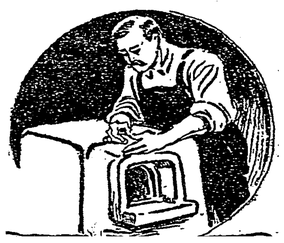
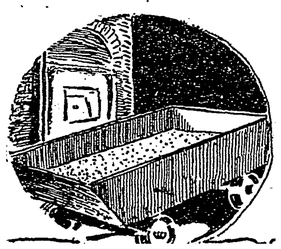
From Sand Bank to Stained-Glass Window

Searching crucible clay for foreign particles.



Modeling a crucible for melting glass.



"Batch wagon" with sand, ready for furnace.

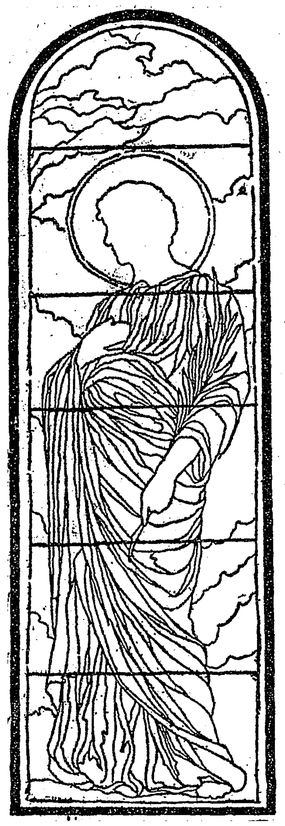
Ladeling out molten glass.

Putting sheet glass in annealing oven.

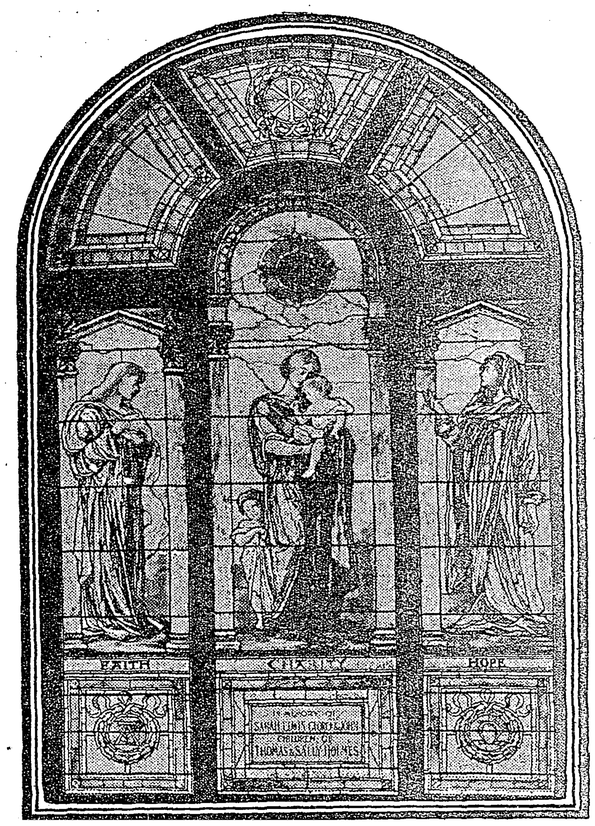
Rolling molten glass into sheets.

Fitting leads after the glass is cut.

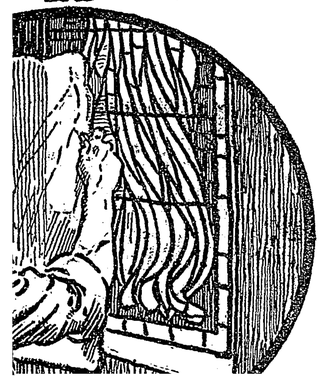
Mr. Chenes working on a cartoon full size of window.



Working drawing for leads of a window.



Memorial window in Church at Northampton, Mass. Designed by Mr. Gabriel C. Chenes.



Selecting an appropriate bit of color.

Story of an Art Industry That Thrives in This City Yet Is Little Known to the Layman---Vagaries and Losses in the Manufacture of the Glass Which Gives the "Dim Religious Light."

THRILLING as was the ordeal of Shadrach and his companions in the roaring furnaces of Nebuchadnezzar, the adventures of an ordinary carload of Massachusetts sand, such as goes daily into the greater Brooklyn glass furnaces and eventually turns up in a dome or memorial window, are not without interest or novelty. Few persons are aware that most of the colored or cathedral glass used in decorative windows over this country is manufactured in Brooklyn—prepared for John La Farge, Gabriel Chenes, and other master workers in glass. So much reformed sand comes from across the river, in fact, as to earn Brooklyn the distinction of being a city of glass houses.

To follow a ton of white sand into a furnace, to watch it transformed into a molten mass resembling red-hot taffy, and then to pursue it visually under huge steel rollers, operated by steam or hand, until eventually it comes forth and is delivered at a ramshackle building on Washington Square as material for the artists, cutters, and joiners, is to gain a knowledge of a unique and very little known art industry of the metropolis.

