

## SCIENCE AND MECHANICS.

## HYDRAULIC CEMENT.

This valuable article is beginning to be more extensively known and used than formerly, and we are satisfied that it only requires to be universally known to be universally applied to uses hitherto unthought of, even by our most practical builders. A writer in the *Prairie Farmer* (Jas. Clarke, Esq.) observes:

"I have been manufacturing and using hydraulic cement for a number of years—consequently I feel as though I am capable of throwing a little light on the subject. It is in general use for building cisterns, cellar bottoms, cellar walls, a cheap and durable pipe for conveying water, mill flumes, mill dams, houses, &c. Cement makes a much stronger mortar than quick lime, and will set as hard as a rock in the water. For plastering the exterior of buildings in imitation of stone, and for plastering the inside of houses, it makes a very hard smooth surface, capable of being washed with soap and water, without injury, and presenting a smooth unabsorbing basis for paint.

**Cisterns** are variously constructed. The best way, however, in my opinion, is to excavate a hole in the ground, in the shape of an egg, with the little end down, plastering on the ground, building an arch with brick to form the covering. Cisterns are more frequently covered with large stone or plank, which will answer a very good purpose. Five bushels, or about 300 pounds, which would be in a barrel of cement, is sufficient for a cistern containing 30 barrels of water.

**Cellar Bottoms**—Take spalls of stone or coarse gravel, and cover your cellar bottoms to the depth of four or five inches; make your mortar into a thin grout; fill your gravel full of the grout, and smooth the top of the same with a trowel. This will make an excellent bottom, and is an effectual remedy against rats.

**Pipe**—Excavate a ditch of sufficient depth, and bed down the mortar made of cement; then take a leather bag four feet long, of the size you require, filled with sand, which you have prepared for the purpose. Lay down the leather bag on the mortar, and build over the same with mortar. In a short time it will set sufficiently, so that you can draw the bag forward, and build over as before. This pipe will soon bear a great pressure of water, and is a cheap and durable pipe.

**MILL DAM**—Build a wall one and one-half or two feet in thickness, taking spalls of stone or clear gravel; make your mortar into this grout, and mix it well with your gravel. It will be necessary to have a frame of one plank on each side to hold the grout and gravel, until it is set; then make a slope wall on each side, or any other plan to form strength to hold the weight of the water.

There have been a number of houses built on this plan in Ottawa and vicinity the past season, which nothing can surpass for cheapness, durability and beauty. For plastering dairies and forming water courses for milk pens, it is admirably adapted.

**Directions for use**—As a mortar, two parts of coarse, clean, sharp sand, to one part of cement—mix together dry, and temper with water; mix in small quantities, as it hardens quickly. If loamy sand is used, a greater portion of cement is required. River or creek washed sand is the best. When used for plastering cisterns, by plastering on the ground, three coats of one-half inch thickness should be put on, one coat each day, until completed—scoring the first two and using more cement in the last coat, which should be well smoothed. Daily sprinkling with water for ten or twelve days will strengthen the plastering of cisterns; and this should be done before the cistern is filled with water. Care should be taken to procure fresh cement; that which is imported is generally old, and nearly worthless.—*Maine Farmer*.

**IMPROVEMENT IN PAINTS**—The perishable nature of paints, and their failure to afford protection to buildings but for a short time, has lately been a subject of much complaint. Mr. Richard Dally claims to have discovered a remedy for this difficulty. He states that one cause of the failure is the adulteration of white lead and colored paints, by a sulphate of barytes. Pure white lead, however, he states, though "admirable for every purpose of interior decoration and ornament," is unfitted to stand exposure to the weather, and when thus exposed, rubs off like whitewash. Mr. D. says, "At the suggestion of an aged and experienced painter, Mr. Henry Roome, the subscriber was induced to make an experiment twenty years since, and from its remarkable preservation, in comparison with paintings as generally performed, (the principles having been corroborated by recent discoveries in chemical science,) he can promise a degree of durability to all paints exposed to the weather, that shall place the art of house painting in a much more favorable light than ever before—for singular as it may seem, most of the paints have hitherto been the result of accident, and not of any fixed principles." He also states that by the application of his discovery, black, yellow ochre, Venetian-red, and Spanish-brown, will be rendered nearly indestructible, "and will continue for a generation unaffected by atmospheric action, thereby furnishing ample protection from the weather for expensive steeples, railroad and other bridges, roofs, fences, &c.

