Wilson's Water Works
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About Allan Wilson / Wilson's Water Works:

For me, water itself is a sculptural element. Rather than using water to accent a sculpture, my energies have been spent in figuring out ways to sculpt water into smooth laminar flows in various forms. I've developed large smooth drops, streams, clear glass-like sheets and vortexes.

In experimenting with the streams of water, I've found that they can do some fascinating things, such as holding balls aloft and generating musical tones. I've used some of these phenomenon as the basis for sculptures and exhibits. Others, such as the musical tones, have yet to be developed into a finished piece.

I'm also interested in using water-powered machinery and mechanisms as sculptural elements. I miss older machines with mechanisms that can be studied to figure out how they work. I like gears.

My first water exhibit was a strobed water drop fountain modeled after Dr. Harold Edgerton's small strobe fountain. My "Stop The Drop" fountain was built to go along with a traveling artistic scientific photography show called "The Eye Of Science." The show was installed at the California Academy Of Sciences, where I worked. After the "Eye Of Science" show closed, I redesigned the "Stop The Drop" fountain for permanent display at the Academy in the Steinhart Aquarium. During the redesign I first developed techniques for forming smooth streams of water, and streams of smooth periodic drops.

In order to build my water exhibits I've learned about pumps, piping and hydraulics. I enjoy designing systems and prototyping new ideas. Because of my mechanical knowledge, I've spent a lot of my career helping other artists, whom I met at the Exploratorium, to develop their water projects. I have a machine shop, and also a test pool with pumps and flow meters, so I can make a prototype and then try it out. One of my important contributions to the world of water exhibits has been to combine a whole room of exhibits into one water system so that the water can be treated similar to that in a swimming pool. Also, I've worked out techniques to finely filter the entire exhibit water flow on every pass without using any additional energy.

Besides water exhibits, I have an interest in microscopes and things microscopic. In particular I enjoy collecting and viewing fresh water protozoa. I first learned machining so that I could make parts for my photomicrography set up.

It's partly because of my three boys that I find myself in this niche of water exhibits for children's museums. For years I set up various water activities at birthday parties and nursery school fairs, and I had a good time watching the children enjoying themselves. I like to play with water, and so I build these water exhibits and activities so I can share what I like to play with, with others. My boys enjoy trying out prototypes and playing with exhibits in my test pool. They help me form ideas for new exhibits.

The two photos seen below were taken of me and my son David playing with a little Laminar Lifter I set up at my older son Paul's fourth birthday party. I think they capture the essence of what I'm about, and why I do what I do.

Tray Table Exhibits: First Prototyped In 2016:

My Tray Table exhibits are scaled down version of my earlier larger exhibits; using 2” diameter balls instead of 3” diameter balls. They work in the same way, just smaller versions. The frames and tray are made from stainless steel; the plastic sheet material is UV resistant and holds up well in treated water. They have their own pumping system and so are independent from each other. A very fine filter is included in each exhibit. I have one Double Vortex working in Santa Rosa and a set of five exhibits running at the Acton Discovery Museum in MA.

Prototypes Exhibits Set Up At The ACM Show In 2016

Laminar Lifter:

Balls go up and balance on a laminar water stream. When another ball is loaded it takes the water from the floating ball, which then falls into the funnel and reloads itself into the stream.

Almost Finished Exhibit In My Workshop.

Below Are Photos Of The Finished Exhibit In The Acton Discovery Museum:

Double Open Vortex:

Clear plastic containers hold water that has been injected tangentially into the bottom so that the water rotates and forms a vortex that is open at the bottom. Plastic balls can be thrown onto the top of the vortex and watched as they float around and then go down the hole in the middle. The balls hover in the air core for a moment before for falling through.

Prototype Double Vortex In My Workshop In 2016

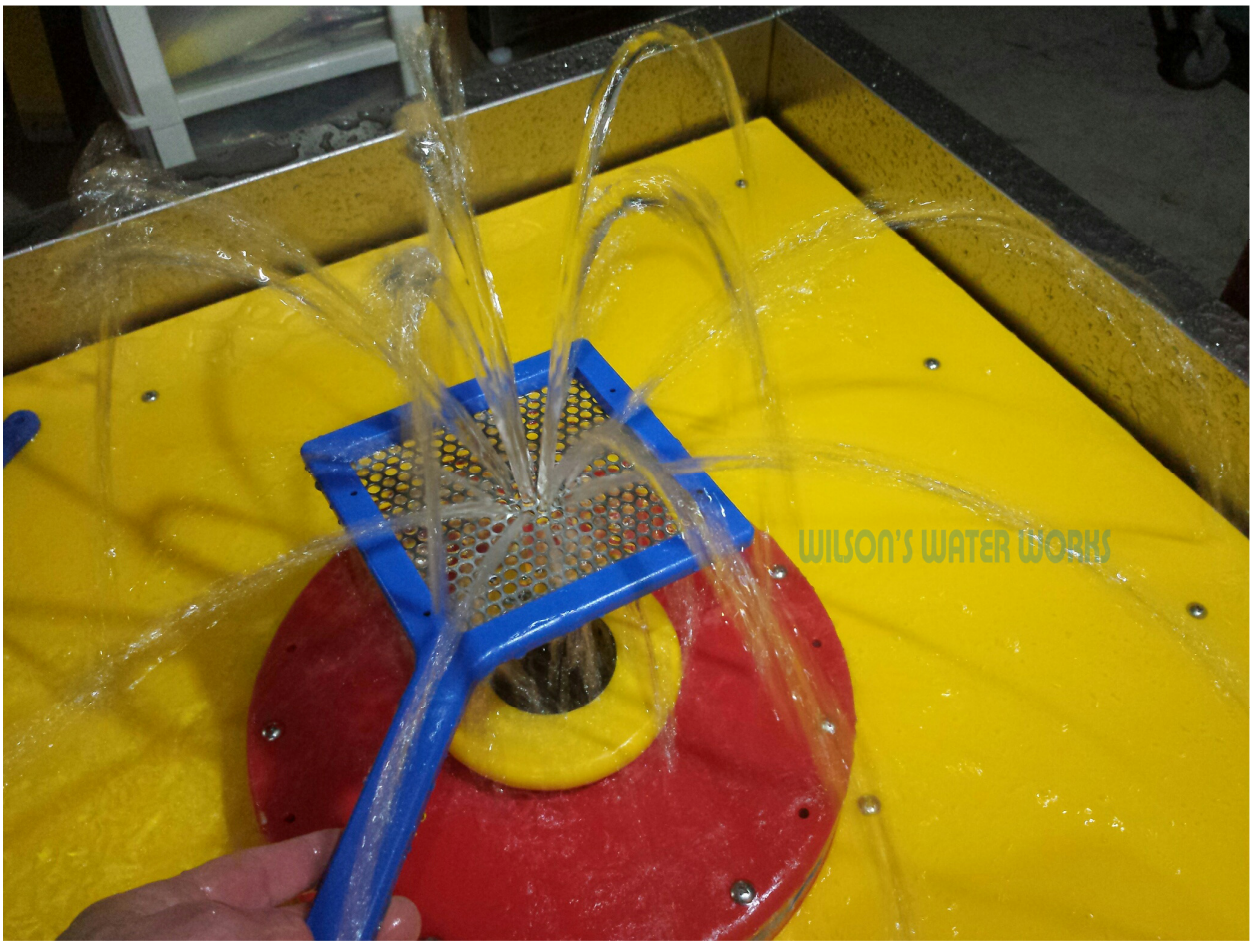
Tray Table Double Vortex In The Acton Discovery Museum


