



REFLECTIONS OF FIRE AND LIGHT: A JOURNEY THROUGH GLASS HISTORY AND ART



COMPILED BY HOWIE BAUM



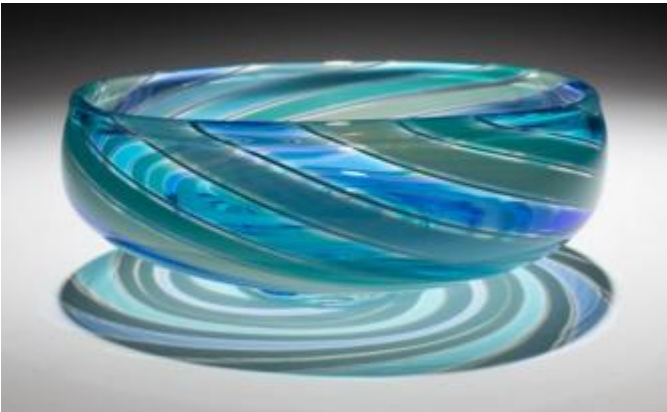
THE AMAZING WORLD OF GLASS !

Imagine, if you will, a substance born of fire and earth,
Ancient secrets whispered through time,

The very building blocks of our world, transformed.

Each reflecting light in its unique way, a spectrum of
beauty, fragile yet strong.

Listen and watch its story: From humble beginnings to
technological and beautiful marvels



PRESENTATION JOURNEY

BEFORE THE COMMON ERA (BCE) AND COMMON ERA (CE)

BCE & CE ARE RELIGIOUSLY NEUTRAL ALTERNATIVES TO BC AND AD



- 1) **Natural Glass materials**
- 2) **Ancient Mesopotamia and Egypt - 2500-1200 BCE**
- 3) **Hellenistic (Greek-like) – 323 to 31 BCE**
- 4) **Roman / Phoenician / Pompeii - 100 BCE to 476 CE**
- 5) **Islamic – 650 to 1500 CE**
- 6) **Venetian / Murano Glass – 982 to 1600 CE**
- 7) **Bohemian Glass – 1250 to 1750 CE**
- 8) **Art Nouveau - 1890-1910**
- 9) **Art Deco (1920s-1930s)**
- 10) **Studio Glass Movement: Breaking the Mold in the 20th Century**
Part 1 - 5 of the best women glass artists & their creations
- 11) **Studio Glass Movement: Breaking the Mold in the 20th Century**
Part 2 - 5 of the best men glass artists & their creations

1) NATURAL GLASS

“FIRE AND STONE: NATURE'S FIRST GLASSMAKERS”

Volcanic Activity: Magma or lava rapidly cools into glass (Volcanic glass, obsidian)



Meteorite Impact: Meteorite hits Earth, causing materials to rapidly melt, fly into the air, then rapidly cool into glass as they fall back to Earth (Tektites)



Weather Events: Lightning strikes sand or rock, melting it and fusing the silica into glass (Fulgurites)



Sound Effect from Pixabay

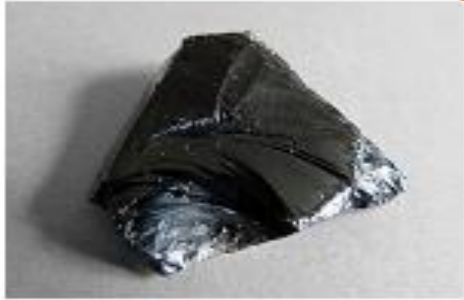
LONG BEFORE HUMAN HANDS SHAPED MOLTEN SAND INTO VESSELS AND ORNAMENTS, NATURE WAS ALREADY CREATING GLASS

NATURAL GLASS

Glass can form naturally from volcanic magma. [Obsidian](#) is a common volcanic glass formed when lava extrudes from a volcano and cools rapidly.

[Moldavite](#) (found in central and eastern Europe), and [Libyan desert glass](#) (found in the [deserts of eastern Libya](#) and [western Egypt](#)) are notable examples of glass materials made from sand melted by an incoming meteor.

[Vitrification](#) of [quartz](#) can also occur when [lightning](#) strikes [sand](#), forming hollow, [branching root-like](#) structures called [fulgurites](#).



A piece of volcanic [obsidian](#) glass



[Moldavite](#), a natural glass formed by [meteorite](#) impact, from [Besednice, Bohemia](#)



[Tube fulgurites](#)



[Trinitite](#), a glass made by the [Trinity nuclear-weapon test](#)



[Libyan desert glass](#)



Tutankhamun's breastplate features a scarab beetle carved from Libyan Desert Glass.

J.Bodsworth/Wikipedia



Libyan Desert Glass is truly among the rarest minerals on Earth.

It was formed **29 million years ago**, and samples are found only in Libya's desolate Great Sand Sea area.

It was created by a meteor that may have exploded before touching down in the desert — generating enough heat to melt the sand there.

TYPES AND COLORS OF OBSIDIAN NATURAL GLASS

People made obsidian tools during the Stone Age. The first known mirrors from around 4,000 BC were polished obsidian!

RAINBOW OBSIDIAN

Strength • Emotional Intelligence • Abundance



GREEN OBSIDIAN

Rarer than other forms of Obsidian

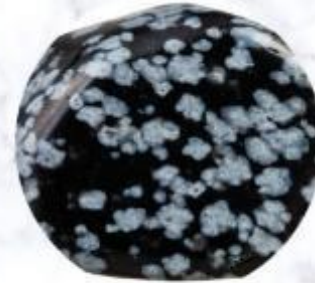
Ancestral Access • Psychic Abilities • Manifestation



SNOWFLAKE OBSIDIAN

This is the one crystal that passively keeps negative entities at bay.

Uplifting • Positivity • Energy Cleanser



smudge-sacaza

MAHOGANY OBSIDIAN

This has many trade names

Protection • Grounding • Healing



FIRE OBSIDIAN



MIDNIGHT LACE OBSIDIAN

also known as Lace Obsidian, Spiderweb Obsidian, and Midnight Vein Obsidian

Balance • Mystical Insight • Psychic Protection



PELE'S HAIR OBSIDIAN

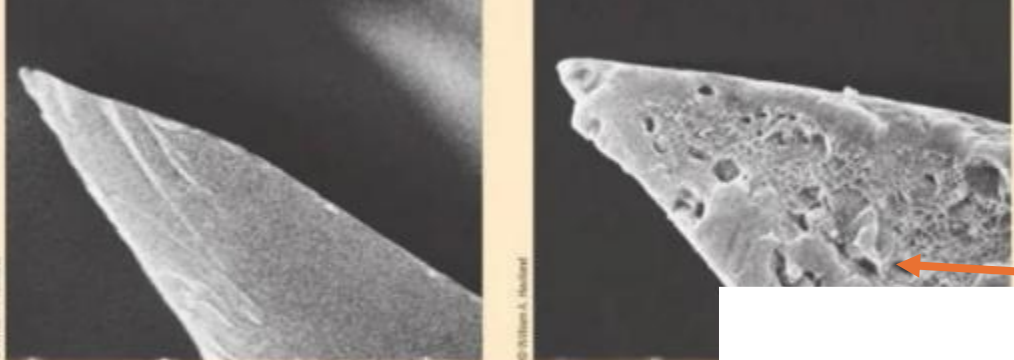
also known as Hair Obsidian, Pele's Mane, and Golden Hair Obsidian

Transformation • Confidence • Grounding



NATURAL MELTED SAND BY A VOLCANO





COMPARISON OF THE SHARP EDGE OF AN OBSIDIAN SCALPEL (LEFT) AND THAT OF A SURGICAL STEEL SCALPEL.



OBSIDIAN FOR WEAPONS AND TIPS FOR MEDICAL SCALPELS

Obsidian can be flaked to create an edge that's incredibly sharp, even sharper than steel surgical scalpels.

Some surgeons still prefer obsidian scalpels for certain delicate procedures:

- **Plastic surgery and cosmetic procedures (leaves less scarring)**
- **Eye surgery**
- **Very fine incisions where minimal tissue damage is crucial and incisions heal faster**

Cultures worldwide used obsidian for arrowheads, knives, and ritual tools for thousands of years precisely because of its incredible sharpness.



2) FROM SAND TO SPLENDOR

THE ANCIENT ORIGINS OF GLASS



Mesopotamia (2500 BCE) - Craftsmen discovered heating sand with plant ash created glass. Small beads and inlays were prized like gemstones.

Egypt (1500 BCE) - Artisans perfected core-forming to create small vessels for perfumes and oils. Brilliant blues and turquoise became Egyptian signatures.

Hellenistic (Greek-like) – (323–31 BCE) - Craftsmen developed casting and slumping techniques, creating fine tableware and intricate mosaic glass (millefiori). Fine glass became widely accessible.

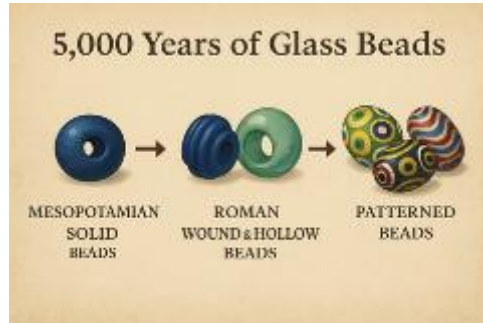
Phoenicia (50 BCE) - The invention of glassblowing revolutionized the craft, transforming glass from royal luxury to affordable material.

Pompeii (79 CE) - Vesuvius's eruption preserved everyday Roman glass—bottles, cups, windows—proving glass had become common, not elite.

MESOPOTAMIA BEADS AND GLASSWARE



GLASS ITEMS MADE IN MESOPOTAMIA, STARTING IN 2,500 BCE (4,525 YEARS AGO !!)



Glass beads were popular and symbolized wealth, artistry, and expanding trade across ancient civilizations.

They were made using a thin, heated metal rod called a *mandrel* that was first coated with a release material like sand or clay and then the rod was put into a container of molten glass.

The molten glass (called gather), attaches to the rod and is shaped by rotating the mandrel and using simple tools.



While still hot, or after re-heating, the surface of the bead may be decorated with fine rods of colored glass called stringers.

After cooling, the wire is removed, leaving the central hole.



BEAUTIFUL GLASS BEAD BRACELETS MADE IN MESOPOTAMIA AND EGYPT



These two cobalt-blue glass beads, found in 3,400-year-old graves in Denmark, came from ancient Egypt, probably via extensive European trade routes.



The earliest evidence of glassmaking includes objects such as beads, pendants, and small glass pieces that were put onto items. They were cast in open molds by Mesopotamian craftsmen.

THESE 3 CONTAINERS WERE MADE WITH THE NEW CORE FORMING METHOD TO MAKE HOLLOW PARTS



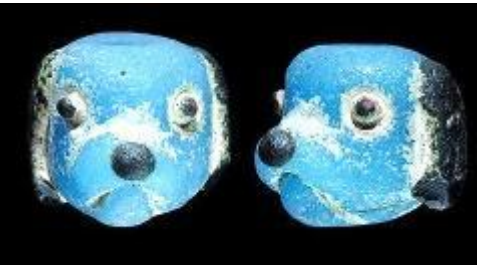
A Mesopotamian core-formed glass bottle – made in the 1400s BCE



Mesopotamian glass perfume bottle - alabastron



Fluted, small vase, core-formed 1300 to 1200 BCE



Dog-shaped beads – made in the 1200s, BCE



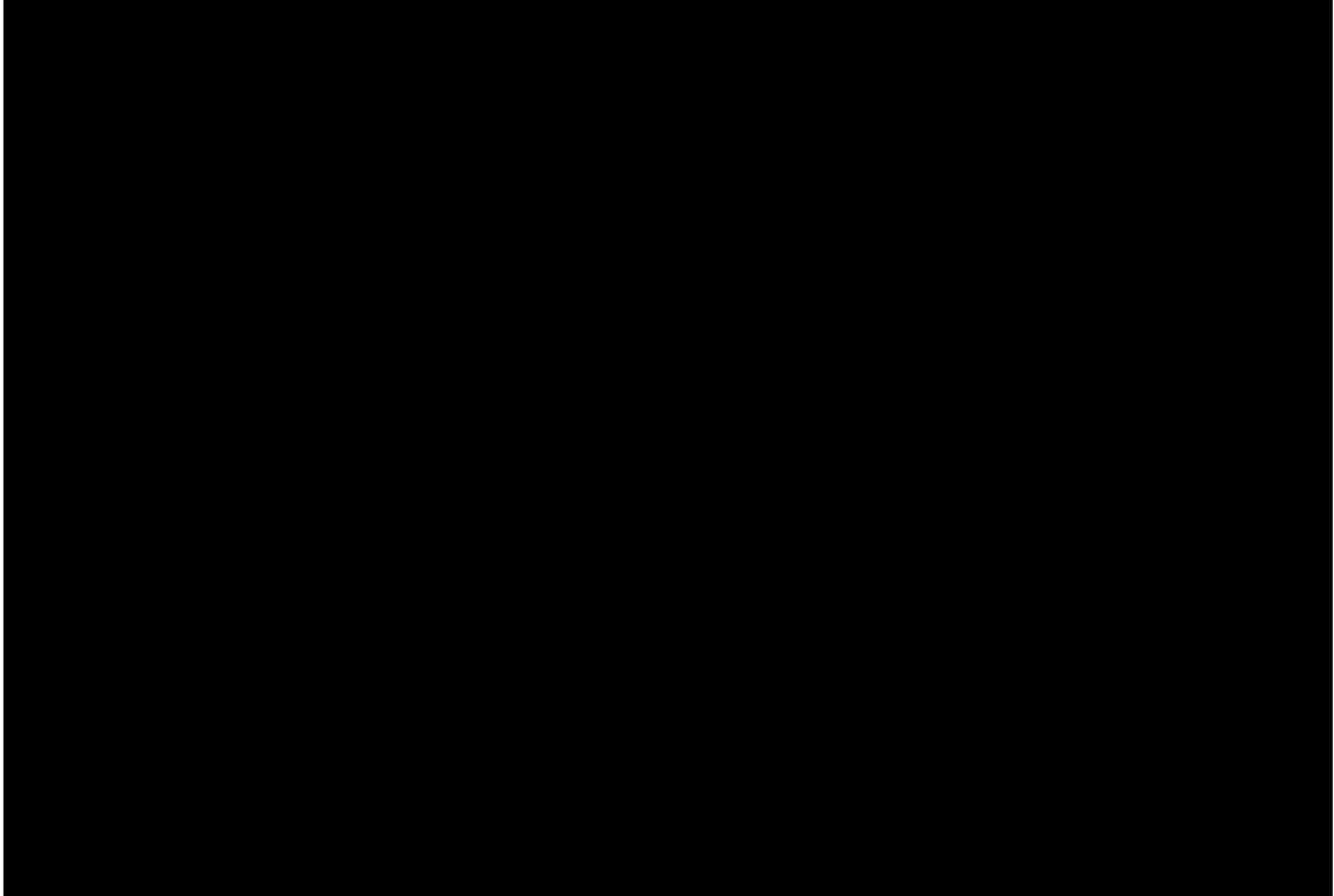
Mesopotamia was the land between the Tigris and Euphrates rivers, where craftsmen discovered the art of mixing sand, soda, and lime to make glass.



