

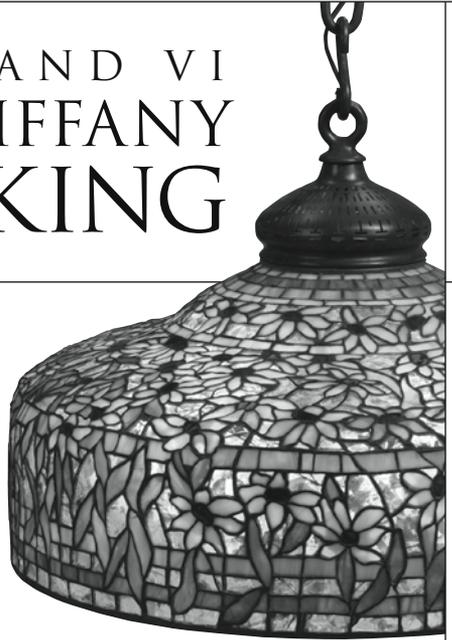
GALLERIES V AND VI SECRETS OF TIFFANY GLASSMAKING

LOUIS COMFORT TIFFANY (1848–1933) began his work in glass with the same tools and ingredients that had been used by artisans for thousands of years before him. Tiffany took the science of glassmaking, however, and elevated it to an art form of new brilliance and beauty. Under his watch, teams of talented designers and craftspeople translated Tiffany’s all-encompassing vision into some of the most memorable glass creations of our time. Tiffany’s studio system was not a simple enterprise; he needed specialized employees—a hierarchy of artists and artisans—to accomplish his goals.

This exhibition addresses the processes that Tiffany’s many companies used to produce everything from glass mosaics and molded buttons to leaded-glass lamps and windows.



TIFFANY STUDIOS WORKSHOP, c. 1927.
Photograph from the collection of The Charles Hosmer Morse Museum of American Art.



Above, top: BLACK-EYED SUSAN ELECTROLIER, c. 1904. *Leaded glass, Tiffany Studios (67-018). This lamp is on view in the Other Rooms gallery in Louis Comfort Tiffany’s Laurelton Hall located in the Museum’s south galleries.*

Above: MOSAICIST WORKING ON MOSAIC FOR ALEXANDER COMMENCEMENT HALL, PRINCETON UNIVERSITY, c. 1896. *Photograph from Glass Mosaic by Tiffany Glass and Decorating Company, 1896.*

Unless otherwise noted, all objects were designed by Louis Comfort Tiffany or one of his artists and made under the name of one of his companies.

I. Leaded-glass Lampshades

The creation of a leaded-glass lampshade began with a color sketch on paper of the lamp design. Next, using pencil, watercolor, and paint, an artist copied the design onto a plaster form in the shape of the shade so that it could be assessed as a three-dimensional object. The design was finally inscribed on a wooden form. Templates for each individual piece of glass that made up the shade were created using the design on this mold, and the leaded-glass shade was assembled on it.

Standardization and bottom-line concerns governed lamp production. Often the templates were fashioned out of brass, which lasted longer than other materials and could be used multiple times in filling orders for the same lampshade design.

When beginning the shade's assembly, a brass ring was placed on top of the wood mold to create an aperture. The artisan then wrapped selected glass pieces—each cut using the brass patterns—in copper foil and positioned



WORKERS IN THE TIFFANY
LAMP DEPARTMENT, c. 1898.
Photograph from Cosmo-
politan, 1899.

them on the mold with small nails. Starting at the top and working down, glass pieces were soldered first to the aperture ring and then one by one to each other. When this process was finished, the shade was removed from the mold and turned upside down to add a rim to the bottom edge and stabilize the shape. The shade was then soldered on the inside and **beaded** on the outside. **Beading** is a heavier application of solder to smooth and round out the line and to protect the copper-foiled edges. After soldering, the shade was patinated to change the color of the solder lines.

The ledger in this exhibition—which lists weekly fees paid to staff in the Women's Glass Cutting Department—illustrates the careful attention to financial detail.