WILSON'S WATER WORKS

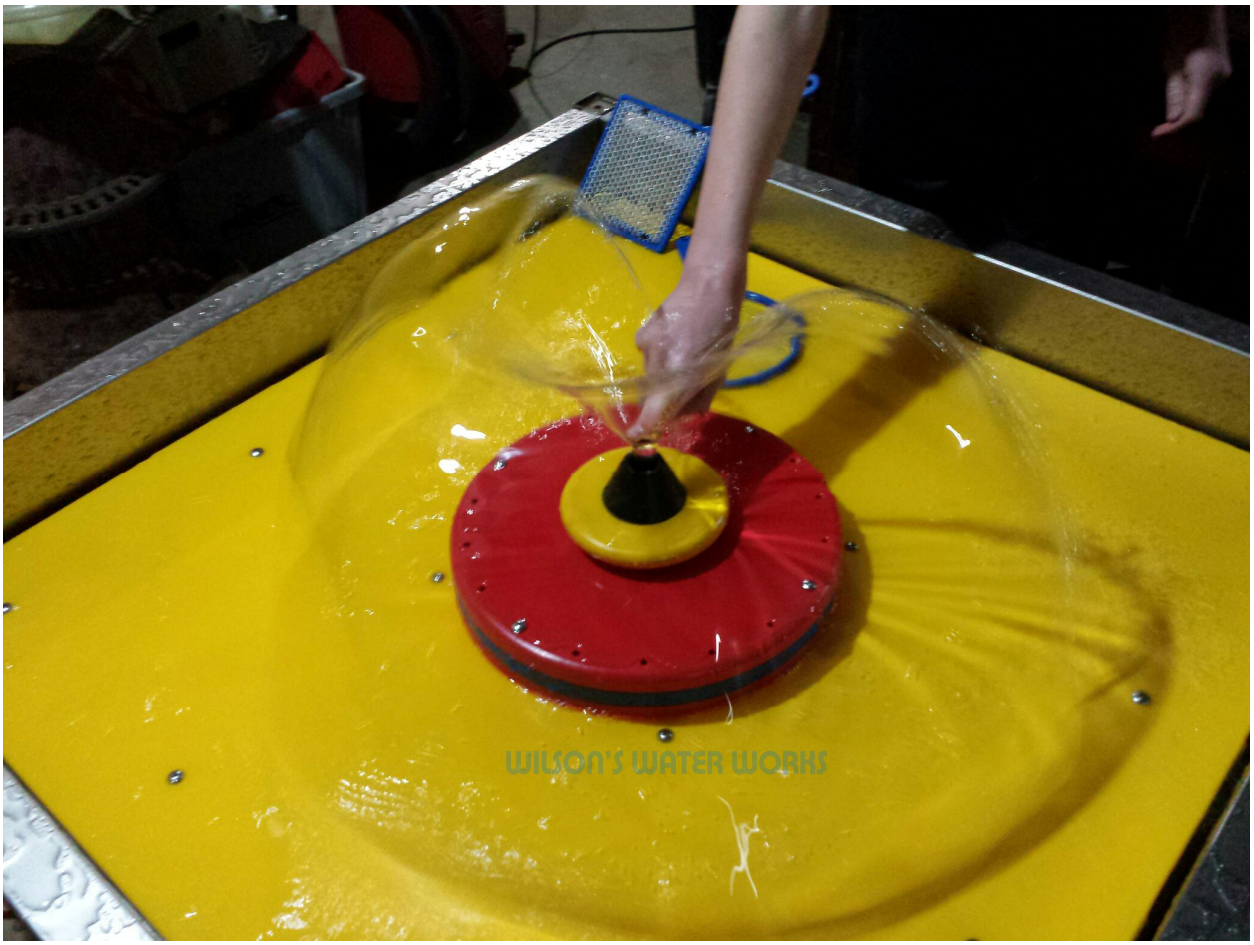

WILSON'S WATER WORKS

Morphable Stream

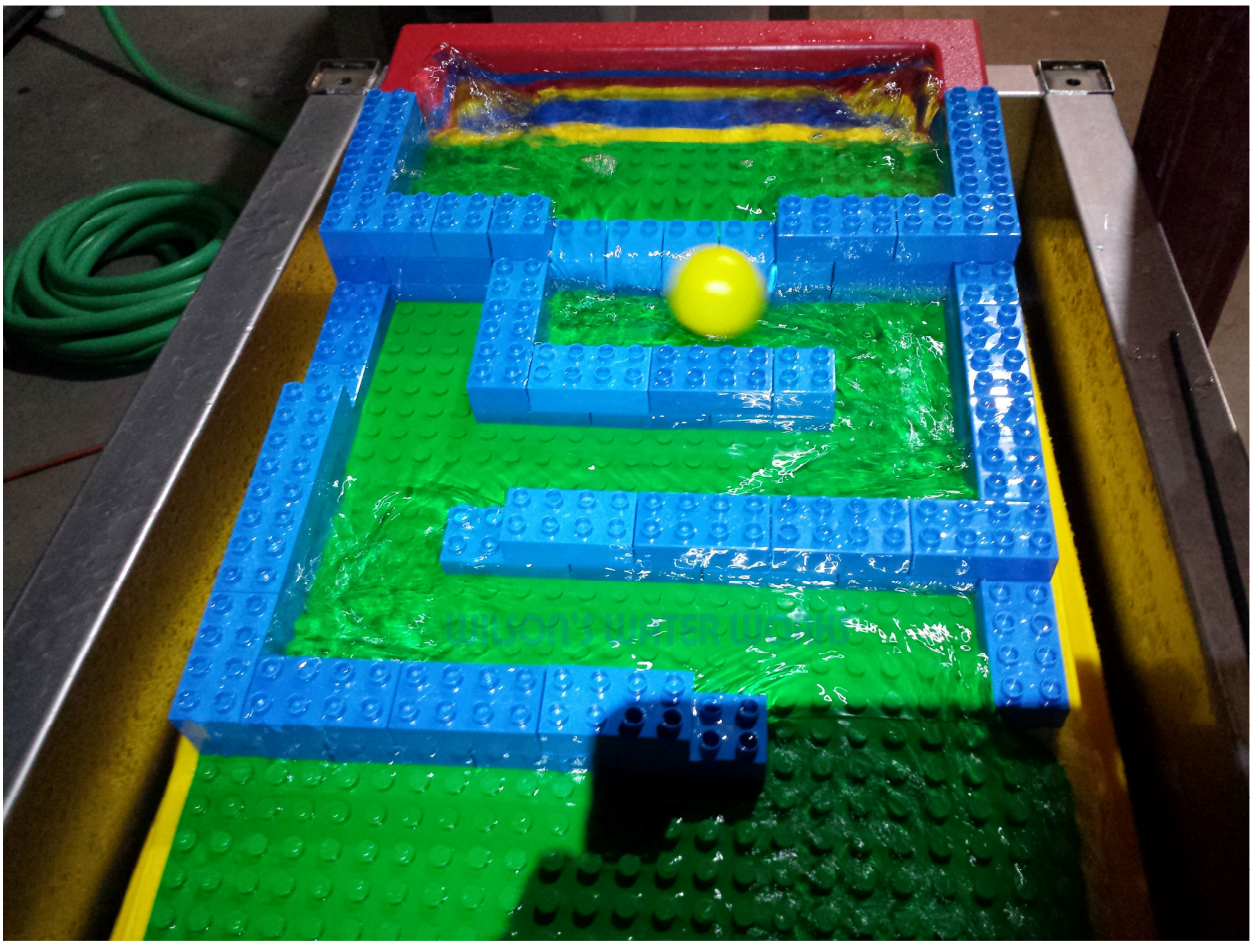
This is a new concept for forming water bells that is more open-ended and interactive than the usual water bell exhibits found in many museums. Besides bells, other shapes and streams can be generated as well. A visitor can form the bell by holding a disc in the path of a laminar stream that jets up about 12" above the tray. By moving the disc over the jet all sorts of shapes can be formed. (See photos) Various other objects held in the stream modify the stream into other interesting shapes and patterns. Also, beautiful smaller jet patterns are formed by holding perforated sheets in the path of the stream.


