LIBBEY GLASS COMPANY

WORLD'S FAIR 1893

Fonds
Chambon

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(formerly
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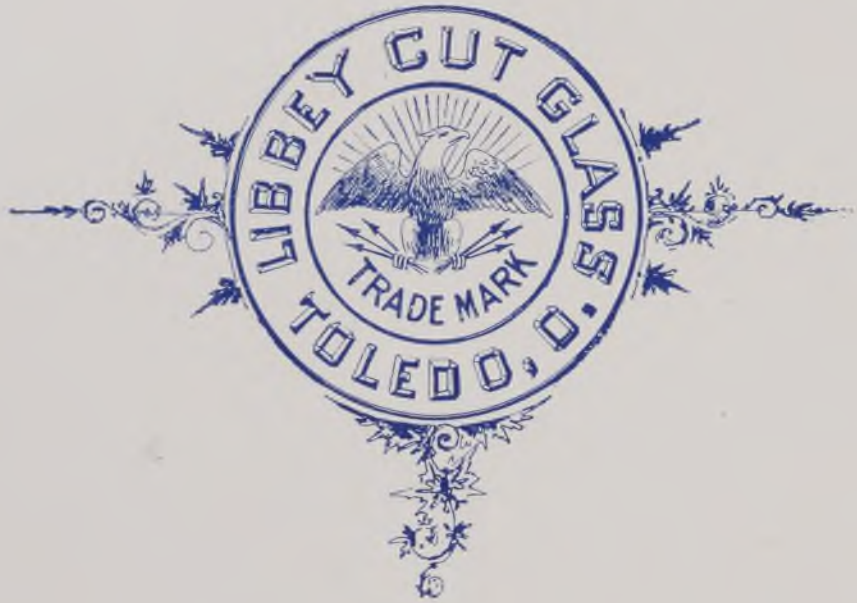


THE MYSTERIOUS ORIGIN OF GLASS

THE WORLD'S FAIR CRYSTAL PALACE OF 1893.

HOWEVER classic or modern authorities differ as to the origin of glass, history is unable to tell us of the beginning of the art, but simply at different epochs, records degrees of excellence in ancient lands. Pliny could only recount by hearsay its discovery by the Phoenician merchants, who landed on the coast of Palestine, and, in preparing a repast, placed their pots on cakes of nitre which fused with the sand, producing the unknown fluid. Chemists pronounce this manner of discovery incredible, as the heat required for fusion is over 2,000 degrees Fahrenheit.

As mystery aids the novelist in romance, so has "*L'art de la verrerie*" a tale in its history. Marietta was the daughter of Beroviero, one of the most famous glass makers of the 15th century. He possessed many valuable recipes for coloring glass, and these were confided to the daughter's care. Now, Beroviero employed a young man, Georgio, as workman, with whom Marietta fell in love, and to whom she revealed her father's secrets. Georgio published and sold the recipes at a great price, and thus enriched he demanded in marriage Marietta of poor Beroviero, who was still cherishing, as he thought, the only copy.

To science, rather than to treasure secrets, the glass-working of to-day owes its great advancement, yet many semi-primitive tools and manipulations seem, just as if by charm, to be quite indispensable in fashioning these dainty fabrics into mold and hue.

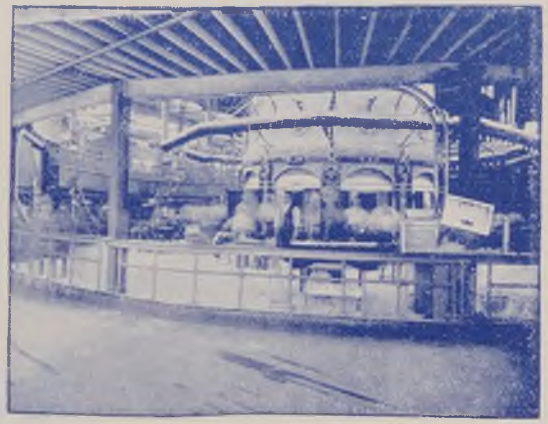
Might he, who conceived the Tyrian and Theban patterns, visit the place to-day where the people of all nations have met in fraternity, not as of yore, concealing their magic arts, but rather to reveal their wares of beauty as well as the science and art of their manufacture, in the great universal market place, which Rome, in her proudest glory, would have beheld in amazement.

Let the ancient Theban become our visitor at this great rendezvous of science, literature and art. Let him enter The Libbey Glass Works, the World's Fair Factory, on Midway Plaisance.

Erected like a palace, within it is more like a theatre, where the beautiful drama of glass art may be viewed in successive scenes by the millions that throng the exposition of 1893.

