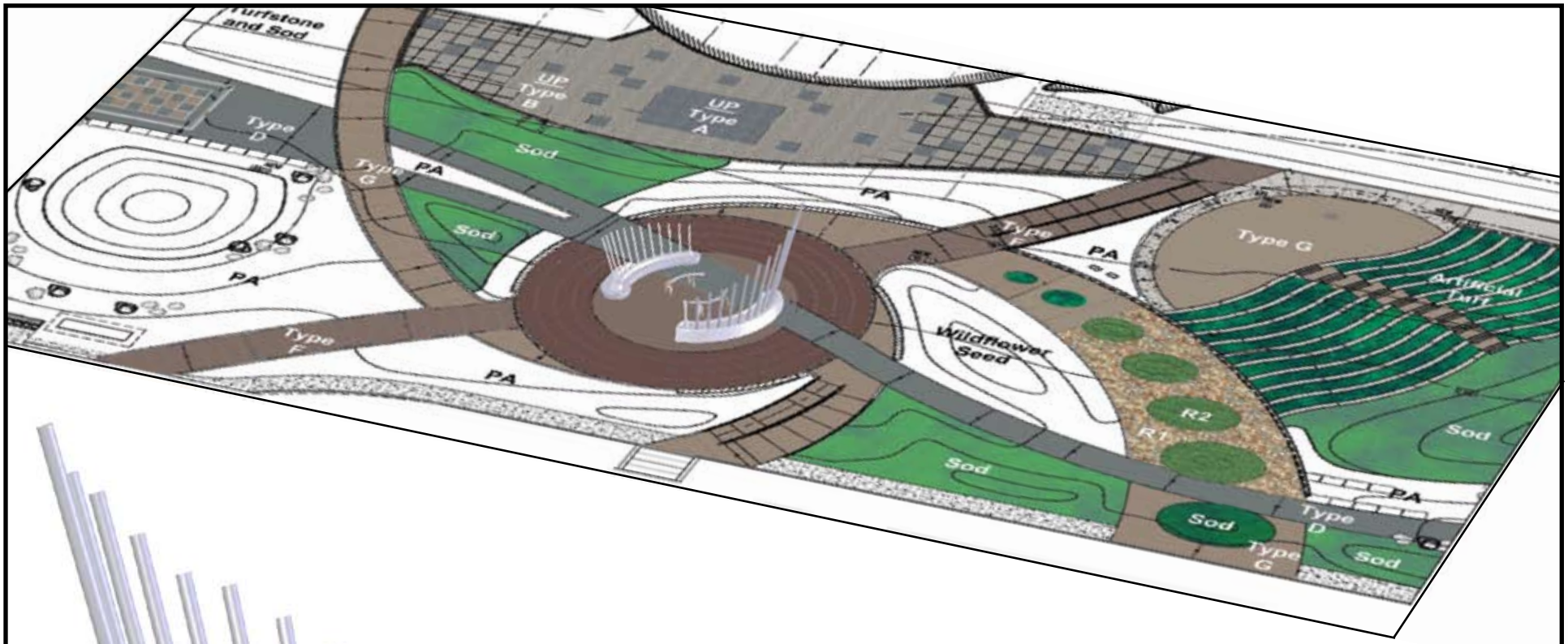
The instrument produces sound using a unique hydraulic system involving water-filled organ pipes that operate with a combination of pneumatic, hydraulic, and forced mechanical action. All other instruments, the world over, produce sound by solid, gas, or electrical media, whereas the initial sound production medium in the hydraulophone is the water that is in direct physical contact with the player's fingers.

