

in a powerful machine at a single heat, the utmost economy of material and greatest possible strength of connections are obtained. This is one of the most noticeable peculiarities of their bridge.

THE ST. LOUIS BRIDGE.

The work on the St. Louis bridge is going on finely and is well done. Every piece is carefully tested before it is put into the structure, the fits are well made and a careful inspection finally insures the rejection of any piece faulty in either construction or material. The "skewbacks" are very awkward shapes to forge and are very heavy. They are furnished by several of the larger forges of the country. Those that we examined were made by Lazell, Perkins and Co., of Bridgewater, Mass., and were well executed.

MANUFACTURE OF GLASSWARE.

As was remarked in an earlier letter, the glass manufactures of Pittsburgh are very important and extensive. A large number of firms are making window glass, and the remainder are generally making a lime glass of such excellence that it requires an expert to distinguish it from flint. It is sometimes called a flint glass, but is made without lead, which was formerly supposed indispensable in the manufacture of a very clear glass. This lime glass lacks the weight and the metallic ring of true flint glass, but, if well made, compares very favorably with it in other respects.

We visited the establishment of W. A. Hamilton and Co., who were making druggists' prescription bottles of a good quality of lime glass, and we were much interested in watching the operation. The great beehive-shaped furnace, with its ten glowing pots and the forty or fifty men and boys clustering around it and hurrying to and fro, was a novel and entertaining spectacle. The skill displayed by the workman in taking from the liquid mass just the right quantity of melted glass upon the end of his hollow iron rod, in blowing it up to just the proper form and size to fit the mold and the rapidity with which the work was done were equally remarkable. The reheating of the necks of the bottles at the "glory hole" and nicely finishing the lip formed an appropriate side show.

A large proportion of the furnaces are now blown out for repairs. This requires some weeks, and the furnaces being rebuilt, their fires are lighted and are not extinguished until another year brings around again the season for repairs.

The O'Hara Glass Works, conducted by Messrs Jas. B. Lyon and Co., were formerly noted as the makers of the best flint glass manufactured in this country. They are now making a lime glass and are sustaining their reputation by the excellence of the new product. These were among the earliest glass works started in the United States, and were established by General Jas. O'Hara and Major Isaac Craig, in 1795, first making window glass. They began making flint glass in 1802. They have made their reputation, and are sustaining it, like the best iron masters of the place, by steady attention to the choice of the best materials and by doing the best possible work upon them, and then by a thorough system of inspection which prevents any, except perfectly satisfactory products, going into the market. Some of the cut ware made here is very beautiful. This work is done by grinding, the work being held in the hand of the workman; and the skill displayed in cutting the most delicate patterns is frequently perfectly marvelous, and appears the more astonishing when it is noticed that the work is done by no more elaborate apparatus than a little metal wheel, running with emery as the cutting material.

The molds in which the pressed articles are formed are quite remarkable specimens of metal work. They are cast frequently in several pieces in order that the article may be withdrawn from them when made, and the ingenuity displayed in concealing the joints, and the patience and the skill exhibited in giving their inner surface a perfection of polish, are equally notable.

COAL AND IRON DEPOSITS.

An excursion by the Monongahela to McKeesport, where a Boston firm are erecting extensive works in which to make iron tubes, afforded an opportunity to enjoy the beautiful river scenery above Pittsburgh, and some of it was very picturesque, and also to explore one of the coal mines from which comes the Pittsburgh coal. The deposits are usually several feet deep in thickness—averaging perhaps four feet and over—as level as a floor, and at sometimes a considerable height above the river level. The mining is easily and safely carried on, the veins being of good height and the rooms having a good floor and roof. The coal is loaded into cars where the bed outcrops on the river bank, and is let down inclined planes and dumped directly into the boats and barges which carry it down to the city or to ports lower down the river. It would be difficult to imagine how Nature could have more conveniently arranged these great deposits for the use of man. None of the expense and danger is incurred here, that attends the sinking of deep shafts and the hoisting of coal to the surface that is generally necessary elsewhere, and there is comparatively little expense for transportation where, as here, the coal is dug from the river bank itself.