The sides, the dome, the ceiling are all glitter and sheen with the products of this mystic art. The sparkling prismatic hues cast from hundreds of cut-glass pieces outrival glistening diamonds, the splendor of ancient Tyre and Sidon, the stars of the astrologers and the grotto of Calypso. He sees here the roaring furnaces containing the crucibles for the fusion of the materials that produce the glass, and there, near by, the finished cut-glass specimen, wondrously carved, all made beneath the dome on the World's Fair factory of the cut glass company. Let our ancient visitor watch the process from the furnace to the completed ware.

BLOWING ROOM, FURNACE, MELTING POTS.



The main doorway from Midway Plaisance into the factory leads to the glass-house or blowing room. This room is semi-circular, the melting furnace being in the center, around which all the workmen may be seen, and the manipulation of the glass closely observed.

The Libbey Glass Company has endeavored, both in the ingenious construction of the palace, as also the placement of workmen, shops and materials, to make all processes easily comprehended by every one.

The furnace in the center of the blowing room is 100 feet high, in the form of a truncated cone, whose base is twenty-five feet in diameter.

The melting pots are stationed just within the circumference, around and a little above the base in the following way: A canopy, whose zenith is about sixty inches above the base, shuts in the whole of the bottom of the tower. Within this dome are included the pots, over which and beneath the canopy, circulates the heat, entering from below, caused by the burning of crude petroleum, pumped through the pipes from Ohio, the only fuel used in this building.

Into this dome open ten arches, through which, small window-like holes serve for the putting in of the batch or sand mixture, and also for the taking out of the mixture when molten. The pots are forty-eight inches high, reaching almost to the zenith of the canopy. At either side of each crucible there is a flue, making twenty flues in all.

Above the little dome the tower is all open, the melting all being confined below.

These pots are manufactured by special pot makers, requiring many more details and much more painstaking in their construction than is generally supposed. To secure the requisite consistency, the rich German clay is mixed with the Missouri clay, and this mixture is trampled by the bare feet. The bottom is three inches thick, forty-two inches wide, and fifty-two inches long, while the sides of the pot are made by placing solid rolls of this clay, three inches in diameter by twenty-four inches in length, one upon another. Ninety degrees Fahrenheit is used in their baking, and no pots are used till from three to five months old. As all the products of the Crystal Palace must needs have their beginning in this fiery furnace, the necessity of perfect utensils, and of skilled, careful

artisans is readily seen. This department should be thoroughly studied before the visitor goes to the cutter's, spinner's or engraver's wheels.

First the crude materials, sand, oxide of lead, potash, saltpetre and nitrate of soda are successively put in the mixing bin, mixed, turned and sifted; the mixture, called batch, carried to the "working-hole," or window, of the melting furnace, into which it is thrown and confined from twenty-four to thirty-six hours, under about 2,200 degrees Fahrenheit, till the process of flux and fusion, called vitrification, takes place, when the contents become a plastic, molten mass.

Cullet, a term applied to defective or broken glass, is thrown back into the pots and remelted.

Lead, as the second ingredient of batch, gives a so-called flint basis, while soda and lime substituted for lead, give a lime basis.

The flint basis always produces the cut-glass stock, and the lime basis usually produces the pressed glass stock. But, of whatever the batch consists, the process of vitrification is the same.

The presence of iron in sand is marked by a greenish appearance. To offset this green color, and give the glass live crystal color, manganese is added to the formula above; gold added to the batch produces ruby; cobalt produces blue; uranium, yellow; copper scales or iron scales, green; ground coke, burnt oats or birch bark, amber; creolite or feld-spar, milky white.

A workman named "gatherer," with a hollow iron pipe called "blow pipe," reaches within the working hole, gathers some of the sticky metal at the point of the rod, and passes the pipe to the blower.

The latter rolls it, quickly and repeatedly, onto an iron slab called "marver," to make the glass substance more symmetrical, expanding the glass by blowing through the pipe which, by his trained fingers, is kept constantly in an easy, swaying motion. When he swings the blow pipe below, it allows the hot plastic substance to sway, and this swaying causes it to lengthen out gently. Should it lengthen too much, he holds the blow pipe upward, somewhat, or even upright, which shortens the shape. But all these motions are made frequently and rapidly, all regulated by requirements as dictated to the sensitive hand and experienced eye of the skillful glass blower.

Next an solid iron rod, called "ponty," is substituted for the blow pipe, and with this as a handle, he turns the glass, touching it incessantly with wooden tools, forming plaques and plates in all conceivable shapes. If the product is to be molded the glass mass is dropped from the "ponty" into press-molds, which are pushed beneath the plunger. The plunger is then inserted by the workman, who pulls the lever down. This causes a pressure upon the glass, and the mold is filled out according to the designs.

Pushing the lever back the plunger is withdrawn, the mold is opened, and he takes from the clamps a beautiful souvenir from the World's Fair Factory.