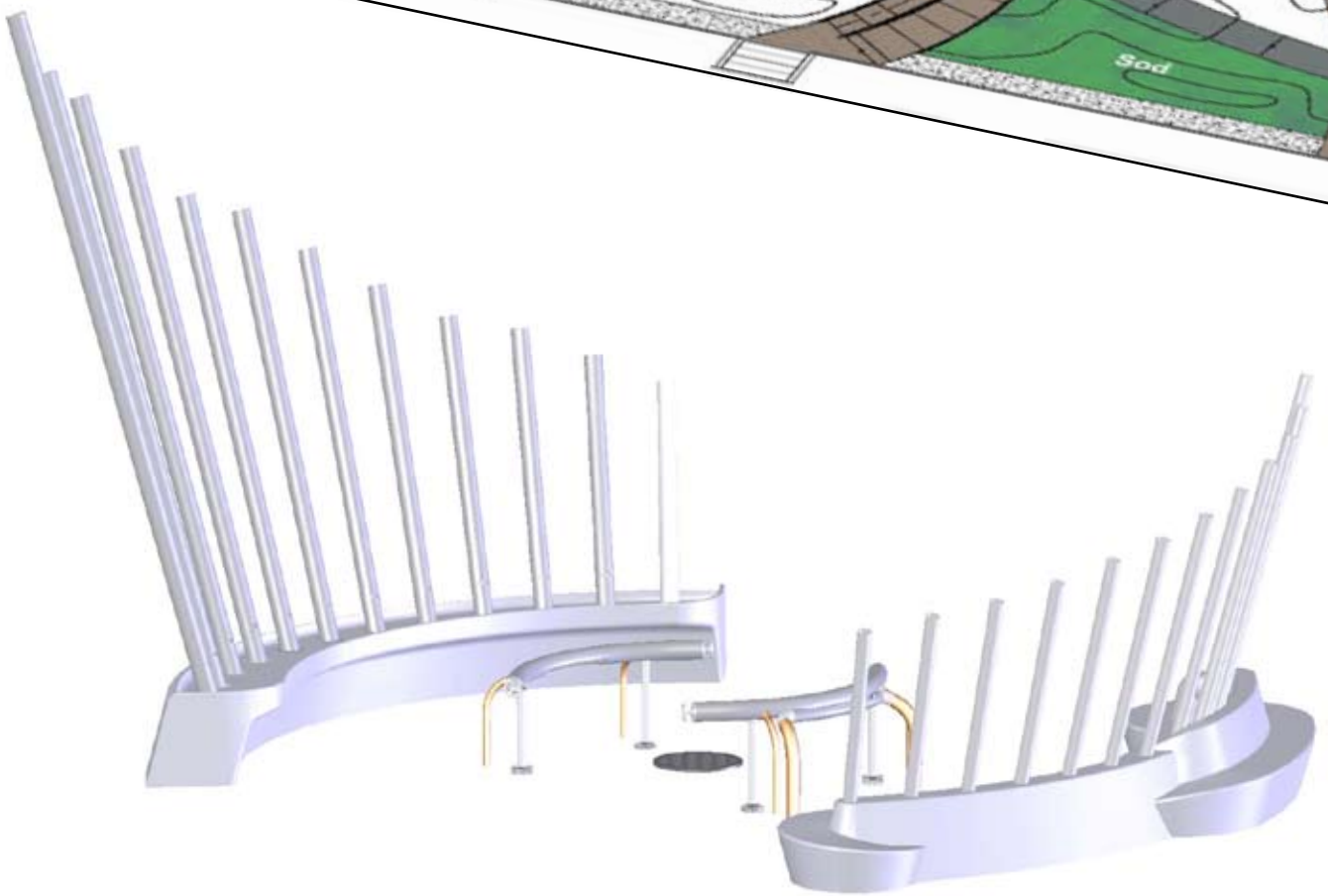
The water that supplies the piece is re-circulated through the instrument and a filter system by three water pumps located in the building's mechanical room.



Top: Aerial view of hydraulophone installation at the Ontario Science Centre (OSC). Photo taken by OSC.

Left: Nighttime panorama. Photo taken by the OSC.





Top:
Drawing showing the FUNtain Hydraulophone as the epicentre of the Ontario Science Centre's Teluscape exploration plaza.

Bottom:
Detailed drawing of the FUNtain Hydraulophone installed at the OSC.