Mesopotamian bead necklace

CORE-FORMING OF HOLLOW GLASS PARTS

<https://www.youtube.com/watch?v=iBZb2bkn4KU>



Ancient Egyptian Glass

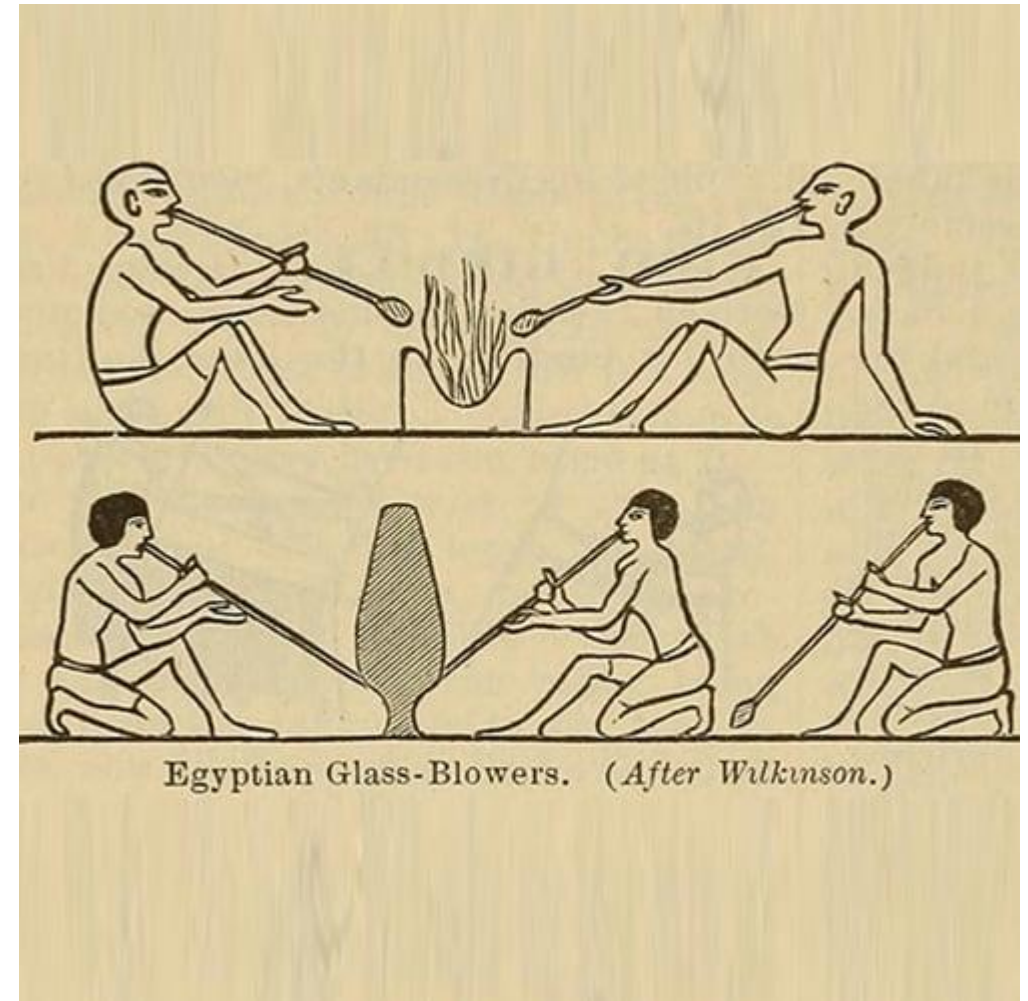




EGYPTIAN ART SHOWING THE VARIOUS STAGES OF MAKING GLASS CONTAINERS AND OTHER ITEMS

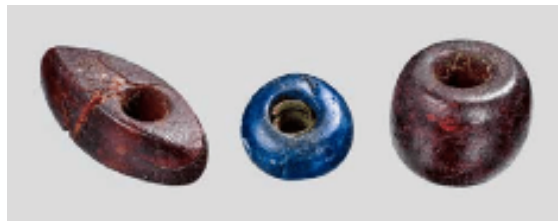


EGYPTIAN GLASS ITEMS



Egyptian Glass-Blowers. (After Wilkinson.)

- Glass beads and small ornamental objects
- Glass inlays for jewelry and decorative work
- Colored glass amulets
- They learned how to make hollow parts, using core-forming.
- Glass vessel production began around 1500 BCE



Since the early glassware was very fragile, they made these ingots that could be shipped and sold to other glassmakers.



Core-formed glass vessel, used as containers for expensive perfumed ointments and cosmetics.



[Image Source:www.egyptprivatetourguide.com](http://www.egyptprivatetourguide.com)



Vase in the form of fish from 1350 BC, made from polychrome glass, Tell el-Amarna, Egypt



Vase, 1400-1300 BCE Egyptian turquoise & opaque cobalt blue, yellow, white,



An ancient Egypt glass vase in the Louvre museum in Paris.
[WIKIMEDIA COMMONS](#)



Egyptian glass vessel



Portrait Inlay of Pharaoh Akhenaten - 1386 BCE



Portrait of King Amenhotep II, Egypt, 1426-1400 BC. Deep blue glass with light tan surface.

Collection of the Corning Museum of Glass, Corning, NY (79.1.4).



Core-Formed, white Amphora
3500 – 1500 BCE



Glass earring with gold top hoop



Lotiform chalice – Glass
and Gold - 1452 BCE.





This is one of the earliest glass pieces made.- owned by Pharaoh Thutmose III -1425 BCE



Core-formed glass vase



Core-formed glass amphora 664 – 332 BCE

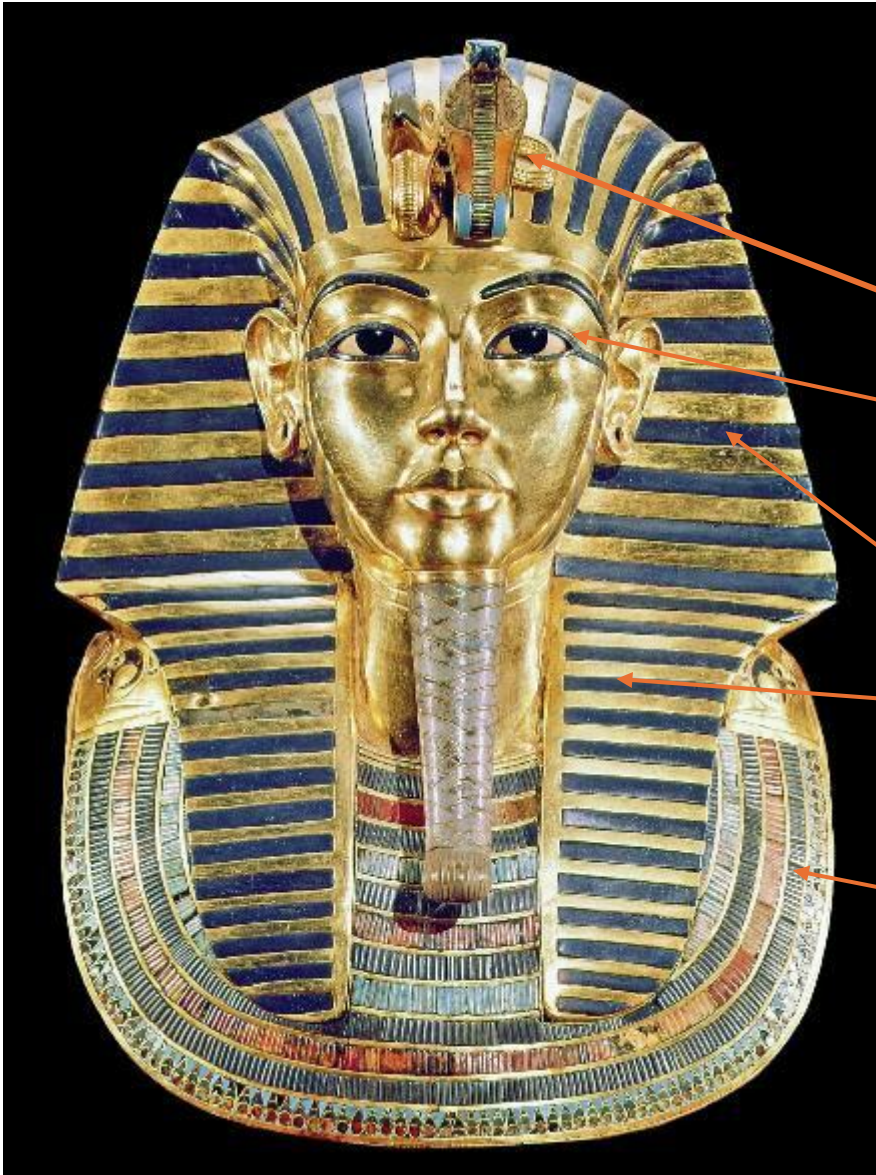


Headrest for King Tutankhamen
Dark blue glass made in 1 piece and weighs 4.4 pounds.



Egyptian spool-shaped-unguentarium (for holding body creams, etc.)

FRONT AND BACK OF THE FUNERARY MASK OF KING TUTANKHAMUN – 1314 BCE
AT THAT TIME, GLASS WAS AS RARE AS GOLD AND USED WITH GEMSTONES, IN THE MASK



Red and blue glass was used at the top of the Uraeus and on the Cobra

Glass inlaid in the eyes, eyebrows, eyeliner, and even in the beard that was worn by Kings and Queens.

Dark blue inlaid glass in all the 54 horizontal rows in the top, bottom, and 24 rows in the back area of the headdress, between the gold lines

Blue, Red, and Green glass pieces were used in the curved, outer collar sections



GLASS AND GOLD COLLAR FROM HIS TOMB

The collar uses all 4 of the glass materials, shown at the right.



- **Dark blue glass** was used to imitate **lapis lazuli**.
- **Light blue glass** was used to imitate **turquoise**.
- **Red glass** was used to imitate **carnelian**.
- **Black glass** was used to imitate **obsidian**.

FALCON PECTORAL OF KING TUTANKHAMUN



THE USES OF MANUFACTURED GLASS MATERIALS IN KING TUTANKHAMUN'S SCARAB PECTORAL

1. **The Vulture/Scarab Wings:** Attached to the central scarab are the open wings and tail of a vulture (Nekhebet) which are inlaid with colored glass.

This is a major use of glass on the piece!

2. **The Cobra (Uraei) Flanking the Scarab:** Flanking the scarab are the profiles of two cobra, inlaid with colored glass paste and bearing yellow solar discs on their heads.

3. **Throughout the Composition:** The entire piece uses colored glass in the cloisonné work, for the various decorative elements.

4. Center **scarab beetle** carved from **Libyan Desert Glass**.



3) HELLENISTIC (GREEK- LIKE) PERIOD (323 to 31 BCE)



3) HELLENISTIC (GREEK-LIKE) PERIOD (323 to 31 BCE)

It bridges ancient Egyptian glassmaking and the Roman glass revolution.

By **25 BCE**, they created and adopted **blow molding** of glass items to make bowls and more.

This made glass vessels widely available for the first time.

Glass makers perfected **mosaic** and **millefiori** patterns, created stunning gold-band glass, and produced exquisitely decorated cast vessels.



Lotus Corolla cup 322 BCE



Mosaic bowl – 150 BCE



Mosaic hemispherical bowl
100;s BCE



Pair of gold earrings
with an Egyptian Atef
crown set with stones
and glass.



Glass vase



Amphora, middle of the
1 hundreds BCE,



Glass unguentaria containers, for holding ointments and perfumes, made in first hundreds CE



Striped mosaic bowl - 100;s BCE



Cast glass Kantharos – 2nd hundreds, BCE



Glass mosaic jar – first hundred BCE



Bowl of sandwich gold glass with a floral design in gold leaf sandwiched between two layers of clear glass. – 2 hundreds BCE

