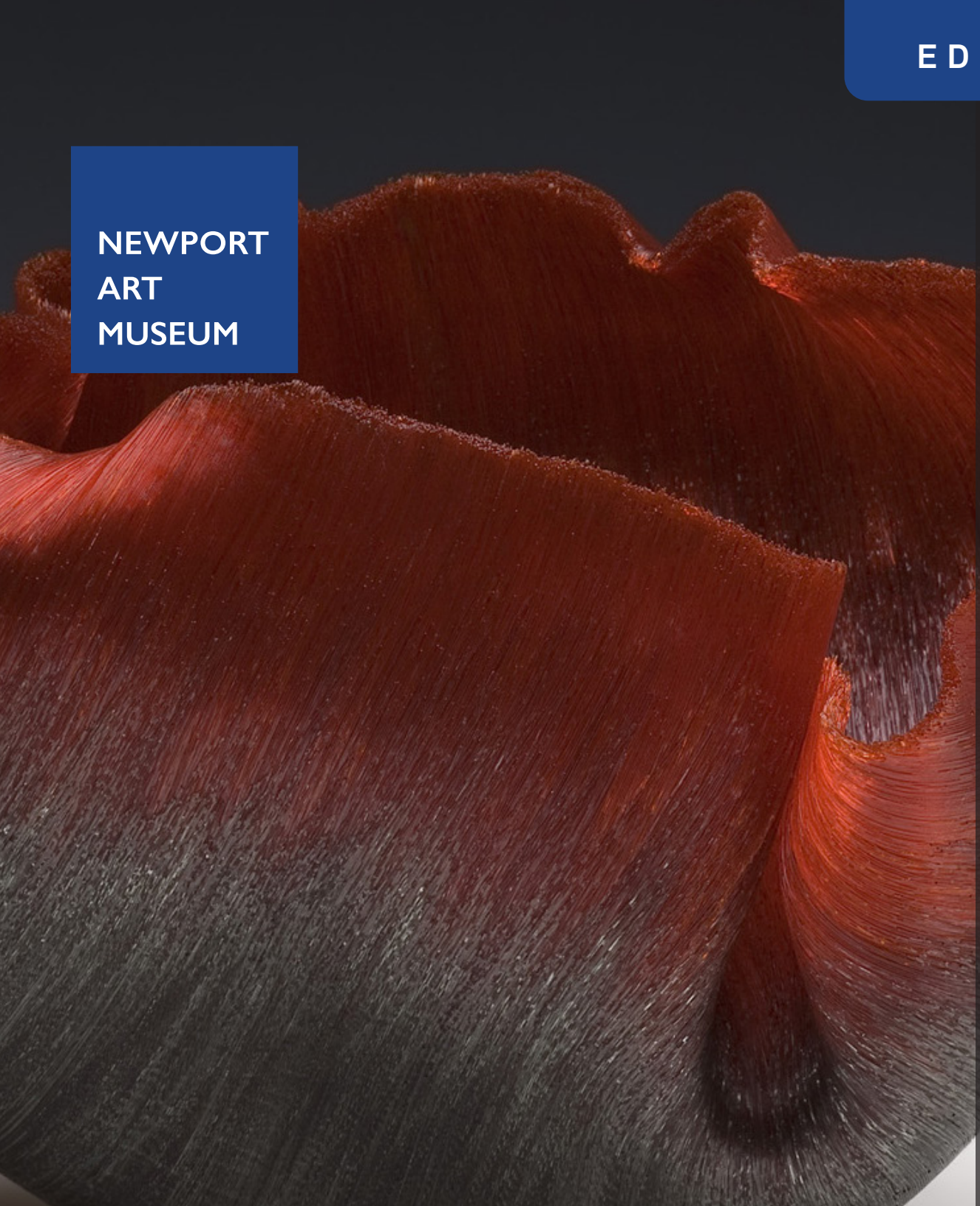
EDUCATOR RESOURCE

NEWPORT ART MUSEUM



SCIENCE OF ART

Featuring

Toots Zynsky, *Ansa*, 2008

About the Artist

Toots Zynsky,
American,
b. 1951
Ansa, 2008

Filet-de-verre (fused and thermo-formed color glass threads), Gift from the Dr. Joseph A. and Helene Chazan Collection
2008.009.003

Mary Ann "Toots" Zynsky, born in Boston, MA is one of the most formidable and exuberant glass artists of our time. The remarkably accomplished artist was drawn to glass blowing when she first witnessed the process in the studios of the Rhode Island School of Design. Her works are known for their unmatched explorations of color and form, and her contributions to the study of glass as a material have not only produced unique works, but have influenced the development of new inventions. Zynsky and her team's futile attempts to manually pull glass by hand led to the development of a thread-pulling machine that could create very thin and uniform strands of glass fibers, also known as **filet de verre**.