One of the interesting features of the blowing room is the blowing of long glass tubing, and the drawing or twisting of colored canes or cane stock.

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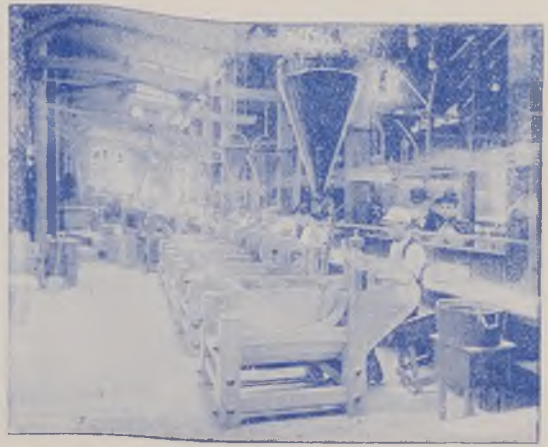
LEAR, OR TEMPERING OVEN.

All glassware, after it leaves the blowing room, is carried at once to the lear, or tempering oven, a system of large trays con-



nected like cars, which subjected to a graduated or annealing heat, are drawn along conducting the goods to the shipping room. Without being tempered none of the glass productions could resist changes in temperature, or even the casual handling necessary in transportation and requisite to their utility.

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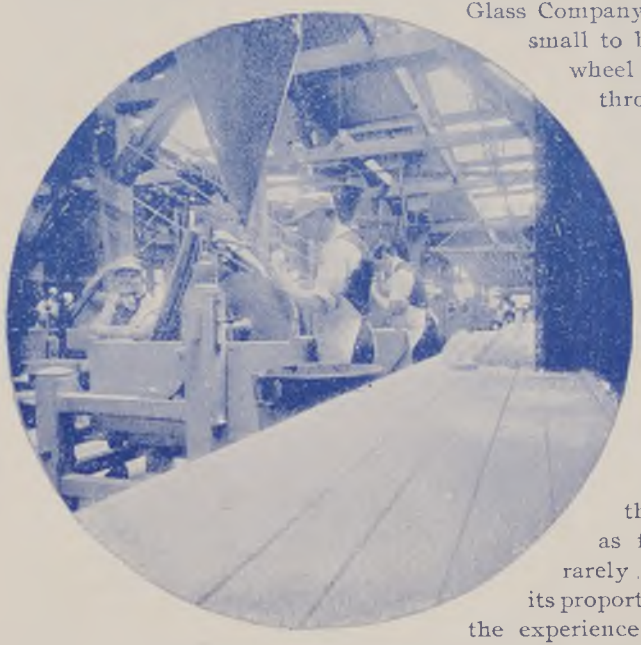
COMPLETE FACTORY OF FINE AMERICAN CUT-GLASS.

Many objects of glassware, when first brought from the blowing room, look rough and crude, having only the general form of a bowl, vase, etc. The entire pattern to be cut is not traced out on the surface, only intersecting lines as guides are drawn in red lead, forming small squares and rectangles. These geometrical divisions are generally made with a pair of calipers, according to the superfacial pattern to be cut. The glass piece is now held to a Bessemer steel wheel, which may be from three to twenty-four inches in diameter, according to the pattern or the kind of incision desired. Above this wheel is a hopper, or funnel, from which is constantly dropping onto it a substance of fine sand and water; the sand-coated wheel cutting deeply into the glass, leaving its mitre. The smoother's apparatus looks very much the same as the cutter's. The hopper is suspended above, but drips only water on the wheel below, which is of fine sand-stone instead of steel.

The smoother takes out the sand particles and rough places, leaving the glass much smoother and cleaner, but not yet with any prismatic lustre, the crowning beauty of all cut-glass.

This manipulation is left to the polisher, whose stand and wheels resemble the others, but

who holds the glass to the mitred edge of a wooden wheel, sprinkled with putty powder or pumice. The polisher puts the last careful touches on the deeply cut furrows so characteristic of The Libbey Glass Company. In intricate designs the grooves are too small to be polished by the wood, and hence a fourth wheel called "brush wheel" is used, upon which is thrown a mixture of rotten stone.



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FULL VIEW OF THE ENTIRE PROCESS OF SPINNING, WEAVING AND BRAIDING OF GLASS FIBRE. (See next page.)