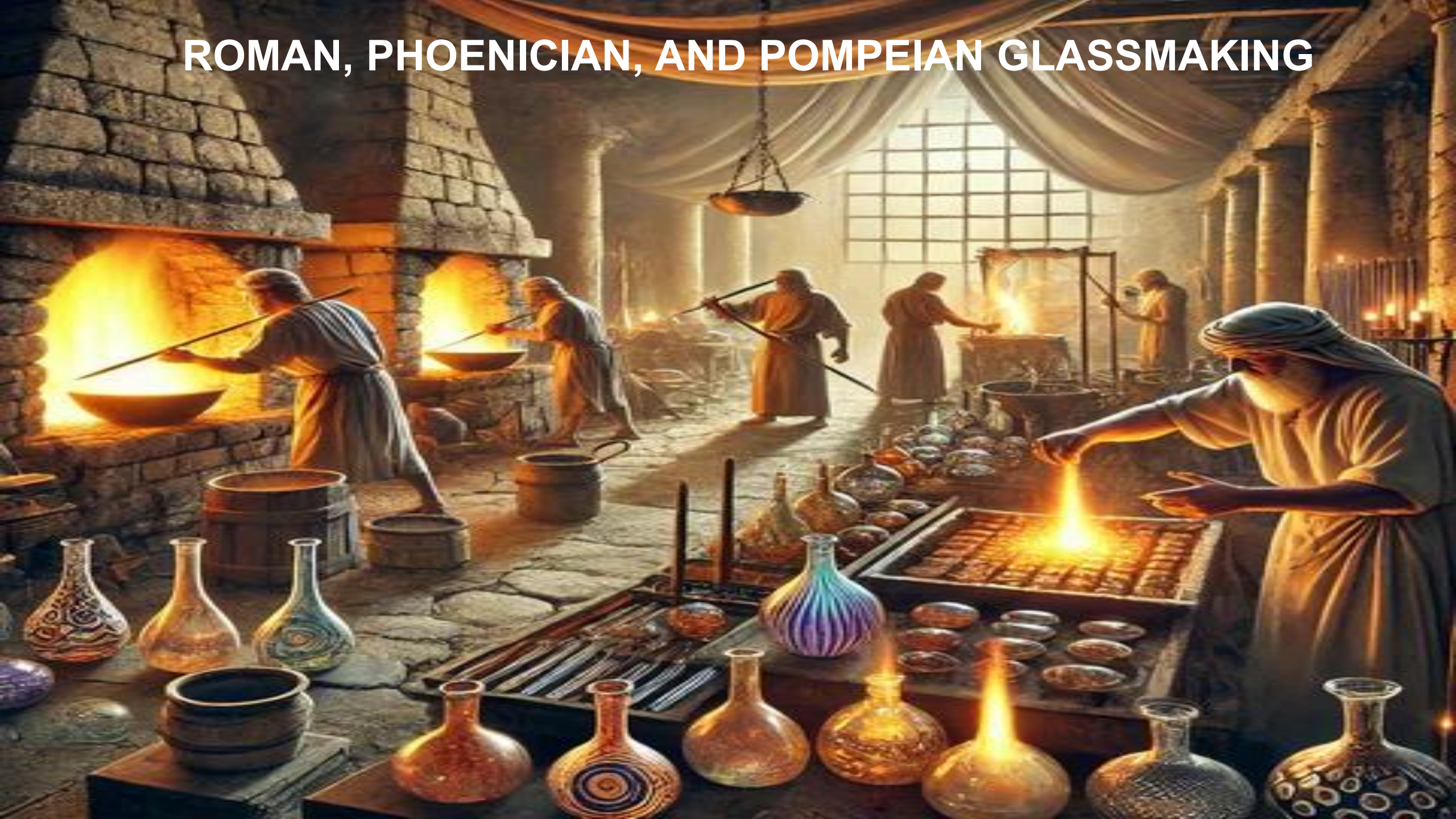


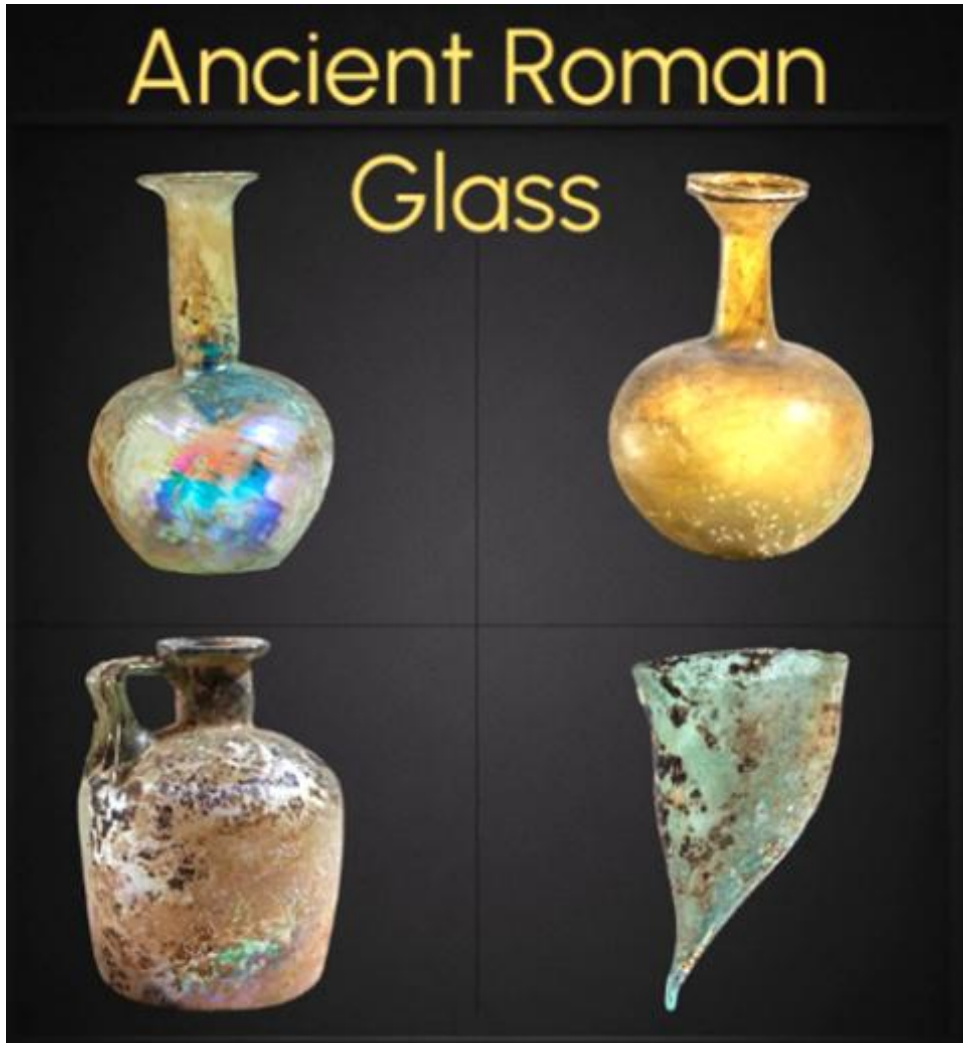
Core-formed Glass Oinochoe – 3 hundreds BCE



Ribbed mosaic bowl

ROMAN, PHOENICIAN, AND POMPEIAN GLASSMAKING





4) ROMAN / PHOENICIAN / POMPEII - 100 BCE TO 476 CE

**The Roman Revolution: When Glass Became
Everyday Magic**

Glassblowing's invention and its transformation of
society

When Rome conquered the Phoenician territories in 63 BCE and Egypt in 30 BCE, they inherited the 2 dominant glass-making centers of the ancient world.

Romans used the glass blowing procedure to manufacture low cost, high quality decorative glassware which was affordable for the average Roman.

**It is estimated that a glass cup was worth less
than a Roman Sestertius coin - \$1.35 today -
about the price of a loaf of bread in ancient
Roman times**





300s CE



100s CE



300's CE - Blown glass hydria
from Baelo Claudia, an ancient
Roman town



200s CE



Deep purple glass amphora
first 100s CE



Roman blown glass drinking horn (rhyton) terminating in a deer's head. 50 – 125 CE



Glass pitcher – 355 CE



Glass amphoriskoi



marbled glass piriform unguentarium



Alabastron
perfume container
75 CE



Vase - 85 CE
transparent Cobalt blue
glass



Glass vessels – 100-400 CE
- a funnel, pitchers, bowls,
and small unguentaria.



Glass Bottle 100-400 CE)
with greenish tint from iron
impurities in the sand.



3 glass pieces – 100–300 CE, showing
the prized purple / amethyst color
achieved through manganese additives



Blown glass “handkerchief”
bowl with decorative trail.
376 CE



Ribbed jar with
weathering 245 CE



Deep ribbed bowl, 50 BCE
dark blue glass with yellow
and white

ENNION Master of Roman Glass

He was one of the most prominent glassworkers of Ancient Rome, active from about 1 to 50 CE.

He is famous for being the first known maker of decorated mold-blown glass, and for the exquisite quality of his work.

Ennion branded his work by signing them.
***“Ennion made me,”* is spelled in raised Greek letters within a rectangular frame.**

His works of art in glass (various vessels) were traded throughout the Mediterranean and were in great demand among the wealthy Romans.

To date, only about fifty specimens have been preserved, which were found at various archeological sites from Spain to Israel.



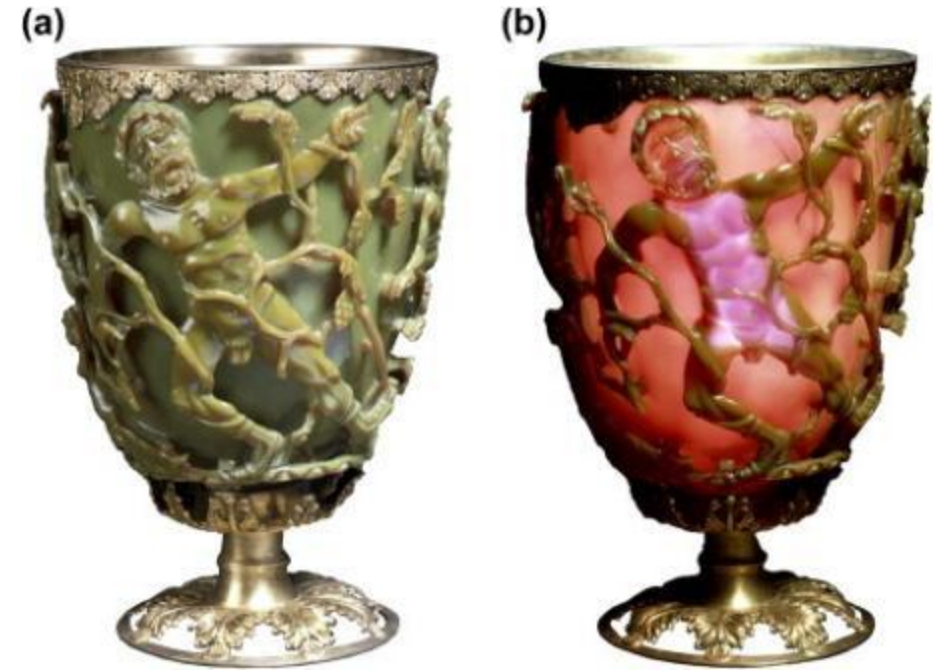


CAMEO GLASS SKYPHOS 25 BCE - 25 CE

This elegant Roman glass wine cup was made of layered **cameo glass**.

To make this cup, an artisan filled the areas of the mold that would become the raised figures with powdered white glass.

When hot, semi-liquid blue glass was added, and the white powder melted and fused with it. The handles and base were added separately.



THE LYCURGUS CUP

It is a rare Roman glass made in 434 CE.

Its color changes from a) Jade green in the front or b) Ruby red when backlit,

It exhibits dichroic properties, due to embedded **gold and silver nanoparticles**.

Dichroic glass is glass which can display multiple different colors depending on lighting conditions.

ANCIENT PHOENICIAN GLASSWARE – 1000 TO 300 BCE

THE INVENTION OF GLASSBLOWING REVOLUTIONIZED THE CRAFT, TRANSFORMING GLASS FROM A ROYAL LUXURY INTO AN AFFORDABLE MATERIAL.



PHOENICIAN GLASSWARE – 9th to 6th CENTURY BCE



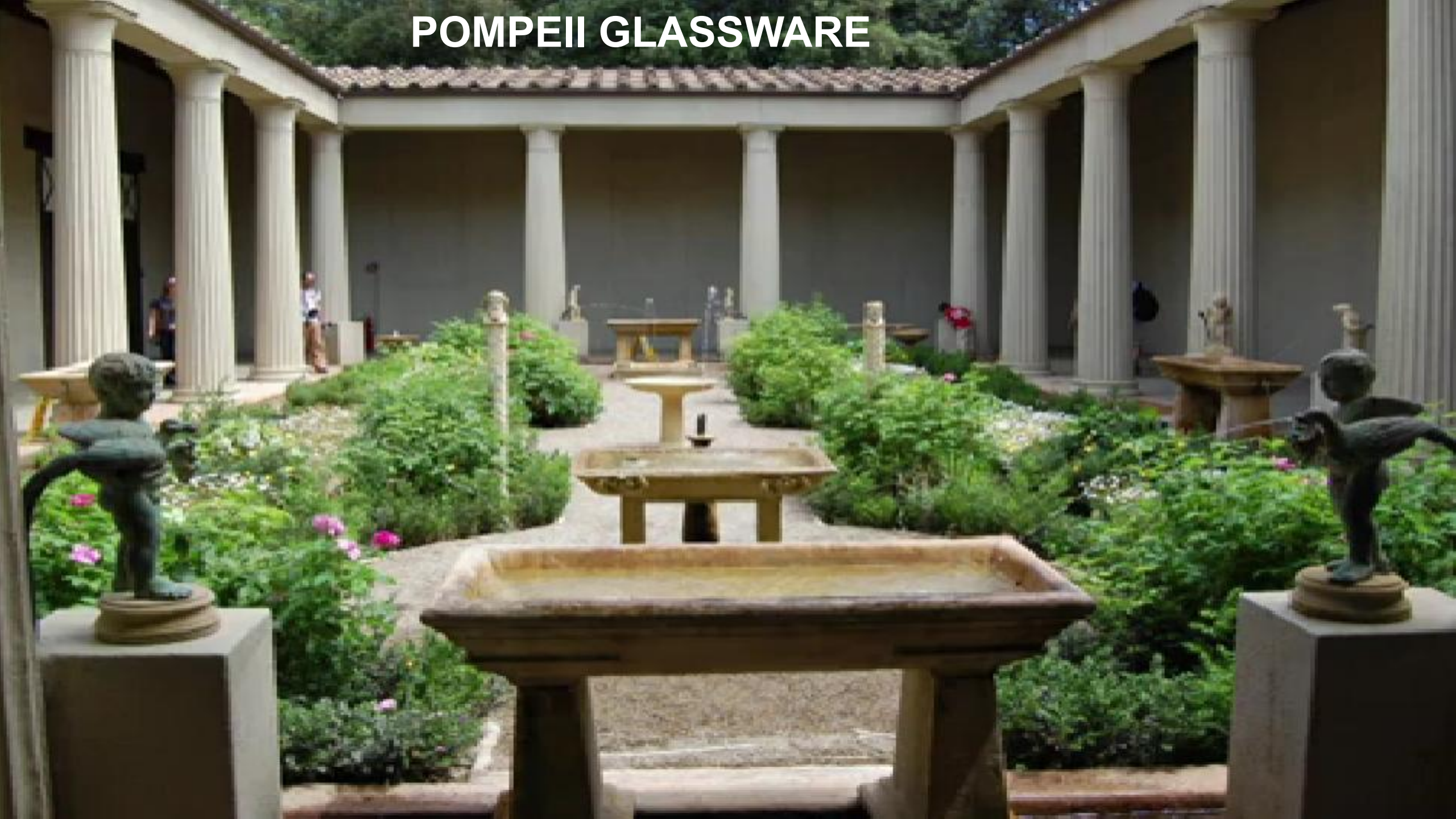


2 colored glass vessels. 400's to 200's BCE.



Phoenician Glass
Alabastron made in
the 400's BCE

POMPEII GLASSWARE



GLASSWARE MADE IN POMPEII



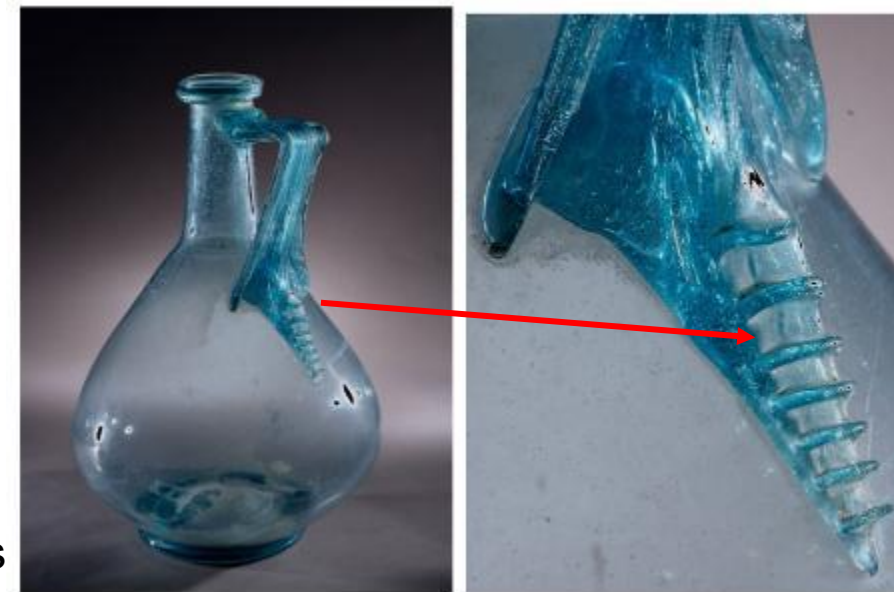
Made with colored glass canes 25 CE



Series of 7 square bottles from Pompeii (1st CE) , presumably used to contain known measures of a liquid commodity such as oil or wine. The capacity doubles with each step from the smallest to the largest.



Blue Glass Amphoriskos with
cupids gathering grapes from
the Villa of the Mosaic Columns
in Pompeii, between
1 and 79 CE



Pompeii Perfume bottle displaying
iridescence. 1st–4th century C.E

ISLAMIC GLASSWARE



5) GLASS ITEMS MADE DURING THE ISLAMIC PERIOD (630 TO 1500 CE)

ISLAMIC ARTISANS PERFECTED ENAMELING AND GILDING TECHNIQUES !