Nighttime in Teluscape

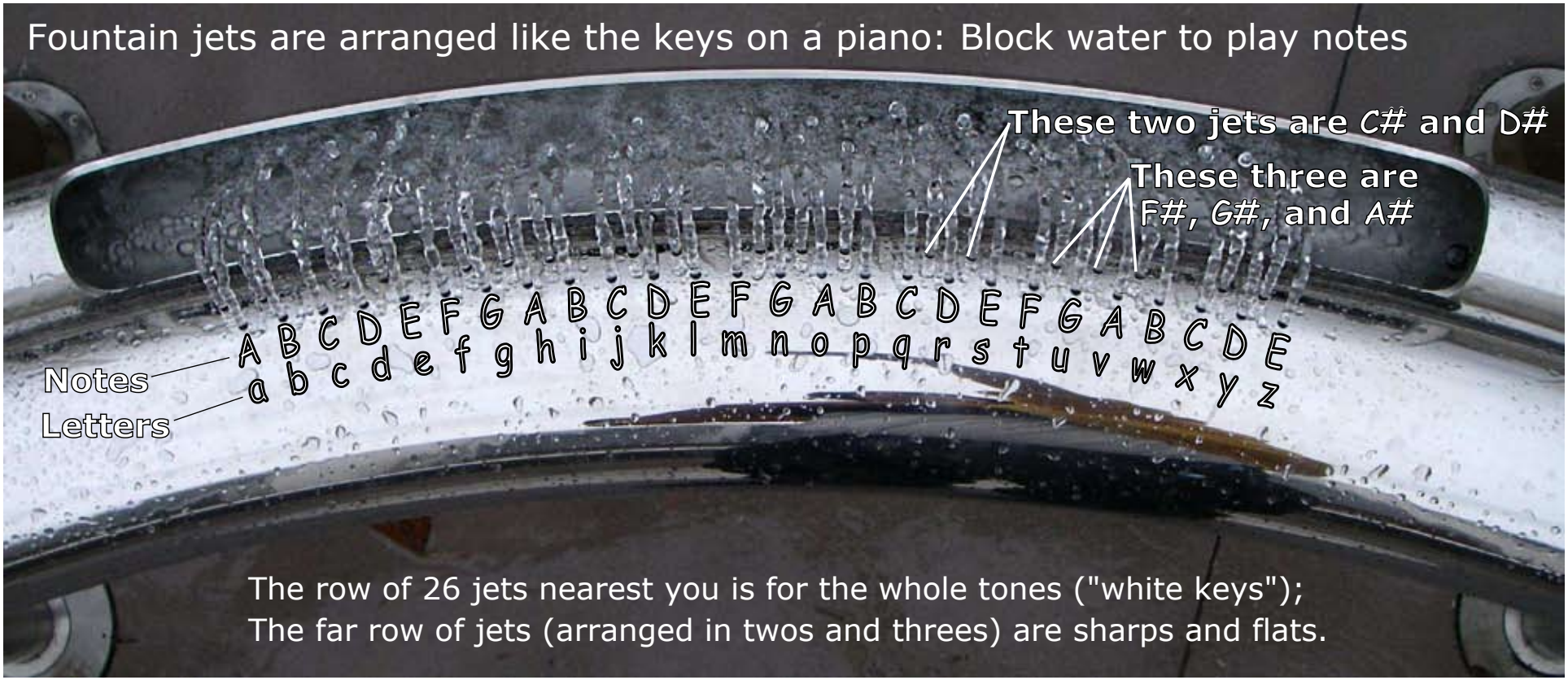
Composer Ryan Janzen rehearsing his orchesteral “Suite for Hydraulophone”

The Hydraulophone: A truly hydraulic musical instrument

The hydraulophone is a truly hydraulic musical instrument, an idea conceived by Steve Mann in the 1980s and later developed in collaboration with Chris Aimone. It uses water as the form of interaction with the instrument, not just as a means of powering the 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.

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. In contrast, the hydraulophone is a pipe organ (a) having hydraulic action, and (b) where sound is produced (in the organological/ethnomusicological sense) by water. Most notably, it is played by directly interacting with the hydraulic fluid. The hydraulophone uses water, resulting in a highly visible form of musical expression that anyone can learn by simply watching a skilled hydraulist and observing how the water sprays. Other instruments use air for sound production, and since air is invisible, it is harder to see what is happening.

The hydraulophone is played by connecting the fingertips with the hydraulic fluid (water) emerging from the fountain's water jets. By changing by the way that you press down and manipulate each water jet, you can manipulate the sound continuously. The intensity as well as the pitch and timbre of the sound can be affected. You can, for instance, droop down in pitch and give the music a sadder sound.



Music lesson on the Ontario Science Centre's hydraulophone

Let us begin by learning proper hydraulophone technique for a very simple song, "Twinkle Twinkle Little Star" that most people already know how to play on the piano, organ, or on other instruments. Once you understand hydraulophone technique for this song, you will be able to play most other songs on the fountain using the same basic principle. The key technique in playing a hydraulophone is getting a good hydraulic bond between your fingertips and the hydraulic fluid (water) emerging from the fountain's water jets.

To find a "**C**", locate any group of two jets in the far row, and then locate the jet in the near row that is just to the left of this group of two far jets. Note that the finger holes on the row closest to you are evenly spaced. These are the natural tones that correspond to the white keys of the piano. The holes on the row further away from you are irregularly spaced. Notice how they are in groups of 2, 3, 2, 3, and so on. These are the sharps and flats, i.e. the tones that correspond to the black keys of the piano. Note that the finger holes on the row closest to you are evenly spaced. These are the natural tones that correspond to the white keys of the piano.

When you have found "**C**", you can play a **C**-major chord by blocking the **C**, **E**, and **G** water jets. Now, looking at your three fingers on the three holes, pull back just a little bit on the two fingers that are covering the **E** and **G** holes. The water should shoot up in a nice arc a few feet in front of you. As you pull back, you can see the change in the shape of the arc. This changes the way the **E** and **G** notes sound.