WILSON'S WATER WORKS


WILSON'S WATER WORKS

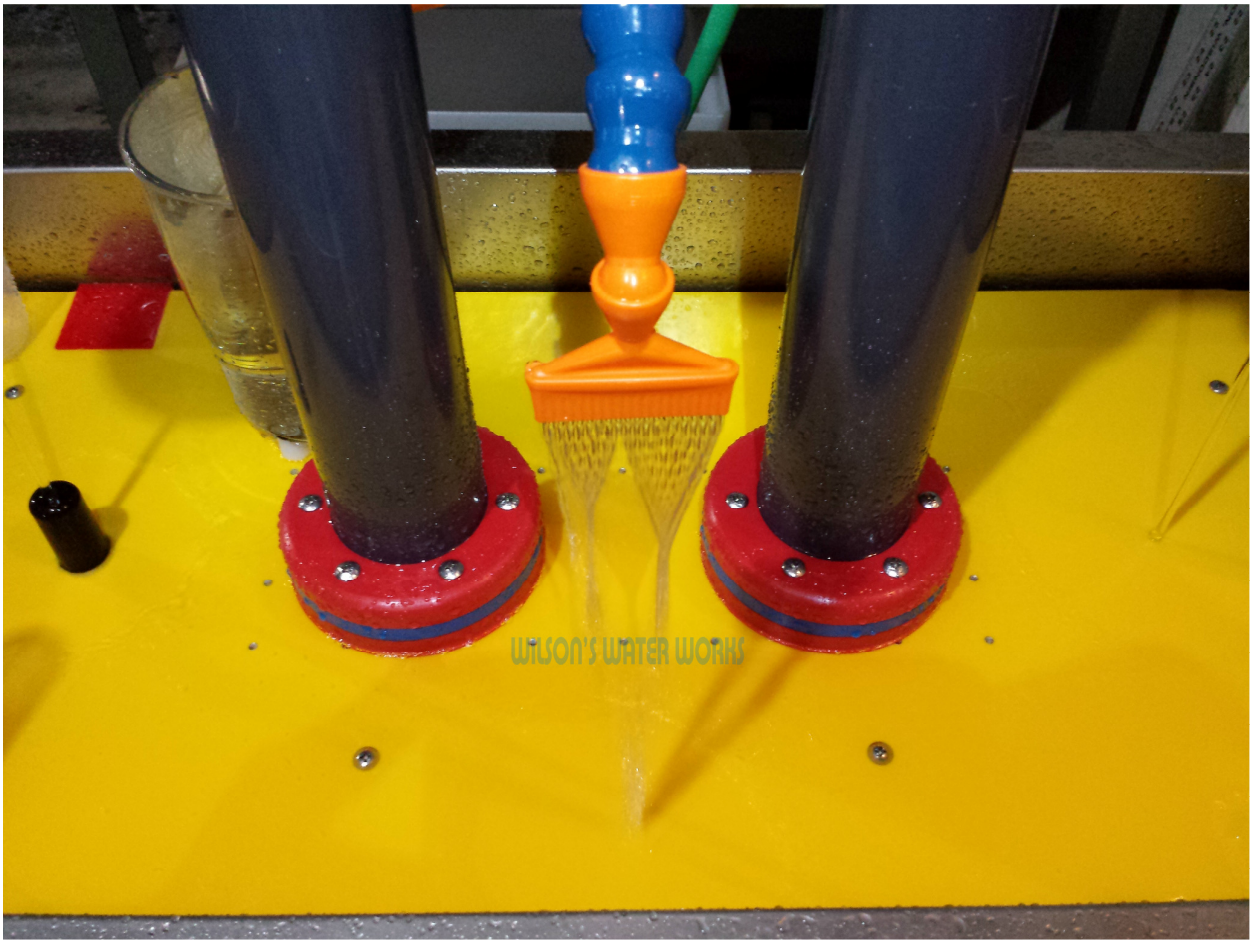


Build-A-Channel:
At the top of an incline plane, water emerges from a chamber to flow down the plane's surface. The plan has bumps on it that fit Lego DUPLO blocks so that the blocks can be built up into many structures including channels, pools, dams and spillways.



Pour & Explore:
Pipes, with various types of nozzles attached, jet water for visitors to fill beakers and other containers to fill and pour. Aimed at younger people.


WILSON'S WATER WORKS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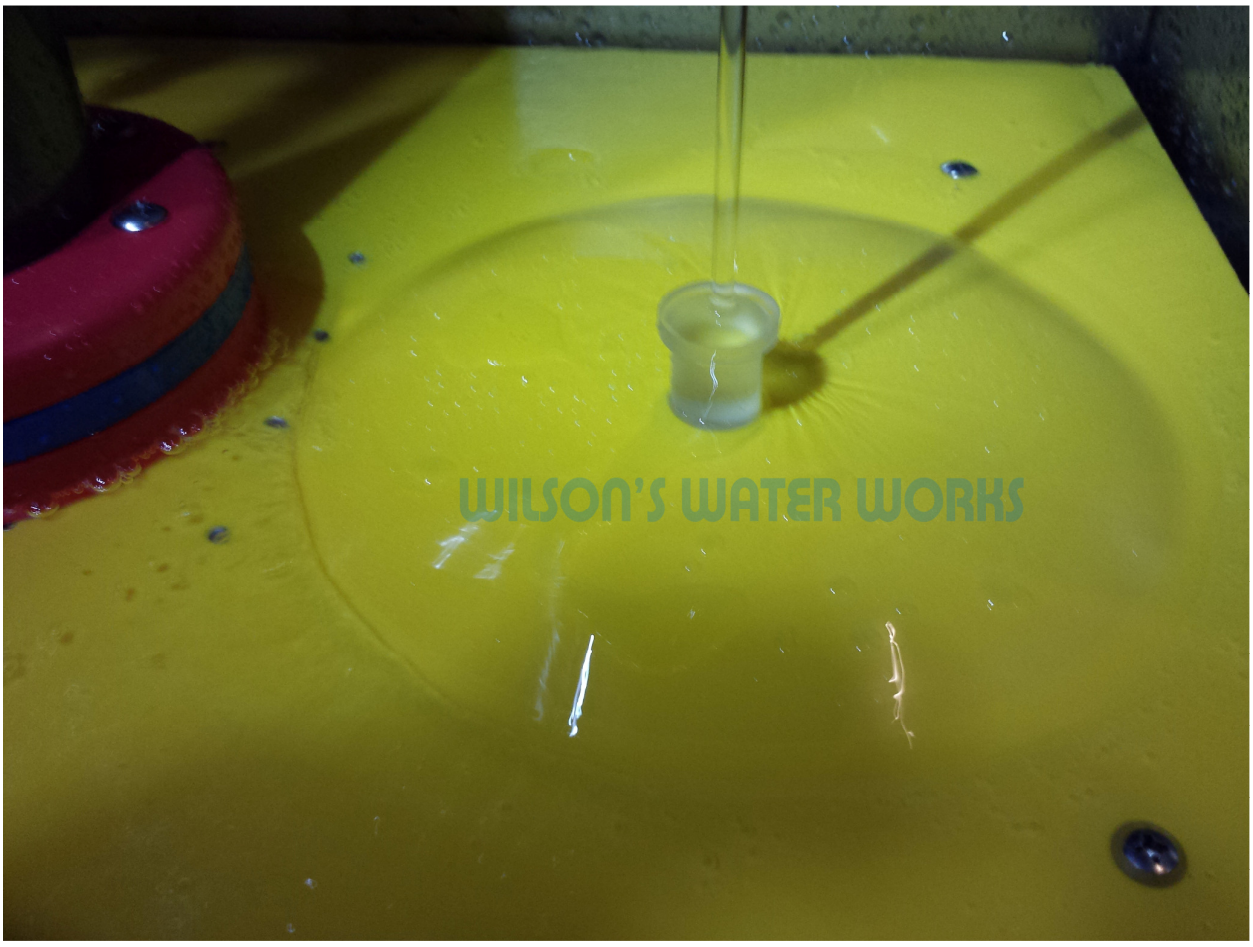
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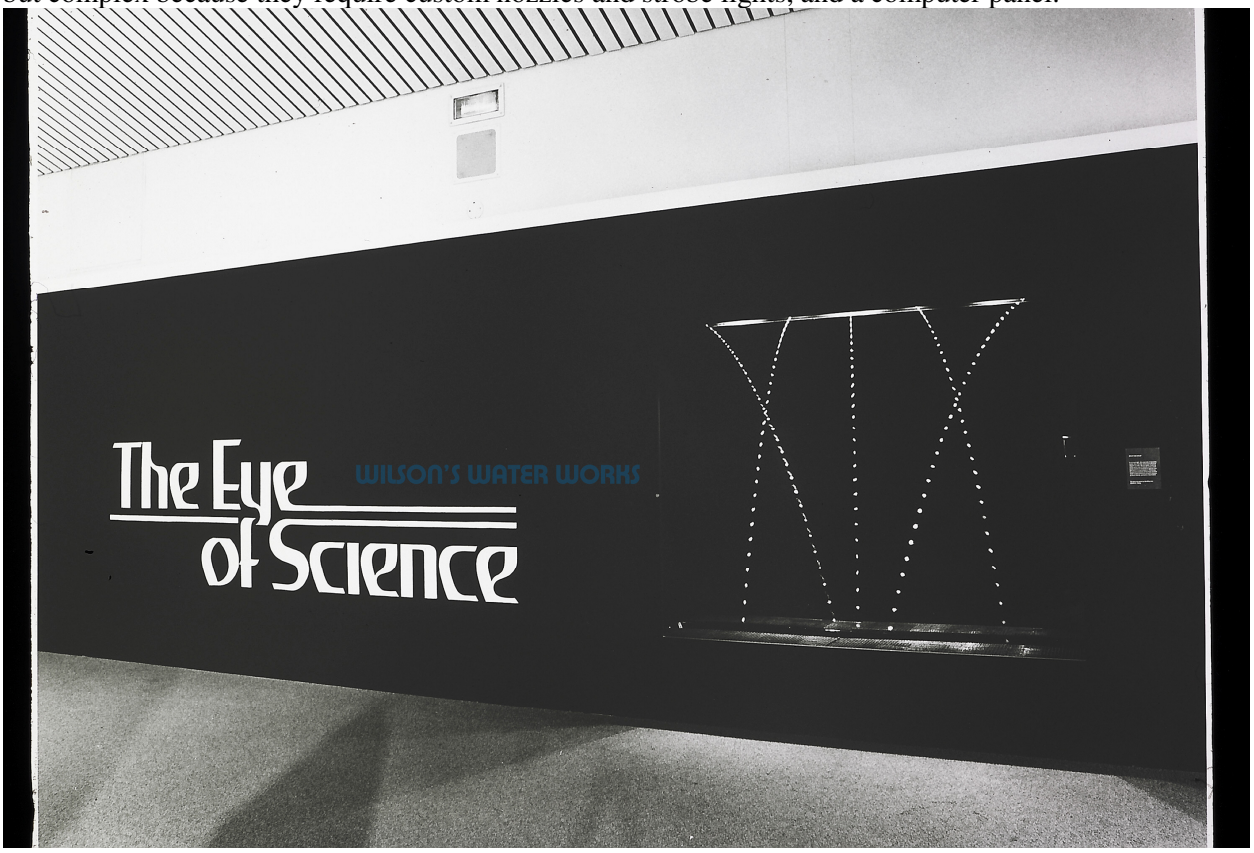
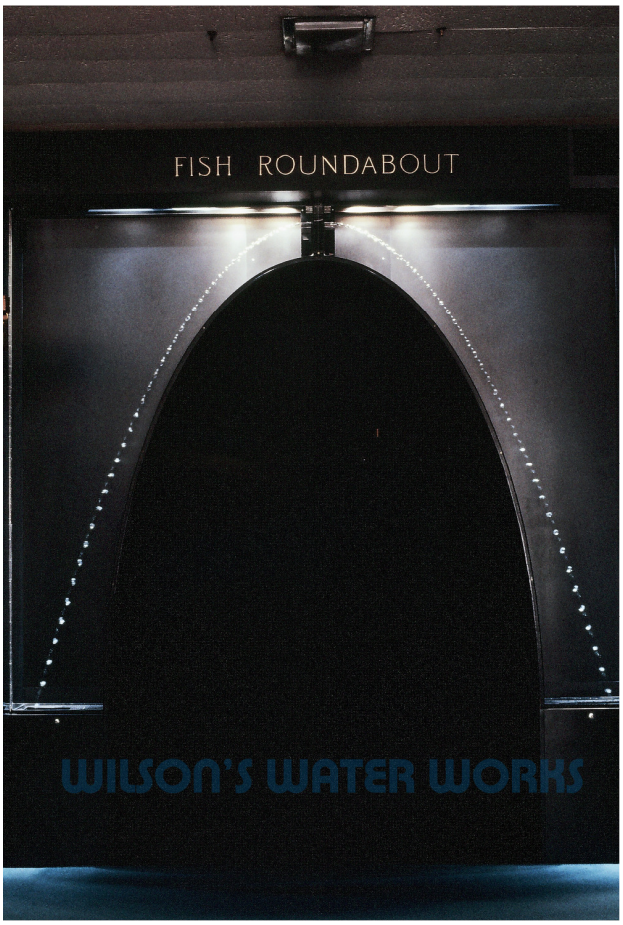
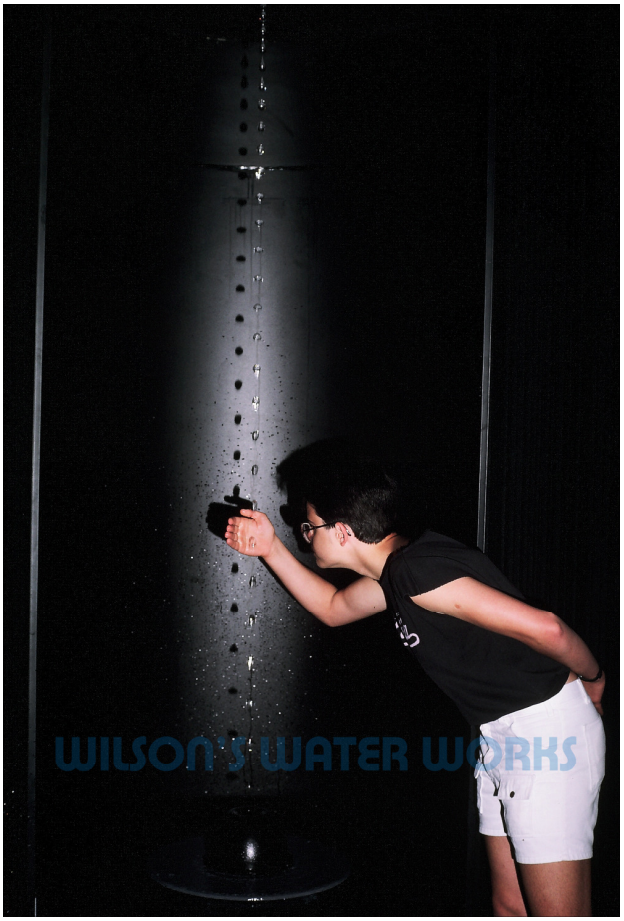
Water Exhibits and Sculptures By Allan Wilson, Wilson's Water Works

