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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 418,

For the Week ending December 1, 1883.

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THE USE OF ARGOL IN DYEING.

A considerable proportion of the argols annually imported into the United States is used for dyeing, in the state in which it arrives, instead of being refined for use in baking powders. It comes, as is well known, in very different states as to purity, but it is scarcely possible to find any samples, no matter how muddy or poor, which cannot be used in dyeing low grades of woolen stuffs, while for finer qualities a better quality of argols, even up to refined cream tartar, is required.

Although argols are employed by dyers as a mordant, they are seldom so used except in connection with another mordant, when their curious chemical constitution enables them to be used for two directly opposite purposes. They in some cases act as an acid, because their tartaric acid can be so readily set free; and in other cases they act as an alkali, because their potassa serves to neutralize the too powerful acid of the other mordant. A single illustration may suffice. The brilliant, beautiful red of the British uniform is known the world over. It owes its splendor of color to argols. Of course the fine cloth worn by officers, especially of high rank, must be treated with the utmost refinement of skill. Twenty pounds of "spirits of tin" are reckoned enough for 100 pounds of cloth. Thirteen pounds of this are boiled for two hours with eight pounds of refined argols, a few ounces of cochineal going with it, just barely to report progress.

This decoction is then poured upon the cloth, the remaining seven pounds of "tin spirits" are added, together with six pounds of cochineal, boiled still further, and for common purposes the work is done. But if a specially "fiery" red is needed for the highest grades of uniform, these argols are all that is required, and the splendid color remains as their trophy. They acted here first doubtless as an alkali, and then in all probability as an acid.

One form of Prussian blue is also worked out on such goods as merinoes, through the agency of argols, and they are used extensively in dyeing black, especially cloths of rather low grade.

Charles William Siemens.

Sir Charles William Siemens, D.C.L., LL.D., F.R.S., the well known scientist, engineer, and electrician, died in London, on the 20th ult., of rupture of the heart. Dr. Siemens was born at Leuthe, Hanover, April 4, 1823, and belonged to a distinguished family of scientists.

He was educated at the Gymnasium of Lubeck, the art school of Magdeburg, and the University of Göttingen. He entered Count Stolberg's engine works as a pupil in 1842, and in 1843 and 1844 visited England to introduce and patent a gilding and silvering method of his brother Werner's and a differential governor for steam engines invented by him and his brother.

He ever afterward made England his home, becoming a naturalized citizen in 1859. In 1849 he and his brother Werner became famous for their process of anastatic printing, Professor Faraday delivering a lecture about it before the Royal Institution. During the following three years Sir William was occupied at times with the chronometric governor. Several of these governors are used in the Royal Observatory at Greenwich for controlling the motion of transit and recording instruments. About the same time he also brought out his double cylinder air pump. In 1847 he turned his attention to the then new study of the dynamical theory of heat, and also the use of a regenerator for recovering that portion of the heat which presents itself at the exhaust port of a caloric engine. In 1851 he introduced his water meter, which has been used extensively. Between 1856 and 1861 he worked out, in conjunction with his brother Frederick, the regenerative gas furnace. While working upon this furnace Sir William also sought to make steel and iron direct from the ore. With this object in view he constructed his sample steel works at Birmingham in 1866, and in 1867 he sent several samples of steel produced in this way to the Paris Exhibition. Since then he has continued to manufacture steel upon the open hearth of his regenerative gas furnace. In 1868 he originated the Landore Siemens steel works, which manufacture upward of 1,000 tons of cast steel per week.

Ever since 1848 Dr. Siemens has been interested in telegraphy, and has occupied a prominent position in the development of electrical appliances. In 1858 he established, with his brothers Werner and Carl and Dr. Halske, of Berlin, the works now known as those of the Siemens Brothers, in London, Berlin, and St. Petersburg. He planned and had built the steamer Faraday for laying ocean cables, and at their Woolwich factory the brothers manufactured several of the Atlantic cables, the North China cable, and the wires for several other telegraph lines. In the department of electric lighting he was esteemed second to no one in England, either in theoretical knowledge or successful practical application. He and his brother Werner were the inventors of the well known Siemens electric lamp. His name is also connected with many other inventions.

