MISCELLANEOUS INVENTIONS.

Mr. Goldsborough Robinson, of Louisville, Ky., has patented a process of treating leaf tobacco for improving its color and quality, which consists in immersing the tobacco in alcohol and then drying it.

Mr. Charles Coon, of Saugerties, New York, has patented a process of repulping paper, which consists in causing the beater engine to operate upon the same while suspended in a hot bath.

Messrs. John S. Headen and John I. Spainhower, of Pleasant Hill, Mo., have patented an improvement in that class of boiler washing machines in which an oscillating lever or analogous device is employed to press or squeeze the clothes, said lever working in a clothes receptacle having a perforated semicircular bottom and placed in a sheet of galvanized iron boiler that is intended to be set over a fire.

Mr. Andrew J. Clark, of Little Falls, Minn., has invented an improved book for holding blank forms, the object of which is to preserve the blanks in good condition, and to enable the different kinds to be readily and quickly referred to and taken from the book.

Mr. Merrill R. Skinner, of Foster Brook, Pa., has patented a swivel hook for connecting and tightening ropes and cables without removing them from the pulleys or shafting, and which is simple in construction and effective and convenient in use.

An improved ice pitcher of simple construction, with a removable lining of porcelain, has been patented by Mr. Herman Vasseur, of Wallingford, Conn. The invention consists in an ice pitcher containing a removable lining of porcelain, glass, or similar material resting upon the detachable bottom of the pitcher.

Mr. Jasper T. Cronk, of Hoboken, N. J., has patented a simple and convenient means of adjusting a clothes line and hanging the clothes from a window. The invention is an improvement on the line fastener for which Letters Patent No. 186,991 were granted to the same inventor February 6, 1877.

An improvement in pianoforte agraffes, patented by Mr. Edward T. Bowlby, of Dixon, Ill., relates particularly to improvements in the agraffe which clasps the strings to the bridge on the sounding board; and the object of the improvement is to prevent the disagreeable jarring of the strings caused by the springing of the frame of the instrument and the setting of the bridge and sounding board.

Mr. William Harkins, of Dunkirk, N. Y., has patented a car coupler formed of a drawhead having an extended arm and a coupling bar at one side with a recess between. A horizontal key is propelled by a pinion gearing into a rack on the key or by a spring. The pinion has a lever arm attached to it which, when the key is set, extends across the recess, so as to be struck by an entering bar of the opposite coupler. When this lever is struck the key is thrown forward by the combined action of the revolving pinion and spring or by the pinion without the spring, and passing through a slot of the coupling bar, holds the cars coupled.

IMPROVED WINDMILL.

The windmill represented in the annexed engraving has its wheel mounted on a vertical shaft, in a strong, well-braced, octagonal timber tower, provided with shutters which may be opened or closed to control the motion of the wind wheel, or to stop it altogether, as circumstances may require. The shutters are hung loosely so that they will open by the force of the wind.

The wheel consists of upper and lower radial, arms extending from hubs placed on the vertical shaft. Between these arms are secured vanes or paddles, which are set at a suitable angle to receive the wind; the outer vane inclining inward from the end of the arm at an acute angle, and the others placed behind and parallel with it. By this arrangement the air passing through the wheel is utilized to the greatest extent: striking the first vane on the outer row, it is guided to the second vane on the second row, and from this to the third vane on the inner set, and so on.

In a mill of this construction the wind from any direction may be utilized to the fullest extent. The wheel and tower are simple and inexpensive, and the mill is adapted to general use.

Wind power is certainly cheaper and more universal than any other, and the machine shown in the engraving seems well adapted for utilizing it.

Further particulars may be obtained by addressing the inventor, Mr. Thomas Dwees, San Antonio, Texas.

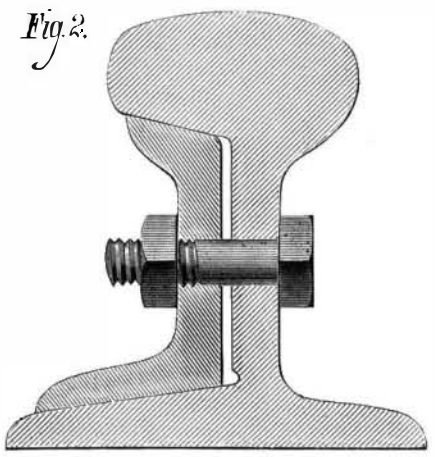
A Night Light.

A simple way to produce an illuminating composition is thus described in *Industry:* Cleanse oyster shells by well washing, expose them to a red heat for half an hour, separate the cleanest parts, and put into a crucible in alternate layers with sulphur; now expose the vessel to a red heat for an hour at least. When cold break the mass, and separate the whitest parts for use. If inclosed in a bottle the figures of a watch may be distinguished by its aid. To renew the luminosity of the mass place the bottle each day in the sun, or in strong daylight; or burn a strip of magnesium wire close to the bottle. The sulphide of lime will thus absorb light, which will again be available at night time.

IMPROVED RAIL.