Now let us go and see the spinning and the weaving, the entire process of glass cloth manufacture, more fascinating, perhaps, as it is the more novel, and seems more fairy-like than all the rest. The end of a cane of solid glass of crystal, or any desired color, is, by means of a small blow-pipe flame, melted, and from the molten end a single threadlet of the candy substance is drawn out, as from boiling candy. This thread, however, rarely breaks, and can, with care, be made to keep its proportion, as even though the flame is not graduated, the experience and constant practice of the spinner enable him to retain the requisite consistency. Constantly being drawn farther out, it is lifted over the periphery of a wheel six feet in diameter, where it adheres and winds, as the wheel is set in motion,

spinning itself out from the red-hot end held by the workman, carefully, that it may not become too molten, yet may keep as plastic as when the tiny thread started on its way.

The wheel makes from about 120 to 360 revolutions per minute, the number guaged as one wishes; the larger number of revolutions producing, of course, not only more windings of glass, but also a finer spun thread. When the spinner, with a watch before him, has timed the wheel one minute, the table before him, with blow-pipe and all, is shifted a trifle, this carrying the glass thread, in its constant adhesion to the dampened wheel, to another spot on its broad periphery, and another circlet-band of fibres is spun. After several such bands, without interruption, have appeared each in one minute, and each possessing, say 360 independent threads, the wheel is stopped and the moistened bands unreeled off on to a long table or board-trays, as in the preparation of candy. The bands of fibrous glass are cut into pieces of about thirty-two inches in length, and carried on the trays to girls at the loom, where the weaving of glass-cloth begins, beside whose many artistic applications in decoration and finery, one may have an entire wardrobe, as such a product is not fragile, but can be folded, pleated, and handled in all ways as cloth. One of the girls passes a band of glass fibres, say 200 threads, through the warp, then the other girl a single thread of silk from a shuttle; thus alternately glass and silk, in the proportion of say, 200 to 1, are woven as a woof to the silken warp, and glass cloth is produced of soft sheen and lustre, and of great pliability. In glass braids no silk is necessary.

THE PRINCESS' GLASS DRESS--ROYAL ROBE OF INFANTA EULALIA.

At one of these wheels and looms the same glass cloth texture is being produced which entered into the royal robe of Princess Eulalia of Spain, who witnessed the process here; called the soft fabric "*marvelous*," and wished a garment all made of spun glass fibre, which she greatly admired.

This unique robe, fitted by Madame Victorine of New York, after its exhibition in this palace, will be forwarded to the infanta at Madrid.

THE ROYAL APPOINTMENT.

Both PRINCESS EULALIA and PRINCE ANTOINE, with royal escort, visited this Crystal Palace Saturday, June 10th, 1893. The infanta examined carefully, and with apparent interestedness, a spun-glass dress just completed for the actress, Georgia Cayvan, as also the many new and beautiful designs in cut-glass wares, saying repeatedly: "I am so fond of this cut-glass; it is excellent." A few hours later President E. D. Libbey received a communication from Eulalia conferring upon The Libbey Glass Company, of Toledo, Ohio, the appointment as

"Glass Cutters to Her Royal Highness Infanta Dona Eulalia of Spain."

ENGRAVERS, ETCHERS AND DECORATORS.

Great pains has been taken not only to make the Crystal Palace replete with beautiful glasswares on exhibit, but also to enable visitors to observe all the appurtenance of a complete factory. Consequently, besides the engravers are the etchers, who cover the glass with a composition of wax and turpentine, allowing visitors to etch their own names on any little souvenir they may choose; the crystal, or blow-flame workers, making unique World's Fair souvenirs in rainbow hues; and the decorators tastefully embellishing, in color, tiny glass slippers, graceful vases and other pieces with their deft brushes and kilns. The delicate handicraft of the engraver is done by small graduated copper wheels, upon which emery, with engravers' oil, is used instead of sand and water, as is the case with cutting. Though engraving is literally a cutting, it would be more properly termed a planing. The engraver, instead of making a straight, deep cut as in cut glass, makes only a bevel incision by sliding or turning the glass in his hand. To smooth and polish such incisions lead wheels and cork wheels, with pulverized pumice, are next applied. The engraver has as little to guide him as the cutter; besides a steady hand, great diligence and painstaking is required. Visitors while viewing this interesting process may have a name engraved on any article desired, and thus obtain a beautiful souvenir, whose manufacture has been observed from beginning to end in the World's Fair Crystal Palace.

CRYSTAL ART ROOM.

Resplendent with prismatic hues thrown from myriads of deep incisions in the cut glassware display, and harmonized by the effulgent sheen and soft lustre of spun-glass cloth, this room doubly merits the name, "Crystal Art Room." The utmost achievements are laid here as offerings of the skill and talent of the artisan to the studio of the artist. The decorator has here arranged the products of the various departments of the "*verrerie*" to give the visitor a comprehenive view of the interesting and wonderful exhibit. The glitter of the cut glass at either side, reflected multifold into the plate glass walls, meets the softening gleam of the ceiling bedecked with glass cloth.