With a little practice, you should be able to get a **C**-major chord in which the "**C**" is emphasized (i.e. the **C** pipe is playing loudly and the **E** and **G** pipes are playing softly). The fingering for the first note and chord of the song, consisting of a strong **C** (index finger) and a weak **e** (middle finger) and **g**, which we denote as "**Ceg**". is shown in the first image of the sequence below. Using this technique, you can play both the harmony and the melody of the song at the same time.

TWIN-
Ceg

KLE
c

TWIN-
ceG

KLE
g

LIT-
cfA

TLE
a

STAR
ceG

HOW
cFa

I
f

WON-
cEg

DER
e

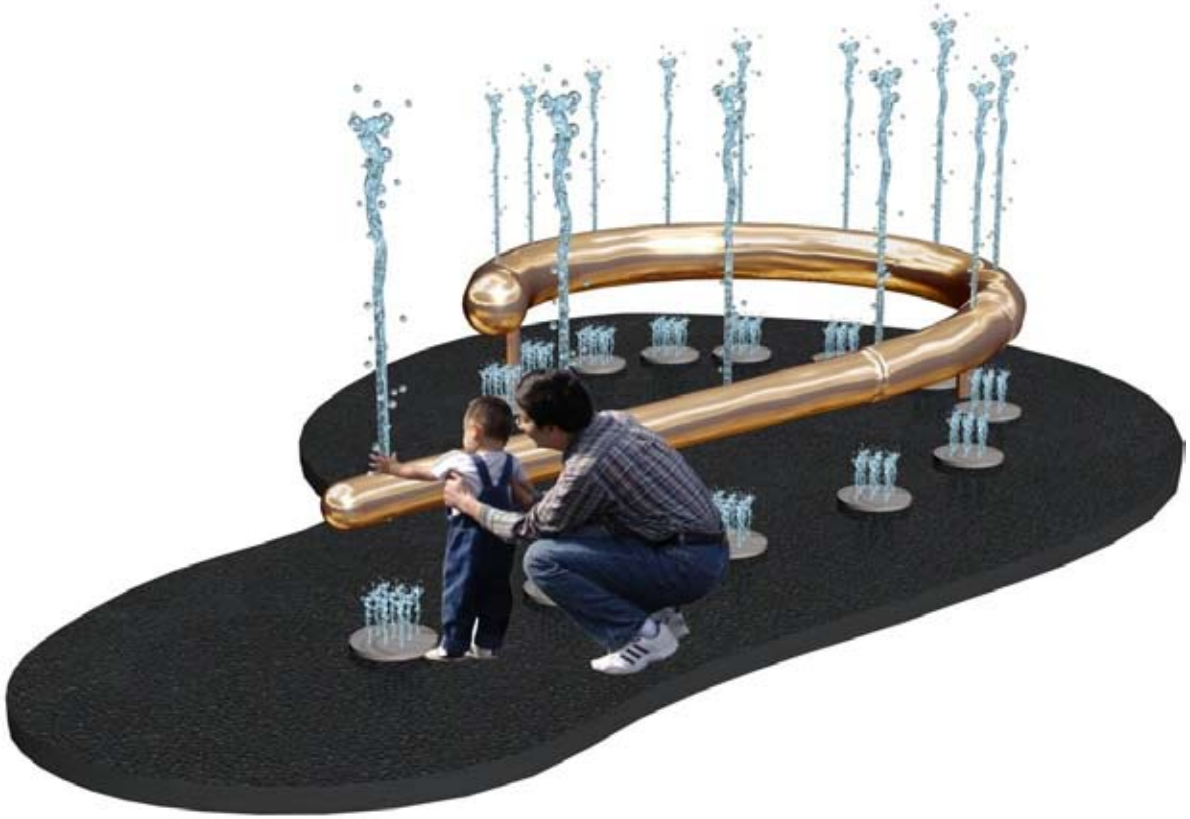
WHAT
bDg

YOU
d

ARE
Ceg

Hydraulophone installation at Early Learning Centre:
(Steve Mann and Chris Aimone, 2005)
Starting from the left side of the hydraulophone, each jet corresponds to a note on the musical scale starting at "**A**", and moving through the musical alphabet, where each jet can be labeled as "**A, B, C, D, E, F, G, a, b, c, d, e.**"

Hydraulophones can be made in an endless variety of shapes and sizes, making wonderful civic landmarks and public sculptures that invite people of all ages and abilities to play in the water.



Please contact us to learn more about our full range of creative design, fabrication and consulting services.

FUNtain.ca

For more information, contact: +1.416.946.3387; 330 Dundas Street West, Toronto ON, M5T 1G5, CAN ADA, www.eyetap.org/fluid