The annexed engravings represent an improved rail recently patented in this country, also in England, France, Germany, and Belgium. It is intended to avoid the noise and jarring common to the ordinary forms of rail by preventing the depression of the ends of the rails at the joints. This construction, besides conducing to the speed, safety, and comfort of travelers, and increasing the durability of the track, adds to the durability of the rolling stock and machinery run upon it.

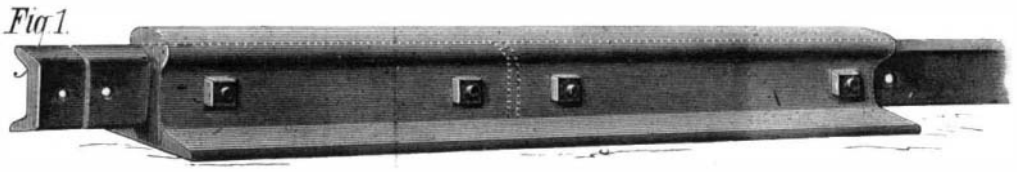
Fig. 2.



VAUGHAN'S IMPROVED RAIL.

The mechanical construction will be understood from the engravings, Fig. 1 being a perspective view, and Fig. 2 a transverse section.

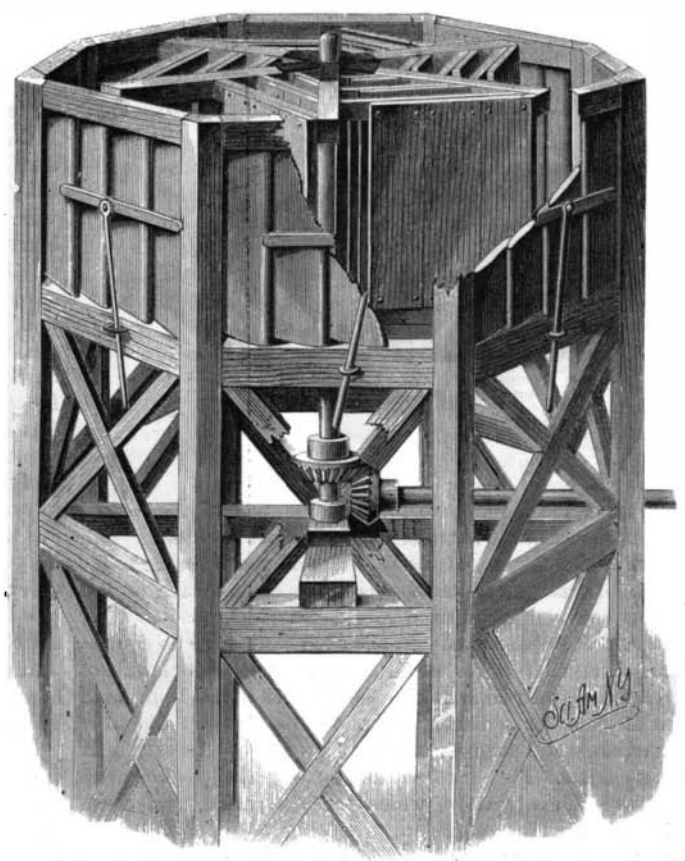
Fig. 1.



VAUGHAN'S IMPROVED RAIL.

The rail is made in two parts, one of which is similar in form to the ordinary rail, the difference being that one side is channeled deeper than the other, and the channel is beveled to receive a re-enforcing bar, which is also channeled and breaks joints with the rail proper so that the whole is as rigid at the joints as elsewhere. A little space is left between the vertical adjoining faces of the two parts of the rail to admit of a perfect bearing at the upper and lower edges of the inserted piece, and there is a small semicircular groove at the juncture of the base and web to relieve the sharpness of the angle.

This improvement is the invention of Dr. A. C. Vaughan, of Shane's Crossing, Ohio. The foreign patents are to be issued jointly to the inventor and Mr. Francis Jordan, of Harrisburg, Pa., who is general agent for the introduction of the invention.



DWEES' WINDMILL.

The Kuro-Si-wo not like the Gulf Stream.

According to the recent report of W. H. Dall, Acting Assistant of the U. S. Coast Survey on the Pacific coast, the Kuro-Si-wo, or Japanese warm current, is not marked in its approach to the American coast by sharply defined walls of water temperature such as characterize the Gulf Stream of the Atlantic. It is not at all like a river flowing in its bed. There is a general drift which is reversible and intermittent when opposed by storms, and which shades off from a temperature of 65°. That part of the Kuro-Si-wo having a temperature of 55° approaches the northwest coast in the vicinity of Vancouver Island. There is a deflected arm of this current known as the Alaska current, which has a temperature varying from 50° to 55°. The shoal waters of the Behring Straits on the eastern side appear to be warmer than on the western side. But Captain Dall says that there is no proof that there is a warm current flowing up through the straits. The whole Pacific coast, however, from Unmak in Alaska, to Vancouver is bathed by a sea with a summer temperature varying from 48° to 55°.