Into this melee of glitter and gleam numerous electric rays pour their streams of brightness. Even the sombre ebony paneling and incasements cannot throw the least gloom over this grotto-like art room of crystal and glass fabrics.

In the center square, protected by a warder of chains in glass link circlets, are exquisite furnishings manufactured in

the spun glass department of the Crystal Palace. Here the upholsterings of divans, chairs, ottomans, as well as cushions, lamp-shades, etc., entirely of glass cloth, though the most novel manufacture of the palace, do not appear as unique and novel as they really are, such is the subdued home-like look of their glossy textures.

The visitor's attention is called particularly to the spun-glass cloth "tapisseries" and ceiling decorations, whose evaluation is $10,000; also to the propriety of these goods as a canvas for the painter, the pleasant effect of such art work being seen in the studies exhibited in the Crystal Art Room. Lamp shades in various designs and sizes, illustrate the practical utility of these goods. All woven glass fabrics may be sponged without the least detriment to color or goods.

At the sides of the room are specimens of the company's deeply cut glass wares. Attention is invited to ice cream sets of thirteen pieces, encased in brass-bound morocco, sherbet and punch jugs of Roman design, quaint decanters of Venetian shapes, graceful celery trays, ice tubs, novel honey dishes, a high banquet lamp, richly cut, dishes of every conceivable use and pattern. At the entrance to the Crystal Art Room are placed, in contradistinction, an old Henry Clay punch bowl of 1812, in pressed glass, and an elegant $200 punch bowl, in deeply cut glass, manufactured by The Libbey Glass Company.

The New England Glass Company which, in 1818, Mr. Bishop, an authority on glass, pronounced "One of the most extensive flint glass manufacturers in the country," passed into the control of its former agent, Mr. W. L. Libbey, in 1878, who not only maintained and elevated the company's high standing recognized by the U. S. government's records of 1865, but also greatly aided the development of the science and art. Mr. E. D. Libbey, on the death of his father, W. L. Libbey, in 1883, assumed the entire charge of the business, having been in the firm since 1880, and removed the factories then styled: "The W. L. Libbey & Son Company," successors to the New England Glass Company, to Toledo, Ohio, chiefly to secure the benefit of the natural gas, which affords a very uniform temperature, requisite in the production of beautiful clear glass of finest quality.

LIST OF AGENTS.

Albany, N. Y....The Van Heusen, Charles Co.
Allegheny, Pa.....Charles Reizenstein
Atlanta, Ga.....J. P. Stevens & Bro.
Akron, Ohio.....Weeks & Kingsbury
Allentown, Pa.....L. H. Yeager & Co.
Altona, Pa.....Baltzell Bros.
Augusta, Ga.....Wm. Schweigert
Adrian, Mich.....Wm. M. Sheldon
Alameda, Cal.....John Goldstone
Alton, Ill.....W. F. Hoppe
Anderson, Ind.....George Greyer
Ann Arbor, Mich.....Wm. Arnold
Ashtabula, Ohio.....R. Riddell
Asheville, N. C.....M. Alexander
Ashland, Wis.....E. J. Born & Co.
Atchison, Kas....Regnier-Shoup Crockery Co.
Alliance, Ohio.....J. A. Zang & Co.
Brooklyn, N. Y.....Ovington Bros.
Boston, Mass.....Abram French Co.
Baltimore. Md.....J. Seth Hopkins & Co.
Buffalo, N. Y.....I. R. Brayton
Bay City, Mich.....Ueberroth & Co.
Binghamton, N. Y.....A. S. Miner
Birmingham, Ala.....Gluck & Black
Bloomington, Ill.....A. E. Elbe
Bridgeport, Conn.....D. C. & E. M. Peck
Burlington, Iowa.....E. H. Carpenter
Bangor, Me.....James Mooney & Co.
Battle Creek, Mich.....Allan Raymond
Belleville, Ill.....Roediger Bros. & Co.
Bradford, Pa.....L. Emery Jr. & Co.
Butte, Mont.....Bartlett Bros.
Chicago, Ill.....Burley & Co.
Cincinnati, Ohio.....F. Schultze & Co.
Cleveland, Ohio.....C. A. Selzer
Champaign, Ill.....C. H. Baddeley
Columbus, Ohio.....Frank F. Bonnet
Charleston, S. C.....James Allan & Co.
Chattanooga, Tenn.....Silva & Abbott
Council Bluffs, Iowa.....W. A. Maurer
Cedar Rapids, Iowa.....T. Z. Cook & Laurance
Charlotte, N. C.....G. S. Read & Co.
Chillicothe, Ohio.....McKell & Co.
Canton, Ohio.....Bour Bros.
Colorado Springs, Colo.....A. Matthews
Coldwater, Mich.....O. D Chapman
Clinton, Iowa.....Pool & Son
Detroit, Mich.....F. G. Smith, Sons & Co.
Denver, Colo.....R. Douglas Crockery Co.
Dayton, Ohio.....A. Newsalt
Des Moines, Iowa.....Perkins & Brinsmaid
Davenport, Iowa...Jens Lorenzen Crockery Co.
Dubuque, Iowa.....C. H. Little, Bruce & Co.
Danville Ill.....Cooke & Hendricks
Delphi, Ind.....W. Gros
Danville, Va.....Williamson & Lipscomb
Delaware, Ohio.....B. Yehley
Decatur, Ill.....O. E. Curtis & Bro.
Deseronto, Ont.....The Rathbun Co.
Evansville Ind... Blackman & Lunkenheimer