Left: Ewer with Molded Inscription, 825 CE, Iraq

Center: Bottle, 725 CE - Egypt or Syria

Right: Bottle with Blue Trails, 1183 CE - Syria



Rock Crystal (clear quartz) ewer, carved from a single piece of rock crystal, from 975 to 996 CE



Goblet with Incised (cut) designs, 700's to 800's CE



Glass Bowl in Millefiori Technique, 900's to 1,000 CE



Islamic mosque lamp with enameled glass and gilding, 1360 CE



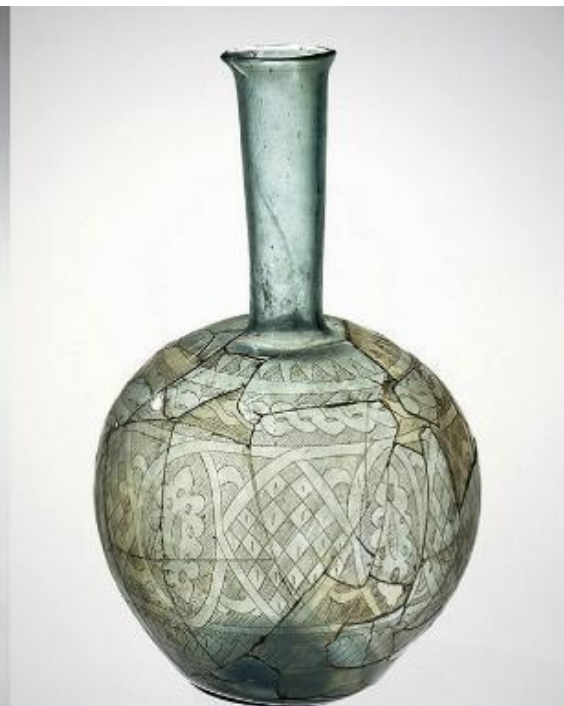
Islamic - 1350 CE



Islamic - Glass lamp of sultan Baybars al-Jashankir, 1309–10 CE, enameled and gilded glass



Cup, about 800-999 CE



Bottle, about 800-899 CE



**VENETIAN - MURANO
GLASSWARE**

6) VENETIAN SECRETS: MURANO AND THE GUILD OF GLASS MASTERS

RENAISSANCE CRAFTSMANSHIP AND JEALOUSLY GUARDED TECHNIQUES

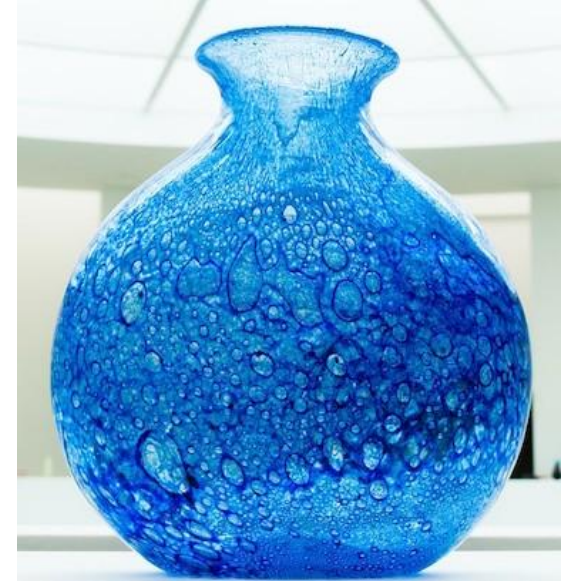
This period is divided into 2 parts:

A) ANCIENT GLASSWARE MADE DURING THE GOLDEN AGE (982-1600 CE)

Venice began glassmaking in 982 CE, but in 1291, the government moved all furnaces to Murano island—officially to prevent building fires, but really to guard their secrets.

For 3 centuries, Murano glassmakers created cristallo (perfectly clear glass), lattimo (opaque white), and aventurine (copper-flecked sparkle).

Their goblets, mirrors, and chandeliers became Europe's ultimate luxury, commanding prices that rivaled gold.



TYPES OF VENETIAN / MURANO GLASS

For 500 years, Venice dominated European glassmaking through:

Cristallo - The clearest glass yet made, rivaling rock crystal in transparency, **Manganese dioxide**, was a key ingredient in the secret formula used to make Cristallo. It was invented by Angelo Barovier, around 1450 CE.



Lattimo - Opaque white glass that mimicked porcelain. It was Invented in Murano in the 1500's CE and owes its opaque white color to **small particles of gold and tin**, which made the glass dense and uniform.





Latticino - Impossibly delicate white threads twisted through clear glass like frozen lace



Aventurine Gourd
Vase - 1880

Aventurine - - tiny flecks of copper are embedded into the glass to create a sparkling, star-like effect.



NUPTIAL BOWL BY ANGELO BAROVIER, 1470 CE

It is one of the oldest examples
of glass painted with polychrome
enamels and gold.

He was also the inventor of
the Cristallo as well as the
Lattimo types of glassware.

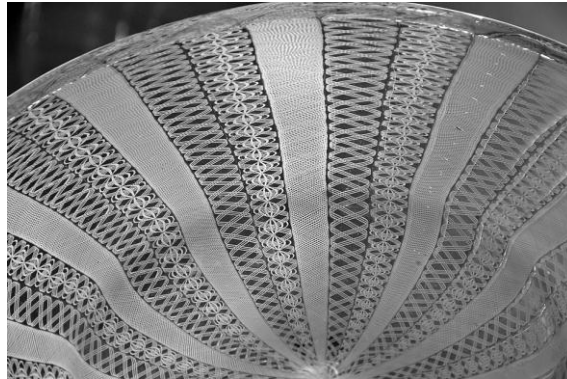




OTHER DECORATIVE METHODS DECORATING METHODS FOR MAKING VENETIAN / MURANO GLASSWARE

Millefiori: : Millefiori means “thousand flowers.” In this method, artisans create colorful glass rods and then cut cross-sections, resulting in floral designs.

It was used in Roman times but became more popular in the 1800’s.



Filigree (Filigrana): Filigree uses thin threads of glass woven together to create a delicate, lace-like effect. It was popular in the mid to late 1800’s.



Sommerso – (Italian for submerged) - multiple layers of glass used to create a submerged, depth-filled effect. It became popular in the 1950’s and 1960’s.



B) THE MODERN REVIVAL STARTING IN THE 1850's

By the 1800s, Murano's dominance had faded.

In the 1850s, a revival began, transforming the island's output.

Modern Murano embraced bold colors, wild organic forms, and sculptural pieces that look nothing like the refined goblets of centuries past.

Today's Murano glass is instantly recognizable—vibrant, flowing, often fantastical—while still using techniques passed down through generations.







BOHEMIAN GLASSWARE – 1250 TO 1750 CE



7) BOHEMIAN GLASS (1250-1750 CE)

While Venice mastered delicate cristallo, Bohemia (now the Czech Republic) took a bolder path.

Using potash from burned wood created thicker glass that was perfect for deep cutting and intricate wheel-engraving that sparkled like diamonds.

By the 1600s, Bohemian innovations challenged Murano:

- Ruby glass made with gold
- Layered overlay techniques
- Lace-like engraving

Europe's kings now had a choice—Venice's elegance or Bohemia's brilliance.



Glass decanter and cup



Czech Emerald Green Floral Pasted
Gold Stem Ware Glass Bowls





Glass covered cup
1850

Green-Gilt-and-Clear-Cut-Glass-
Vases-Alhambra-Form



Bohemian Glass Compote





BOHEMIAN BEAKER MADE IN 1820

IT IS A VERY SPECIAL EXAMPLE OF THE SKILLS TO MAKE GLASSWARE BY BOHEMIAN GLASS ARTISTS

Overlay technique - Cobalt blue glass layered with white/clear glass, then cut through to reveal the blue

Deep grinding wheel cutting and engraving - Those detailed architectural panels (columns, arches, scrollwork)

Gilt (gold) decoration - The gold detailing was a Bohemian specialty

Rich cobalt blue - Bohemians were famous for this intense blue color

Formal, classical design - Very typical of 19th century Bohemian work

This is exactly the kind of piece that challenged Murano's dominance - it's bold, technical, and shows incredible craftsmanship.



SCHWARZLOT (BLACK
ENAMEL) DECORATED
GLASSWARE



SCHWARZLOT URANIUM
GLASS VASE WITH
HUNTERS AND POEMS



RUBY FLASHED AND OVERLAY GLASS - 1875



LITHYALIN GLASS VASES,
(THE NAME MEANS THAT IT MIMICS THE
APPEARANCE OF NATURAL STONE).- 1820



URANIUM GLASS

Bohemian glassmakers in the 1830s added uranium oxide (about 2% by weight) to create this striking yellow-green glass.

Called 'Vaseline glass' for its resemblance to petroleum jelly, it glows brilliant green under UV light—not from radiation, but from uranium's chemistry.

Popular from the 1880s-1920s, production stopped during WWII when uranium was needed for the Manhattan Project.

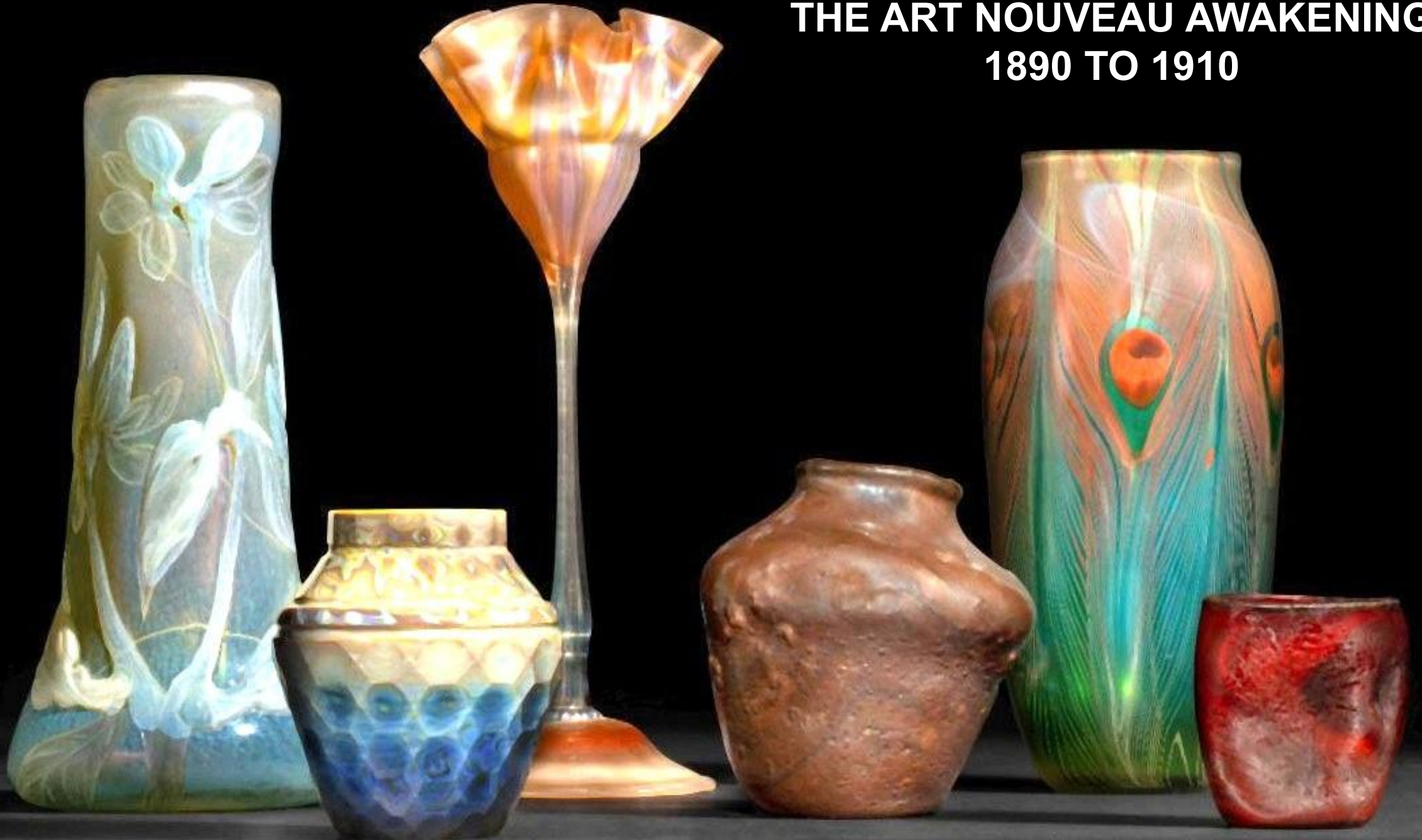
Despite containing uranium, it's completely safe—emitting less radiation than a TV."



URANIUM GLASS WITHOUT UV LIGHT AND WITH IT



THE ART NOUVEAU AWAKENING 1890 TO 1910



8) THE ART NOUVEAU AWAKENING 1890 TO 1910

Tiffany, Gallé, and others, making Glass as Art

When glass became sculpture and poetry combined

Nature became glass.

French masters Émile Gallé and the Daum brothers captured landscapes in layered, acid-etched vessels.

Dragonflies, wisteria, and peacock feathers came alive in shimmering glass.

Louis Comfort Tiffany's revolutionary Favrile glass changed color in light.

Art Nouveau shattered boundaries—these weren't containers, they were sculptures.





Cobalt blue iridescent glass bowl made around 1900 by Johann Lütz Witwe - a famous Bohemian/Austrian glassmaker who worked for the Loetz glass Co.

(So, it's both Bohemian AND Art Nouveau !)



Perfume decanter by New England Glass Company, 1868.



Glass Inkwell designed and made by **Johann Loetz Witwe** in early 1900s



Inkwell - Daum Co. In Nancy, France - Violets & Dragonflies - 1895



Items from the collection of the State Hermitage Museum and the collection of Y-A-Borisov, in Russia

Phänomen vase, designed by Max Ritter von Spaun, manufactured by Johann Lütz Witwe Glassworks, 1900



ÉMILE GALLÉ (1846-1904)

A trained botanist, Gallé required his artists to work from actual plants—each flower had symbolic meaning (wheat = charity, myrtle = joy).

He invented "marquetry de verre," layering colored glass to trap entire landscapes inside vessels.

His factory employed 300 workers and continued producing glass marked with a star after his death in 1904.



Oakleaf design vase



Cameo glass



Inkwell With Umbels







**DAUM BROTHERS
(Auguste 1853-1909 &
Antonin 1864-1931)**

Not originally glassmakers—
their father took over a failing
factory when the owner couldn't
repay a debt.

The sons transformed it into Art
Nouveau royalty, reviving *pâte
de verre*, an ancient Egyptian
technique lost for thousands of
years.

After Gallé's death in 1904, the
Daums became the unrivaled
leaders in decorative glass.



Dragonfly Lamp



Lamp





LOUIS COMFORT TIFFANY

LOUIS COMFORT TIFFANY (1848-1933)

If Art Nouveau had a king, it was Louis Comfort Tiffany

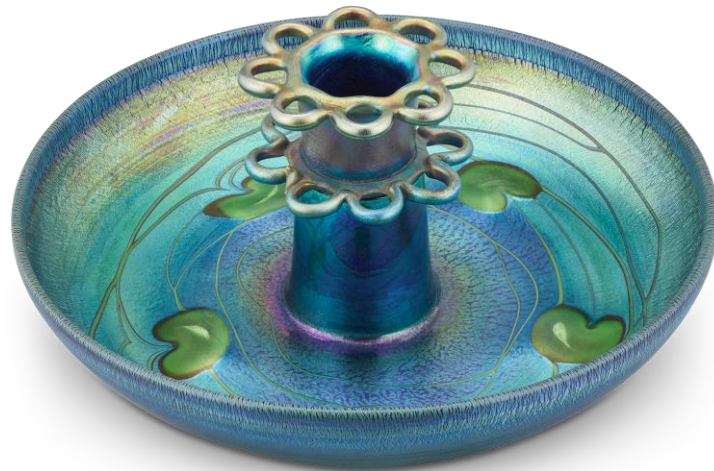
Son of jeweler Charles Lewis Tiffany, Louis saw Émile Gallé's work at the 1889 Paris Exposition and became obsessed with glass.

He invented Favrite glass with iridescent surfaces that changed color in light.

His most ambitious work: a 24-ton glass curtain for Mexico City made of over a million pieces, depicting volcanoes.

NOTE: This section shows glass art that Tiffany produced and there will be a separate section about his beautiful stained glass windows.









ART DECO GLASS – 1920's TO 1930's



ART DECO GLASS (1920s-1930s)

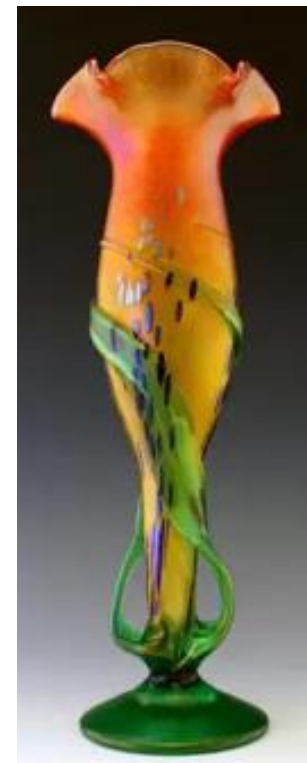
Art Nouveau's flowing nature gave way to bold geometry, streamlined forms, and machine-age glamour.