The winter along a coast of this temperature never can be severe. There is a great precipitation of moisture, but only a moderate degree of cold until the interior of the country is reached. Southeastern Alaska has been described by recent explorers as having more than a tolerable climate. For a considerable part of the year it is pleasant and altogether agreeable. It is essentially that of Vancouver. The exhalations of moist air are drifted inland. Vegetation is rank, and a great deal of the land can be made very productive. It is not to be supposed that the influence of the Kuro-Si-wo is lost after passing Vancouver in a southerly direction. It no doubt has some influence all along the Oregon coast, and greatly aids in the precipitation of moisture in Washington Territory and Northern Oregon, and in producing the fogs of the California coast.

MECHANICAL INVENTIONS.

An improved nut lock, patented by Messrs. Amandes Hackman and George W. Tinsley, of Blakesburg, Iowa, consists of a bolt having a longitudinal groove cut across its screw threads, in combination with a nut having a thin raised annular collar or flange, that fits about the bolt and may be pressed into the groove of the bolt for the purpose of locking.

A baling press so constructed that the head block can be moved to one side to uncover the top of the baling box, and that the direction of motion of the follower can be changed while the driving shaft moves continuously in the same direction, has been patented by Mr. Alexander McN. Paxton, of Vicksburg, Miss.

Mr. Henri Burin, of New York city, has invented a tool for cutting off metal rods, bars, or shafts, and also for cutting screw threads, and especially intended for heavy work. The inventor makes use of a cutter head fitted for being revolved by a hand crank and gearing on a base or support that is to be clamped around the bar or shaft. The cutting tool travels around the shaft or rod, and is set up by a screw as the work progresses.

A novel and efficient rock drill, wherein the drill is fed and turned automatically, and is operated in delivering a blow by the full force of the propelling power, has been patented by Mr Arthur W White, of Buffalo, N. Y.

Mr. Kimp Hill Higginbotham, of Waterford, Miss., has patented a water wheel, so constructed that it can be run with a very low head of water, and can be stopped and started automatically.

Mr. Joseph V. Morton, of Winchester, Ky., has patented a sewing machine motor, so constructed that sewing machines may be driven by hand power or by foot power, or by both hand power and foot power, as desired.

Signaling by Illuminated Steam.

A new method of signaling at sea has lately been tested in England by the Trinity Board, with great promise of beneficial results. The system was devised by Carl Otto Ramstedt, late of the Russian navy. The apparatus consists of a dished chamber, in which the inventor burns strontium or other substances so as to produce a variety of colors if desired. At the back of the chamber is a reflector, by means of which the light is thrown on the steam either steadily or in flashes at will. The steam thus becomes a luminous mass, varying in color with the substances used in combustion. In practice the light is thrown upon the steam issuing from the funnel of a steamer, and optical signals are made according to any known code of signaling, such as by combinations of flashes of longer or shorter duration. This is effected by the light apparatus being closed in at the front with a hinged cover, which is manipulated by the signaler according to arrangement. The result of the experiments showed the system to be very effective and applicable to its intended purpose, and there appears to be little doubt that it will prove of value as a means of signaling at sea.

The advantages of the invention are not limited to steamers, as it is equally applicable to sailing vessels, in which the light might be thrown upon the sails.

Useful Shams.

Under the above heading, which we think an inappropriate one, as most of the articles named are not only useful substitutes, but in some cases superior to the genuine article for use in the arts, Mr. P. L. Simmonds, in the *British Trade Journal*, remarks as follows:

One of the most noticeable features of modern times is the immense progress which has been made, and the manufacturing ingenuity and scientific skill displayed, in finding substitutes for expensive or scarce raw materials and articles in general demand. The fact is apparent beyond question that art is fast invading the domain of nature. Chemistry is enabling us to replace animal and vegetable dyes, and to form artificial gems, or creditable imitations; mineral oils replace animal and vegetable ones for illuminating purposes, and the electric light is treading upon the heels of gas.

The expensive outfits for the whale fisheries are comparatively abandoned, whalebone and blubber from the huge marine mammals being less in request; coral insects may proceed with their submarine constructions unmolested; the sea tortoise will be pursued less eagerly for its carapace; the ostriches of the desert be less sought after; and even the great pachyderms of India and Central Africa can be spared to be more usefully employed in extending the march of commerce. Under our enlightened civilization we can now manufacture our own whalebone, coral, tortoise shell, ivory, and feathers, without the need of penetrating into wild jungles and arctic or tropical seas for our supplies. The extinction of whalebone in commerce will not deprive us of our umbrellas, or the female sex of their parasols and corset busks. Rattans have been converted into wallosin, and horn shaped into pliable bones, while steel ribs also do duty effectually for baleen.

Ivory, being an expensive material and in continual demand, has formed the subject of many patents for good substitutes, but those tried have generally had more the appearance of an opaque cement than the natural dentine. The best and most effectual imitation, which takes a good polish, is the American substance passing under the name of "celluloid."

Celluloid is one of those inventions of recent origin which has become a substitute for many natural raw materials. It is a species of solidified collodion produced by dissolving gun cotton in camphor with the aid of heat and pressure. The applications of celluloid are now legion. As a substi tute for ivory it is best known, and so perfect is the resemblance that a close inspection is required to distinguish the counterfeit from the genuine; the absence of the grain, or decussation, is the chief distinction. Celluloid possesses not only all the strength and elasticity of ivory, but it does not warp nor discolor with age.