Stop The Drop: California Academy Of Sciences, San Francisco, 1982
Steinhart Aquarium, CAS, San Francisco, 1984
Three different Ripley's museums, 1986 & 1987
Exploratorium, San Francisco, 1987
Saskatchewan Science Centre, Regina Canada, 1989
Technorama, Winterthur Switzerland, 1992

"Stop The Drops" are fountains with regular periodic streams of drops that are made visible by strobe lights. The drops look like big globs of glass and people try to pick them out of the air. When the strobes are lit at the same frequency as the drops, the drops appear to be floating in the air, although they are really falling down at a rate of about sixty drops a second. When the frequency of the lights is going faster than the drops, the drops appear to being going slowly upwards. When the frequency of the lights is going slower than the drops, the drops appear to be moving slowly downwards. These exhibits are beautiful, but complex because they require custom nozzles and strobe lights, and a computer panel.

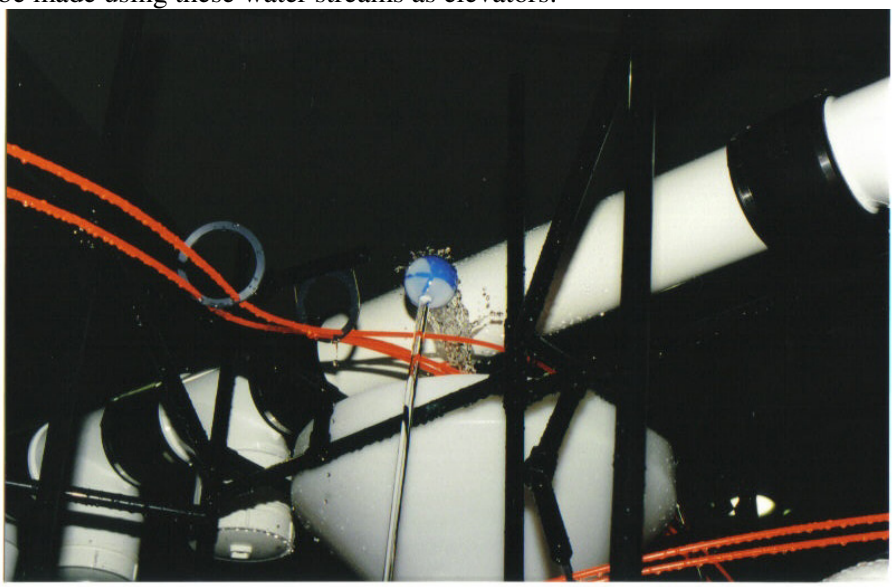


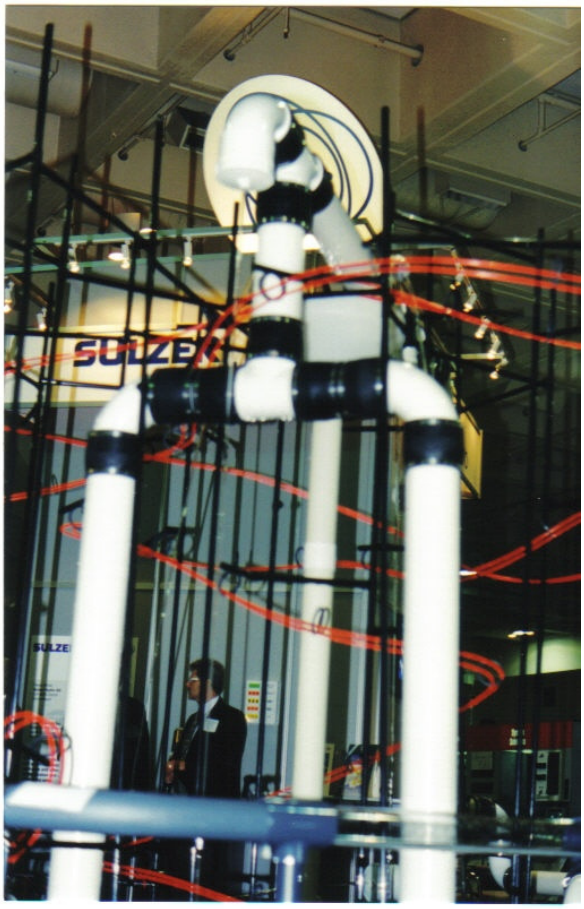

FISH ROUNDABOUT
WILSON'S WATER WORKS


WILSON'S WATER WORKS

Ball Works One: Sulzer Booth @ Water Power '95 Show, San Francisco, 1995

"Ball Works One" was a temporary installation at a water-power trade show in San Francisco. There were two streams that raised plastic balls up about nine feet in the air where they would fall off onto two different roller coaster tracks. One stream balanced the balls until another ball would roll in at the bottom and take the water, and the other stream would drop them off on the track when the balls reached the top. The balls on one track would roll until they got to the other nozzle and then be lifted back up again to start the journey down the other track. There was also a turgo wheel turbine that turned a little generator that made electricity to run an HO gauge locomotive on a track that was inside of the clear handrail around the pool that the sculpture was in. I called it "Ball Works One" because I have ideas for many other Works to be made using these water streams as elevators.





