Science and Art.

Patent Leather.

In the manufacture of patent leather there are two distinct operations—the first being the preparation of the leather for the reception of the varnish, and the second, coating the leather with brilliant and transparent varnishes.

The first thing is the preparation of the linseed or drying oil, which is done as follows:—Five gallons of linseed oil are boiled with four pounds and a few ounces of white lead, and an equal amount of litharge, (each in a state of fine division), until it becomes of the consistence of a syrup. This mixture is then united with an ochre or chalk, according to the quality of the skins that are to be treated, and it is evenly spread on both sides of the leather, and well rubbed in. Three very thin coats are applied, allowing each to dry before the other is put on, and the surface is ground down with pumice stone. This process of laying on the drying oil and rubbing down is continued until a sufficient quantity has been laid on to prevent the varnish from penetrating the leather.

To the presence of so much lead in patent leather we think we may ascribe the prevalence of tender feet, corns and bunions, among those who are in the habit of wearing boots and shoes of this material, as it has a very drying and drawing action; and persons who so indulge, look shiny about the feet at the expense of their health. They had better exert themselves a little, by using paste blacking, and thus be able to walk in comfort and with ease.

The leather being thus prepared, a mixture of the linseed oil and lead with fine ivory black is made, and a little turpentine added, to make it flow easily; this is laid on by means of a soft brush, and five or six coats are applied. This gives the surface of the leather a rich black, shining, pliable surface, over which, when dry, the varnish may be applied.

The varnish is composed of one pound of either asphalte, Prussian blue, or fine ivory black, ten pounds of thick copal varnish, twenty pounds of the linseed oil prepared as before described, (by boiling with litharge and lead), and twenty pounds of spirits of turpentine. The various tints are given by the various coloring materials added; thus, asphalte gives a reddish color, Prussian blue a greenish blue metallic tint, and the ivory black, which is the most common, a beautiful and brilliant black. The chief uses for this leather are the manufacture of boots and shoes, and the aprons and fittings of wagons and carriages.

Bleaching Fibrous Materials.

An invention for this purpose has been lately patented in England; as it is of some importance we give the full particulars:—

The plants or fibres to be acted upon are placed in large cisterns, boiling caustic and other lyes—which may have been previously used—are added; and should they not be sufficiently strong, the inventor introduces hot water saturated with quick lime, and thus obtains caustic retting. These cisterns may be kept heated by a jet of steam. Three, four, or five days, according to the plant or fibrous substance operated upon, will generally be found sufficient to bring it to a good state of retting, and for being passed through a breaking or decorticating machine, in order to open up the fibers and separate foreign matters from them. The plants or fibers are fed on to an endless belt, which delivers them on to a shoot, from whence they fall between a hollow semicircular stationary plate, smooth, toothed, or fluted, and a rotating drum with a fluted or roughened surface. After getting out of the action of the drum, the fibers are received into a trough at the bottom of the machine, and are washed in clear water. The fibers being now deprived of the greater part of the gum and resin, and other foreign matters adhering to them, and having also received a commencement of disintegration and cleaning, the lye which is about to be explained is intended to remove the remainder of these substances, and to prepare the complete separation of the filaments from each other, and to commence the decoloration of these filaments which the washing, after coming from the barking machine, only prepared. For the next operation a rotating closed boiler is preferred, but a closed wooden or metal vessel may be used. The vessel is charged with the barked and washed filaments. A sufficient quantity of water is introduced, so that when boiling, the matters shall be covered by it; or if a rotating boiler is used, less water will be needed than for a stationary. For every 200 pounds of filamentous matters, add in the boiler or vessel 2 lbs. of subcarbonate of soda crystallized, and eight or ten quarts of liquid chloride of lime at 2° to every 100 quarts of pure water. When the fibers have been exposed to the action of these agents for a time, varying with the nature of the material under treatment, they are removed to a double acting washing, opening, and separating machine. This machine is fed with clear cold water. It is divided lengthwise through the center, and at opposite ends, and on opposite sides, there are two inclined fluted metal surfaces, the faces of which are armed with blades; and working towards or against these blades are other blades projecting from a cylinder or drum, to which rotary motion is communicated. In the machine there are also placed two revolving drums, to which rotary motion is also communicated. The fibrous substances are continuously subjected to the action of the armed cylinders and plates, and to the action of the washing drums. When sufficiently washed (which experience will readily dictate) the quantity of water is diminished in the machine, and the bleaching is commenced by introducing some of the bleaching agents set forth in a specification filed by the applicant, December, 1856. After a certain time, these bleaching agents are drawn off, cold water is introduced, and the fibers are subjected to another washing. When washed they are removed to or into another vessel, where they receive their final bleaching. In this vessel agitation is kept up by means of a paddle wheel, to which slow rotary motion is communicated. After the bleaching has been effected, the bleaching agents are drawn off, clear water introduced, and washing drums extending across the machine are set in motion to finally wash the fibrous matters.

Natural Pyramids.