Art Deco glass embraced mass production alongside luxury—press-molded patterns created affordable elegance, while master craftsmen produced one-of-a-kind masterpieces.

Frosted glass, sharp angles, stylized figures, and geometric patterns defined the era.

This was glass for the Jazz Age: sophisticated, modern, and unapologetically glamorous.







RENÉ LALIQUE (1860-1945)

The undisputed king of Art Deco glass. Lalique began as Art Nouveau's greatest jeweler, then shifted entirely to glass around 1910—perfect timing for the new era.

He designed everything from perfume bottles for Coty (making both companies fortunes) to car hood ornaments, creating his famous "Spirit of the Wind" mascot.

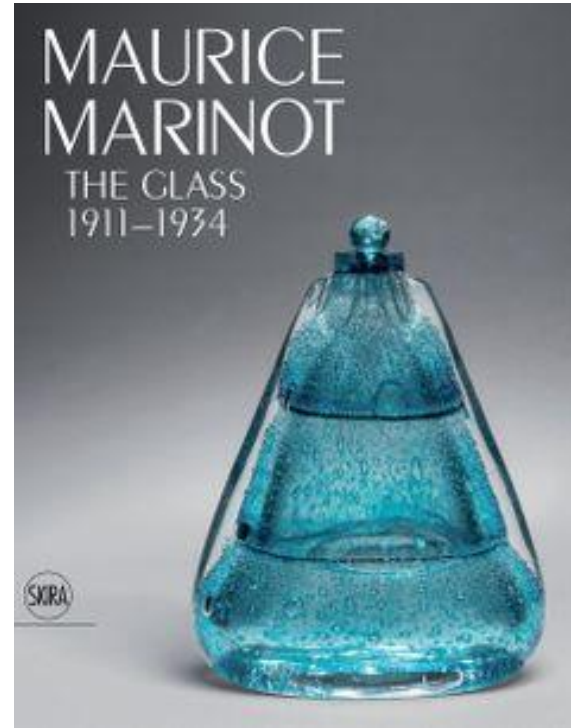
His opalescent glass with frosted surfaces and bold relief patterns became the defining aesthetic of Art Deco luxury.







GLASS PERFUME BOTTLE DESIGNS BY RENE LALIQUE



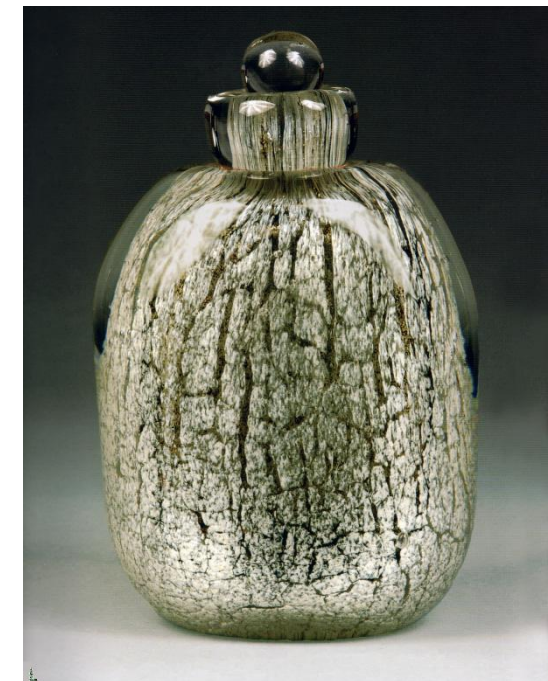
MAURICE MARINOT (1882-1960)

While Lalique embraced industrial production, Marinot went the opposite direction—one man, one furnace, total artistic control.

A trained painter, he taught himself glassblowing and created thick-walled vessels with trapped bubbles, internal crackles, and acid-etched patterns.

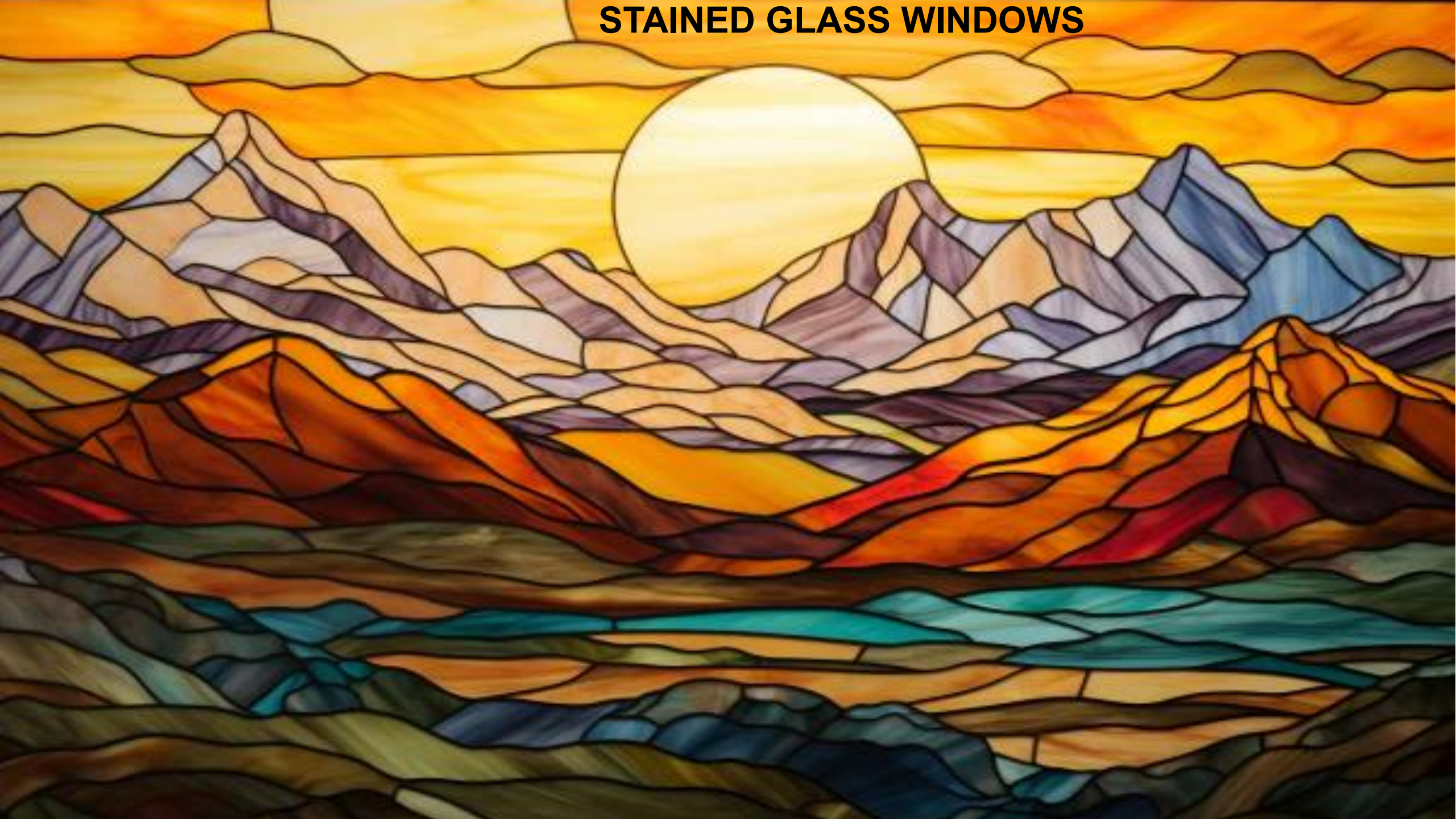
Each piece took days to make.

His work bridged Art Deco's geometry with expressionist emotion, proving glass could be pure sculpture.





STAINED GLASS WINDOWS



STAINED GLASS THROUGH THE AGES

Stained glass has illuminated sacred spaces for over a thousand years.

The earliest known fragments date to the 7th-9th centuries, but the art form reached its magnificent peak during the Gothic period of the 12th and 13th centuries.

The soaring cathedrals of medieval Europe—like Chartres in France and Canterbury in England—featured stunning rose windows and narrative scenes that told biblical stories to congregations who couldn't read.

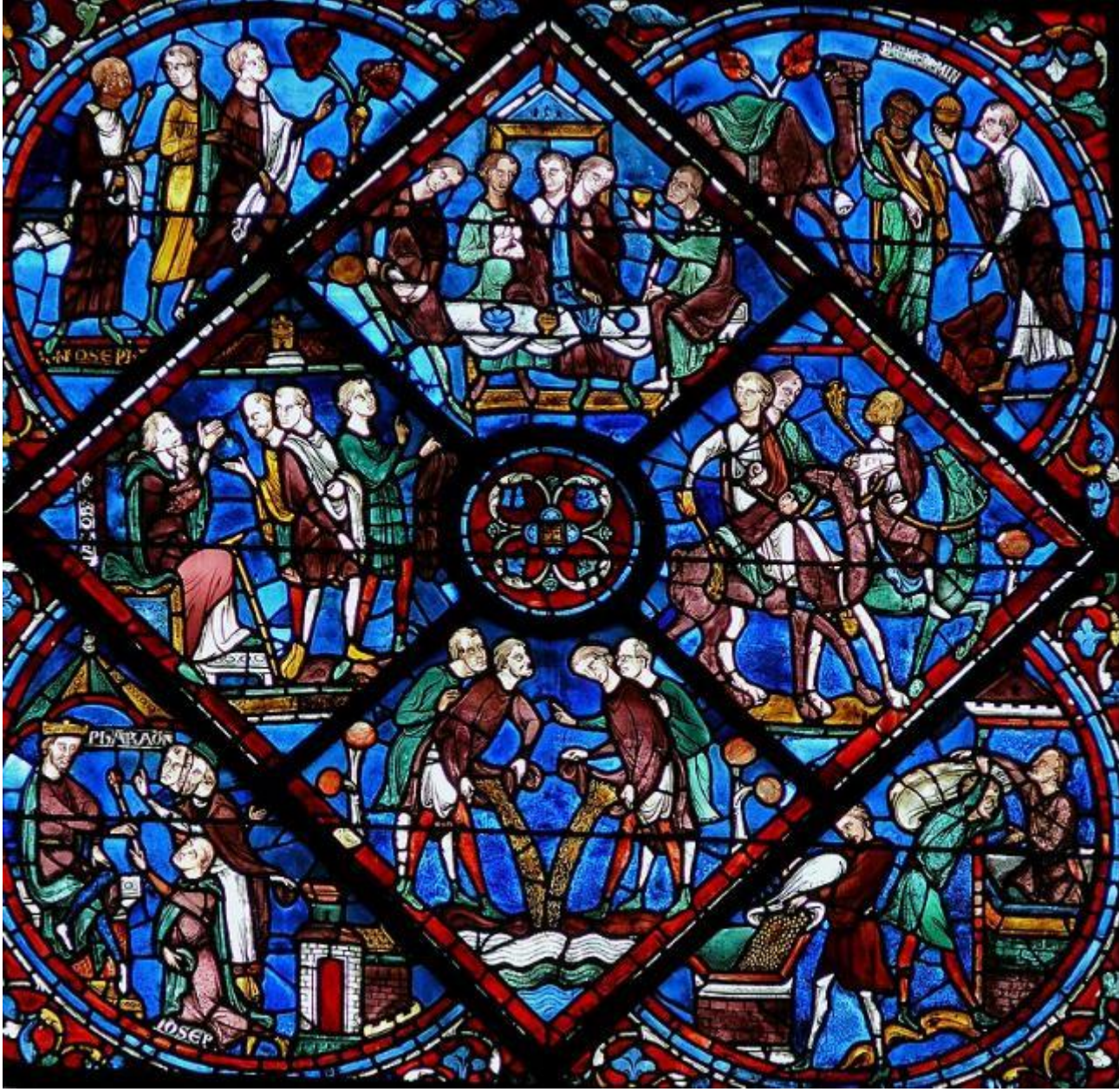
For centuries, stained glass remained primarily a religious and architectural art form.

(Tiffany's stained- glass windows, lamps and more are shown after this section)

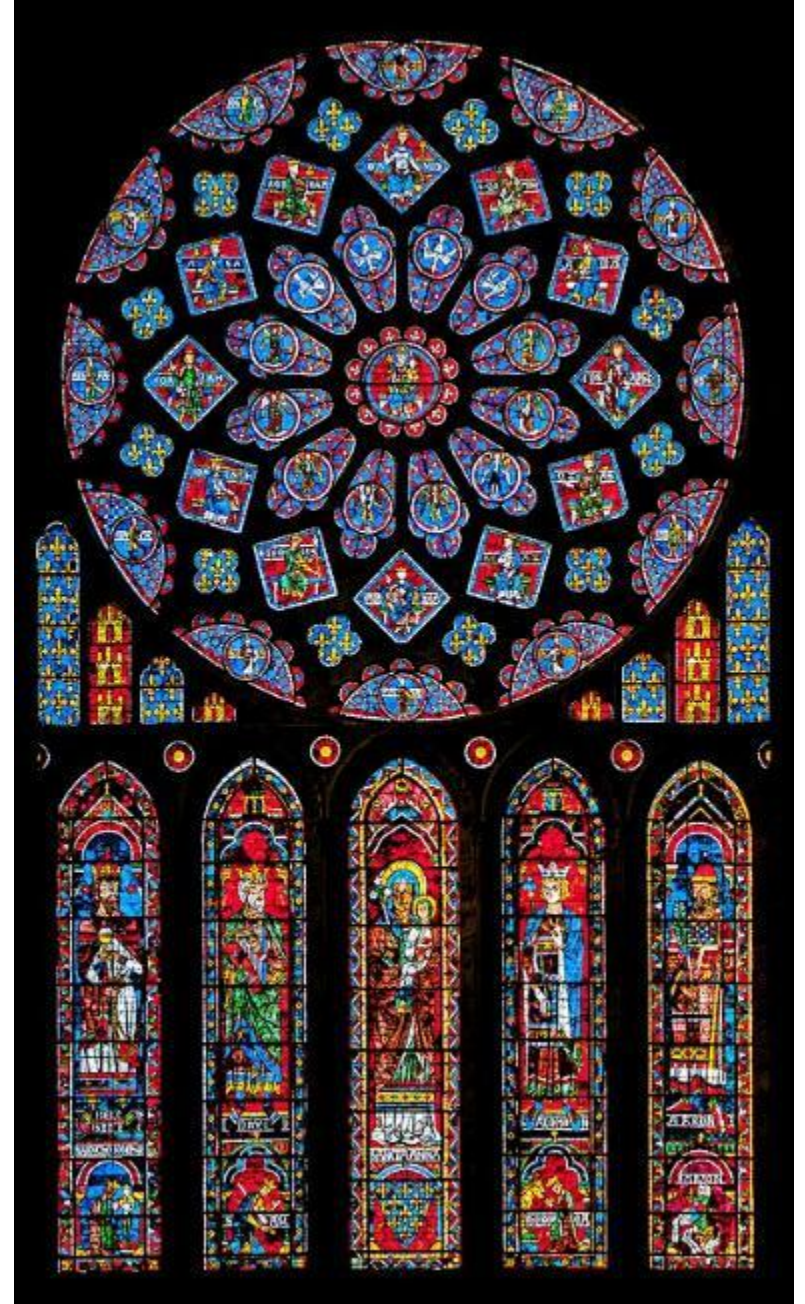


The Chapel of Thanksgiving is the spiritual epicenter of a complex called Thanks-Giving Square in Dallas, Texas.