It is much used in making combs, backs of brushes and hand mirrors, frames for looking glasses and portraits, handles for knives and forks, piano and organ keys, and billiard balls, which are said to be equal in elasticity to those of ivory. One advantage it has over ivory is that it may be moulded, so that the most delicate and elaborate articles can be made with it at a fraction of the cost of true ivory. An endless variety of colors can also be given to celluloid by the admixture of proper pigments.

In imitation of tortoise shell it is made into such articles as combs, card cases, cigar cases, napkin rings, etc. The pink coral so popular for jewelry is admirably imitated with it, and so are malachite and amber mouthpieces for pipes, cigar holders, and musical instruments.

Beautiful fancy ornaments are made of artificial tortoise shell, which is formed by melting gelatine at a moderate temperature with a small amount of metallic salts, running the whole into moulds, and staining the mass with hydrosulphate of ammonia, so as to produce an imitation of the grain of natural tortoise shell. The appearance of tortoise shell may also be given to horn by brushing it over with a paste made of two parts of lime and a little soda lye, which is allowed to dry. This forms sulphuret of lead with the sulphur contained in the albumen of the horn, and produces dark spots, which contrast with the lighter colors of the horn.

Among minor products which have been successfully imitated are meerschaum, horn, and coral, by the pulp of potatoes, turnips, or carrots, treated with sulphuric acid.

Ostrich feathers, which, as the coveted court plumes of fashion have always been in demand at high prices, are not only getting more plentiful by the domestication of the bird, instead of hunting it down in its wild haunts, but imitations of all kinds have sprung up—those of spun glass sold at from 2*s.* to 8*s.* each instead of 10*s.* to 20*s.*; those made of silk, etc. It has heretofore been the custom to work up all the odds and ends of ostrich feathers into plumes, and even to make use of the feathers of other birds. But it was left for Yankee ingenuity to get up an imitation, the component parts of which are silk on a rattan or celluloid quill. This "sham" could be easily passed off on ladies as genuine, and almost defies detection by others than experts.

Cloth, in imitation of furs and skins, is now made from mohair or goat's wool, and the resemblance is so good that at a few yards' distance it is difficult to tell whether it is real or imitation. It is colored to resemble seal, beaver, otter, and chinchilla, and lately there has been quite a quantity made in imitation of ostrich feathers, and used very largely for trimmings on dresses and mantles. At the last Paris Exhibition there was an imitation white squirrel shown, shaded to a light fawn.

The manufacture of imitations of precious stones has long been an important industry in France, but it has increased enormously of late years, on account of the perfection attained in the art; and at present the supply cannot keep pace with the demand for fictitious gems. A revolution has been brought about lately in the manufacture of artificial diamonds by substituting a preparation of gold for the oxide of lead in making the strass, and further, the stones when cut are subjected to a chemical process by which the refractive power is made equal to that of diamonds of the purest water. These perfect stones attracted great attention in the last Paris Exhibition, where they were exposed side by side, and in the same cases, with real diamonds of great price. Whether the latter can ever be artificially made on an extensive scale is still a matter of dispute, although its possibility is claimed. Any man can convert a diamond into charcoal, but it is not so easy to turn charcoal into diamonds. The recent claim of Mr. MacTear, of Glasgow, to have crystallized carbon is acknowledged, but the diamonds produced are as yet too minute to affect the value of natural ones.

Artificial pearls have long been manufactured with the greatest skill and ingenuity, and so close is the imitation that alternate strings of false and genuine shown by jewelers can scarcely be distinguished. Mourning jewelry of black glass has replaced the more expensive jet ornaments among the lower classes.

Numerous patents have been issued from time to time for making imitation marble, which in practice have been more or less successful; by some of these an almost perfect imitation of the various shades and colors of marble is obtained, and slate is made to imitate marble. Artificial stone is now made to any extent.

Within the last six or seven years a complete revolution has taken place in the substitution of artificial alizarine for the natural alizarine of madder. The culture of this dye root has almost been abandoned now in the producing countries where it was formerly grown. The product from an agricultural industry which yielded yearly over £2,000,000 in value has been entirely replaced by a chemical.

As a dye, alizarin is now, at most, not more than one-third of the average price of madder in former years. The "green grease," one of the last portions of the distillation of coal tar, was formerly an impurity, and valueless; instead of being thrown into the gutter, this by-product has become a valuable commodity which has largely benefited our gas works, England being the great tar producing country. The new color obtained from it does away, too, with the necessity of separately mordanting the fabric to be dyed.

From the light coal tar oils a whole series of aniline colors, of formerly unknown shades, have sprung up, exceeding in value £2,000,000 sterling annually. The estimated value of the production of coal tar colors, here and on the Continent, is about £3,250,000, and this industry has placed at the disposal of commerce products which, but for chemical research, could never have been obtained.

Ultramarine is another color which has made remarkable progress, although it is not a recent substitute, its manufacture dating from 1828, when it was discovered by Guimet. In 1820 the blue prepared from lapis lazuli cost £80 the pound; now the yearly production of ultramarine in Europe (chiefly in Germany and France) is over 22,000,000 lb., sold at less than 1*s.* the pound.