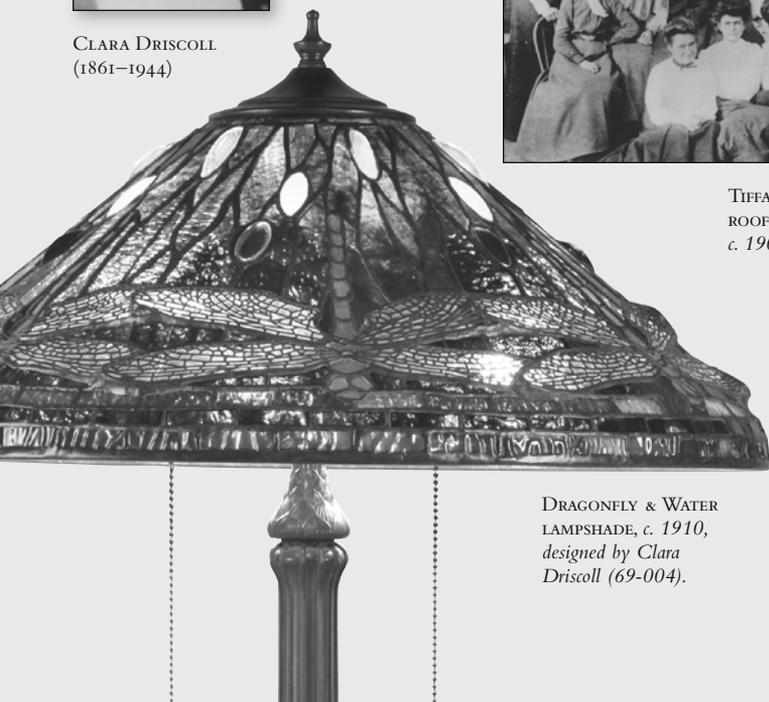
- 1) **Modern leaded-glass lamp fabrication display, 2003**
Susan Greenbaum, New York
- 2) **Restoration footage for Black-eyed Susan electrolier, 2005**
Venturella Studios, New York
Sean Eno, videographer
- 3) **"Supervision-General Work-Practice," 1905-6**
Tiffany Studios ledger,
pages 200-201
(1999-065)
- 4) **Tiffany Girls on the roof of Tiffany Studios, c. 1904-5**
Photograph
(2009-012:001)



CLARA DRISCOLL
(1861–1944)



TIFFANY GIRLS ON THE
ROOF OF TIFFANY STUDIOS,
c. 1904–5 (2009-012:001).



DRAGONFLY & WATER
LAMP SHADE, c. 1910,
designed by Clara
Driscoll (69-004).

THE WOMEN'S GLASS CUTTING DEPARTMENT

The design and production of lampshades was primarily accomplished within the Women's Glass Cutting Department. Tiffany established the department at his studio in 1892, allowing women for the first time to cut and select glass for windows and mosaics along with the men. Tiffany employed six women at his glasshouse in Corona, New York, in 1892. By 1897, Tiffany had between forty and fifty women employed in his glass workshop, who were known as "the Tiffany Girls." Clara Driscoll (1861–1944), supervisor of the department, designed many lampshades, including the popular *Dragonfly & Water* shade that was awarded a medal at the 1900 Paris world's fair. Women were respected for their color sense and ability to cut glass for the most intricate patterns.

II. Blown Glass

Glassblowing is a team activity that employs the talents of many artisans. Typically, a supervisor known as a **gaffer** manages a group of five to seven people who comprise one **shop**.

To create a blown-glass object, glass ingredients must first be heated to a molten state of 2,400 degrees Fahrenheit. These are the next steps:

Shaping: An artisan collects a gob of the hot, liquified glass, known as a **gather**, from the working furnace on the end of a metal **blowpipe**, a hollow rod, usually five feet long. The molten glass is blown, rolled, pulled, and manipulated with various tools into the shape desired. During this phase, the object is taken frequently to a reheating furnace commonly referred to as a **glory hole**.

Finishing: The shaped object is transferred from the blowpipe to a **pontil**, a long, solid metal rod, for additional sculpting and added details.

Cooling: The completed glass object must be placed in an **annealing oven** to cool gradually over time. If glass objects are not annealed, they will crack or break.



1) *Left to right:*

Vase, c. 1903

Carnation

Blown glass

Marks: 9542A / L.C.T.

(U-035)

On its base, this vessel shows the mark (the round, shiny area in the center) left by the pontil. The number within the pontil mark is the Morse Museum's identifying accession number. The initials L.C.T. are etched on the left-hand side of the pontil mark and the number 9542A, a unique production number that is helpful in dating this object, is at the bottom of the pontil mark.