Only within the past few years has the making of memorial windows taken an important place among the fine arts. Practically the first hand-rolled glass made in the United States was produced in Brooklyn in 1880, since which time the popularity of and demand for stained-glass windows has increased by leaps and bounds.

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Scattered over the country are approximately a million domes and windows, a majority of which were designed, if not by, after designs of, a few artists whose studios are in the neighborhood of Washington Square.

Alice discovered nothing more entertaining in Wonderland than one may find in the glass house across the bridge. But they who weave magic in them are a secretive folk—ever coming and going in whispers and taking a sort of blue-stocking care about admitting visitors. Why? Each factory has its own secret processes of making glass, its special ovens as carefully watched and warded as a thoroughbred on the eve of a Suburban, its workmen and apprentices who form of themselves a close corporation. Admission is always a special privilege.

Arriving, for instance, at one factory, the writer was met and dubiously surveyed by Manager John Dannenhoffer. Being satisfied that no verbal stones were to be thrown at the house, the entertainment committee of one cautiously led the way through the rambling premises.

Were Brooklyn Grenada, Manager Dannenhoffer would be known as an alchemist. He and his brother have inherited many secrets, along with the business, from their father—a pioneer of pioneers in glassmaking.

Sometimes a Dannenhoffer speaks English, the rest of the time German. The manager was speaking German when he approached a huge bin and directed a number of workmen about the respective quantities of sand, soda ash, alkali, metallic oxide, and twenty-four-carat gold to use in mixing a batch of ruby glass.

Twenty-four-carat gold? Nearly $200 worth of pure gold was being sprinkled recklessly on the sand heap before the protesting eyes of the visitor.

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Directly sand, soda, alkali, oxide, and gold were being twirled and whirled round and round in a sort of exaggerated hogshead. Then the precious batch was shoveled into the fining pots, of which twelve were in commission in a temperature of 3,500 degrees.

"You never can tell," explained the alchemist, "what is going to happen in there," pointing toward the crimson glare of the nearest furnace. "Just now we are making ruby glass on a special rush order, the pure gold you saw giving the batch a shade of ruby, unless one of several things happen before the glass is ready for rolling.

"For example," stepping aside as one of the furnaces was opened, "it frequently happens that every particle of gold in a batch is burned out, leaving a drabbish gray glass, worth hardly one-half as much as the opalescent ruby. Let us see how this batch is coming along."

Wielding a long-armed ladle, an assistant had advanced and dished out enough of the raw, molten mixture to make a sheet of regulation size. Walking over to a heavy, steel-based machine, he poured the writhing contents on the chilled metal. Immediately two supernumeraries with iron forks began working—pulling—the red-hot lump, much as home-made candy is pulled. Shoving it close under the roller, the molten mass was flattened out and deftly transferred to the annealing ovens, where it was subjected to a gradual cooling process. On from chamber to chamber in the great oven coolers the sheet passed, until it was finally served up like a German pancake—a perfect sheet of ruby glass, worth 30 cents a pound.

The original batch of sand and other material, sufficient for 1,000 pounds of glass, was worth $300 in the finished state.

"One curious thing about the manufacture of stained or colored glass," resumed Manager Dannenhoffer, "is the uncertainty of results. As one might say in a whisper, there are only two things more uncertain—the mood of a woman and the heels of a mule. We, for instance, never know exactly how the shades will be in the finished product. If we did, if we could foreshade the glass accurately, we could save hundreds of thousands of dollars both to ourselves and to the consumers, the purchasing public.

"Again," passing into the barn-like storerooms, with their tons and tons of precious glass boxed and ready for shipment, and leading the way up stairs to a room such as Omar Khayyam may have minded in writing his rubaiyat, the guide continued, "there is the constant likelihood of the fining pots cracking or proving defective—and each pot is worth from $50 to $60."

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Ranged along the walls were a dozen pots in process of making. Over in one corner a workman was breaking up a quantity of Hessen clay—combing and kneading it of hairs and stray straws. The presence of a foreign particle in a pot subjected to a temperature of 2,000 or 3,000 degrees occasions a costly leakage even when it does not result in the pot cracking and spilling gold, glass, and all, it was explained.

Emerging and descending again to the nether furnaces, the guide directed attention to a number of workmen making what is called hand-rolled and drapery glass. Drapery glass, used, as the name designates, in securing drapery effects on window figures of such as saints and women, taxes the skill and ingenuity of the glassmakers to the utmost, explained the guide.

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Two men were rolling a red-hot lump of raw glass into a sheet about a quarter of an inch thick. No sooner was the flattening process completed than another workman, with an eye to millinery effects, caught the cooling, but still pliable, glass with the prong of an iron spear, and with a deft turn of the wrist, looped it at one end so that in a trice several graceful folds rippled and radiated over the surface in much the same manner as a Roman toga falling from a Senatorial shoulder.