The Sonora *Journal* gives an account of a very singular ledge of rocks which has recently been discovered in Petaluma in California. It is composed of regular prismatic columns, inclined but a few degrees from the perpendicular toward the center of the hill. The columns generally have five sides, and are usually about twenty inches in thickness, divided into two blocks varying from one to four feet in length, which are so closely jointed and so firmly cemented together that it is quite difficult to separate them. The columns are also bound to each other by a layer of grayish colored cement, about an inch in thickness. The rock is very hard, and of a dark color, and belongs to that class of rocks denominated basalt by geologists. The whole ledge presents the appearance of a solid structure of masonry, reared, like the Egyptian Pyramids, to perpetuate the works and memory of man, in defiance of the flight of ages. So abundant, indeed, are the appearances of design, that we are not surprised that many persons have unhesitatingly pronounced it the work of art. There is abundant evidence, however, that precludes the possibility of such being the case. This columnar structure of rock is not unfrequent. It is seen along the margin of Snake River, and in the passage of the Columbia River through the Cascade Mountains, perpendicular walls of this columnar structure are often seen rising to the hight of forty or fifty feet.

The rocks are easily quarried and brought to town, but the greatest advantage of all is their thorough adaptability to the construction of fire-proof buildings—neither fire or water affecting them in the least. We saw a chip from one of the rocks subjected to fire until it became heated to a bright red color, after which it was immediately thrown into cold water. No change whatever from its original appearance could be perceived.

Daguerreotypes by Lightning.

A country woman recently arrived in Paris from the department of Seine-et-Marne, who was, a short time since, watching a cow in an open field, when a violent storm arose. She took refuge under a tree, which, at the instant, was struck by lightning; the cow was killed, and the woman was felled to the earth senseless, where she was soon after found, the storm having ceased with the flash which felled her. Upon removing her clothing, the exact image of the cow killed by her side was found distinctly impressed upon her bosom.

This curious phenomenon is not without precedent. Dr. Franklin mentions the case of a man who was standing in the door of a house in a thunderstorm, and was looking at a tree directly before him when it was struck by lightning. On the man's breast was left a perfect daguerreotype of the tree.

In September, 1825, the brigantine *Il Buon-Servo* was anchored in the Armiro bay, at the entrance of the Adriatic sea, where she was struck by lightning. In obedience to a superstition, the Ionian sailors had attached a horse-shoe to the mizzen-mast, as a charm against evil. When the vessel was struck, a sailor who was seated by this mast was instantly killed. There were no marks or bruises upon his person, but the horse-shoe was perfectly pictured upon his back.

In 1841, a magistrate and a miller's boy were struck by lightning near a poplar tree, in one of the provinces of France; and upon the breast of each were found spots exactly resembling the leaves of the poplar.

At a meeting of the French Academy of Sciences, January 25, 1847, it was stated that a woman of Lugano, seated at a window during a storm, was suddenly shaken by some invisible power. She experienced no inconvenience from this, but afterwards discovered that a blossom, apparently torn from a tree by a lightning stroke, was completely imaged upon one of her limbs, and it remained there until her death.

A great many more similarly wonderful instances have occurred, and they are generally recorded among the curiosities of science. —*New York Post.*

Submarine Tunnel.

It is twenty-six miles across the English Channel from Dover to Calais, and it occupies, ordinarily, two hours to cross over in a little steamer. It is an uncomfortable trip, and many a strong stomach has had to give its contents to the sea, after having escaped this fate during a long ocean voyage. Considering the great rush of travel across this channel, and the discomforts of the journey, it is no wonder that modern engineering is called on to devise a better system.

The Paris *Siecle* says that the possibility of uniting England and France by means of a submarine tunnel has been practically and scientifically considered by M. Gamond, a skillful engineer. He submitted his plans to the Emperor, who was so well pleased with the project that a commission was authorized, who decided that M. Gamond is no mere dreamer. The British government have also named on their side a commission; and it is probable that, in the coming spring, French and English engineers will apply themselves to the work of vigorously examining the practicability of the project.

There have been many schemes proposed before, one of which was to lay an iron tunnel along the bottom of the channel; and another to make a gradually inclining tunnel from London, continue it under the bed of the channel, and again rise on the French side. To each of these schemes there has been some practical objection; but M. Gamond having a knowledge of these, we hope that his plan may be successful.

Warmth for the Winter.

The Newport *Mercury* gives forth a valuable suggestion, which we transcribe as being worthy of attention. After sympathizing with those who, during the coming cold weather, will feel the biting frost, and shiver through want of fire—and most heartily have they our pity and humble aid—the editor suggests the following:—

"Take a number of old newspapers, and paste them together until you have a spread large enough for the bed, and this place under an outer quilt or spread, when it will be found to act like a charm."

Surely, if this will keep a person warm in place of fire, there will be many who will follow the advice; and we have no doubt that every newspaper publisher will volunteer to do what the proposer does, namely, to give away his old newspapers for so charitable a purpose.

To Fasten Leather to Metal.—Soak the leather in a hot solution of nut galls, and apply it to the metal upon which it is to be fastened, having first given the metal a coat of glue. When dry, the leather will adhere so tight that it sooner tears than separates from the metal.