

THE STAINED GLASS WINDOW INDUSTRY.

There are few arts combining both the useful and ornamental that add so much to the gratification of the public as the introduction of stained glass windows in edifices, whether public or private. To so temper the glare of light passing through an opening in the wall, and render it a source of pleasure to the eye, by means of harmonious colors, is the study of the stained glass window producers.

In church edifices, this use of colors in windows has now become quite general, and to meet the æsthetic demand, glassmakers and artists are taxed in devising new shades and designs to meet the local or sentimental tastes.

For design, it is quite natural that the great field of Scripture should furnish an endless variety of central subjects, while a framing may be composed by a harmony of flower, leaf, and scroll.

In arranging a window the artist is first governed by the cost of the materials and the sum allowed for the finished work. That being stated, he arranges the sash space into the most beautiful and appropriate design that the pecuniary limit will allow. The design is first arranged on a small water colored sketch, then enlarged to full size by pencil outline on heavy manila paper. Each of the parts of the design are now cut out by use of double shears, shown in the illustration. These shears are made double for the purpose of cutting away as much of the paper on the line as will compensate for the thickness of the leads that join all the various pieces together. A simple design is shown above the shears, cut into its parts and a tack through each to keep them in place on a board, and from which they are removed to lay upon the glass, while a diamond or wheel follows their edge as a guide in cutting. There are five different sizes of leads used, shown in cut, the height being the same, but of varying widths of face presented; the double shear concerns, of course, only the upright, standard portion of the lead.

At this point, the taste of the artist is further supplemented by the skill and eye of the glass selector. From a profusion of colored glasses, with surfaces of smooth or roughened texture as required, he selects the quality and color he thinks most effective for the location. This he writes upon each piece of the design and then they are given over to the glass cutter.

The glasses most used are prime colors—ruby, blue, amber, purple, and green. In addition to these are plain hammered cathedral (all shades), antique, variegated cathedral of two or more shades, blended brown and amber, brown and blue, brown and pink, olive and amber, imported Venetian, American Venetian, ondoyant, and, the most useful of all, opalescent glass. Most of these varieties are made in this country and are prized for their clearness. The surfaces are in all designs and degrees of corrosion.

If the window is to have figures included in the design, or portions that require special treatment, then the work, such as portraits, hands, feet, animals, etc., is painted with metallic colors on plain glass and "burned in," in a gasoline heated muffle furnace, shown in lower left corner of cut. This requires great skill and management in gradual raising of the temperature to the flowing point, and final slow cooling. Even with the greatest care, fine bits of painting are sometimes cracked and ruined in the furnace, necessitating a repetition of the work.

Having all the various pieces of glass prepared and laid upon their corresponding part of the paper design, the board upon which they rest is removed to a large table, where, in a square corner of the table, two pieces of the lead are mitered and placed against the right

angle sides of the elevated edges. The first corner piece is placed in the groove of the lead, a short piece is cut the length for the lower edge and another for the angle end and side. The workman is provided with a hook shaped knife, as shown in the lower right corner of cut, with which he easily cuts the soft leads, while the weighted opposite end of the knife handle serves as a tamping hammer.

A second piece then follows in its place and is similarly surrounded with the grooved leads; curved edges are readily placed by the very plastic lead. Occasional measurements are taken, and with a soft wood guard the work is tamped up to reduce any enlargement of work, by crooks in the intervening leads.

When the pieces are all in their appropriate places, the workman goes over every joining of the leads with a soldering iron and solder, thus fastening the whole together. This necessarily must be done with both sides. To make a window rainproof, the glass must be puttied in to the sash. The leads are made slightly deeper than the thickness of the glass, for this provision, and now the workman daubs thin putty over

has been conducting a series of tests on emmensite, this test demonstrated that it cannot be fired in safety in large charges. Until the test on May 11, it has been successfully fired in shells from powder guns of medium caliber. The 7, 11, and 12 inch guns being used, the charges not exceeding thirty pounds. It was then determined to try an old 15 inch smooth bore gun which had been rifled. After testing the gun with large charges of gun cotton a steel shell was filled with 230 pounds of emmensite and the gun was loaded. Extraordinary precautions were used and the gun was fired by electricity. A terrific explosion followed when the firing key was touched, and the air was filled with flying bits of iron and sand. The gun carriage was torn to bits and scattered. A hole 10 feet deep and 25 feet in diameter was made in the ground. No one was injured.

The Electric Candle.