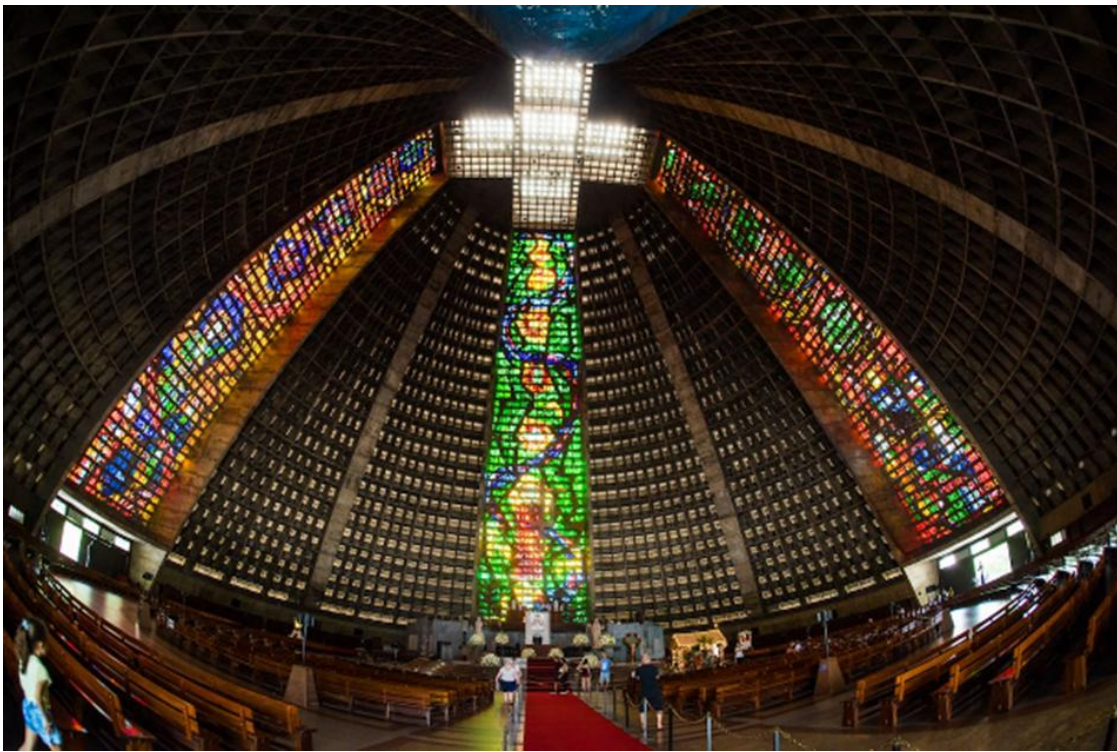
Inside the chapel, which is open to all faiths, visitors will find a stunning spiral of colorful stained glass called the Glory Window, which rises 60 feet into the air.



13th-century window from the cathedral in Chartres, France showing extensive use of the cobalt blue with green and purple-brown glass, details of amber and borders of flashed red glass.



The north rose window of the Chartres Cathedral (Chartres, France)



Better known as the Metropolitan Cathedral of Rio de Janeiro or the Cathedral of St. Sebastian of Rio de Janeiro, it is dedicated to Saint Sebastian, the patron saint of Rio de Janeiro.

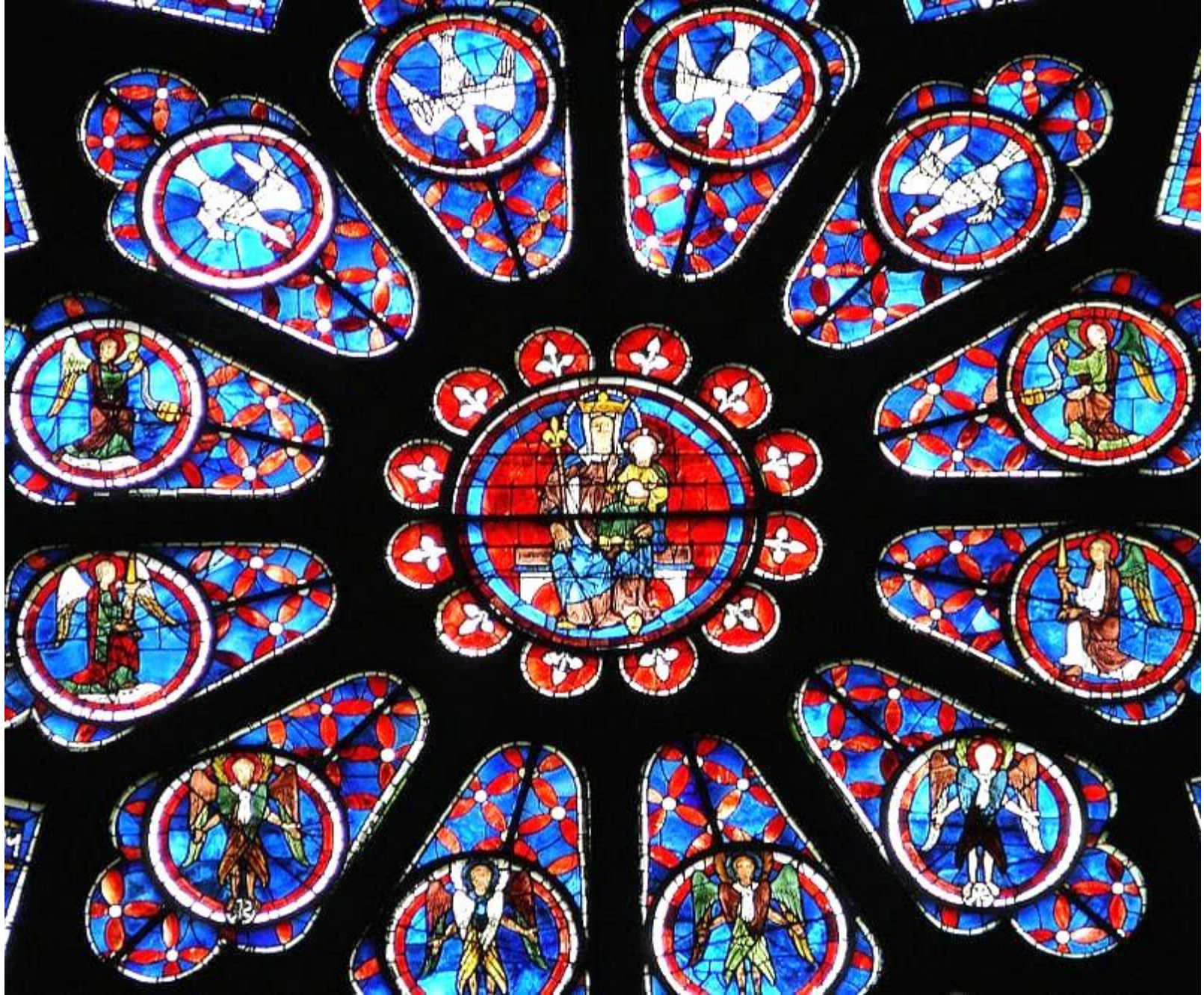
Conical in shape, the massive cathedral is reminiscent of a Mayan pyramid, save for four 200-foot panels of stained glass stretching to the pinnacle.

Floor-to-ceiling stained-glass windows in shades of blue and purple line all sides of the sanctuary at Santuário Dom Bosco., and, as if the digs needed more bling, there's also a massive Murano glass chandelier hanging in the middle of the room.

It's made of 7,400 pieces of Murano glass



Stained glass – Chartres, France



Barcelona's [Palau de la Música Catalana](#) has beautiful stained-glass creations.

The grand glass skylight functions as the centerpiece and is meant to resemble a drop of water and honey, casting a warm glow throughout the multi-story venue.



Iran's [Nasir Al-Mulk Mosque](#) is one of those places you'll have to see to believe.

Also referred to as the Pink Mosque and the Mosque of Colors, Nasir Al-Mulk Mosque provides an inspiring display as thousands of colors alight through the stained-glass patterns and colorful tiles that make up the interior



There are grand cathedrals the world over whose stained-glass windows don't hold a candle to this station's "Dome of Light," said to be the largest colored-glass installation in the world.

The dome is the work of renowned Italian artist Narcissus Quagliata, who shipped the piece to Taiwan all the way from Germany



The Cathedral of Brasília in [Brazil](#) is home to a unique ceiling, especially in a church.

Sixteen curved concrete columns interspaced with stained glass form a circle of light and make for a stunning visual display around the churchgoers,





A landmark of Milan — and still an active shopping mall — the Galleria Vittorio Emanuele II treats shoppers not only to luxury stores but also a massive glass ceiling topping the entire arcade-style structure.

In the center, a glass dome stands tall as an easily recognizable feature of the classic design, which dates back to the mid-1800s



Like most things in [Dubai](#), [Wafi Mall](#) is over the top.

Much more than a mere shopping mall, it's a spot for fine dining, a health club and spa, glow-in-the-dark mini golf, and even a traditional Arab souk.

Towering above it all is an elaborate, multi-colored, pyramid-shaped stained glass ceiling depicting peaceful nature scenes.

Melbourne's [National Gallery of Victoria](#) is the oldest gallery in Australia and exists across two buildings, with more than 70,000 works in its collections.

Its ceiling, however, is a masterpiece in its own right: It is the largest piece of suspended stained glass in the world, spanning the length of an entire hall.



Havana's Hotel Raquel dates to 1905. Its 25 rooms are decorated with paintings and pictures by Cuban artists, and the hotel reflects an Art Nouveau style throughout.

Besides the stylish interior, however, the biggest eye-catcher in the hotel is the ornate arcade ceiling in the lobby. The colorful stained-glass piece bestows a soft glow on the rooms and halls below; it's the skylight of all skylights



Not one but two oversized stained-glass domes top the Chicago Cultural Center, a landmark building of Chicago that was once a library but now functions as the city's official reception center.



Windows in the choir of the [Basilica of Saint-Denis](#), one of the earliest uses of extensive areas of glass (early 13th-century architecture with restored glass of the 19th century)

LOUIS COMFORT TIFFANY

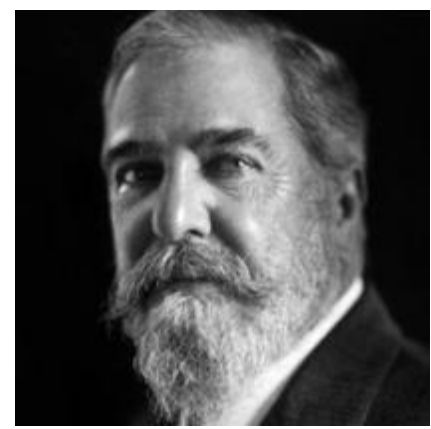
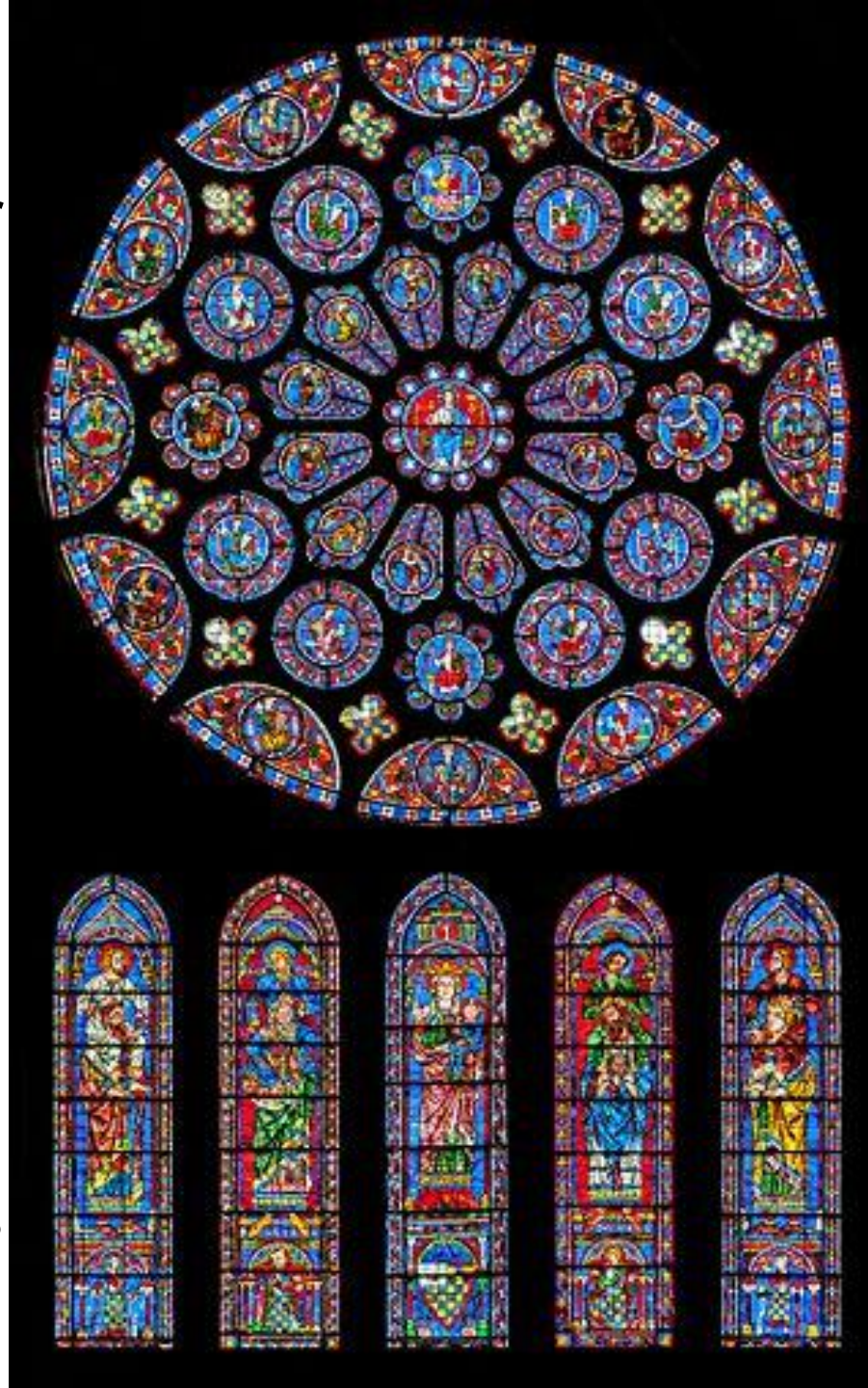
American stained glass and jewelry designer (1848-1933)

Louis Comfort Tiffany, son of Tiffany & Company founder Charles Lewis Tiffany, initially trained as a painter before revolutionizing the world of decorative glass.

Associated with the Art Nouveau and Aesthetic movements, his designs drew deeply from nature, painting, and jewelry - featuring landscapes, floral themes, and abstract designs that moved away from traditional religious imagery.

Tiffany Studios produced over 200,000 stained glass windows – both religious and secular designs and became renowned for developing Favrite glass, an opalescent technique that created an extraordinary richness of color and texture never seen before in the medium.

On the next 2 pages are images of the 12 different glass design themes he created for his stained-glass art.



