

The Early History of Photography and the Daguerreotype Process.

A.D. 1556. The alchemists noticed that horn silver (fused silver chloride) blackened when exposed to the sun's rays.

1777. Scheele, the great Swedish chemist, discovered that silver chloride is very readily darkened by blue light, and very little or not at all by red light (origin of the employment of red glass in our dark rooms). He also proved that when this darkening occurs chlorine is liberated, and that the darkened salt acted upon by ammonia leaves a residue of metallic silver.

1801. Ritter extended Scheele's experiments. He found that silver chloride darkens in the space beyond the violet end of the spectrum, demonstrating the existence of rays which do not excite vision. These are now called the "ultra-violet rays." Ritter also observed that the red (least refrangible) rays not only do not darken silver chloride, but that they actually whiten silver chloride that has been darkened in the blue (more refrangible) rays.

1802. Wedgwood, the great potter, and Sir Humphry Davy coated paper and leather with silver nitrate and silver chloride, and obtained profiles by the agency of light. They, however, could not fix the pictures thus produced.

1827. Niepce came to England, and brought specimens of pictures taken in the camera. He discovered the property of light of rendering various resins insoluble in their solvents.

1839. The daguerreotype process was published in this year, and Mr. H. Fox Talbot communicated his paper process to the Royal Society, and first produced negatives. Mungo Ponton also this year discovered that potassium bichromate when on paper altered in composition by exposure to light.

1840. The Rev. J. B. Reade accidentally observed the development of the latent image in the Talbotype process with gallic acid.

1841. The calotype process introduced by Fox Talbot (description postponed).

1843. Sir John Herschel first took pictures on glass, and recommended the use of hyposulphite of soda for fixing.

1851. Mr. Scott Archer and Dr. Diamond introduced the collodion process in a practical form.

THE DAGUERRETYPE PROCESS.

A silvered copper plate is polished with tripoli and rouge and chamois leather buffs until the surface is quite free from scratches, when it is exposed to the fumes of iodine for about three minutes, or until the surface presents a bright yellow color, and then to bromine until it assumes a violet hue, when it is ready for exposure. After exposure no image is visible, but on placing the plate above mercury heated to about 150° Fahr., it rapidly appears, the lights being represented by an amalgam of mercury and silver, and the shadows by silver. It is fixed by immersion in a ten per cent solution of hyposulphite of soda. After washing, the image may be intensified by pouring on the plate mixed solutions (very dilute) of gold chloride and hypo., and heating over a spirit lamp. The picture should be protected with a glass plate.

Theory of the process.—The iodine (and bromine) attacks the silver, forming a thin film of silver iodide, Ag I. On exposure to light this is reduced to subiodide—



The silver underneath the film acts as a sensitizer, combining with the iodine set free to form fresh iodide. On development, the nascent atoms of silver in the subiodide form an amalgam with the mercury.—*E. Howard Farmer, in British Journal of Photography.*

Healthy and Profitable.

Some industrious Gothamite, bent upon tearing the mask from some popular idol, and holding it up before an admiring world in its true light, has taken advantage of the interest in sanitary reform awakened in this city by the beneficent workings of the new law, to reveal some matters of which he has possessed himself concerning sewer gas, plumbers, wealth, etc. Since the discovery of the deadly sewer gas, and the creation of sanitary engineering as its uncompromising foe, the occupation of the plumber has come to be looked upon almost as one of the high arts. The *Tinner and House Furnisher* claims that the plumber has, as it were, become master of the situation; at least, he has taken advantage of it to bring in bills longer than the moral law, and ranging higher than those of doctors and undertakers. Plumber's solder, it has been said, has become as expensive as the gold filling with which dentists plug up cavernous teeth. Of course, the plumber whose health must be prejudiced in order to save that of other people must be allowed the privilege of raking in the shekels, untrammelled by nice discriminations as to the relation of the service performed to the length of his bill. But all this is now changed. Plumbers must step down; for it is set forth that plumbers not only enjoy better health, but that they live longer and die gamer than any class of men except professional office holders. Considering their extortions, the knowing New Yorker thinks the death rate among them is not half as great as it should be. He finds no names of plumbers' widows in the Directory, nor any children of plumbers in orphan asylums. He thinks, therefore, sewer gas must be a healthy, life-giving thing, and is considering the propriety of organizing a society for bottling it up to supply to people in the country, who are denied this luxury.

AN ORNAMENTAL WATER JAR AND BASIN.

In the baronial halls of Germany curious and artistic brass reservoirs for holding water are frequently found suspended upon the tapestried walls for the service of guests as they enter the castle. These are usually in shape like old English coffee urns without the stand, and are often engraved with the family coat of arms of the proprietor of the establishment. Underneath the tank is placed, either upon a table, or suspended upon the wall, a basin similar in decoration and style, and calculated to receive the water as it is drawn from the supply above. These were placed either, as suggested, at the entrance hall, or near the exit of the banqueting room, so that the guests could moisten their fingers in the perfumed stream before taking part in the dance. Many of these old pieces may now be found in Germany, and are much sought after by connoisseurs and art collectors.