Vase, c. 1903

Carnation

Blown glass

Marks: 9475A / L.C.T.

(U-036)

Glass with an iridescent appearance is created by adding metallic materials to the the primary ingredients of glass—silica, soda or potash, and lime. Iridescence can also be achieved by spraying a glass object's surface with stannous or lead chloride before heating it in an oxygen-deprived atmosphere.

Above: ON LEFT, JACK PAGE SHAPES GLASS OBJECT WITH JACKS AT TIFFANY FURNACES. ASSISTANT ON THE RIGHT IS BLOWING INTO THE BLOWPIPE. *American photographer (20th century), private collection, photograph ©Christie's Images, The Bridgeman Art Library.*

Vase, 1905

Lily
Blown glass
Marks: 5851B
Paper label: 61
(93-002)

This vessel was most likely created in two parts. The stemmed vessel and the foot would have been joined together while hot.



Vase, c. 1899

Pansy
Blown glass
Marks: L.C.T. / T1146
(U-012)

This vase exhibits extensive manipulation with a variety of tools. Notice the round bottom, pulled body and neck, and flared rim.

Flower holder, c. 1906–24

No. 712, Hexagon design base;
1-in. tube insert
Blown glass, bronze
Marks on glass: L.C.T.
Marks on base: TIFFANY
STUDIOS / NEW YORK / 712
(54-004)

Bases and blown-glass vessels were sold in a variety of pairings, which provided many different styles and price points for the same type of vase.

Vase, c. 1906–13

Trumpet flower
Blown glass, bronze
Marks on glass: L.C.T.
Marks on base:
TIFFANY
STUDIOS / NEW
YORK / 1043
(54-009)

This vase features colors that may have been applied with frit or glass rods.



Vase, c. 1898

Cypriote
Blown glass
Marks: L.C.T. K241.
Favrile –
Exhibition Piece
(78-0228)

Tiffany's Cypriote glass has the rough, irregular, and pitted surface, that was common in glass buried for centuries. Tiffany artisans likely reproduced this effect by rolling molten glass in crushed glass crumbs.



2) Glassblowing Tools

These tools are modern examples similar to those that would have been used at Tiffany's companies.

Blowpipe: Used to create the approximate mass and the general design of the object being developed.

Casting Ladle: Used to transfer hot glass into a cast.

Duck Bill Shears: Used to cut glass and often to trim and shape a piece.

Jordan Jacks: Used to shape glass as well as to open a glass vessel.

Paddle: Used to shape glass.

Pontil: Used after the blowpipe for further shaping and finishing touches.

Tongs: Used to take items from the pontil to the annealing oven.

III. Opalescent Glass

The glass made at Tiffany Studios was called **opalescent** glass or American glass. It was radically different from **pot metal**, a type of glass commonly used in Tiffany's era. Pot metal was uniformly colored, translucent, and regular in every way. Craftspeople making pot metal windows often painted them with enamels—a glass paste—to create form and visual effects.

By contrast, opalescent glass was fabulously varied in color and texture—even within a single piece of glass. By careful selection, Tiffany could use his glass to mimic foliage, fabric, water, or a sunlit horizon. Tiffany, in a sense, was painting with glass, as opposed to painting on glass. He applied for and received patents for his modifications and improvements upon opalescent glass, although John La Farge (1835–1910) first patented the underlying process in 1879.

Tiffany created the word Favrile to use as a general trademark for his works. The term was derived from the word “fabricate” to suggest the handmade quality of the objects produced by his studios.

Top to bottom:

Fragment, c. 1885

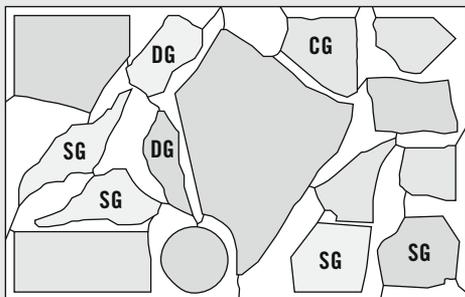
Tiffany home, Seventy-second Street, New York City; Laurelton Hall, Long Island, New York
Leaded glass
(77-036:F)

Touch Box

Tiffany glass was created in a variety of ways. Some glass types were rolled out onto a flat surface and manipulated.

To create the cloth-like **drapery glass (DG)** artisans used hand tools to move and twist hot glass into folds.