Louis Comfort Tiffany
1915

The south transept
windows from
Chartres Cathedral



OPALESCENT GLASS



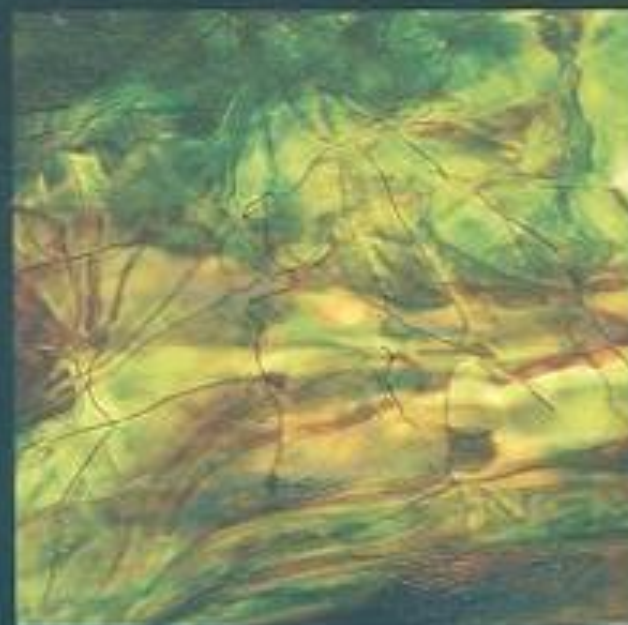
DRAPERY GLASS



RIPPLE GLASS



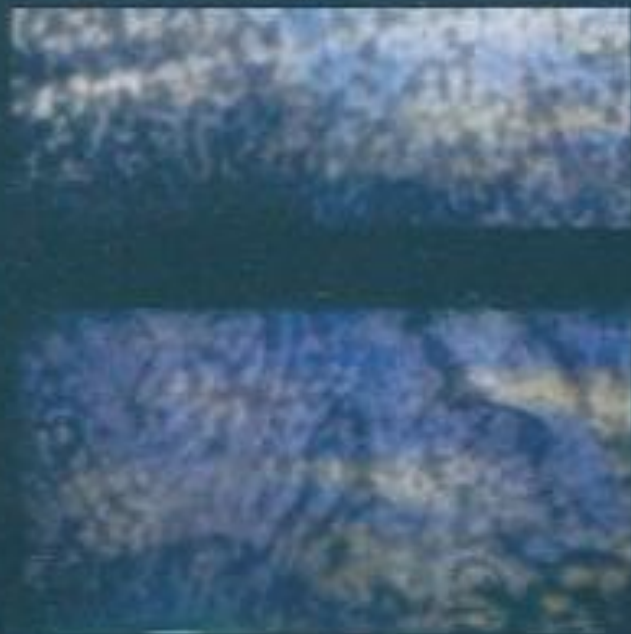
FRACTURE GLASS



STREAMER GLASS



FRACTURE-STREAMER GLASS



MOTTLED GLASS



STRIATED GLASS



FAVRILE



JEWELLED CHUNK GLASS



PRESSED JEWELS



FLASHED GLASS

LOUIS COMFORT TIFFANY'S STAINED-GLASS CREATIONS, USING THE **FAVRILE GLASS MATERIAL**

One of the defining qualities of Tiffany glass is the incredible variety of colors and patterns of glass that the studio experimented with.

Inspired by medieval stained glass works as well as contemporary glassmaking he observed in Europe, his stained-glass windows became renowned not only for its designs but for the unique and innovative glass they produced for them: **Tiffany's patented Favrile glass**.



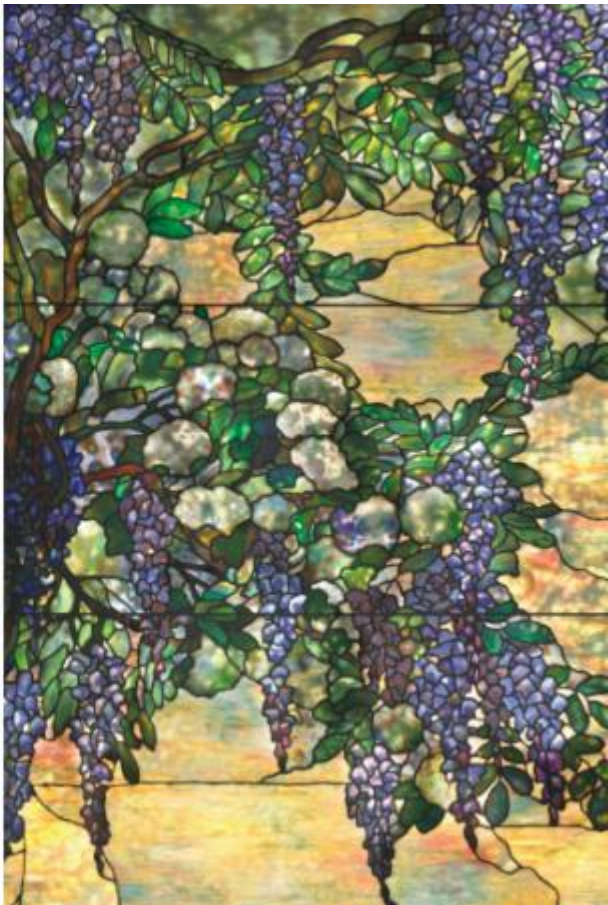
(Left) Detail of Tiffany Studios, 'The Goddard Memorial Window' for St. Luke's Episcopal Church, East Greenwich, Rhode Island, 1909-1910.



Tiffany Studios, Landscape Window with Magnolias, Hydrangeas and Azaleas, c. 1915



“Peacock’ Window”, 1910-1915



'Snowball and Wisteria" window, circa 1902



‘Peony’ Leaded Glass Window from the Darius Goff House, Pawtucket, RI, 1893



'Landscape with Magnolias
and Irises' Window, circa 1910



'Cypress and Azalea' Landscape Window for the
Residence of Charles E. Rushmore, Woodbury Falls,
New York, 1908.

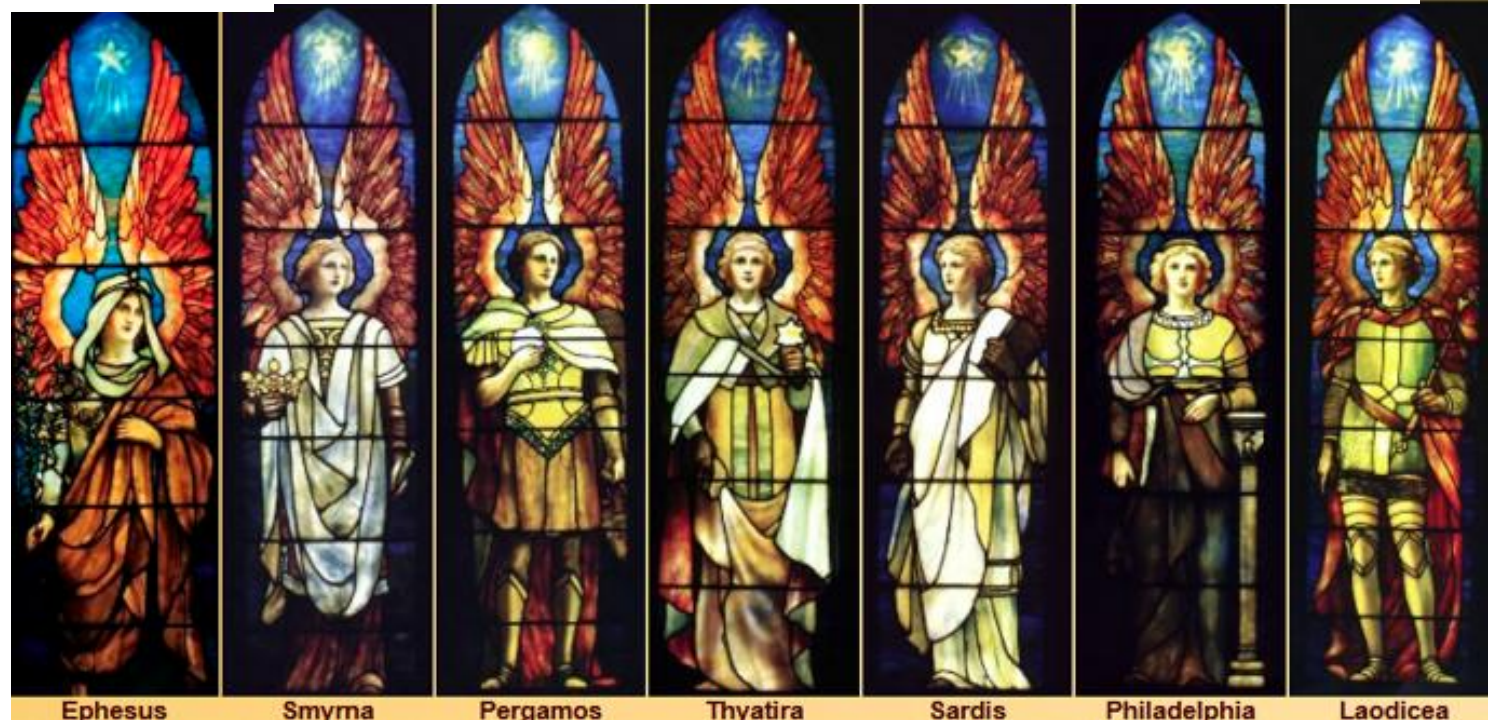
“IN COMPANY WITH ANGELS” 7 REDISCOVERED TIFFANY WINDOWS IN CINCINNATI

Created in 1902 for a Swedenborgian church in Cincinnati, these 8-foot angel windows were nearly lost to history.

When the church was demolished in 1964 for highway construction, the windows were crated and forgotten for nearly 40 years in parishioners' garages and basements.

Rediscovered in a Pennsylvania barn in 2001, the windows depict angels from the early Christian churches of Asia Minor, each holding a gift God promised if the churches would reform.

After being exhibited at the Taft Museum in 2011, they have since traveled to museums across the U.S.





Ephesus



Smyrna



Pergamos



Thyatira



Sardis



Philadelphia



Laodicea

TIFFANY STAINED GLASS WINDOWS IN OTHER CINCINNATI CHURCHES AND THE ART MUSEUM



Second Presbyterian Church - Has **13 Tiffany windows** showing typical features like drapery glass and nature imagery, with biblical scenes



Church of the Advent (Walnut Hills) - Has **5 Tiffany windows** commissioned by prominent Cincinnati families (Longworth, Stettinius, Olmstead, Bates, and Baldwin)

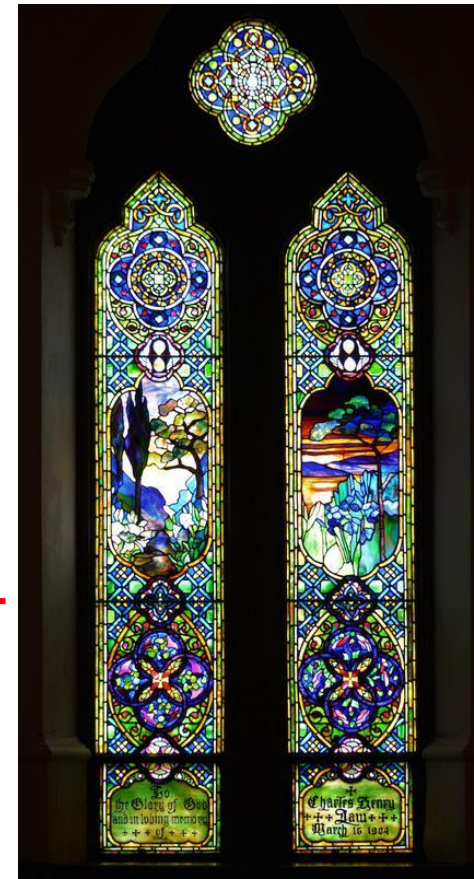


First Unitarian Church

Mount Auburn Presbyterian Church



Calvary Episcopal Church



Cincinnati Art Museum - Has 4 Tiffany windows originally from St. Michael and All Angels Episcopal Church in Avondale





"The Angel of the Resurrection", [Louis Comfort Tiffany](#)'s work in the First Presbyterian Church, Indianapolis (1905)



Windows with sunrise in the forest at springtime, and autumn sunset (1905), in the collection of the [Brooklyn Museum](#)



“Mermaid and Goldfish”

The original was one of Louis C Tiffany’s favorites and he kept it for his own collection and refused to sell it.



Guests of the [Gran Hotel Ciudad de México](#) will find themselves beneath one of the four largest works of Tiffany stained glass in the world.

A masterpiece of Art Nouveau style, the hotel that the glass piece calls home dates all the way back to 1899.



The main stage of Palacio de Bellas Artes in Mexico city holds a one-of-a-kind stage curtain made by Tiffany's in New York. Weighing over 24 tons, the curtain is composed of over **a million pieces of stained glass**.

Described as “a veritable poem of light,” it depicts the glistening snow-capped peaks of Iztaccihuatl and Popocatepetl, two legendary volcanoes and landmarks of the Mexican panorama, rising thousands of feet into an iridescent sky.



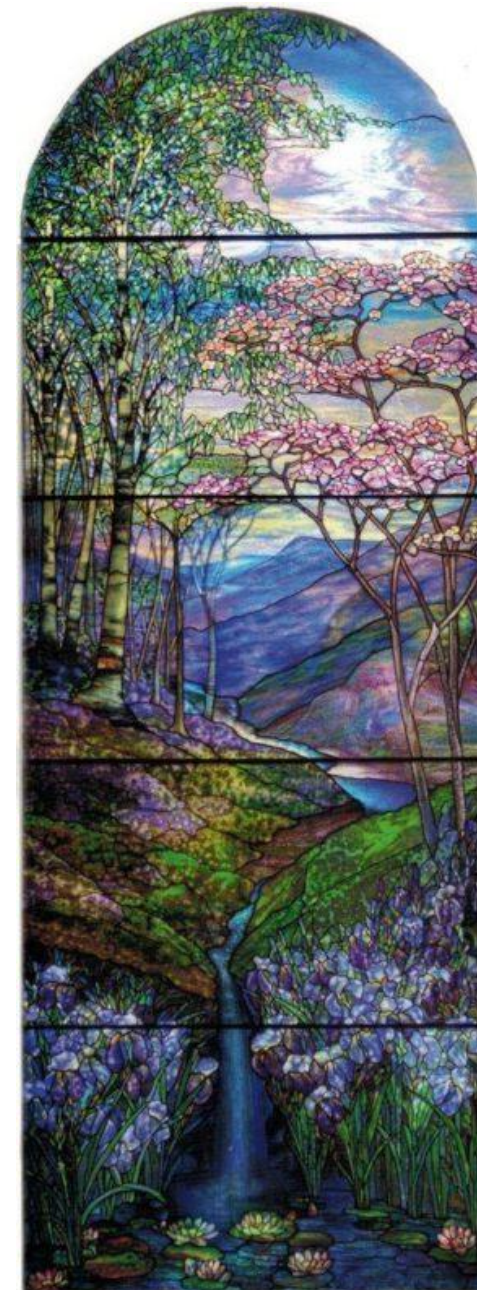


“AUTUMN LANDSCAPE”

AGNES NORTHROP

She was one of the original 6 workers of Tiffany Studios Women's Glass Cutting Department and known for designing floral and landscape windows.

She was Tiffany's premier stained glass window designer who designed and made over 6 large windows.



“RIVER OF LIFE”



STAINED-GLASS TIFFANY WINDOW SELLS FOR RECORD \$12.48 MILLION AT AUCTION

The Danner Memorial Window originally designed for an Ohio church, sold for \$12.48 million at an auction at the New York branch of Sotheby's.

The dazzling 16 feet high was the result of a collaboration between acclaimed artist Louis Comfort Tiffany and Agnes Northrop, one of the firm's leading designers.

Northrop, who started work for the firm in the 1880s and was a trailblazer in a male-dominated arena, designed a memorial window to her father for the Reformed Church of Flushing in New York in 1903.

That was the "thematic precursor" for the Danner Memorial Window 10 years later.