Evanston, Ill. . . . . Ullrich Bros.
Erie, Pa. . . . . T. M. Hemphill & Co.
Easton, Pa. . . . . Thomas Fassitt
Eau Claire, Wis. . The Smith Bros. Crockery Co.
Elgin, Ill . . . . . W. A. Skinner
Elkhart, Ind. . . . . George H. Wheelock & Co.
Ft. Wayne, Ind. . . . . H. N. Ward
Findlay, Ohio. . . . . E. L. Entrikin
Flint, Mich. . . . . J. C. Decker
Fond Du Lac. . . . . A. Spence & Son
Ft. Smith, Ark. . . . . Bloch Queensware Co.
Freeport, Ill. . . . . C. H. Little & Co.
Fresno, Cal. . . . . Nathan, Dohrmann & Co.
Fremont, Ohio. . . . . T. F. Heffner
Fostoria, Ohio. . . . . Robbins Bros. & Co.
Grand Rapids, Mich. . . H. Leonard, Sons & Co.
Galesburg, Ill . . . . . C. H. Trask
Gloversville, N. Y. . . . . A. D. Norton
Goshen, Ind. . . . . Peters & Herr
Green Bay, Wis. . . . . Weise & Holman
Greensboro, N. C. . . . . E. M. Caldcleugh & Bro.
Hartford, Conn. . . . . Olds & Whipple
Huntington, W. Va. . . . . F. A. Nash
Harrisburg, Pa. . . . . W. H. Spooner
Hillsdale, Mich. . . . . H. P. Mead & Co.
Haverhill, Mass. . . . . Charles Emerson & Sons
Hamilton, Ont. . . . . Gowans, Kent & Co.
Hazelton, Pa. . . . . Kline & Co.
Honey Grove, Texas. . . . . S. L. Erwin & Co.
Indianapolis, Ind. . . . . Charles Mayer & Co.
Ironton, Ohio. . . . . E. Bixby
Jackson, Mich. . . . . W. E. Wygant
Johnstown, Pa. . . . . A. W. Luckhardt
Joliet, Ill. . . . . T. W. Martin
Jackson, Tenn. . . . . A. K. Jobe
Jamestown, N. Y., Harris, Underwood & Doering
Janesville, Wis. . . . . W. G. Wheelock
Kansas City, Mo. . . . . T. M. James & Sons
Kansas City, Kas. . . . . A. Jeanneret
Knoxville, Tenn. . . . . Hope Bros. & Co.
Keokuk, Iowa. . . . . C. Hornaday
Kingman, Kas. . . . . Tredick & Co.
Louisville, Ky. . . . . A Kaye
" " . . . . . J. Dolfinger & Co.
Lexington, Ky. . . . . W. E. McCann & Co.
Little Rock, Ark. . . . . Charles S. Stifft
Lincoln, Neb. . . . . Funke & Ogden
Leavenworth, Kas. . . . . C. L. Knapp & Co.
LaFayette, Ind. . . . . C. H. Ankeny & Co
LaPorte, Ind. . . . . Wm. Crawford
Lima, Ohio. . . . . Harman & Bell
LaCrosse, Wis. . . . . J. W. Toms China Co.
Logansport, Ind. . . . . Snider & Alber
Los Angelos, Cal. . . . . H F. Vollmer & Co.
Lynchburg, Va. . . Kinnier, Montgomery & Co.
Lyons, N. Y. . . . . Zimmerlin Bros.
Milwaukee, Wis. . . . . C. Preusser Jewelry Co.
Montreal, Que. . . . . Henry Birks & Sons
Minneapolis, Minn. . . . . The Dickinson Co.
Memphis, Tenn. . . . . W. & S. Jack Co.
Macon, Ga. . . . . Charles H. Solomon
Montgomery, Ala. . . . . D. Abraham
Muskegon, Mich. . . . . F. Mueller
Madison, Wis. . . . . John Larson & Co.