Zynsky's artistic process begins with thin strands of glass fibers. Zynsky then layers and fuses these threads together in a special **kiln** and later manipulates, molds, and shapes them into vessel forms. Zynsky's most recent works use colored glass threads to capture the vibrant colors and shape of Earth's most endangered birds.

Later, Zynsky became one of the only women in a group of pioneering artists to study with renowned glass artist, Dale Chihuly. While earning her BFA at RISD, she also helped Chihuly found the Pilchuck Glass School in Washington State, the founding of the school would eventually help establish studio glass work as a mainstream art form. In 1980, she became the assistant director and head of New York Experimental Glass Workshop, now known as UrbanGlass in Brooklyn, New York.

Zynsky's work is included in more than 75 international museum collections. Her work was the first piece of contemporary glass commissioned and acquired by the Museum of Modern Art in New York and was also acquired by the White House in 1993, now housed in the William J. Clinton Presidential Library. Other Museum collections include the Metropolitan Museum of Art and the Cooper-Hewitt in NY; the *Musée des Arts Décoratifs du Louvre* in Paris, the Stedelijk Museum in Amsterdam, the Victoria and Albert Museum in London and Australia's National Gallery of Victoria, and the Newport Art Museum. Zynsky is the recipient of numerous prestigious honors and awards including the 2015 Smithsonian Visionary Award, the Women's Center of Rhode Island Annual Women of Excellence Award in 2013 and the Rhode Island Pell Award for Excellence in the Arts in 2006.

Description of Artwork

Ansa is a wide bowl-shaped sculpture with a small base and organic, gently ruffled edge. It is about the size of a large bowl. It is deep red in color, with shades of black and deep purple towards its base. It is constructed of thousands of thin glass threads layered and fused together. The overlapped glass threads are oriented in the same diagonal direction, rather than criss-crossing each other, giving the surface a subtle swooping striped appearance. The rim of the sculpture's opening is about ¼" thick and is made up of the cut ends of the glass threads, similar to the ends of a blunt haircut. Though the glass threads are thickly layered, making the sides dense and largely opaque as the color darkens toward the base, light glows a brilliant orange-red through the rim. The interior of the sculpture is rounded and curved in at the rim, and the same color as the exterior.

About the Artwork

The majesty of Toots Zynsky's glass vessels cannot be separated from the innovative process by which she fabricates them. For her, the careful layering of glass threads on a round heat-resistant fiberboard plate is a meditative process, akin to drawing and painting. Fused inside a specially designed **kiln**, the process continues as she manipulates the glass disc with heat resistant "pillows," allowing it to slowly soften into a series of bowl-shaped forms. Eventually she turns the work upside down to slump over a mold and finally uses special heat-resistant gloves to manually squeeze the form while it is still inside the kiln, ultimately achieving the desired shape.

Zynsky is inspired by many things, including movement, nature, and music. Zynsky is a **synesthete**, which means she has a neurological condition that enables her to involuntarily see colors when she listens to music. She has used this intersection of two **cognitive pathways** - music and color - to inform the shapes and color choices of her vessels.

The title of the work, *Ansa*, is derived from both archaeology and astronomy. In Archaeology, the word "Ansa" means a looped handle, especially that of a vase. In Astronomy, it indicates the visible extremities of Saturn's rings, particularly on those occasions when they appear to resemble two handles. Ansa was one of a series of vessels Zynsky created during a time of deep personal loss. She nearly gave up making art altogether, so significant was her grief, but her son urged her to go to the studio and simply make something in red glass. Through the transition of deep red-black glass at the base to glorious orange-red at the rim, the *Ansa* series of vessels not only symbolizes loss, but also reflects glimmers of hope and healing.