A cheap substitute for silver has been found in aluminum made from bauxite, at a cost of 20*s.* the lb.

When the war with Russia rendered bristles scarce and dear, commerce soon supplied our brushmakers with vegetable substitutes in the shape of kittool fiber and coir fiber from palms, Mexican fiber from the leaves of *Agave sisilana*. Piassava fibre from the leaf stalks of a South American palm came in to supply bass brooms, chimney sweepers' brushes, and street sweeping-machines. Even split quills have been brought into requisition for brushes, and for white and dyed bristles we are not alone dependent upon the stiff hair of the hog.

Another cheap substitute brought into use is that of vegetable down, to replace the costly animal product, eider down. These silky downs, clothing the seeds of several plants, such as *Bombax*, *Ceiba*, *Calotropis*, etc., are now largely used for filling coverlets, ladies' quilted petticoats, muffs, and other articles. This vegetable down is 50 per cent cheaper than the feather down. The qualities which recommend it for use are immunity from attacks of moth and vermin, lightness, elasticity and softness, medium warmth, and cheapness.

The manufacture of oleomargarine, or artificial butter, has already reached the status of an important industry, both in America and on the Continent. The production of oleomargarine is carried on on an extensive scale in large establishments, where great quantities of fat can, by special machinery, be treated cheaply and with uniform results, while the churning of the oil with the milk, and the subsequent processes necessary for its conversion into butter, are the work of numerous small factories.

Besides the use of oleomargarine for the manufacture of artificial butter, it finds another extensive channel in the manufacture of cheese, being added to skim milk and rennet. The cheese produced is said to be palatable, and to make a heathful article of food.

Gas bids fair to be replaced ere long by the electric light, judging by the progress Mr. Edison has made with his electric lamp.

Careful thought and ingenuity are always on the search to utilize waste products, and to find substitutes. For instance, there is a large demand for eggs for various manufacturing purposes—for glace leather in glove making, book binding, photographing, calico printing, clarifying liquors, etc., in the form of albumen, and the yolk of the egg, etc.

Large premiums have been offered for a good substitute for egg albumen, but no really efficient substance has yet been discovered. In glove making a mucilage obtained from the root of the marsh mallow has been tried. Some manufacturing processes require the white of the egg, some the yolk. At least four eggs are required to clarify every barrel of wine; and when the production of wine in France and other continental states is considered, the demand becomes extensive, reaching hundreds of millions of eggs. Some of the seaweed isinglass might certainly be used for this purpose.

There is no end to artificial productions, and the list might be extended indefinitely, including artificial ice, which renders us independent of King Frost; artificial sugar, which we can make from starch or rags; artificial fruit essences, artificial horn from seaweed, artificial wood from compressed sawdust or straw, artificial leather from old scraps or the leather cloth, artificial parchment from paper chemically treated with sulphuric acid, and as hides for leather become more in demand, we have come to utilize the formerly neglected skins of the alligators, the snakes, the kangaroos, the porpoise and other sea mammals, and fishes.

Use of the Blowpipe with Closed and Open Glass Tubes.

BY C. J. MULLER.

Very important results are obtained by heating substances under examination in closed or open glass tubes. They should be of hard German glass, as this does not readily soften under heat, nor become discolored, like ordinary flint glass, by a deposit of reduced lead. The most convenient size for the closed tube is 3 inches by 3 or 4 10ths; of the open tube, 4½ inches by 2-10ths.

The Closed Tube.—The phenomena to be observed in using the closed tube are: 1, Decrepitation; 2, change of color; 3, phosphorescence; 4, deposit of condensed aqueous vapor; 5, deposit of a solid sublimate; 6, fusion; 7, evolution of gas or vapor, which may be colored, alkaline, acid, or odorous. Sometimes it is advantageous to have the tube bulbous at the bottom. It should be rendered dry before use by warming it over the spirit-lamp, and also be quite clean. The assay may sometimes be in powder, sometimes in the shape of a small fragment, according to circumstances. If in powder, the powder should be introduced so as not to soil the sides of the tube. The charged tube should be first heated in the flame of a spirit-lamp, and in most cases the heat be subsequently increased by exposure to the blowpipe flame. To test the acidity or alkalinity of any condensed moisture or uncondensed vapor, small strips of moistened turmeric or litmus paper should be inserted in the mouth of the tube.

EXPERIMENTS.

Witherite, simply heated by means of spirit-lamp, decrepitates, yielding watery vapor, which condenses in the upper part of the tube.

Nothing but the existence of water in the mineral is proved by this experiment.

Gypsum, heated by spirit-lamp, afterward by blowpipe flame, becomes white, and is converted into plaster of Paris. Water condenses in the upper portion of the tube.

The behavior and result are characteristic of gypsum.

Fluorspar, heated by spirit-lamp, phosphoresces in the dark, and decrepitates, yielding a little water sometimes.

Behavior is characteristic.

Nat. Alum, heated by blowpipe flame, gently at first, strongly afterward, intumesces and yields much water. When strongly heated sulphuric acid is evolved, which reddens litmus paper.

Turquoise, heated by spirit-lamp, yields water, turns black, and sometimes decrepitates.

Wavellite, heated by blowpipe flame, yields water and hydrofluoric acid, which corrodes the glass.

