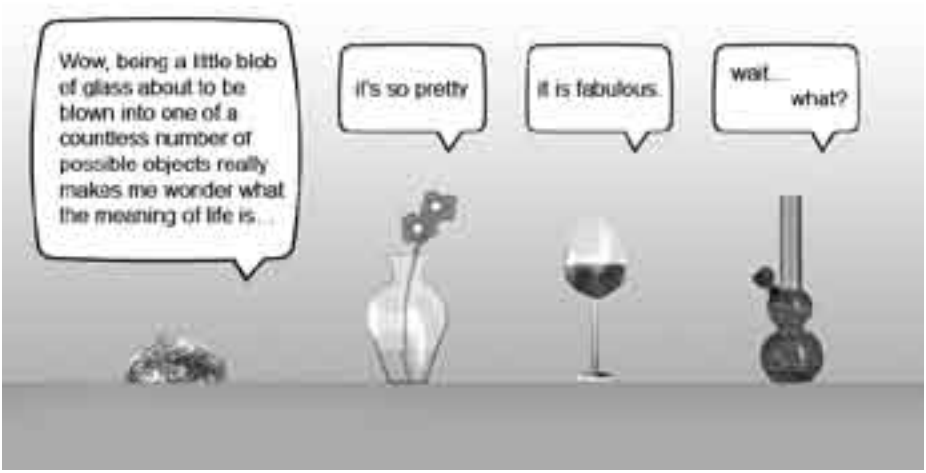

A BRIEF HISTORY OF GLASS

Glass has been around long before humans roamed the earth. In fact, glass has been around longer than any creatures roamed the earth. Natural glass, like obsidian, is formed from the heat of volcanoes that fuses bits of rock and sand. Like many animals, humans were amazed by this shiny object and wished to make more. And because of our opposable thumbs, we did just that. Actually, historians believe that the discovery of the glass making process was due in part by accident by the Phoenicians. According to Pliny the Elder[1]:

> *"The tradition is that a merchant ship laden with nitrum (soda and potash) being moored at this place, the merchants were preparing their meal on the beach, and not having stones to prop up their pots, they used lumps of nitrum from the ship, which fused and mixed with the sands of the shore, and there flowed streams of a new translucent liquid, and thus was the origin of glass."*

Without our opposable thumbs, however, we never would have made the little oven that created the first glass. The Phoenicians used the liquid glass as a glaze over ceramics and transported these materials throughout their trade route; their being avid sailors the practice spread quickly and other countries figured out how to better utilize glass. Egyptians made the first colored glass by mixing it with different oxides. Until about 50 BCE, glass was an expensive commodity because it was difficult to create. But Romans in Phoenicia figured out a faster and more efficient way, known as glass-blowing, which has not changed much to this day. The Romans realized that since glass was malleable during the beginning stages, that they could stick it on the end of a hollow tube and inflate it like a bubble. This allowed glass to be mass-produced because it could be formed into a hollow mold or freely shaped with tools. With this discovery, people made glass of all different shapes and sizes, and it was good.

Ok, so we know where cups came

1. Agricola , Georgius, De Re Metallica, translated by Herbert Clark Hoover and Lou Henry Hoover, Dover Publishing

from, but what about non-cups? There are many ways that ancient people used glass, but since not all of them are exciting, let me go over the interesting parts. Millefiori (Italian for "thousand flowers") was in fact developed by the Egyptians during the 2nd century BCE. It's made by heating a bunch of thin glass rods of different colors until they fuse together. Then you pull them into little flowerlike designs which are then applied to more glassware like vases or bowls. It leaves a beautiful pattern and is used today for things like paperweights, beads, and marbles.

Paned glass occurred during the 17th century in France (a bit before the Industrial Revolution) and is made by casting and rolling glass. As the process improved, people could produce thinner and longer sheets. Windows are made in much the same way, though bulletproof glass is made from a plastic mixture.

One more? Okay. New Jersey, famed for not much besides Atlantic City (just kidding of course) in fact had a huge glass blowing factory between 1781-1870. They made tableware and window glass, and used mainly the natural color: green and brown for bottles and aquamarine for window glass. They also had a technique that was peculiar to South Jersey called "lily pad." An extra coating of molten glass was put on the bottom of a cup or jug and worked into points which made it resemble its namesake.

Glass making hasn't changed too much, though we use machines now to make most of our windows and cups for us. There's a lot of glass out there, and everyone has at least one shiny object whether it be a mirror, cup, or computer chip. Plastic may make it happen, but glass is a lot more fun to look at.

Now Beta Testing: Microwaveable Glass

Glass melting is an energy consuming and environmentally unfriendly process, and for years, people have been trying to find new technology to make it easier. Enter the Czech Republic. 100 km north of Prague (that's 62.14 miles to us Americans) a Dr. Milan Hajek made a technical breakthrough by utilizing microwave technology to melt glass.

Although many people have toyed with the idea, no one had made the breakthrough discovery that Hajek did. Hajek realized that glass and ice were similar and stated in a press conference, "Glass is like ice. If you put a cube in the microwave it won't melt…but if there's a drop of water on the ice, the drop will heat up and melt the whole cube." It took two years of work, but Hajek found the drop of liquid that would melt glass. He identified a metallic compound that kick-starts the melting process and then could be removed later without a trace.

This new technology saves glassmakers up to 50% in energy costs and also spares the environment the emissions produced from the traditional gas furnaces. Besides this, any type of glass can be melted (cullet or batch) and because there are different reaction mechanisms and kinetics, this also allows for selective heating. Initially he created two furnaces: one that can handle 10kg (22lbs) and a larger that can handle up to 50kg (110lbs). He is working on even larger ones that can handle up to 350kg (770lbs). There are currently furnaces in operation in the US and the patent is granted in over 60 countries