"We have a good many tricks at our end of the trade," concluded the manufacturer, "but we are not in the same class with the artists, such as La Farge and Chenes. They begin, you know, where we leave off."

Gabriel Chenes was busy on a design for a forthcoming window of heroic dimensions when seen in his Washington Square studio-workshop. During many years of association with John La Farge—the great French master—his name has been affixed to some of the most celebrated work and windows done in this country.

While hardly of middle age himself, there is much of Middle Ages and mystery about the roomy studio near the home of Mayor McClellan. Here and there were boldly executed drawings of Biblical or saintly characters, St. Luke gazing down from one wall, while Peter the Hermit preaches the first crusade to a rapt mediaeval assemblage grouped about him on another wall.

Mythology and the Scriptures, in both of which the maker of memorial windows must be versed, were generously represented in the well-selected library, contributing further to the dimly devout atmosphere.

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Adding a touch to a No. 8 halo and buckling on a No. 9 sandal with two successive strokes of the pencil, the artist stepped back and surveyed his handiwork. Smiling abstractedly, he remarked that the halo was a failure, as, tilted to one side of the head, it conveyed an impression of rakishness quite out of seeming with the apostolic wearer.

"We have to be very careful and conservative in reproducing the revered and reverend figures of Biblical history," pursued the artist. "For the world has made up its mind, rightly or wrongly, regarding the personal appearance of this or that saint or character. As a matter of fact, there is no positive clue to the minute appearance of any of the great Scriptural figures. We are—and it is a curious coincidence—as much in the dark as to the positive features and figure of the Christ as we are of Shakespeare. Nevertheless, everybody has a photographic idea of how both of them looked, and hence—in the case of the great figures of the New Testament—the memorial window artist has small scope for originality, even though his reading may have convinced him that such and such a character was really very dissimilar from the general notion.

"At the same time, the mission of the memorial window is a responsible one and demands conscientious thought and deliberation on the part of the artist, in so far as a vast number of persons, in Sunday schools and churches, get indelible mental impressions from it.

"Again," with a despairing expression, "our work lasts forever, under ordinary conditions. Nothing save lightning or an earthquake or contact with a destructive object ever destroys a glass canvas, so to say, and for that reason, when a church or cathedral is provided with windows, no matter how ugly or inappropriate, there is small chance of replacing them. Sentiment also has considerable to do with it, it being contrary to sentiment to disturb a window which a congregation has gazed on for years.

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"Frequently," he continued, "the graver nature of the work of communing with saints, so to say, is violently disturbed by a client wanting the impossible done. For instance, a woman recently ordered from me a memorial window to commemorate her late husband. She thought Saint Paul preaching at Athens would be appropriate. But on receiving the preliminary drawing she decided that her husband should be shown in the Athenian audience, listening to the preacher. It took considerable tact and reasoning to persuade her otherwise.

"On another occasion a New England congregation, composed of practical, hard-working folk, strenuously objected to the use of Greek characters under a trinity of Faith, Hope, and Charity. The Elders wanted no hifalutin' dead language used, and so the English terms were adopted.

"I suppose the average person," continued Mr. Chenes, "is like the average vestryman who cannot reconcile results with the expense of making a set of handsome memorial windows, say, those costing from $1,000 to $5,000 a window. But when it is remembered that the glass alone in such a window costs several hundred dollars, besides time and thought spent on the original color drawing and the work of transferring the drawing to glass, the expense is explained. As an instance, Mr. La Farge and I once worked up a window of forty or fifty figures, in which there were so many thousand pieces of glass that they could not be counted. Windows like that may require a year or more in the making."

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Rising and crossing from his studio to a tottering old building on the south side of Washington Square, the artist continued: "My saying that several hundred dollars' worth of glass may go into a window was figurative rather than literal. Twenty times as much glass as actually used is broken in making a window. There," pointing to an immense pile of broken glass, "is material which cost thousands of dollars—gone to waste. It costs $5 a load to cart it away."

On every floor of the building men were turning out windows, domes, candelabra, gorgeous lampshades, nearly everything possible to colored glass save eyes and baseball arms.

How, it may be asked, are the workmen guided in selecting the hundreds of shades and shades that go into a window? One large room was plastered with dummy drawings, on each of which was pinned bewildering bits of paper bearing numbers. Each number meant a shape and shade, and, the foreman volunteered, the workmen follow copy, even though it be out of the window.

Now and then, as was the case with a window for the William K. Vanderbilt house, a client is not satisfied with mere glass, but will have a window studded with rubies, amethysts, opals, and other precious stones, running the cost into tens of thousands of dollars. Daily experiments in securing color effects are producing results which are a revelation to the layman. Ask them on Washington Square, and they will tell you that red and blue make purple; that violet placed over ruby and opal softens the tone and pulls a window together; that certain colors must be used in fighting the three lights known as warm, cool, and firelight, and many other mysteries to the uninitiated. Without being art nouveau, memorial window making to the man in the street is a new art, as yet comparatively unexplored.

WILLIAM GRIFFITH.

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