There are 15,000 square miles of these coal fields; \$15,000,000 of Pittsburgh capital is invested in mining and probably \$25,000,000 in transportation, while the total of all interests dependent upon these coal fields cannot fall short of the enormous sum of \$100,000,000.

Neither time nor space will admit of a description of our visit to the mill of Schoenberger and Blair, where we saw the best iron sponge—made directly from the ore by Mr. Blair's process—that we have seen anywhere, or to the Superior Mills, where we found probably the best arranged iron rolling mill in the United States.

THE SIEMENS FURNACE.

We cannot describe the Siemens furnace that we saw in such common use where high temperature or economy of fuel was desired, nor even refer to the beautiful application, which the inventor has made in it, of well recognized scientific principles and of as well known practical engineering facts; and we must even omit a description of what we saw at the Allegheny observatory, where Professor S. P. Langley has arranged for the regulation of the time of the great Pennsylvania railroad and its branches by electrical clocks connected with his own standard at the observatory—the widest "distribution of time" in the world already, and in a fair way to be much further extended by the energetic astronomer who has commenced the work. The ten days of our visit were quite insufficient to satisfy our desire to thoroughly explore even a small number of the numerous interesting engineering establishments, or to witness the many attractive sights about this great human beehive. We must leave all until our good fortune shall offer an opportunity to revisit this place, and hurry westward and northward to see where the iron ores generally used here are obtained and how they are mined, and to see some of the great deposits of copper which feed our markets. R. H. T.

SCIENTIFIC AND PRACTICAL INFORMATION.

FIREWEED FIBER.

A plant, yielding a fiber capable of being spun and woven, called the *epitobium* or fireweed, has lately attracted the attention of manufacturers. It is very similar to the cotton plant, but the seeds are smaller and no ginning is required to separate them from the boll. Wicks, ropes, yarn, and even paper have been made from it, the last named application being especially successful, the product almost equaling the silk-made paper of China and Japan. The most valuable characteristic of this plant is stated to be that it will grow in any soil, and it is said to have appeared spontaneously in evergreen covered lands which have been burnt over.

PREPARATION OF SILK.

Silk in its raw state, as spun by the worm, is either white or yellow, of various shades, and is covered with a varnish which gives it a stiffness and a degree of elasticity. For the greater number of purposes to which silk is applied, it must be deprived of this native covering, which has been long considered to be a sort of gum. The operation by which this coloring matter is removed is called scouring, cleansing, or boiling. Nothing agrees so well with the nature of silk and preserves its brilliancy and suppleness so perfectly, so far as European experience goes, as a rapid boil with soap and water. It appears, however, that the Chinese do not employ this method, but something that is preferable. Possibly the superior beauty of their white silk may be owing to the superiority of the raw material.

To produce the China white, a little annatto is mixed with the soap water, so strong as to lather by agitation, and the silk is passed through it. As to the other shades, they have only to be dyed more or less with a fine indigo, previously washed in hot water and reduced to powder. After being withdrawn from the bath, the silk is introduced into the sulphuring chamber, if it is to be made use of in the white state. The silks intended for the manufacture of blondes and gauzes are not subjected to the ordinary scouring process, because it is essential in these cases for them to present their natural stiffness. For these the manufacturer selects the raw silk of China, or the whitest raw silk of other countries, which are steeped and then rinsed in a bath of pure water, wrung and exposed to the vapor of water, and then passed through the azure water.

The dull silks, says the *British Trade Journal*, in which the varnish has already undergone some alteration, never acquire a fine white, unless they are exposed to sulphuric acid gas. Exposure to light has also a very great effect in whitening silks, and is had recourse to, it is said, with advantage by the Chinese. The Chinese prepare their silk with a species of white beans, with some wheat flour, common salt, and water in the respective proportions of 5, 5, 6, and 25. It is difficult to discover what chemical action can occur between the decoction and the varnish of raw silk; possibly some acid may be developed which may soften the gummy matter and facilitate its separation.

A RAILWAY tunnel under the Mississippi river at Memphis, Tenn., is projected, to cost five millions of dollars.