The Science of Glass

Multiple scientific processes occur throughout the creation of glass. Glass is made by heating ordinary sand with recycled glass with soda ash (sodium carbonate) and limestone (calcium carbonate) in a furnace until it melts and turns into a liquid. Sand is mostly made of silicon dioxide and melts at 1700°C (3090°F). Soda ash is added to reduce the sand's **melting point**, which reduces the amount of energy required to heat it, but adding soda ash alone would result in a **water soluble** glass or glass that would dissolve in water. In order to prevent this, limestone is added, which allows the glass to harden completely. The result is soda-lime-silica glass, standard window glass.

These are typical colours, and can be affected by the type of glass as well as the concentration of the colourant. Combination with other elements and compounds can also have an effect on the final colouration of the glass.

Why doesn't **molten** sand revert back to sand granules when it cools? Molten glass goes through a complete transformation into a kind of frozen liquid, or **amorphous solid**, where the **molecules** are disorganized and randomly arranged. It has an entirely different structure with *some* properties of a solid, and *some* of a liquid.

Once produced, glass is transparent, fairly resistant to heat, **unreactive** or **chemically inert**. Glass can be reheated and recycled multiple times. **Elements** and **compounds** can even be added to glass when molten to give it different properties including durability, aesthetic differences, workability, and color change. For example, to change the color of glass, different metals or metallic compounds are added.

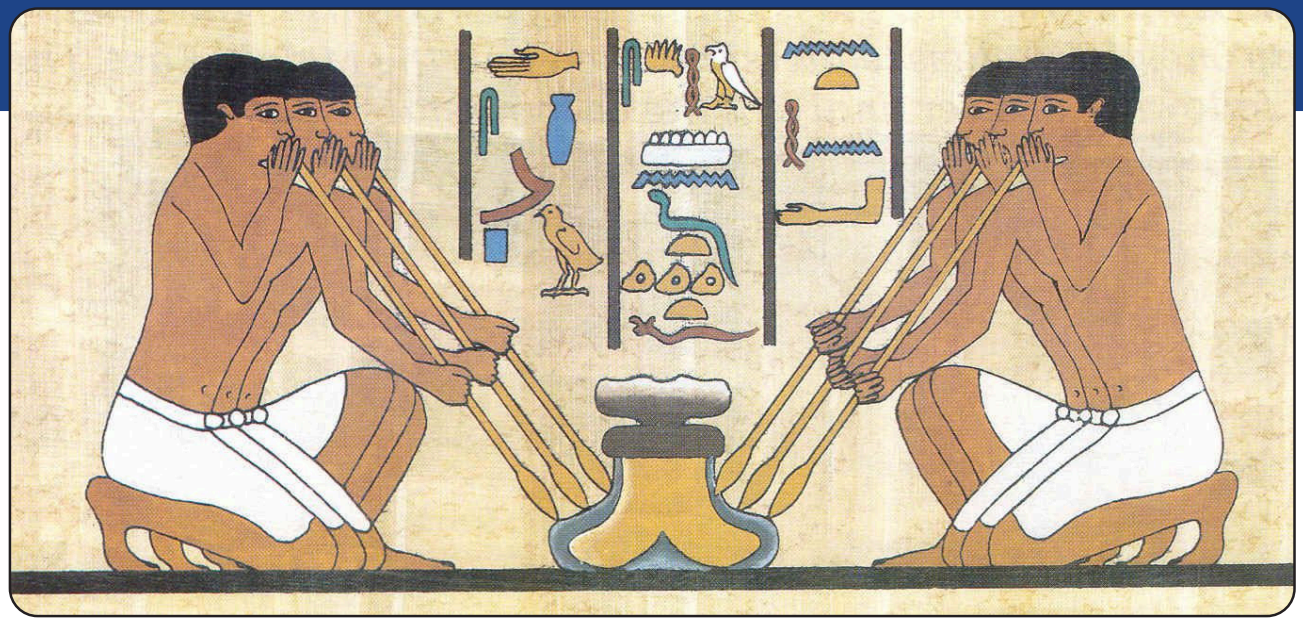
Art in Context

History of Glass

Evidence of small blown glass vessels and beads dates back as early as 3500 BCE in Mesopotamia and Ancient Egypt. Those early artisans experimented with adding different materials to the molten glass which resulted in the discovery of ways to achieve colored glass.

In the eighth century, a Persian chemist and alchemist, Abu Musa Jabir ibn Hayyan (721 CE Iran - 815 CE Iraq), often known simply as “Geber,” recorded dozens of formulas for the production of glass in specific colors. Known as the “father of Arabic chemistry”, he identified that certain metal oxides were the key ingredients for coloring glass.