**FOREIGN PATENTS**—The British Government grants patents, both of importation and invention, for 14 years, which term may be extended for the like period. A patent for England and Ireland costs \$1046. Patents are issued in France to citizens or foreigners for all industrial inventions; and the charges for five years are about \$100, and in proportion for ten or fifteen years. The subject patented must be put in practical operation within two years from the date of the grant. In Austria patents of invention are granted to applicants, whether natives or aliens, for terms of from one to fifteen years, at the option of the petitioner. For fifteen years a patent costs 440 florins; the value of a florin is 47 cents. The government of Prussia usually grants patents for eight years. The Russian government grants patents of invention, and also of importation, both to citizens and aliens. The actual charges to patents of invention are—for three years \$75, for ten years \$375; and patents of invention are not granted for a longer period than ten years. In Belgium, a patent either of invention or importation, may be granted for five, ten or fifteen years, at the option of the petitioner. If a patent of importation be granted, it expires with the original patent procured in the country from which the importation is made.—*Sci. Mech.*

**BUCKLE MAKING MACHINE**—We have just completed and forwarded to the Patent Office, the model, drawings, and description of one of the most extraordinary machines of modern times, invented by Messrs. A. North & Son, New Britain, Ct. The machine is in successful operation in the business of manufacturing harness buckles of various sizes and patterns. In the process the machine takes the wire from a coil, bends and perfects the squares or square rims, shapes and bends the tongues, and bends and closes the tubular rollers, and polishes the buckle complete. The miniature model construction at this office embraced sixteen different movements, put in operation, by connection, with a single small crank; and the drawings comprised fifty different figures. The specification occupied fifteen pages, written in our ordinary brief and condensed style. It is a first rate invention.—*Sci. Mech.*

**CURIOSITIES OF ARITHMETIC**—An eastern prince was so much delighted with the game of chess, which had been devised for his amusement, that he desired the inventor to name his own reward.—The philosopher, however, was too modest to seize the opportunity of enriching himself; he merely begged of his royal master a grain of corn for each square on the chess table, doubling the number in proceeding from the first to the sixty-fourth square. The king honoring his moderation, made no scruple of consenting to the demand; but on his treasurer making the necessary calculations, he was somewhat surprised to find that he had engaged to give away the impossible quantity of 87,076,425,546,692,656 grains of corn, equal to 80,000,000,000 bushels.

**THE VELOCITY OF LIGHT**—The eclipses of the moons of the planet Jupiter had been carefully observed for some time, and a rule was obtained which foretold the instants, in all future time, when the moons were to glide into the shadow of the planet and disappear, and then appear again. It was found that these appearances took place sixteen minutes and a half sooner, when Jupiter was on the same side of the sun with the earth, than when on the other side; that is, sooner by one diameter of the earth's orbit, proving that light takes sixteen minutes and a half to travel across the earth's orbit, or eight minutes and a quarter to come to us from the sun.

**CHINESE GRASS**—There is in China an article grown and manufactured into clothing, no description of which is to be found in any of the works of travellers who have been in that country. Its native name is *Mae*, and it answers the purpose of silk and hemp combined. It is annual, sown in drills, in February, and gathered in August. It grows on dry, hilly soil, like tea, all over China, and in every variety of climate—much of it within two or three days' journey of Canton. Its consumption is enormous; it may be found in its various degrees of quality, among all classes of the vast population, worked into almost every description of fabric; in the largest cables of their junks and in the choicest texture of clothing worn by the luxurious classes. Like silk, it is there an article of universal consumption. There is no article at present known in the country that could be substituted for it. It is scarcely exported at all.

**MANUFACTURE OF GLASS**—A mountain of Silica has been discovered at Hartsville, Sumner county, Tennessee, which is pronounced by the State geologists to be the finest in the Union. Tennessee bids fair to outrival any of her sister States in the manufacture of glass.

**MEXICO CITY**—The city of Mexico is nine thousand feet above the level of the sea; and in this locality narrow chests and diseased lungs are unknown; while from the extreme dilation of the atmosphere animal substances never become putrid.

**TO KEEP CHIMNEYS CLEAN**—Plaster the inside with mortar made with one peck of salt to each bushel of lime, adding as much sand and loam as will render it fit to work, and then lay on a thick coat. If the chimney has no off-set for the soot to lodge on, it will contiguous perfectly clean and free from all dangers of taking fire.

**A NEW RAT TRAP**—Take a tub or kettle fill it to within six inches of the top with water, cover the surface with chaff or bran, and place it at night where the rats resort. By this method thirty-six rats have been taken in one night.