TIFFANY LAMPS AND MORE

WONDERFUL DESIGNS WERE MADE BY CLARA DRISCOLL AND THE “TIFFANY GIRLS” WHO SHE MANAGED

Tiffany's iconic leaded glass lamps, which entered production around 1895-1900, are among the most celebrated decorative art objects in American history.

However, many of the most famous designs—including the Wisteria, Dragonfly, and Peony lamps—were actually created by Clara Driscoll, who managed 35 women in Tiffany's Women's Glass Cutting Department.

She and her skilled team of craftswomen, known as the "Driscoll Girls," designed and executed these intricate masterpieces.

Her contributions remained hidden for nearly a century until letters she wrote were discovered in 2005, finally revealing that the artistic genius behind Tiffany's most treasured lamps was a woman leading a department of women artisans.





The “Tiffany girls” or the “Driscoll girls” were a group of artists managed by Clara Driscoll who and worked in the Tiffany glass cutting department.

They worked on the design and making some of the stained-glass windows but mainly desk and hanging lamps and items for a person’s desk.



Clara Driscoll



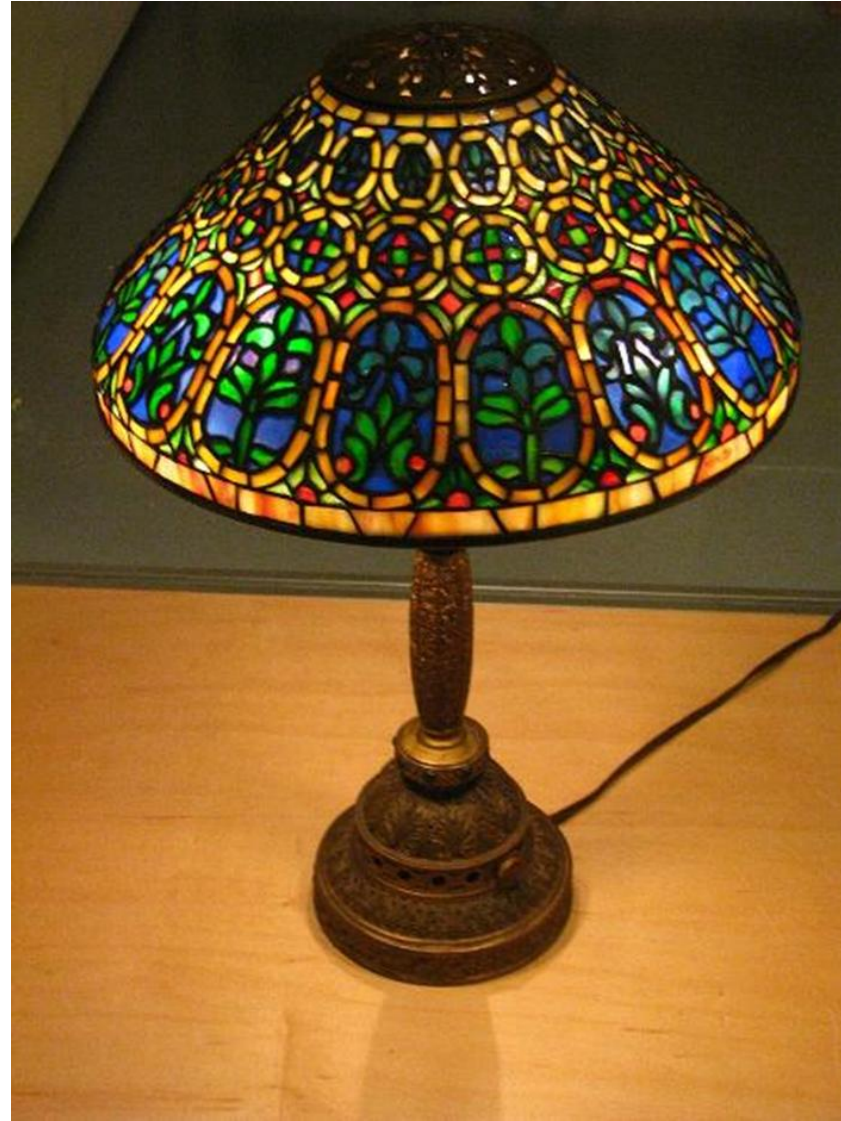
[Clara Driscoll](#), head designer at [Tiffany & Co.](#), c. 1899–1920, Tiffany "Daffodil" leaded glass table lamp. This is an example of copper foil glasswork, an alternative to came glasswork.



A typical copper foil Tiffany lamp, with a jonquil daffodil design



Clara Driscoll Tiffany lamp, laburnum pattern, c. 1910 Credit: Sailko - Own work



Tiffany Studios "Venetian" desk lamp
1910-1920



11



12



13



14



15



16



Clara Driscoll and the women who worked for her, worked on some of the stained glass windows and other decorative objects like **Inkwells**



DESKSETS DESIGNED BY THE DRISCOLL GIRLS OF LEWIS TIFFANY CO.



PAPERWEIGHT



5 OF THE BEST MODERN WOMEN GLASS ARTISTS

The modern studio glass movement has produced extraordinary women artists who transformed glass from a craft into high art.

Toots Zynsky pioneered a unique technique of fusing thousands of glass threads into vibrant vessel forms.



Jaroslava Brychtová of the Czech Republic was a fearless pioneer in large-scale glass casting beginning in the 1950s - a time when women in studios were virtually unheard of.



Ann Wolff creates deeply emotional sculptural works combining blown glass with engraving and painting.



Ginny Ruffner became famous for her whimsical frameworked glass sculptures combining imagery and text.



Nancy Callan stands out as one of the most notable women in the American studio glass movement, known for her technically masterful lampworked sculptures.



5 BEST MODERN MEN GLASS ARTISTS:

Dale Chihuly is arguably the most influential glass artist in American history, known for his spectacular large-scale installations and co-founding the Pilchuck Glass School in 1971.



Italian maestro **Lino Tagliapietra** brought the centuries-old secrets of Murano glassblowing to America, influencing an entire generation of artists.



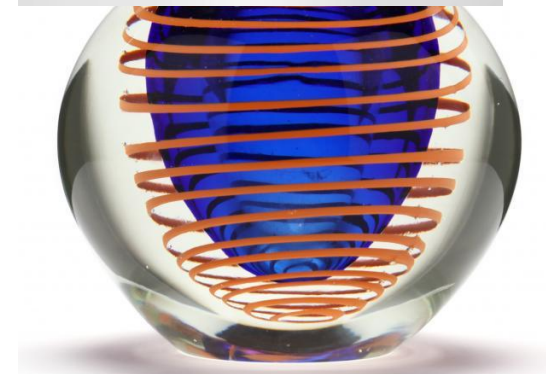
Preston Singletary is celebrated for blending studio glass techniques with his Tlingit Native American heritage, creating spiritually powerful works.



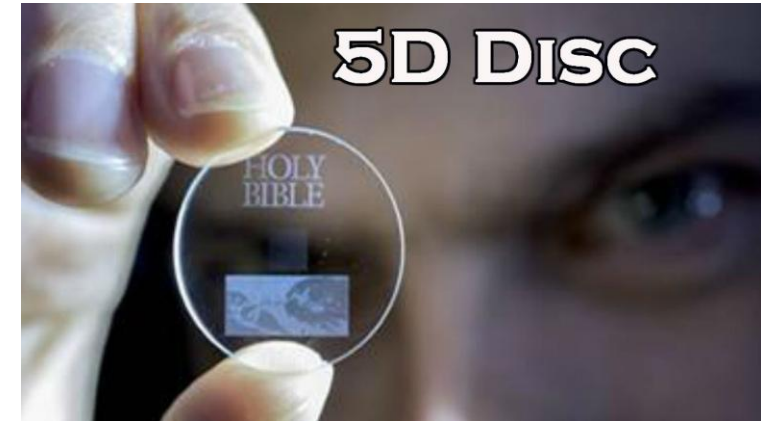
Harvey Littleton is considered the father of the American studio glass movement, developing in 1962 the technique of melting glass at low enough temperatures to work in a studio rather than a factory.



Czech artist **Stanislav Libenský**, working alongside Brychtová, created monumental cast glass sculptures that redefined what the medium could express.



Glass and the Future: Preserving Human Knowledge (2013 - Present)



It can hold 75,000 full movie DVD's !

5D Optical Data Storage: The Superman Memory Crystal

- **Technology:** Femtosecond laser pulses create tiny structural changes in glass at the nanoscale
- **Storage Capacity:** Hundreds of terabytes in a disc the size of a CD
- **Longevity:** Stable at room temperature for billions of years — essentially permanent by human timescales
- **Five Dimensions:** 3 spatial dimensions plus the size and orientation of the nanostructures
- **Developed by:** University of Southampton Optoelectronics Research Centre (2013)

The Full Circle of Glass:

5,525 Years of Innovation

What Has Been Preserved Forever

- Universal Declaration of Human Rights — Our shared values
- Isaac Asimov's Foundation series — Ironically, stories about preserving knowledge across civilizational collapse
- The Bible, Magna Carta, and other foundational texts — Our cultural heritage
- The complete works of Shakespeare — Our literary treasures

The Poetic Journey

- 3500 BCE: Mesopotamian artisans discover glass — creating beautiful beads to capture light and beauty
- Through the ages: Glass becomes windows to see the world, lenses to see beyond it, vessels to hold what we treasure
- 2025 CE: Glass may become the medium that preserves all human knowledge — outlasting humanity itself

***From capturing beauty to preserving civilization:
The journey of glass mirrors the journey of humanity itself.***

A serene sunset scene featuring a dark silhouette of a tree in the foreground. The sky is a mix of deep blues, oranges, and yellows, with wispy clouds. The colors of the sky are reflected in a body of water below, creating a symmetrical effect. The overall mood is peaceful and contemplative.

THE END

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https://en.wikipedia.org/wiki/History_of_glass

<https://www.britannica.com/technology/glass>

APPENDIX

- **Glass Structure**
- **Materials used to make glass**
- **Metal oxides and metal particles used to product different colors in glass**
- **Glass-Making Timeline**
- **Alphabetic glossary of terms used for Tiffany glass**

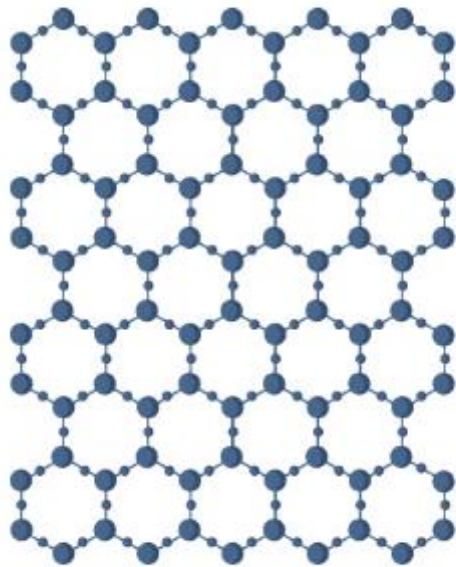
GLASS STRUCTURE

Glass has a random molecular structure like a liquid, even when it cools to a solid state.

Made primarily of silica (from sand), soda ash, powdered limestone, metal oxides for color, and recycled glass (called cullet), they are mixed and melted to achieve desired properties such as heat tolerance, strength, or color.

These materials are melted at a high temperature of 3,100°F (1700°C) and fuse together into a new material - glass!

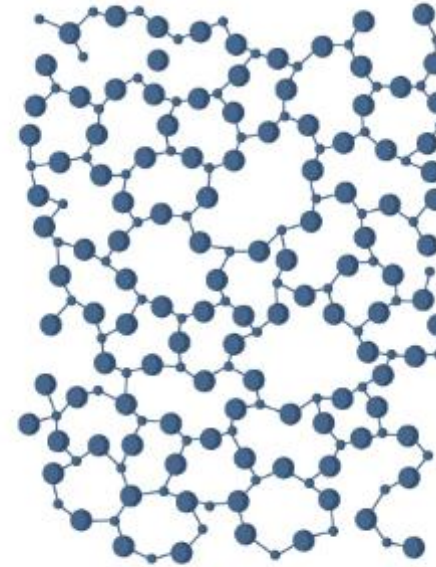
The Puzzle of Glass



In a **crystal**,
molecules form
an ordered, rigid lattice.



In a **liquid**,
molecules are disordered
and free-flowing.



Strangely, **glass** has
disordered molecules
like a liquid, yet is solid
and rigid like a crystal.

**glass is often called
a rigid liquid.**

Soda-Lime glass is the name of the most common type, which is used to make windows, bottles, light bulbs, and jars

SILICA FROM SAND

is very
tiny loose
pieces of rock
70%



CULLET

At a ratio
between 5-50%,
recycled glass is
added to help
reduce the
melting
temperature



SODA ASH

is commercial
grade sodium
carbonate that
is free from
water
15%



LIMESTONE

is organic
material
consisting
mainly of
calcium
carbonate
9%





IRON
 Fe^{2+} *

IRON-SULFUR
 Fe-S

COPPER
 Cu^{2+} *

CHROMIUM
 Cr^{3+} *

NICKEL
 Ni^{2+} *

GOLD
 Au

COPPER-TIN
 Cu-Sn



MANGANESE
 Mn^{3+} *

COBALT
 Co^{2+} *

URANIUM
 $\text{U}^{4+/5+/6+}$ *

NEODYMIUM
 Nd^{3+} *

ERBIUM
 Er^{3+} *

SELENIUM-CADMIUM
 Se-Cd

CADMIUM
as CdS

METAL AND METAL OXIDE * POWDERS USED TO CREATE THE DIFFERENT GLASS COLORS

Glass Making: A Timeline

3600 BCE

3rd Millenium
BCE

Glass invented
Iraq & N Syria

Technology
spreads to **Egypt**

Formed into
artefacts through:
core-forming,
casting, grinding,
cold-cutting

c. 1500 BCE

2nd C BCE

Development of
Hellenistic glass
industry

Cast, fused and
slumped open
forms being
produced

Mid to 1st C BCE

Small tube-blown
vessels in **Eastern
Mediterranean**

First quarter of
1st C

Fused bands of glass
& bottles (some
with gold bands)
inflated by blowing
iron; small blown
flasks & unguent
bottles in **Eastern &
Western provinces**

25 to 40 CE

Mould-blown
vessels introduced
in **East and West**;
free-blown
repertoire expands

Enamel-painted
blown glass added
to repertoire

Mid to 1st C

After AD40 a range
of large blown
vessels introduced;
wide repertoire of
forms, workshops in
Western provinces

Cast & slumped
forms continue,
but blown forms
dominate

Late 1st C

Robust & profitable
Roman glass industry
established

Glass vessels
widely accessible
to all levels of
society

GLOSSARY OF LOUIS TIFFANY'S GLASS TEXTURE CREATIONS

Favrile Glass: Iridescent glass with brilliant or deeply toned colors, often resembling the sheen of butterfly wings or peacock feathers.

Opalescent Glass: Glass that exhibits different colors when viewed under light, offering more color variety and texture compared to traditional stained glass, which he used for water and foliage.

Drapery Glass: A type of Favrile glass manipulated while molten to create deep folds and grooves, resembling fabric.

Confetti Glass (Fracture Glass): Made by embedding small pieces of colored glass into a sheet of molten glass, used for landscape and floral designs.

Fracture-Streamer Glass: Combines confetti-like pieces with thin, elongated pieces (streamers) within the glass.

Streamer Glass: Features thin, thread-like pieces of colored glass incorporated into the main glass sheet.

Ring Mottle Glass: Characterized by circular areas of contrasting colors and textures within the glass.

Ripple Glass: Glass with a wavy surface texture, often used to depict water.

Turtleback Tile: Thick, translucent, and iridescent glass tiles in various colors and sizes, frequently used for decorative elements and lamp bases.