A CUBIC foot of air weighs 523 grains. A cubic foot of water weighs 1,000 ounces.

THE POPULAR SCIENCE MONTHLY, No. 4, for August, contains a variety of interesting scientific articles, collated principally from foreign magazines and other publications. To those who cannot conveniently find access to the original sources, these compilations will prove valuable. The editor, Professor E. L. Youmans, is well known as a lover of science, and as an indefatigable worker in the promulgation of useful knowledge.

Facts for the Ladies.—Miss H. W. Terry, Wading River, N. Y., has used her Wheeler & Wilson Lock-Stitch Machine almost constantly for 5 years, on all kinds of family sewing, and broken but one needle. See the new improvements and Woods' Lock-Stitch Ripper.

Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed four Lines, One Dollar and a Half per Line will be charged.

The paper that meets the eye of manufacturers throughout the United States—Boston Bulletin, \$4 00 a year. Advertisements 17c. a line. Cheap Engines for Sale by Brady & Logan. See page 93.

In the Wakefield Earth Closet are combined Health, Cleanliness and Comfort. Send to 34 Day St., New York, for descriptive pamphlet.

Callow's New process of Graining Oak, Walnut, Chestnut, Rosewood, &c., with Metallic Therm Graining Tools, patented July 1 1870, does triple quick work, first class imitations, is durable, and makes every man his own Grainer. Address, with stamp, J. J. Callow, Cleveland, O.

Forty-five horse Engine, Lathes, Drills, three inch Shafting, with assorted Pulleys, and other iron working Machinery and Tools, in Brick 4 story Factory, for sale low, with or without Building. Easy rail and water distance from New York. Address Box 1,203, New York.

Lenoir Gas Engine—Wanted, the address of any agent in this country of the Lenoir Gas Engine, or of any person who has one imported within two or three years. Address, F. R., Box 498, Newport, R. I.

Platina Plating—Alb. Lovie, 729 N. 3d St., Philadelphia, Pa. Gear Wheels, for Models; also Springs, Screws, Brass Tube, Sheet Brass, Steel, &c. Illustrated Price List free by mail. Goodnow & Wightman, 23 Cornhill, Boston, Mass.

Brick and Mortar Elevator and Distributor—Patent for Sale See description in *Sci. American*, July 20, 1872. T. Shanks, Lombard and Sharp Streets, Baltimore, Md.

The Berryman Manf. Co. make a specialty of the economical feeding and safety in working Steam Boilers. Address I. B. Davis & Co. Hartford, Conn.

The Berryman Heater and Regulator for Steam Boilers—No. one using Steam Boilers can afford to be without them. I. B. Davis & Co. Hartford, Conn.

Wanted—An Engine Belt 76 ft. long, 19 inches wide; either new or second hand. Address P. O. Box, No. 237, Buffalo, N. Y.

Wanted—Two good machinists used to Lathe, Planer, and Bench work. Steady employment and good pay for the right men. Address, stating terms, age, &c., Oneida Community, N. Y.

Wanted—Melter. Permanent situation, at good wages, to a good, experienced Iron Melter. Address C., Iron Founder, Cleveland, O.

Tested Machinery Oils—Kelley's Patent Sperm Oil, \$1 gallon; Engine Oil, 75 cts.; Filtered Rock Lubricating Oil, 75 cts. Send for certificates. 116 Maiden Lane, New York.

Kelley's Chemical Metallic Paints, \$1, \$1.50, \$2 per gallon, mixed ready for use. Send for cards of colors, &c., 116 Maiden Lane, N. Y.

Kelley's Pat. Petroleum Linseed Oil, 50c. gal., 116 Maiden Lane.

Secondhand Saws and Mandril for Sale—one 46 inches diameter, used six weeks in cutting Georgia Pine Flooring—one 32 inches, never been used. H. A. Crane, foot W. 30th St., New York.

Brown's Coal Yard Quarry & Contractors' Apparatus for hoisting and conveying material by iron cable. W. D. Andrews & Bro., 414 Water St., N. Y.