The presence of fluorine is proved.

Iron Pyrites, heated by blowpipe flame, yields much sulphur and some sulphureted hydrogen; detected by its odor and its action on acetate of lead paper.

Mispickel, heated by blowpipe flame, yields a red sublimate of bisulphuret of arsenic, and also metallic arsenic.

Pyrolusite, by blowpipe flame, when strongly heated, gives off oxygen, which may be recognized by its action on a splinter of ignited wood inserted in the mouth of the tube.

It increases the glow of the splinter, or causes it to burst into flame.

Nickel glance, heated by blowpipe flame, decrepitates, and yields an orange-colored sublimate or tersulphide of arsenic.

Ullmannite, heated by blowpipe flame, yields a white sublimate of antimonous acid, and some tersulphide of arsenic.

Calamine, by blowpipe flame, strongly heated, evolves carbonic acid gas, which may be recognized by its action on an ignited splinter of wood inserted into the tube. It extinguishes it immediately.

Jamesonite, by the blowpipe flame, fuses, and yields sublimates of sulphur, sulphide of antimony, and metallic antimony.

ACCORDING to Professor Church, withered leaves of the usual autumnal colors—yellow, red, or brown—can be rendered green again by steeping in water along with a little zinc powder.

A Poisoning Case with Lessons.

An interesting poisoning case came before the Coshocton County (Ohio) Court, at the February term, in which a woman was charged with administering arsenic to her husband, who died the 13th of August, 1870, with all the symptoms of arsenical poisoning. The body was exhumed on the 26th of August, the abdominal viscera removed and submitted to Professor C. Howard, of Columbus, for analysis, who reported traces of arsenic in the stomach, intestines, and kidney, and four-fifths of a grain in the liver.

The professor was of course an important witness in the trial, and his examination elicited some facts which are not without interest to chemical students. The tests he used were Reinsch's and Marsh's. He described the manner of distinguishing the metallic spot of arsenic on porcelain from that of antimony, relying on the hypochlorite of sodium solution and the nitrate of silver tests, together with the production of the octahedral crystals which have always been considered so highly characteristic of the arsenical sublimate. The defense created a doubt in the minds of the jury as to the reliability of Professor Howard's analysis, by showing on cross examination that a work on jurisprudence considered the hypochlorite of sodium test of the arsenical spot as wholly unreliable, *as it would also dissolve the antimonial spot*, though slowly. The production of octahedral crystals was proven to be unreliable as a test for arsenic by a recent statement from Professor Wormley, that antimony sometimes will produce crystals *which cannot be distinguished in appearance from those of arsenic.* We are here taught the important lesson that some of the so-called reliable distinguishing tests for arsenic are not reliable, and the careful toxicologist should make use of more confirmatory tests. The attending physician testified that he had prescribed subnitrate of bismuth to the patient, and we have not the least doubt that the arsenic found in the viscera came from this medicine. What an important lesson to the pharmacist! Here was a woman on trial for murder; arsenic was found in her dead husband's remains, and circumstantial evidence pointed to her guilt, and yet we believe the cause of the whole proceedings was this treacherous subnitrate of bismuth. Every druggist should carefully test his preparations of bismuth and ascertain whether or not they are contaminated with arsenic. We are happy to state that the woman was acquitted.—*Phil. Hoglan in Pharmacist.*

The Action of Platinum on the Animal Organism.

The action of most of the metals on the animal organism is well known, but that of platinum has been but little studied, almost the only observations that we know being those of Höfer and Gmelin, made respectively forty and fifty years ago. This gap in our pharmacological knowledge has been, to a certain extent, filled by some researches of Dr. Fredk. Kebler, of Cincinnati, in the laboratory of Strassburg, and which have, says the *Lancet*, been recently published in the *Archiv fur Experim. Pathologie u. Pharmakologie* The observations relate to the action of platinum both on frogs and warm-blooded animals. The mode of administration was the subcutaneous injection of a solution of chloride of platinum neutralized by carbonate of soda. The chief effects on frogs were found to be—augmentation of the general sensibility; heaviness of voluntary movements; curving of the back when this or the head was stroked, sometimes with painful extension of the hind legs on cutaneous irritation; increasing paralysis of the voluntary movements; spontaneous convulsive spasms of the extremities, or individual groups of muscles; weakened muscular irritability; loss of consciousness; and death. From these effects it would seem that platinum paralyzes the voluntary muscles, but paralyzes their movements before it affects the muscles themselves, apparently in consequence of a specific action on the central nervous system. The heart appears much less affected than the voluntary muscles, being scarcely interfered with, when death occurs. In mammals, however, the action is somewhat different. The direct effect on the muscles is not perceptible. Death rapidly occurs from a paralysis of the abdominal vessels when a dose is administered such as might affect the muscles. In rabbits a copious diarrhea is produced, and in dogs there are vomiting and hemorrhagic stools. In the former, after death, the mucous membrane of the stomach and intestine is congested, and in the latter the congestion extends also to all the abdominal organs. The muscular irritability was in all cases preserved up to death. In both kinds of animals indications of general paralysis were perceptible soon after the administration of the poison. The results of the experiments seem to indicate that the action of the poison takes place upon the muscular fibers or the peripheral nerve endings of the vessels, most probably upon the latter. But the phenomena presented by frogs, and some of the characters of the weakness in mammals, suggest that probably platinum has also a specific action on the central nervous system, and the nervous symptoms are due partly to this, and partly to the local anæmia. The fatal dose of platinum appears to be, for dogs 5 to 6 milligrammes. and for rabbits about 10 milligrammes of the body-weight of the animals experimented upon.