Many honors were bestowed upon him, all countries recognizing and appreciating his ability. He received the Telford medal of the Institution of Civil Engineers; was elected a fellow of the Royal Society in 1862; member of Council of Institution of Civil Engineers and of the British Association; a manager and vice-president of the Royal Institution; and was once president of the Institution of Mechanical Engineers. He was first president of the Society of Telegraph Engineers. In February, 1877, after having visited this country, he was made an honorary member of the American Philosophical Society, and in October, of the same year, became an honorary member of the Gewerbe-Verein, of Berlin. He was a member of the Athenæum Club and of the Philosophical and Royal Society Clubs. In 1869 Oxford University conferred upon him the degree of Doctor of Laws, and in 1874 he received the Royal Albert medal for his researches in heat and his metallurgical processes. In 1875 he received the Bessemer medal of the Iron and Steel Institute for his services to the iron and steel trades. He was appointed first a commander and subsequently a dignitario of the Brazilian Order of the Rose.

Effect of Frost on Fire Plug Casings.

At a recent meeting of the Engineers' Club of Philadelphia Mr. Allen J. Fuller referred to a general impression that the freezing of the earth around fire hydrants has a tendency to gripe fast to the frost jacket and lift it with the expanding or heaving earth, which he denied for the following reasons;

1. The frozen earth slides on the surface of the frost jacket, because its expansion is greater than that of iron.

2. As the expansion of the earth must be in proportion to the intensity of the cold, so will it be greater above than below a given point, therefore the first foot of frozen ground will have a greater upward movement than that which is below it, and the second foot greater than the third, etc. Thus it will be seen that the earth below a given point rises more slowly than that above, and its friction is opposed to the one above.

3. If this is true of feet it is true of inches, and of portions of an inch, therefore there is a retardation movement throughout.

4. The upward movement of the ground, the freezing being greatest toward the surface, and such movement involving a more complete fracture of the earth surrounding the frost jacket, it follows that the friction is less at this point than that below it, and in consequence there is less power to move upward than downward.

Of course the above does not apply to any construction that the frost can get beneath.

Professor Haupt remarked that he thought the theory was in part sustained by the fact observed by some of the district surveyors, and verified by the accurate measurements they were obliged to make, that fences moved bodily to the south and east in consequence of the action of the sun and frost upon the ground on opposite sides of them. He thought also that the deductions concerning the immobility of structures resting below the frost line was not fully sustained by the facts as, in the Northwest, where ice forms rapidly, he had heard of numerous instances of piles, driven for bridges and extending some distance below the frost line, having been raised as much as five to six inches in a single night, and he conceived the action in this case to be similar in kind to that of piles driven entirely through solid ground, the only difference being in the *amount* of the resistance offered by friction and weight of pile. The water in freezing around the pile acts upon it as a gripper or vise, and the expansion of the various strata or laminæ of water as they become converted into ice act as levers to force up the pile.

Mr. Howard Murphy did not consider the case cited by Professor Haupt as parallel, as the so-called piles, being driven through water and soft mud, were probably columns resting upon their bases and depending but little upon the frictional resistance of the material through which they passed. Therefore the expansive force upward of the freezing water would be opposed by little more than the weight of the pile, whereas in a fire hydrant casing or other deeply planted post the presumably well rammed material around the whole length underground would offer such proportional frictional resistance as to cause the freezing earth to slide up the post rather than to lift it. If the ice could be supposed to act downward upon the piles in question, it is hardly likely that it would have forced them further home.

A Novel Clock.

A gentleman in Brussels claims to have contrived a perpetual clock. It was started in the latter city about one year ago, and up to a recent date is said to have been running perfectly. An up draught is obtained in a tube or shaft by exposing it to the sun. This draught turns a fan, which winds up the weight of the clock until it reaches the top, when it actuates a brake that stops the fan, but leaves it free to start again after the weight has gone down a little, and thus the power is stored for keeping the clock in motion.

Improved Projectile.

Krupp, the noted gun maker of Essen, has just taken out a patent on a flat-headed artillery projectile. The pointed projectiles, as is well known, are apt to deflect when striking iron plates or water at certain angles. The new projectile, slightly tapering at the butt, will not only pierce the plates all the more easily, but is also calculated to hit the ironclads below the water line. In order that the resistance of the air against the flattened head may not impede the celerity of the projectile, the latter is provided with a pointed tin cap, filled with grease, which cap drops off on striking the object.

In an article on the "Traveling Electric Light," on page 287 of this journal, credit should have been given to our contemporary *La Lumière Electrique*, for the illustrations and description of the apparatus.