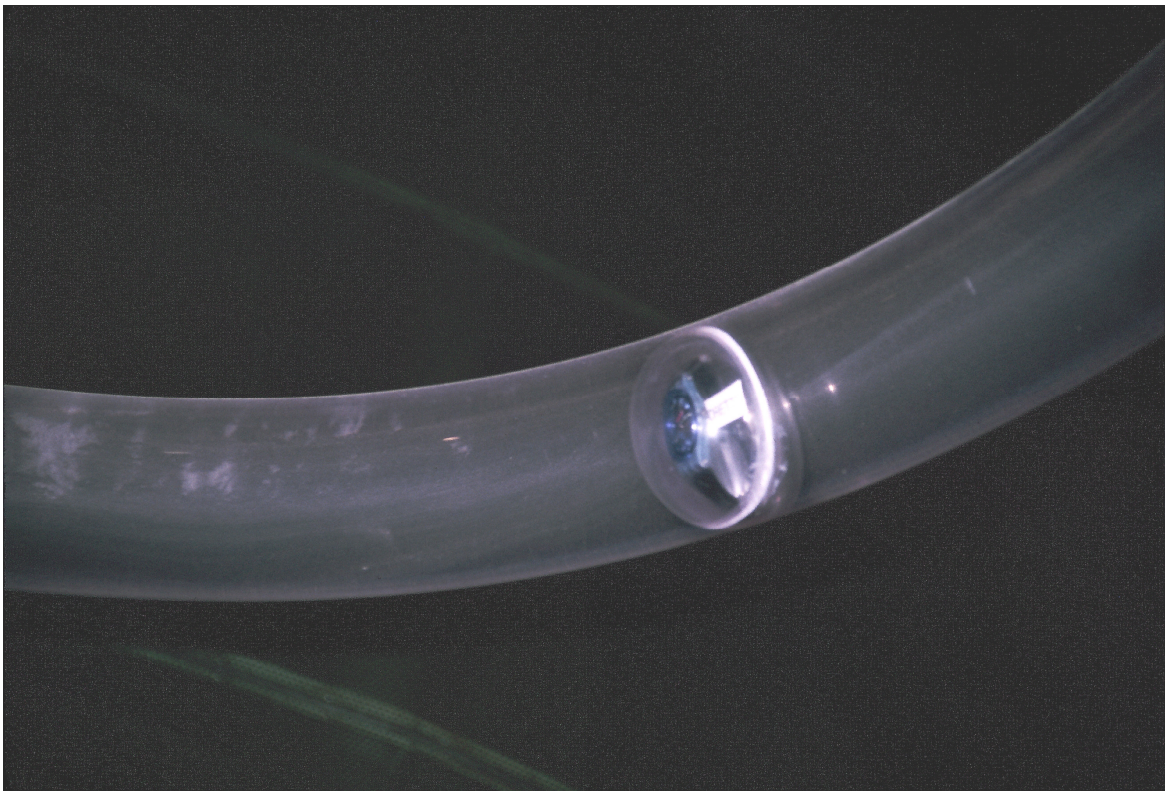
Interrupted Arch: Landis & Gyr Company, Zug Switzerland, 1996

The arch was a laminar stream that jetted up into the air and arched over into a shallow pool of water. The arch would run at full height for a few minutes, and then slowly recede until it only went up a few feet. While it receded it maintained the same parabola shape but got smoother and quieter as it got smaller. Visitors could push a button to interrupt the arch so as to get little chunks of water flying through the air.

The large nozzle and framework seen in the photos were supposed to be beneath floor level, and there would have been a slot in the floor instead of a pool. In the last month of fabrication, the customer decided that it was too expensive to dig the hole. It would have been so much nicer to have the stream emerging from a slot in the floor.

Watch Time Travel: Swatch Pavilion, Expo '98, Lisbon, 1998

Swatches were sealed in 70mm plastic balls that were balanced to be neutrally buoyant, so that the balls would glide along with water in tubes all around the pavilion. The tube was a very long siphon. At the end of the tubing run, the balls collected in an Archimedian spiral corral. The balls were then dropped into a cup attached to a Cardan-gear mechanism ball-lifting machine that raised the balls and dropped them into the siphon tube at the top. The water and balls in the tube glided along at about one meter a second.

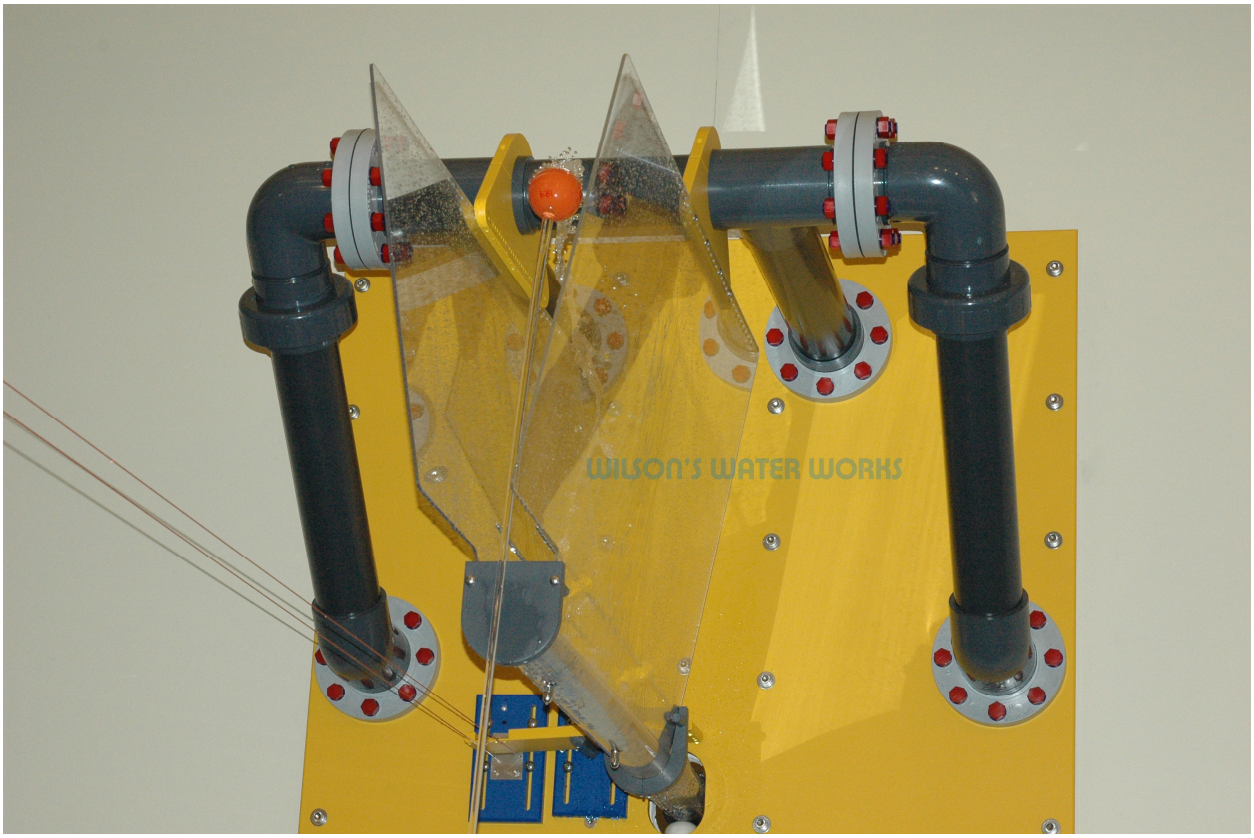


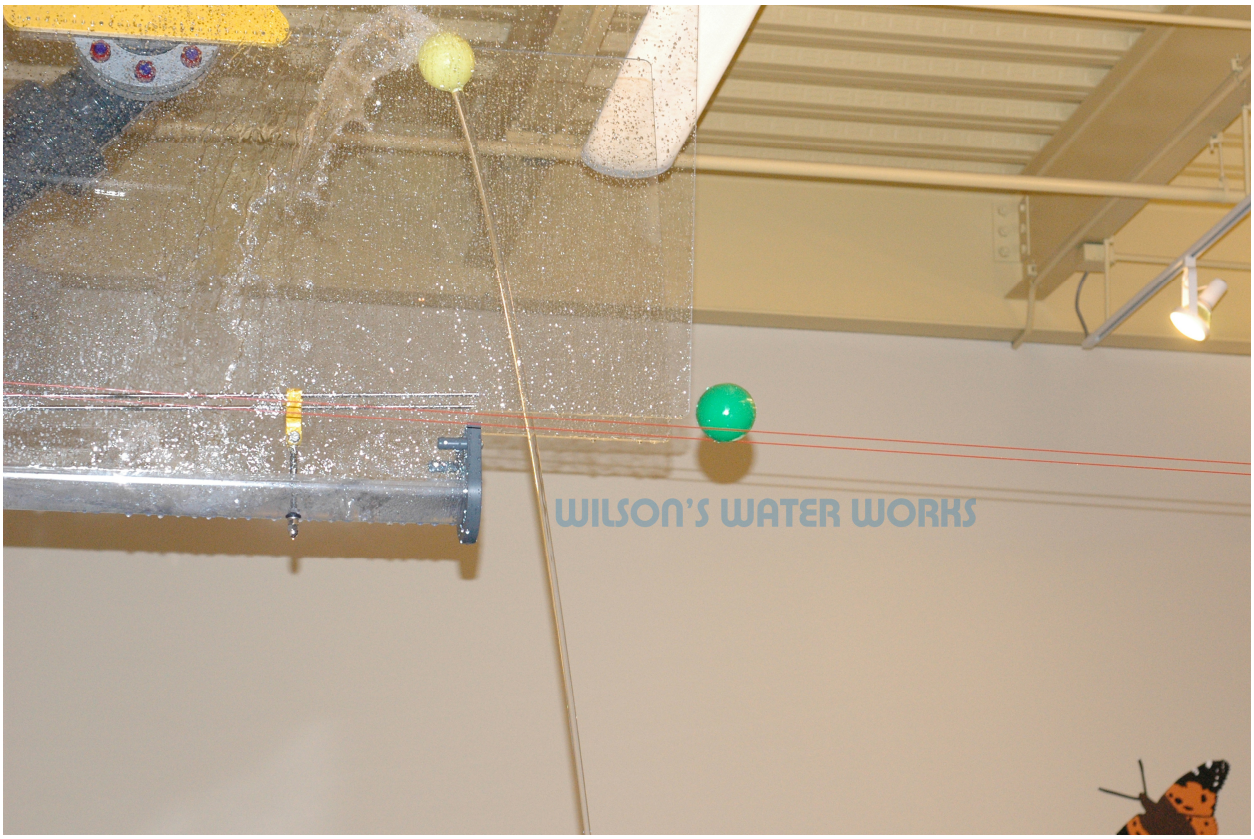
Scuba Diving Scuba Swatches: Swatch Pavilion, Expo '98, Lisbon, 1998,No Photos