An Extra Mule.

Dr. Yandell, in a letter to the *Louisville Medical News*, speaks of a fertile female mule, now to be seen at the Jardin d'Acclimatation, Paris. She has brought forth no fewer than six foals—some by zebras, some by an ass, and some by a stallion.

Extraction of Perfumes with Chloride of Methyl.

BY PROFESSOR CAMILLE VINCENT, ECOLE DES ARTS ET METIERS.

Some months ago a manufacturing perfumer, M. Massignon, came to consult me respecting the employment of chloride of methyl (which has the property of dissolving fats, resins, and essential oils) in the extraction of the odorous principles of scent-producing plants. I expressed my belief that it might be so employed, but told him that I had no *data* in point at my command.

An experiment subsequently made with scent-woods succeeded, but the product possessed a very unpleasant odor, the commercial chloride of methyl used for industrial purposes retaining a pyrogenous product with a very persistent odor. I therefore turned my attention to the purification of the methyl, which in itself has a sweet ether-like smell; and in this I succeeded perfectly by treating ordinary methyl chloride with concentrated sulphuric acid, which completely absorbed the unpleasant odor. Chloride of methyl liquefied after the above treatment was found to leave no odorous residue on evaporation; it is perfectly suited for the extraction of perfumes, and when subsequently evaporated, leaves them with their limpidity and delicacy wholly unimpaired. My first experiment was made with orange flowers in a glass vessel; and the product thus obtained was pronounced by several experts to be superior to neroli obtained in the ordinary way by distillation with water. Encouraged by the success which had thus far attended my efforts, I had an apparatus constructed of sufficient size to test the practical value of the discovery by operating upon several kilogs. at once of different kinds of flowers. It consisted of the following parts: 1. A digester, in which the flowers to be extracted were placed; 2. A receiver for the liquefied methyl chloride previously purified with sulphuric acid; 3. An air-tight vessel to receive the methyl chloride after passing through the flowers, in which a vacuum could be produced with the aid of an air pump; 4. An air pump to exhaust the last named vessel, and to drive the methylic vapor into a cold coil, whence it returns, in a liquefied state, into receiver 2. The air pump and coil formed part of an ice-making machine

The extraction of the perfume, as, for example, of roses, is thus performed. The digester 1 is filled with flowers. Upon these is turned, with the aid of a conical stop cock attached to receiver 2, a portion of the liquid chloride of methyl contained in the latter vessel. A couple of minutes are allowed for digestion, and then the liquid is run off into receiver 3. Another charge of methyl is given, which is filtered through the flowers into vessel 3, like the preceding, and so on until the flowers are supposed to be exhausted. The air-tight receiver 3 is now partly filled with the liquid methyl charged with the odorous principles of the flowers washed by it. Any portions of chloride remaining in the digester can be removed with the air pump and by passing steam through the residue of the flowers, receiving the watery vapor in a gasometer, the chloride in each case being returned to receiver 2 through the cold coil. The chloride of methyl charged with odorous principles in vessel 3 must now be evaporated *in vacuo*. For this purpose a current of water at 86° Fah. is passed round the vessel, while the air pump is at work. When the manometer attached indicates an internal pressure of half an atmosphere, the operation may be considered as completed. The air-tight receiver is opened, and the odorous principles are found in the residum of fatty matter and wax left by the evaporated methyl. Treated with alcohol cold, this residuum yields up the perfume of the flowers in its full potency and delicacy.

In this way may be obtained, not only the perfumes of flowers generally extracted by distillation, but also of others, as the jasmine and violet, which, on account of their easy destructibility, are prepared chiefly by *enfleurage* or maceration in fat. Specimens of the perfumes extracted with deodorized methyl chloride have been sent to the Société d'Encouragement. The results with all kinds of scent-producing plants, flowers, seeds, barks, and roots alike, show that the yield by the methylic process averages 25 per cent more than by ordinary distillation with water.

M. Massignon is erecting an apparatus on the above principle at Cannes, which will be capable of extracting 1,000 kilogs. (20 cwt.) of flowers daily, and which he hopes will be in work in the course of the present month. The refrigerator attached to the apparatus manufactures 60 kilogs. of ice per hour.—*La Nature.*

Brilliant Metallic Deposits on Glass.