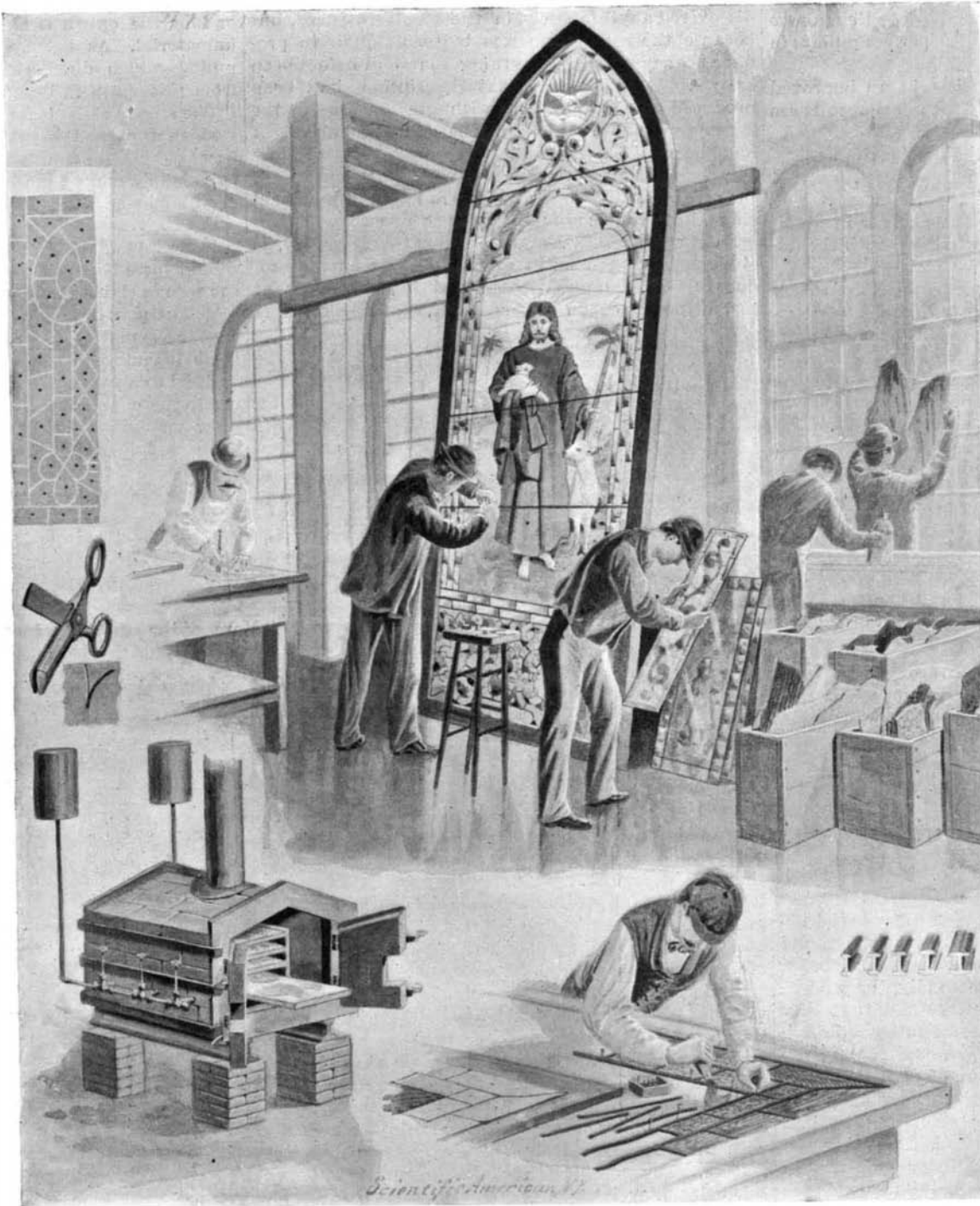
The electric candle is in great request in England for the lighting and decoration of dining and other tables. An ingenious device for lighting the candles is provided by placing small pads under the table cloth, and taking the current from them by means of two pin points in the base of the candlestick. The candles, of course, are extinguished on being taken from the table, and are relighted when they are replaced in the proper position. They are so arranged that the bulb and the glass imitation of a wax candle can be removed, when the candlestick can be used for an ordinary candle. When used with shades of colored silk, the electric candle makes one of the prettiest additions to a dinner table that it is possible to imagine.

The Protection of Iron and Steel by the Gesner System.

The Gesner method of protecting iron and steel from rusting is described in La Revue Scientifique. The principle of the process consists in forming on the surface of the metal treated a double carbide of hydrogen and iron, which is extremely hard and adhesive. In carrying out the process, the articles must first be thoroughly cleaned from rust; but it is not so essential that all oil or grease should be removed from their surfaces. The treatment is effected in a pair of gas retorts, set side by side, and raised to a temperature of from 600° to 700° C. The articles to be treated are placed in a retort for about twenty minutes, when a current of hydrogen is turned into the retort, and kept on for forty five minutes. Then a small quantity of naphtha is introduced; the supply being kept on for

ten minutes. The naphtha is then shut off; a current of hydrogen being turned on for fifteen minutes longer, when the process is finished. All that remains is to cool the retorts down to 400° C; and as soon as this temperature is reached, the retort lids can be taken off and the product removed. The coating thus produced has a bluish color, and is stated to be so adherent to the metal that a treated bar can be bent through an angle of 45° without disturbing it. The thickness of the protective coating is not stated.

THE Boston Herald says: A Portland business man has hit on a new scheme for being awakened at the proper time in the morning, which he declares beats any alarm clock that ever was invented. He has his telephone in his bedroom, and each night when about to retire he calls up the central office and requests the operator to call him up at a designated hour, in order to find if the "phone" works properly. Promptly at that hour the bell rings loudly, and he is awakened with neatness and dispatch. He claims that the service thus rendered is alone worth the annual rental of the telephone.



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the whole glass, and with a handle broom he sweeps in every direction over the window and drives the putty into the spaces, finally cleaning off the surplus by a bath of sawdust and a vigorous brushing.

Nothing remains to do now but put the glass in the sash, set it up as shown, and wire it securely to thin cross bars for security from high winds, etc.

We are indebted to Chicago firms for information and sketches pertaining to this industry, and it is a pleasure to us to speak our gratification of the work done, both in an artistic and workmanlike manner, by Messrs. Geo. E. Androette & Company, Flanagan & Biedenweg, and the Wells Art Glass Company, of Chicago. We are pleased to know that many churches, private residences, and places of trade are beautified with their products.

Bursting of an Old Fifteen Inch Gun.

A test of emmensite, the new high explosive, at the Sandy Hook proving ground on May 11, resulted in an explosion of the shell in the gun, which was shattered, some of the fragments being found a quarter of a mile away. According to Captain Frank Heath, who