This was a giant Cartesian Diver exhibit where Scuba model Swatches were hung below glass open bottom floats in a ten-foot tall clear pipe filled with water. A visitor could increase the pressure in the pipe by pumping in air. When the pressure in the pipe was increased, the air in the floats was compressed and the watches descended. When the pressure in the pipe was returned to normal, the watches rose to the top.

Balls On A Water Stream: Water Ways Exhibits**,** Children's Discovery Museum of San Jose, 2003
Later Called Laminar Lifter: CT Science Center, 2009, WonderLab, 2010
Children roll balls down a stainless steel track where the balls roll into a laminar water stream. The stream jets the balls up to about ten feet above the floor where most of the balls balance on top of the stream until they are replaced by the next ball coming up. The ball that was previously balancing falls on to a short track and rolls out to the side a bit and then drops off into the water tray below.

In the toddler area of the "Water Ways" exhibit room there is a small pad of three little streams that can hold up three balls. When the balls fall off a stream they can roll over to another stream and go up. When there are six or so balls taking turns they look as though they are being juggled. The heights of the streams are as low as possible so that toddlers can play without reaching up, and thereby having water run down their arms.


WILSON'S WATER WORKS


WILSON'S WATER WORKS

Open Vortexes: Water Ways Exhibits, Children's Discovery Museum of San Jose, 2003
CT Science Center, 2009, WonderLab, 2009

Cylindrical acrylic tubes hold water that has been injected tangentially into the bottom of the tube so that the water rotates and forms a vortex that is open at the bottom. The water falls through a hole in the bottom and fans out into a cone pattern before landing in the water in the collection tray. Plastic balls can be thrown onto the top of the vortex and watched as they float around and then go down the hole in the middle. By adjusting the rotation speed of the vortex, the center hole can be sized so that the balls get stuck on their way down and hover for a bit before falling out the bottom. The Large Open Vortex in the below photos is three feet in diameter and four feet tall. The balls hover in the air core when the core is made narrow.

In the toddler area of the "Water Ways" exhibit room there is a small open vortex that is low enough for small children to get their arms into it to influence the flow. Thus toddlers are able to experiment with the flow and to benefit from the immediate feedback of cause and effect.

Besides the four exhibits just mentioned, I was involved in the prototyping and design of the other exhibits, as well. I designed, drew in AutoCAD, specified, and oversaw construction of the water system for the Water Ways exhibits.

The Open Vortexes at the CT Science Center are improved by having rotatable nozzles so that the flow can be directed in either direction, or even towards the hole in the middle.


WILSON'S WATER WORKS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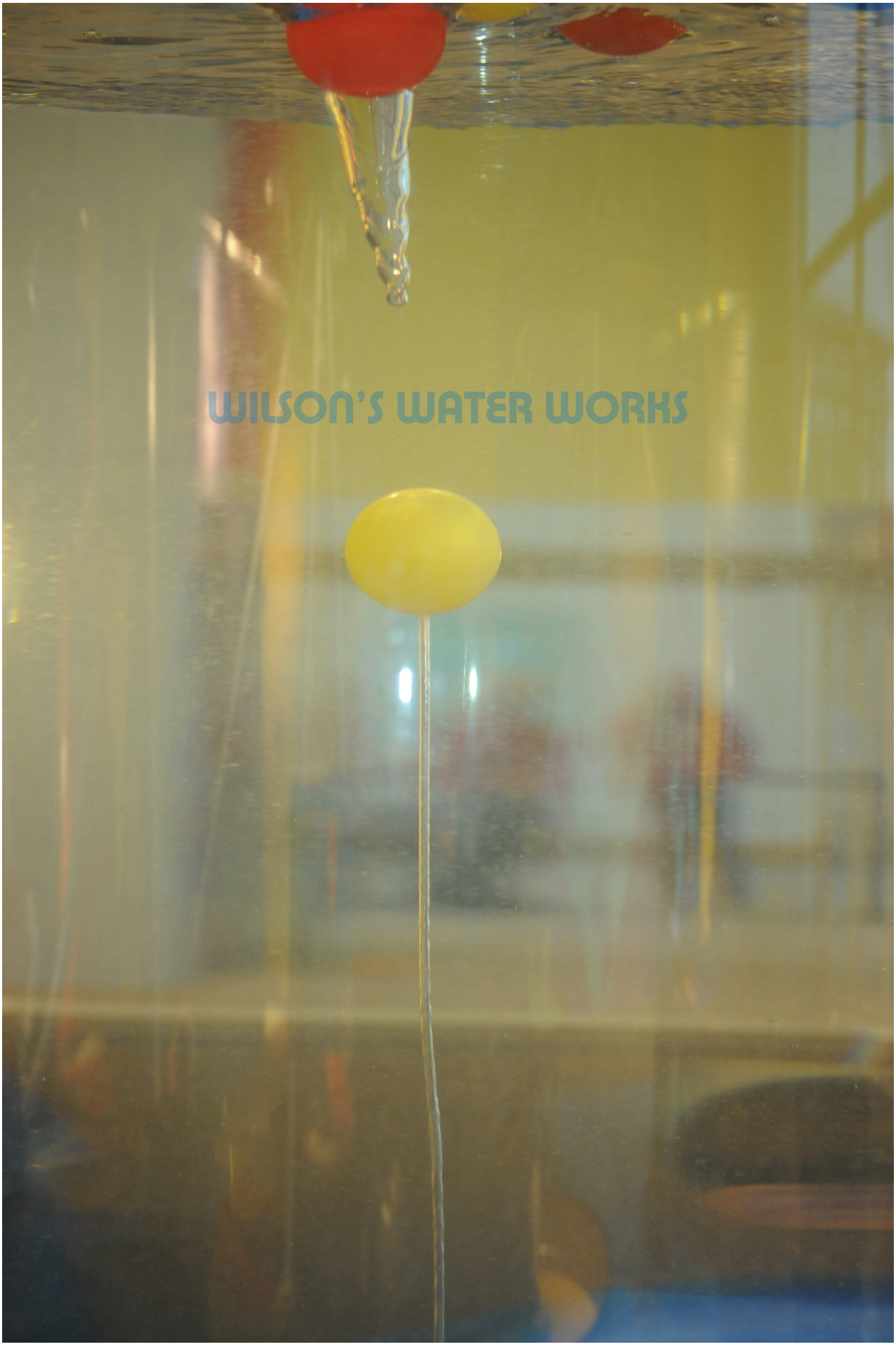
Please leave
all cups and
water toys here.
Thank you!


WILSON'S WATER WORKS


WILSON'S WATER WORKS

Morphable Stream: CT Science Center, 2009, WonderLab, 2009

This is a new concept for forming water bells that is more open-ended and interactive than the usual water bell exhibits found in many museums because besides bells other shapes and streams can be generated as well. A visitor can form the bell by holding a disc in the path of a laminar stream that jets up about 18" above the tray. By moving the disc over the jet all sorts of shapes can be formed. (See photos) Various other objects held in the stream modify the stream into other interesting shapes and patterns. Also, beautiful smaller jet patterns are formed by holding perforated sheets in the path of the stream.

Sons Trying Out The Concept

Finished Exhibit At WonderLab

Build-A-Channel: CT Science Center, 2009, WonderLab, 2010

At the top of incline planes water emerges from small holes to flow down the plane's surface. The planes have bumps on it that fit Lego Duplo blocks so that the blocks can be built up into many structures including channels, pools, dams and spillways.