The deposit of a silver mirror on the interior of glass balls and hollow vessels, by filling them with suitable silvering solutions, is an exceedingly simple operation, yielding most beautiful results. The film of silver, although very thin, is not without expense. Metals which form with sulphur precipitates having a brilliant metallic luster, may be employed in the same manner as silver, yielding varied and beautiful effects at little cost. Carl Mann, assayer in Pribram, describes the use of antimony and lead as follows:

When nitric acid is added to a concentrated aqueous solution of tartar emetic solution as long as a precipitate is produced, then filtered and the precipitate stirred into fresh water, the liquid formed is essentially a basic nitrate of antimony in suspension. On diluting a portion of this milky liquid and boiling, the precipitate dissolves in the hot and acid liquid. A little of this hot solution poured into a hollow glass vessel and cooled as rapidly as possible, by shaking or holding it under running water, the liquid becomes milky and deposits a very thin but perfectly homologous film of the antimony salt on the sides of the glass. On washing it out with cold water and passing sulphureted hydrogen gas into it, or pouring in a solution of the gas, the glass appears of a uniform faint yellow color; the sulphide of antimony formed adheres very firmly to the sides of the glass after washing and drying.

By repeating this procedure several times the film can be increased very considerably within certain limits. Such glasses appear of a beautiful golden color with a green reflection. The effect is very fine and pleasing.

If sulphureted hydrogen gas be passed into an aqueous solution of oxide of lead in excess of metaphosphoric acid, a portion of the sulphide of lead will, under the proper conditions, adhere firmly to the sides of the vessel in which it is precipitated. The vessel will then have different metallic colors by reflected light according to the thickness of the film, darker when thicker. By transmitted light such a glass has a yellowish brown color.

The lead solution may be prepared by dissolving 1 part phosphoric acid in 4 parts water, also a second solution of 1 part sugar of lead in 20 parts water, and a third of a strong decoction of saponaria or an aqueous emulsion of an ethereal oil such as turpentine or *oleum serpylli*. To cover a glass ball with this lead film, three volumes of the phosphoric acid solution is poured into the ball, then four or five of the lead solution, and as much of the saponine solution. The total quantity of the liquid must be sufficient to easily cover the interior on tipping it slightly. If a thin film of the antimony be deposited first the lead film adheres better. The sulphureted hydrogen gas is passed in and the vessel kept moving to bring it in contact with every part of the glass. It is afterwards washed and dried. P. N.

AGRICULTURAL INVENTIONS.

Mr. Raphael T. Semmes, of Atlanta, Ga., has patented certain improvements in plows, and more particularly in that class of plows in which the standard is made reversible and adapted to receive mould boards and turning plows or scrapers on one side, and bull-tongues, sweeps, or shovel plows on the other.

Mr. Ferdinando Poole, of Emporia, Kan., has patented an improved hedge fence layer, which is so constructed as to lay the plants at any desired compactness and at any desired closeness to the ground.

An improved grain thrasher and separator has been patented by Mr. Martin Williams, of St. Johnsville, N. Y. The object of this invention is to furnish combined grain thrashers and separators so constructed as to separate the thrashed grain from the straw more thoroughly than machines constructed in the ordinary manner.

A Ship Canal through Denmark.

A concession has been granted to Herr Dahlström for a ship canal from the Baltic to the North Sea, between the Bay of Kiel and Brunsbuttel, in the estuary of the Elb. Its depth throughout is to be 20 feet 9 inches, its width at the surface of the water 160 feet, and at the bottom, 64 feet, the banks consequently having a very gentle slope. Provision will, moreover, be made, by the adoption of a peculiar system of locks and reservoirs, for increasing the depth of the water to 25 or 26 feet whenever it may be desirable to do so, and this depth will allow of the passage through the canal of the heaviest German ironclad afloat—the König Wilhelm, a vessel of 9,603 tons displacement and the largest ship in the German Navy, drawing only 26 feet. The canal can, it is calculated, be completed in six years, and will, it is estimated, cost $3,750,000, or about $2,250,000 less than the estimates made a few years ago of the cost of constructing a canal 31 feet deep and 224 feet wide at the surface of the water. In size, it may be added, the proposed Baltic and North Sea Canal does not compare unfavorably with the Suez Canal, the width of this at the surface of the water being 172½ feet, the width at the bottom 70 feet, and the depth about 26 feet 3 inches.

A New Gatling Gun.

An improved Gatling gun has lately been exhibited by the inventor in England. It is capable of firing 1,000 shots per minute, and killing a man or a horse at a mile range. The gun has a compact appearance, can be taken to pieces, and easily carried about, can be applied to military or naval use, and the mechanism of it is simplicity itself. The revolving barrel has ten compartments, into which, as they whirl round, metal cartridges drop from a tall oblong case fixed over the center of the barrel. At each turn of the handle ten shots are fired, and their dispersion is accomplished by a sliding apparatus. The size of shot in different caliber guns of this class ranges from musket-balls to half-pounders. By the use of this implement three men can do the work of 300 riflemen.

A Fast Locomotive.

A passenger engine built chiefly for speed has just been finished at the Baldwin Locomotive Works, for use on the Bound Brook route between New York and Philadelphia. It is intended to make the distance, 90 miles, in 90 minutes. Its driving wheels are 6½ feet in diameter, and there is but one pair. The weight of the engine is 84,000; and its water tank holds 4,000 gallons. The dimensions of ordinary passenger engines are: driving wheels 5 to 5½ feet; weighs 70,000 to 75,000 lb.; capacity of water tank 2,000 to 2,500 gallons.