Mixing two or more colors of molten glass together created **streaky or striated glass (SG)**.



Confetti glass (CG) was made by pouring molten glass on top of pieces of colored glass or by sprinkling pieces of colored glass into hot glass.

Some of these terms for glass types are merely descriptive and were not necessarily used by Tiffany.

IV. Leaded-Glass Windows

The creation of a Tiffany stained-glass window began with a small sketch or drawing that was followed by a **cartoon**, a full-scale painting of the proposed window. (See the cartoon for Yale University's *Education* window in the Museum's lobby). Then the designer made two **cutlines**—tracings of the cartoon on which the planned

glass cuts were carefully marked in thick black line. The first outline served as the pattern for the window. The second was cut into templates to be used to produce the many individual glass shapes and sizes required by the pattern. Next, glass for the window design was chosen from stored sheets available in thousands of colors and textures. Once all of the glass for the window was selected and cut, the window was put together in one of two ways:

Leaded-glass technique: Artisans fit the cut glass into flexible lead **comes**, which are strips of lead shaped like construction “I-beams.” The glass pieces are placed on either side of the “I” and soldered and mitered at the joints.

Copper-foil technique: Lead comes were difficult to use for complex patterns requiring many small glass pieces. For these projects, especially the leaded-glass lampshades, artisans wrapped the edges of glass pieces with a thin copper foil before they were laid out and soldered together. This copper foil was treated with beeswax on one side and muriatic acid on the other. The beeswax permitted the foil to adhere to the glass, while the muriatic acid permitted solder to bond to the foil.

1) Modern window-making techniques display, 2005

Melody Spence, designer
Visions in Stained Glass Inc.,
Orlando

Left: Leaded glass

Right: Copper-foiled glass

2) Lead lines from Faith window, c. 1896
First Presbyterian Church,
Lake Forest, Illinois

These lead lines were removed during the window's conservation. Lead deteriorates over time and needs to be replaced. The lead lines are taken off as a whole so that the conservator has a guide to follow.

METALLIC OXIDES PRODUCE COLOR

Iron	→	Green
Cobalt	→	Blue
Manganese	→	Amethyst/Purple
Tin	→	White
Iron/Sulfur	→	Ambers/Browns
Lead Antimony	→	Yellow
Gold/Other Metals	→	Red

V. Glass Chemistry

Silica (most commonly sand), soda or potash, and lime are the three primary ingredients of glass. When mixed, these raw materials form what artisans refer to as **batch**. Color is created in various ways, but often by adding either **metallic oxides** to the batch or various ready-made forms of colored glass during other stages of the glassmaking process.

1) Left to right:

Vase, c. 1913

Blown glass

Marks: 2272 H / L.C. Tiffany –
Favrile
(52-007)

Vase, c. 1912

Blown glass

Marks: 5061 G / L.C. Tiffany –
Favrile

(56-018)

2) Ingredients and coloring agents for glass, including ready-made colored-glass forms

A) Frit (ground-up glass)

B) Sand

C) Glass rods, small and large

D) Metallic oxides

E) Billets (large chunks of glass)

VI. Molded and Pressed Glass

Tiffany produced a variety of glass tiles, jewels, and buttons in molds or with presses. In the molding process, molten glass was poured, blown, or pressed into a mold typically made of metal. The green buttons in this display were made with a special press to imprint the design, but no mold was used. An object produced solely with a press has an irregular border.

1) Selected molded glass, c. 1878–1915
(87-021, 87-017, 87-022, 67-017:K)

2) Cards of buttons, c. 1910
(1998-005:1, 53-007)

3) Diecast for Tiffany Studios glass jewel, c. 1902–25
No. 154
Leo Popper & Sons, New York
(2004-024)

VII. Glass Mosaic

Tiffany began experimenting with mosaics in the early 1870s. The glass pieces used for mosaics, often about one-quarter-inch square, are called **tesserae** and are cut from sheets of colored glass.

1) Sample panel, c. 1925
Geometric
Glass mosaic
(76-011)

2) Top to bottom:

Tea stand, c. 1901

Dragonfly

Glass mosaic, bronze

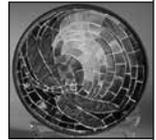
Designer: Clara

Driscoll, 1861–1944

Marks: TIFFANY

STUDIOS / D1128

(85-010)



Assorted tesserae from Tiffany Studios, 1902–10

Glass

(Education Collection)



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