Sclentific advances in the process of glassmaking as well as new artistic practices by artists like Zynsky continue to expand the ancient practice into a contemporary art form.



Art in Context

The Studio Glass Movement (1950s-1960s)

During the 1950s, ceramic and other craft media artwork began to gain in popularity, inspiring glass artists to make artwork, rather than strictly functional objects. This transition was led by artist and educator Harvey K. Littleton, who started experimenting with hot glass in his studio in 1958. He eventually realized that his desire to develop studio glassblowing in America could become a reality after encountering the small, historic glasshouses of Italy and experiencing limited success with his own glassblowing experiments.

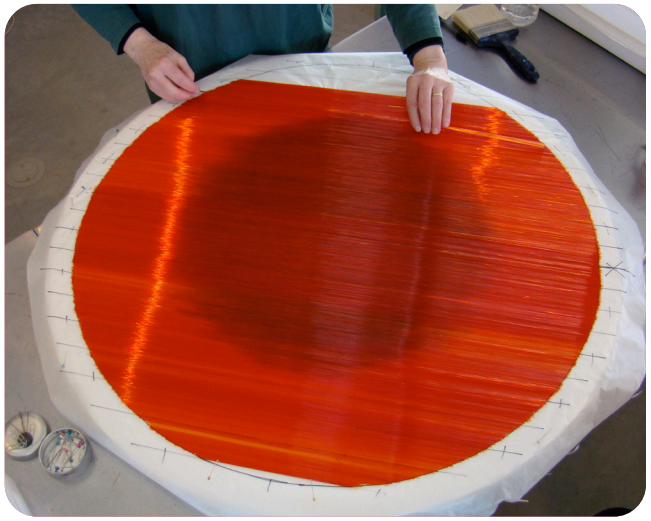
Littleton (right) joined forces with the Toledo Museum of Art, the site of the "birth" of the American Studio Glass movement. Glass research scientist Dominick Labino (next page) successfully devised a small, inexpensive furnace in which glass could be melted, making it possible for artists to blow glass in independent studios. Littleton subsequently started a glass program in the ceramics department at the University of Wisconsin in Madison. Some of his early students were Dale Chihuly, Marvin Lipofsky, and Fritz Dreisbach, all artists who have played seminal roles in raising the awareness of studio glass around the world. Some of Littleton's students, like Chihuly and Lipofsky, successfully took glassblowing in experimental and innovative directions. Focusing on the execution of artistic ideas in glass, they searched for ways to subvert the traditional associations between glass and functionality by exploring sculptural forms.

Most artists, however, were hampered by their lack of technical knowledge, and early studio glassblowing attempts were little more than artful blobs. Thus, American studio glass artists gradually shifted their attention to technique in the late 1960s, looking for guidance to Sweden, Czechoslovakia, and especially to Italy, countries famous for their glass-working expertise.

Dominick Labino at the 1962 workshop. Photo by Robert C. Florian. Collection of the Rakow Research Library of The Corning Museum of Glass.

Emergence, Dominick Labino, 1980. Collection of The Corning Museum of Glass (2007.4.165). Gift of the Ben W. Heineman Sr. Family.

The Process



The Process Continued

The finished product

Questions for Viewing

What do you find most inspiring - Zynsky's finished works or the processes by which she makes them?

Zynsky sees colors when she hears music. What kind of music do you think pairs well with *Ansa*? What about the music makes you connect it to the sculpture?

How would you describe this work to someone who cannot see it?

Are you or would you like to be a synesthete? In what ways do you think it would change your perception of the world?

What other natural resources could you utilize to create sculptural pieces?

Imagine the many ways that artists make art - what kind of non art-related skills did they need to learn to do what they do?

Glass threads are very fragile by themselves, but fused together are very strong. What examples can you find in chemistry that support this same idea?

Activities

INVENT: Zynsky's struggles with hand pulling glass led to the invention of a new machine that could create uniformly thin strands of glass more effectively. Design an invention that could help you execute a specific art technique, real or imagined.

MAKE: Select a piece of music, listen closely to all of the instruments, sounds, rhythms and mood. Try to visualize colors, textures, images, patterns, and create an artwork inspired by the music. Explain how you translated the sounds into a visual work using descriptive language.