Mahoney City, Pa.....E. Schertzinger
Manistee, Mich.....C. D. Gardner
Mansfield, Ohio.....H. Harroun & Co.
Marion, Ohio.....M. Nelson & Sons
Massillon, Ohio.....Joseph Coleman
Menominee, Mich.....G. A. Woodford
Michigan City, Ind.....N. V. Cole
Muncie, Ind.....Jackson & Ethell
Muscatine, Iowa.....George W. Dillaway
Morenci, Mich.....M. A. Bell
Meridian, Miss.....George W. Meyer
New York, N. Y.....Higgins & Seiter
" " .....Frank Haviland
" " .....Davis Collamore & Co.
" " .....Black, Starr & Frost
" " .....Tiffany & Co.
" " .....Wilhelm & Graef
New Orleans, La.....E. Offner
New Haven, Conn.....John Bright
Nashville, Tenn....The B. H. Stief Jewelry Co.
Newport, R. I.....E. P. Allan
North Adams, Mass.....W. H. Sperry & Co
Northampton, Mass.....William Dearden
Norwalk, Ohio.....L. C. Bradley
Omaha, Neb.....Samuel Burns
Oakland, Cal.....Nathan, Dohrmann & Co.
Oshkosh, Wis.....John F. W. Decker
Oswego, N. Y.....J. Wendall & Son
Ogdensburg, N. Y.....Bell Bros.
Oil City, Pa.....H. H. Rand
Ottawa, Ill.....R. H. Trask
Ottumwa, Iowa.....J. Prugh & Co.
Ottawa, Ont.....A. & A. F. McMillan
Oskaloosa, Iowa.....S. J. Dutton Co.
Oneida, N. Y.....S. Chapin & Son
Philadelphia, Pa., Wright, Tyndale & VanRodeu
" " .....Bailey, Banks & Biddle
Pittsburg, Pa.....Hardy & Hayes
Providence, R. I.....Tilden-Thurber Co.
Portland, Ore.....Olds & Summers
Portland, Me.....Moxie, Sawyer & Co.
Poughkeepsie, N. Y.....W. R. Farrington
Pueblo, Colo.....Robbins' Crystal Hall
Paducah, Ky., Robins Glass & Queensware Co.
Passaic, N. J.....P. Heliagers
Piqua, Ohio.....Louis Bros.
Pittsfield, Mass.....A. A. Mills
Port Huron, Mich.....O'Neil Bros. & Co.
Portsmouth, Ohio.....E. E. Ewing
Peoria, Ill.....C. E. Wheelock & Co
Paris, Ky.....Ford & Co
Peterboro, Ont.....J. McClelland
Parkersburgh, W. Va.....J. Wetherell & Son
Quincy, Ill.....Sohm, Ricker & Weisenhorn
Rochester, N. Y.....D. Rosenberg
" " .....H. C. Wisner
Richmond, Va.....Richmond China Co.
Reading, Pa.....J. C. Illig & Bro.
Racine, Wis.....B. Hinrichs
Rockford, Ill.....A. W. Wheelock
Raleigh, N. C.....W. H. & R. S. Tucker & Co.
Richmond, Ind.....S. N. Jenkins
Rochester, Minn.....J. B. Blickle
San Francisco, Cal., Nathan, Dohrmann & Co.

St. Louis, Mo..Mermod & Jaccard Jewelry Co.
St. Paul, Minn.....Wemott, Howard & Co.
Syracuse, N.Y....Joseph Seymour, Sons & Co.
Scranton, Pa.....Weichel & Millar
St. Joseph, Mo...Regnier-Shoup Crockery Co.
Sacramento, Cal....Nathan, Dohrmann & Co.
Saginaw, Mich.....The Daudt & Watson Co.
Salt Lake City, Utah..Callaway, Hoock & Co.
Savannah, Ga.....Thomas West & Co.
Seattle, Wash.....E. Lobe Co.
Sioux City, Iowa.....J. K. Prugh & Co.
South Bend, Ind...George H. Wheelock & Co.
Springfield, Mass.....Charles Hall
Springfield, Ohio.....C. B. Fisher
Springfield, Ill.....J. C. Klaholt
San Diego, Cal.....Boyd & Stahel
Sandusky, Ohio.....George Marshall
San Jose, Cal.....Oscar Promis
Schenectady, N. Y.....S. R. James
Shamokin, Pa.....W. K. Snyder
Sheboygan, Wis.....Adam Imig
Shreveport, La.....A. Kahn
Spokane Falls, Wash., Geo. F. Tilghman & Co.
Steubenville, Ohio.....J. W. Forney
Stockton, Cal.....Nathan, Dohrmann & Co.
Streator, Ill.....George M. Rigden
Sault St. Marie, Mich.....P. M. Church & Co.
Salem, Ind.....B. T. Pace
Shelbyville, Ind.....J. G. De Prez
Sunbury, Pa.....W. H. Hill
Santa Cruz, Cal.....Nathan, Dorhmann & Co.
Sherbrooke, Que.....Lucke & Mitchell