It is better to purchase one of the American Twist Drill Company's Celebrated Patent Emery Grinders than to wish you had.

New Style Testing Machines—Patented Scales. Send for New Illustrated Catalogue. Riché Brothers, 9th and Coates Streets, Philadelphia, Pa.

Flouring Mill near St. Louis, Mo., for Sale. See back page.

State Rights on improved Cigar Moulds for Sale. Patented June 25, 1872. Inquire of Isaac Guthman, Morrison, White Side Co., Ill.

For Machinists' Tools and Supplies of every description, address Kelly, Howell & Ludwig, 917 Market Street, Philadelphia, Pa.

For 2, 4, 6 & 8 H.P. Engines, address Twiss Bro., New Haven, Ct.

Peck's Patent Drop Press. Milo Peck & Co., New Haven, Ct.

The best recipes on all subjects in the National Recipe Book Post paid, \$2.00. Michigan Publishing Company, Battle Creek, Mich.

Mining, Wrecking, Pumping, Drainage, or Irrigating Machinery, for sale or rent. See advertisement, Andrew's Patent, inside page.

We will Remove and Prevent Scale in any Steam Boiler or make no Charge. Two Valuable Patents for Sale. Geo. W. Lord, Phila., Pa.

For Hydraulic Jacks and Presses, New or Second Hand, send for circular to E. Lyon, 470 Grand Street, New York.

An inducement.—Free Rent for three months to tenants with good business, in commodious factory just built for encouragement manufacturing. Very light rooms, with steam, gas, and water pipes, power elevator, &c. &c. Manufacturers' Corporate Association, Westfield, Mass. Plans of Building, Room 22, Twenty One Park Row, N. Y.

For Marble Floor Tile, address G. Barney, Swanton, Vt.

Old Furniture Factory for Sale. A. B., care Jones Scale Works, Binghamton, N. Y.

Walrus Leather for Polishing Steel, Brass, and Plated Ware. Greene, Tweed & Co., 18 Park Place, New York.

Pattern Letters and Figures, to put on patterns, for molding names, places and dates on castings, etc. H. W. Knight, Seneca Falls, N. Y.

Steel Castings to pattern, strong and tough. Can be forged and tempered. Address Collins & Co., 212 Water Street, New York.

Presses, Dies, and Tinner's Tools. Conor & Mays, late Mays & Bliss, 4 to 8 Water St., opposite Fulton Ferry, Brooklyn, N. Y.

Portable Baths. Address Portable Bath Co., Sag Harbor, N. Y. Extra Heavy Oak tanned Belting—Rubber Belting, Packing, Hose, &c. Greene, Tweed & Co., 18 Park Place, New York.

All kinds of Presses and Dies. Bliss & Williams, successors to Mays & Bliss, 118 to 122 Plymouth St., Brooklyn. Send for Catalogue.

Diamond Carbon, of all sizes and shapes, furnished for drilling rock, sawing stone, and turning emery wheels or other hard substances also Glazier's Diamonds, by John Dickinson, 64 Nassau St., New York.

For Steam Fire Engines, address R. J. Gould, Newark, N. J.

Williamson's Road Steamer and Steam Plow, with Rubber Tires. Address D. D. Williamson, 32 Broadway, N. Y., or Box 1809.

Belting as is Belting—Best Philadelphia Oak Tanned. C. W. Army, 301 and 303 Cherry Street, Philadelphia, Pa.

Boynton's Lightning Saws. The genuine \$500 challenge. Will cut five times as fast as an ax. A 6 foot cross cut and buck saw, &c. E. M. Boynton, 80 Beekman Street, New York, Sole Proprietor.

Better than the Best—Davis' Patent Recording Steam Gauge Simple and Cheap. New York Steam Gauge Co., 46 Cortlandt St., N. Y.

For Solid Wrought-iron Beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

For hand fire engines, address Rumsey & Co., Seneca Falls, N. Y.

To Ascertain where there will be a demand for new Machinery, mechanics, or manufacturers' supplies, see *Manufacturing News* of United States in Boston Commercial Bulletin. Terms \$4.00 year.