WRITE: Creative Writing Brainstorm - answer the following questions with the first thing that comes to mind. (Remember, there are no wrong answers.) Discuss as a group.
What is the color of noise? What is the color of a quiet room? What is the taste of silence? How does green smell? Is yellow hot or cold to touch? What color are nightmares? If you could hear a cloud, what sound would it make? What does rock music taste like? Country music? Classical music? What is the smell of homework? Anger? Friendship? Danger? A crush? What is the color of a sigh? Laughter? Tears? If you could touch gossip, what would it feel like? What is the color of happiness? What does night smell like? Sunshine? Prejudice? What is the taste of applause?

STEAM Vocabulary

FILLET DE VERRE: layers of glass threads that are fused and hot-formed inside of a kiln

KILN: a furnace or oven for burning, baking, or drying, especially one for calcining lime or firing pottery

GLASS BLOWING: the craft of making glassware by blowing air into semi-molten glass through a long tube

SYNESTHESIA: a neurological condition in which stimulation of one sensory or cognitive pathway (for example, hearing) leads to automatic, involuntary experiences in a second sensory or cognitive pathway (such as vision). This may, for instance, take the form of hearing music and simultaneously sensing the sound as swirls or patterns of color." People who have synesthesia are called synesthetes

MOLECULE: a group of atoms bonded together, representing the smallest fundamental unit of a chemical compound that can take part in a chemical reaction

AMORPHOUS SOLID: a solid that lacks an ordered internal structure. Some examples of amorphous solids include rubber, plastic, and gels. Glass is a very important amorphous solid that is made by cooling a mixture of materials in such a way that it does not crystallize

UNREACTIVE / CHEMICALLY INERT: a description of a substance that is not chemically reactive. Most Group 8 or 18 elements that appear in the last column of the periodic table (Helium, Neon, Argon, Krypton, Xenon and Radon) are classified as inert (or unreactive)

MOLTEN: liquefied by heat, especially of materials with a high melting point, such as metal and glass

ELEMENT: each of more than one hundred substances that cannot be chemically interconverted or broken down into simpler substances and are primary constituents of matter. Each element is distinguished by its atomic number, i.e. the number of protons in the nuclei of its atoms

COMPOUND: a substance formed from two or more elements chemically united in fixed proportions

MELTING POINT: the temperature at which a given solid will melt

WATER SOLUBLE: the description of a substance that is able to be dissolved in water

ALCHEMY: the medieval forerunner of chemistry, based on the supposed transformation of matter. It was concerned particularly with attempts to convert base metals into gold or to find a universal elixir

Other Works by Toots Zynsky

Toots Zynsky
Alberello, 2014
“Filet-de-verre”
3 7/8 x 14 1/2 x 5 1/2 inches

Toots Zynsky
Volante, 2017
Filet-de-Verre Fused and thermo formed colored glass threads
13 5/8 x 29 5/8 x 15 1/2 inches

Additional Resources

Artist Website: https://www.tootszynsky.com

Zynsky Studio Video, Masters of Studio Glass by Corning Museum of Glass, Feb 2011: https://www.youtube.com/watch?v=IVKO8Jpup48

Synthesia Video:https://www.npr.org/sections/allsongs/2018/05/09/586386659/how-a-synesthetic-artist-sees-sounds-and-turns-music-into-paintings

Zynsky Studio Video by Voice of America, Jan 2020: https://www.tootszynsky.com/on-the-web,https://www.voanews.com/episode/artist-uses-glass-thread-create-luminous-vessels-4172301

Credits

Glass Color Diagram: https://www.compoundchem.com/2015/03/03/coloured-glass/

Science of Glass: https://www.explainthatstuff.com/glass.html

Synesthesia definition: https://www.psychologytoday.com/us/basics/synesthesia

Geber: https://www.britannica.com/biography/Abu-Musa-Jabir-ibn-Hayyan

Ansa definition: https://www.dictionary.com/

Image of Egyptian glassblowers: https://www.historyforkids.net/ancient-egyptian-science.html

Image of Abu Musa Jabir ibn Hayyan, father of Chemistry: https://www.britannica.com/biography/Abu-Musa-Jabir-ibn-Hayyan

Image of Harvey Littleton: https://www.cmog.org/article/harvey-k-littleton-and-american-studio-glass-movement

Image of Dominic Labino: https://www.cmog.org/article/american-studio-glass-movement

Other Works Images: tootszynsky.com

Process Images: Courtesy of Toots Zynsky