Children Trying Out Concept

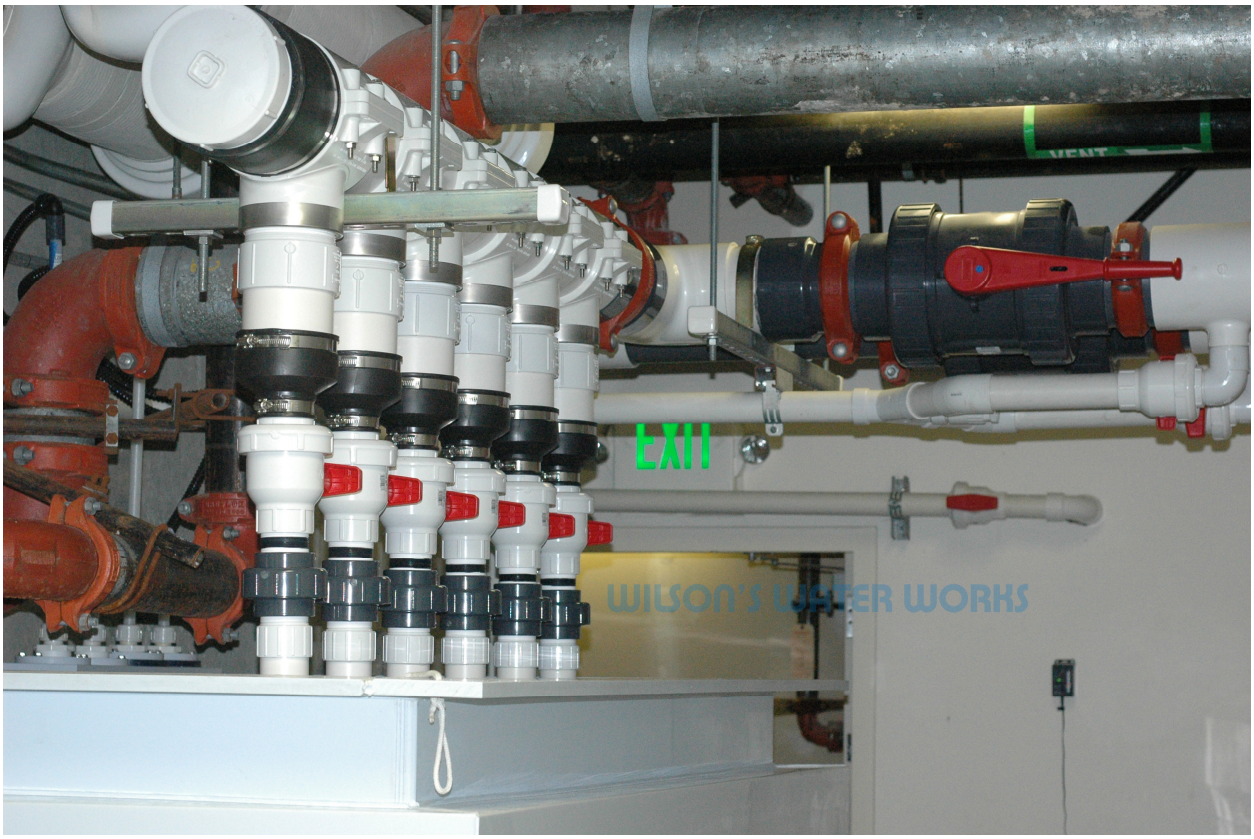
Pour & Explore: CT Science Center, 2009, WonderLab, 2010

Pipes, with various types of nozzles attached, jet water for visitors to fill beakers and other containers. One nozzle that has a line of closely spaced holes, and the streams from these holes can be made to flow together into a sheet. Another pair of nozzles can be adjusted so that one nozzle is higher so that visitors can explore what happens when it is. Another nozzle has a line of small holes, and when it is made vertical the streams jet out to different distances like the classic "hole in a can" demonstration.

Exhibit Water Systems:

Here are some photos of the exhibit water system at the Children's Discovery Museum of San Jose. In 2003 I designed this system, specified most of the parts and equipment and plumbing, and showed the exhibit department director how to do a proper job of assembling the pipe and fittings. Some of the custom parts I made myself. One ten horsepower cast iron pump efficiently supplies the water to all the exhibits upstairs.


WILSON'S WATER WORKS


EXIT
WILSON'S WATER WORKS

Water Sculptures and Fountains By Others For Which I've Been Integral

Pandora: By William Maxwell, Palace Of Fine Arts Lagoon, 1988

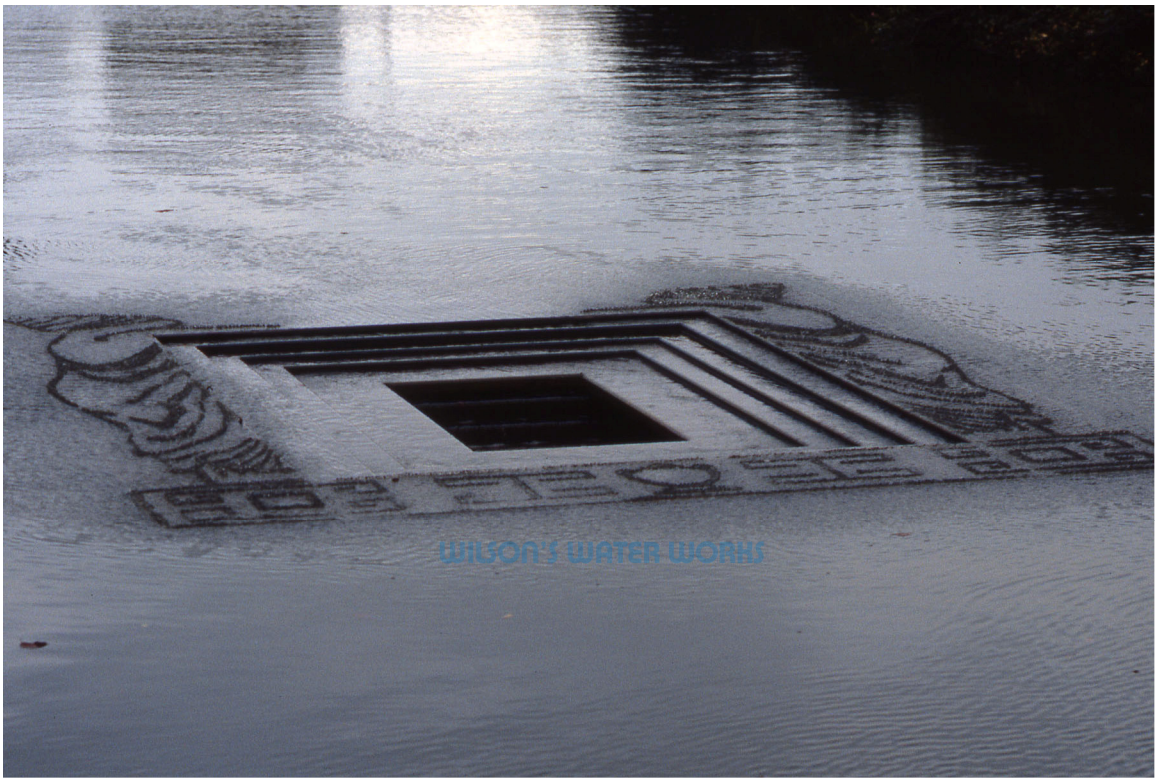
While I was at the Exploratorium working as an exhibit developer, the artist William Maxwell became an artist in residence. He arrived with two very interesting ways of forming an image on the surface of a body of water, and had already done a few small sculptures using these techniques.
One of the techniques, that he called "negative space", was a way to form an image by lowering the water level in a contoured shape. Imagine if there was a large bowl just under the surface of a lake. When you looked out into the lake the bowl, being under the surface, would not be visible. If then the water in the bowl was pumped out very quickly so as to drain the bowl faster than water can flow over the top edge, a circular hole would be formed on the surface of the lake. Mr. Maxwell had already done a small sculpture, using a pump that pumped around 15 gallons a minute, in the shape of a lizard.

The other technique, that he called "pixilated image", was a way to form an image on the water's surface with hundreds of tiny water jets popping out from a box that is just below the surface. If the jets are off, one sees nothing when looking out to the lake, but when the jets are on the image pops into view.

Mr. Maxwell, thinking that the Exploratorium could help him take his ideas to the next level, conceived a rectangular piece that was twelve by fourteen feet with a negative space staircase that stepped down into the lake. He called it "Pandora."

I designed an underwater pumping and pneumatic control system that pumped one thousand gallons a minute and so could run the negative space and all the pixel images at once. Dave Fleming (another exhibit developer) invented three very clever valves. One valve shifted the pump suction from the negative space to the lake so that the pixels could be run without the negative space draining. Another valve, operated by a large float, added water to the bottom of the negative space after the space was drained so that the pump got enough water without sucking air from the bottom of the staircase. The third valve was an air operated regulator that kept the pressure in the pixel manifold constant when more or less of the four pixel sets where on or off. The system was controlled by a programmable controller based panel located in a nearby building with airlines and power going to the lake in an underwater conduit. Pandora was a massive undertaking for the Exploratorium, and several other people from the shop helped to build and install it in the lake outside the museum.
The San Francisco parks department authorized the piece to be in the lake for six months, and since it was so popular they extended permission for another six months.