ORNAMENTAL WATER JAR AND BASIN.

lectors, not only for their antiquity and the associations connected with them, but for their decorative and artistic value. The tank and basin given in our illustration is a reproduction of one of these old pieces mounted upon a wrought iron stand, and produces an effect at once striking and graceful, and furnishes an article which would be a handsome and practical adjunct to a modern house.

Recent Armor Plate Trials.

An important trial of armor plates was recently made at St. Petersburg on Wilson compound—steel faced—armor and Schneider's Creusot steel armor. The experiments were made 24th November, 1882, at Ohta, near St. Petersburg, on two plates, each 8 feet long by 7 feet wide by 12 inches thick; weight of each about 12½ tons. The *Engineer* says that one plate was made of steel by Messrs. Schneider & Company, of the Creusot Works, France, and the other was made on Wilson's system, one-third steel, two-thirds iron,

by Messrs. Charles Cammell & Company, Limited. Both plates were backed by 12 inches of timber placed horizontally, and two three-quarter inch iron plates supported by diagonal struts. The gun used was an 11-inch Aboukoff breech-loader, the range 350 feet. The projectiles were of chilled cast iron shells, 553½ pounds English—made at Perm, in the Ural. The first shot was fired at Schneider's steel plate. The charge of powder, 132 pounds English. Velocity, 1,506 feet. The projectile was destroyed, but it broke the plate into five pieces. The penetration was 13 inches.

The second round was fired at Schneider's steel plate. The charge of powder was 81 pounds English. The shot was broken up; there was penetration 16 inches. The plate was broken into nine separate pieces. The previous cracks were opened out, three new ones being produced.

The third round was fired at Schneider's steel plate. Charge of powder was 81 pounds English, with a steel shell, Aboukoff make. Seven pieces of the plate remained hanging on to the shattered backing. One piece weighing about one ton was found 13 feet behind the target; ten pieces weighing about three tons together, were scattered on the ground in front. The projectile was found 740 yards to the rear of the target, and was apparently uninjured.

The fourth round was fired at Cammell's compound plate, with a charge of powder 132 pounds English. Velocity, 1,506 feet. The projectile was destroyed. A few cracks produced on the steel face both concentric and radial, but they were of no importance. The front of the shot had splashed on the plate, and the head remained in, so that the penetration could not be ascertained, but, judging from the diameter of the piece wedged in the shot hole, it was thought not to exceed 5 inches.

The fifth round was fired at Cammell's compound plate. The charge of powder was 81 pounds English. The result on the face could not be seen, as the remaining bolt had broken and let the plate fall on the ground face downward before the target.

The total stored up work in the first round at each plate is 8,704 foot tons, implying a power of perforating 16.3 inches of wrought iron. This was, therefore, a severe test, the shot being a full match for 12 inches of compound armor.

Brick Fronts.

The overwhelming desire for a "neat job" has done mischief in brick work. A pressed brick wall is a monotonous thing when brick is used alone. It shows only mechanical precision and exactness, and these qualities become very tiresome when they are exhibited for their own sake and not as means to an end. A slight unevenness in texture and in color helps the look of a wall, and it is the aim of the maker of pressed brick and of the builder to avoid the slightest unevenness. The best looking brick walls, except in the perverted eyes of bricklayers, are those in which the unevenness appears, that is to say, those which are built, not of pressed bricks, but of common bricks, chosen for color. To an artistic eye, for example, the wall of the recently completed addition to Mr. Hunt's *Tribune* building, which is built of selected common bricks, laid in cement, looks better than the face brick used in the principal fronts of the building, although the face brick is relieved of much of what would otherwise be its monotony by the free use of granite in combination with it. The jail attached to the Jefferson Market court house is built of selected common brick, while the court house itself is built of pressed brick, and the superiority, in this respect, of the jail must be evident to everybody who has looked at the two together.

A yet more striking instance is furnished by the new Casino, one of the most admirable pieces of brick work in New York, and the more interesting because there is no stone work worth mentioning, but the whole building is of burnt clay. The brick used here is Collaberg and Croton brick, very carefully selected, and used in the lower walls in alternate bands. The work has in consequence a beauty of color and a beauty also of texture which cannot be attained by the use of the more fashionable material.—*N. Y. Record.*

Case Hardening Low Steel.

There are a number of processes for case hardening low steel or iron. It is desirable to have a carbon covering or envelope that does not evaporate or oxidize quickly at the temperature required for hardening. As the prussiate of potash contains in its anhydrous state only about 19 per cent of carbon, while the potassium, iron, and nitrogen are nearly 80 per cent, it follows that it is too weak in carbon to be very effective in case hardening. As boiling water takes up nearly its own weight of prussiate of potash, a saturated solution may be made, to which is added as much bone charcoal, bone black, or charcoal from leather or horn as will take up the solution, or as much as can be made wet; the mass is then spread out and thoroughly dried in an oven. It will then be ready to mix with whatever may be used to make it adhere to the steel, such as oil, grease, or any other sticky substance. Bone, leather, or horn charcoal can be made by roasting it at a low red heat in a closed vessel, so close that no air can injure the product. A crucible or iron box covered with clean sand will do.

Where a Dollar Makes a Millionaire.

A Russian traveler in the Malay peninsula claims to have found in use there the smallest "coin" in the world. It is a minute wafer made from the juice of a tree. Its value is about the millionth part of a dollar.