Toronto, Ont.....Gowans, Kent & Co.
Troy, N. Y.....Jessup & Henderson
Tacoma, Wash.....S. S. Brooks
Terre Haute, Ind.....J. E. Somes
Topeka, Kas.....Farnsworth & Brinsmaid
Tiffin, Ohio.....L. Secwald
Titusville, Pa.....A. L. Hall
Utica, N. Y.....Sherwood & Golden
Urbana, Ohio.....G. Judd Williams
Vicksburg, Miss.....Benjamin Guider
Vincennes, Ind.....George Harris
Vancouver, B. C.....James A. Skinner & Co.
Washington, D. C.....M. W. Beveridge
Worcester, Mass.....The Clark-Sawyer Co.
Wilmington, N. C.....S. A. Schloss & Co.
Wilmington, Del.....William Lawton
Waterbury, Conn.....E. T. Turner & Co.
Wheeling, W. Va.....I. G. Dillon & Co.
Wichita, Kas.....W. W. Pearce
Wilkes Barre, Pa.....Thomas C. Parker
Williamsport, Pa.....Seitz Bros.
Waco, Tex.....W. M. Ragland & Son
Watertown, Wis.....A. Wiggenhorn
Winona, Minn.....S. W. Morgan
Winchester, Ky.....The Winn Furniture Co.
Warren, Ohio.....H. S. Pew
Winnipeg, Man.....Gowans, Kent & Co.
York, Pa.....Isaac Bennett
Youngstown, Ohio.....W. G. Smith
Ypsilanti, Mich.....S H. Dodge
Zanesville, Ohio.....Aler & Garey

List of manufacturers whose goods have been used in the construction and operating of the World's Fair Crystal Palace:

D. L. STINE, Toledo, Ohio—Architect.

AERIATED FUEL CO., Springfield, Mass.—Oil Fuel System.
BARAGWANATH (WM.) & SON, Chicago, Ill.—Feed Water Heating and Purifying Apparatus.
BARNEY VENTILATING FAN CO., Boston, Mass.—Ventilating System.
CHRISTY FIRE CLAY CO., St. Louis, Mo.—Fire Brick and Fire Clay.
FINDLAY CLAY POT CO., Findlay, Ohio—Glass Melting Pots.
GARDEN CITY SAND CO., Chicago, Ill.—Sand for Glass-Making.
GRATON & KNIGHT MFG. CO., Worcester, Mass.—Belting.
GRIFFEN ENAMELED BRICK CO., New York City—Enameled Fire Brick.
HALL STEAM PUMP CO., Pittsburg, Pa.—Air Compressors and Oil Pumps.
LAMSON CONSOLIDATED STORE SERVICE CO., Chicago—Pneumatic Tube and Railway Cash Carrier Systems.
MAGNESIA SECTIONAL COVERING CO., Ambler, Pa.—Steam Pipe Covering.
MATHER ELECTRIC CO., Manchester, Conn. (Dynamos, Motors and Generators.
CLAFLIN & KIMBALL, Agents, Boston, Mass. (The "Novak" Lamps.
MILWAUKEE GAS STOVE CO., Milwaukee, Wis., "Decorating Kilns" for Firing Glass.
MUSKEGON CHEMICAL FIRE ENGINE CO., Muskegon, Mich.—Fire Extinguishers.
NICHOLS & MATHEWS, Wellsburgh, W. Va.—Furnace Builders.
PUTNAM MACHINE CO., Fitchburg, Mass.—Lathes and Drills.
RELIANCE OIL AND GREASE CO., Cleveland, Ohio—Machinery Oil.
RUSSEL & CO., Massillon, Ohio—Engines.
STERLING CO., Barbeton, Ohio—Steam Boilers.
STURTEVANT (THE B. F.) CO., Boston, Mass.—Fan Blowers.
WARD ARC LAMP ELECTRIC SUPPLY AND CONSTRUCTION CO., New York, Arc Lamps.
WORLD INJECTOR—AMERICAN INJECTOR CO., Detroit, Mich.—Boiler Injectors.
WORTHINGTON PUMP CO., New York City—Feed Water Pump.
WROUGHT IRON BRIDGE CO., Canton, Ohio—Contractors. (Built this building complete.)

LIBBEY GLASS CO'S FACTORY AT WORLD'S COLUMBIAN EXPOSITION

IN FULL OPERATION DURING THE FAIR

Dimensions: 150 ft. wide, 200 ft. long. Height of Tower, 100 ft. One of the most interesting features of the Fair.

MAIN FACTORY, TOLEDO, OHIO, U. S. A.

THE FOSTER PRESS . CHICAGO