WILSON'S WATER WORKS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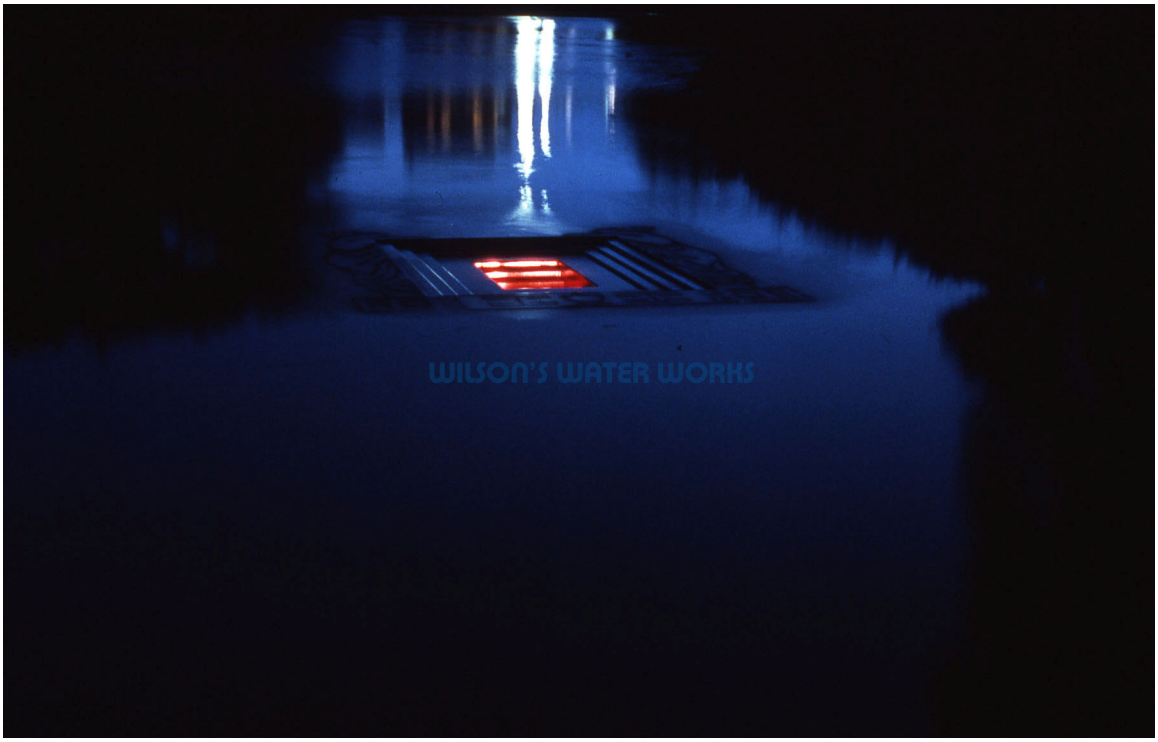
WILSON'S WATER WORKS


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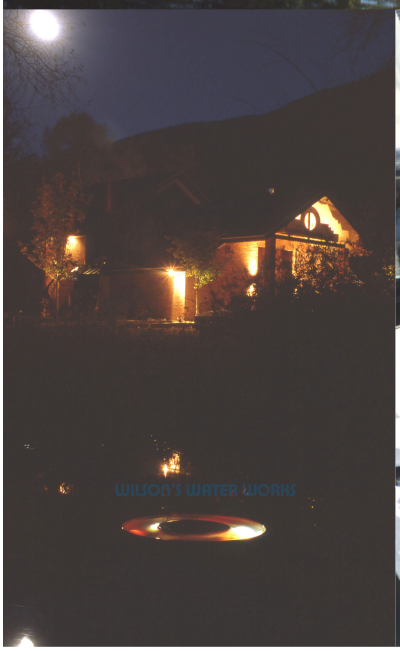
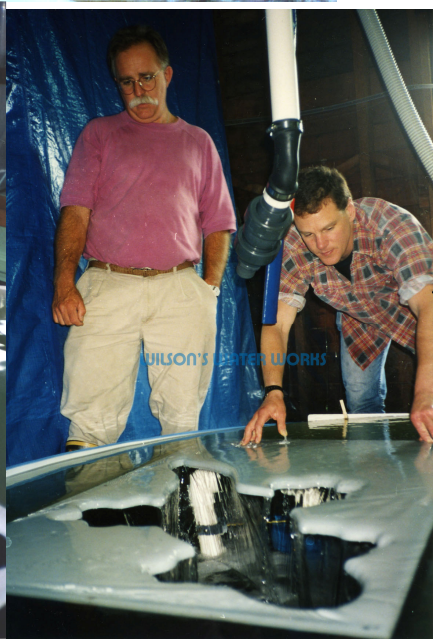
Luminous Ring: By William Maxwell, Aspen Art Museum, 1988

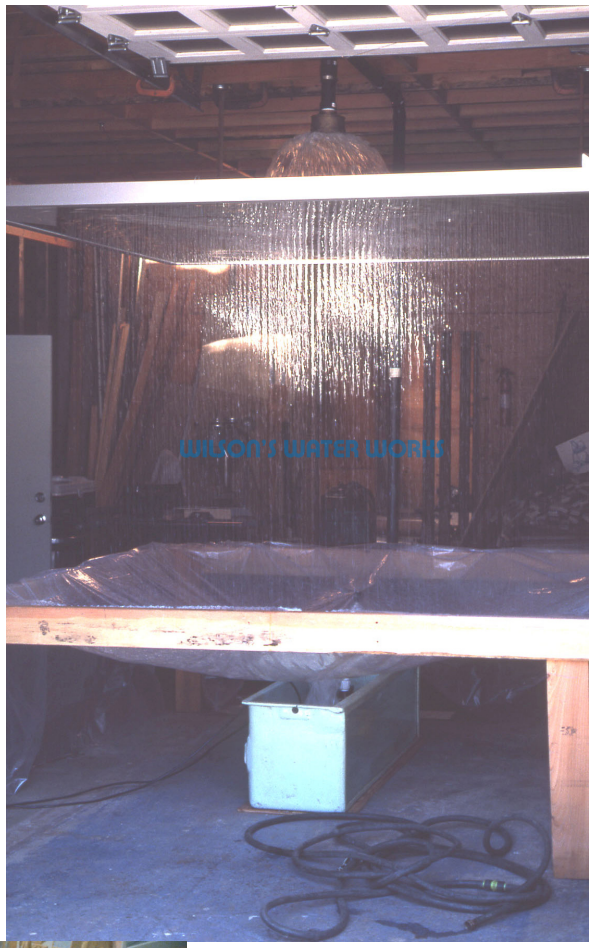
When Mr. Maxwell arrived at the Exploratorium he also had a commission for another negative space sculpture that he called "Luminous Ring." We used the Luminous Ring to test the float valve concept, and to get aquatinted with working in the lake outside the Exploratorium. I traveled to Aspen to install the sculpture in the lake outside the art museum.





Rain Column: By Douglas Hollis, Rincon Center San Francisco, 1988

For Doug's concept of a column of rain falling five stories into a pool, I conceived of the over head tray that forms the column of rain and also the dimple of a pool that the water falls into. I designed the pumping and treatment system, and oversaw its installation. I fabricated some special parts and pipes that allowed the pump equipment to be near the supply pipe, and still meet height regulations. I also caught the inside mechanical contractor (a very large company) in submitting a dishonest bid. They were kicked off the job, and an honest plumber assembled the pump room and piping for one seventh the cost. Doug built the original rain tray. In 2004 I redesigned the tray using better materials and had the many holes drilled automatically from my CAD drawing.



Unspecific Gravity: By Douglas Hollis, U. of South Florida, 1998

This fountain, outside of the chemistry building, has a dozen water molecule sculptures that slowly rotate while spraying a fine mist.
Doug starting to design the workings for this sculpture, and so by the time he came to me for help the piping and pump where already installed. He wanted to use water power to rotate the molecules, and had bought a heavy duty brass rotating sprinkler head in the hopes of adapting it for use in the sculptures. The supply pipe was in and he wanted to use the pump he had bought, and have all the workings inside of the 3" stainless pipe that supports the molecules.

The mechanism I designed uses a venturi to convert a small, higher pressure flow from the pump to a larger, low pressure flow that provides motive water for a small pelton wheel turbine that rotates the molecule through a planetary gear speed reducing assembly. A tube diverts a small flow of the higher pressure pumped water up to where it can go into the rotating shaft and make its way to the ten misting nozzles that are inside the molecule. The central oxygen atom has eight, and the two hydrogen atoms have one each. I designed and made the first ten nozzle adapters that hold the nozzles recessed just inside the copper shells of the atoms. I had a local automated machine shop make 120 more, and Doug braised them into the shells and hooked up the flexible tubing on the inside of the atoms. I made all the parts for the lower hydropower drive mechanisms.

Mountain Mirage: By artist Douglas Hollis, Denver Airport, 1999, It's been removed to make room for transit system where the pump room was.

This fountain has 3232 vertical water jets that shoot to different heights to simulate the Rocky Mountains with water. Doug drew a simplified topographical map that I scanned into the computer and assigned a height value to each jet. I designed, prototyped and manufactured the nozzle-valve assemblies, and designed and drew in AutoCAD all the piping and support tiles in the pool. I emailed the drawings to Colorado for assembly by local contractors.


WILSON'S WATER WORKS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