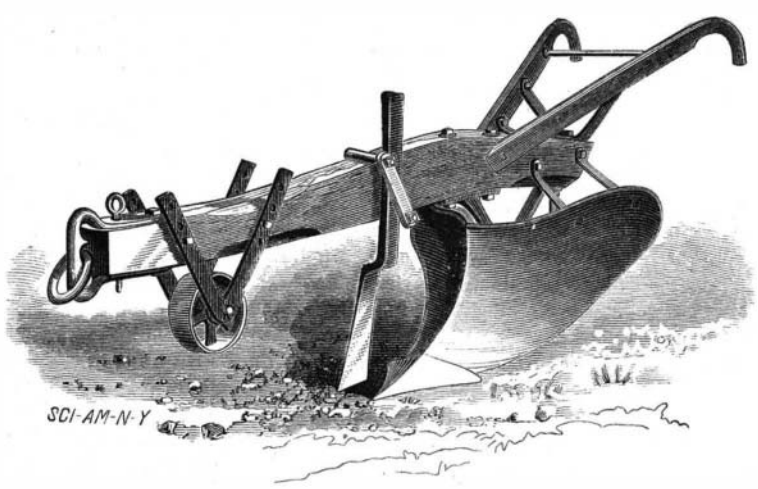
IMPROVED DOUBLE MOULD BOARD PLOW.

Our engraving represents an improved double mould board furrowing plow, which is designed to make a furrow from twelve to sixteen inches deep in previously plowed and prepared land, for planting sugar cane. The essential feature of the plow consists in making the mould board so that all its horizontal lines from the apex to the rear end are straight instead of concave, as heretofore made. This form presents the same angle to the earth all the way from front to rear, thereby avoiding the greater angle along the rear part which causes the earth to clog on that part until it fills up the concave to a straight line, making the plow draw very hard, not only by the greater friction of earth which does slide off, but because of the great mass of earth that is pushed ahead of the plow by reason of the resistance of the mould board. The mould boards are extended higher and lower and also further back in order to prevent the earth from running over or beneath the mould board back into the furrow when plowing deeply, and also in order that the angles of the boards may be made sharper for a given width of furrow.

This plow is now being manufactured by Messrs. Dillingham & Co., of Honolulu, Hawaiian Islands, who should be addressed for further particulars.



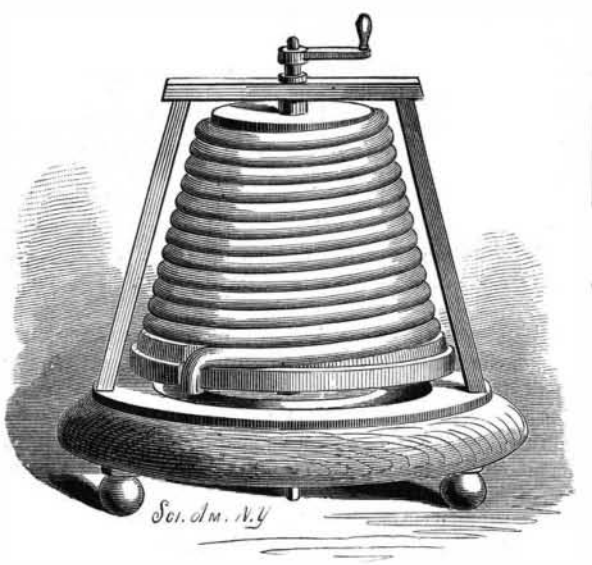
DILLINGHAM DOUBLE MOULD BOARD PLOW.

Fruit Jellies made without Fruit.

M. Girard, director of the Paris Municipal Laboratory, says that the chemical knowledge applied to the concoction of spurious foods and drinks is of a very high order, and would suffice to make the fortunes of the adulterators a dozen times over, if applied in an honest capacity. The matter which seems to have aroused him of late is a peculiarly ingenious thing in gooseberry jelly. It appears that the article is made entirely of seaweed. The coloring matter is fuchsine, and the flavor is given by a compound of acetic ether, tartaric acid, aldehyde, and œnanthic. Inspectors often recognize it from the fact that it is "a little more elegant than the genuine article." M. Girard ought to send over to a New York grocery if he wants first class jellies of all kinds made without the real fruit.

HOSE REEL.

The hose reel represented in the engraving is so constructed that every part of a hose wound upon it stands at an inclination in the line of its length, thereby causing the water to drain off from the interior. In the upper surface of the base, which may be supported upon legs, is a groove provided with a pipe leading down through the base. Rising from the base are uprights whose upper ends are secured by a cross piece, in the center of which and in the center of the base are journaled the gudgeons of the reel head. This reel head is made in the form of a truncated cone, and at its base is an inclined ledge having a hole through it at its thinnest part. Above the cross piece the upper gudgeon is provided with a crank by which the head may be revolved for reeling up the hose. In reeling, one end of the hose is first passed through the hole in the ledge when the crank is turned, so that the first coil of hose rests upon the inclined ledge. The next coil, coming upon the first, which is held at an inclination by the ledge, will also take the same inclination and will furnish an inclined support for the next coil, and so on. By this arrangement all the water in the hose will run into the groove in the base and be conducted away by the pipe. At the upper end of the reel head is a hook for holding the upper end of the hose. By the use of this device the interior of the hose is quickly relieved of water and kept dry without any extra trouble or attention.



BILLINGS' HOSE REEL.

This invention has been patented by Mr. Albert Billings, of Bergen Point, N. J.

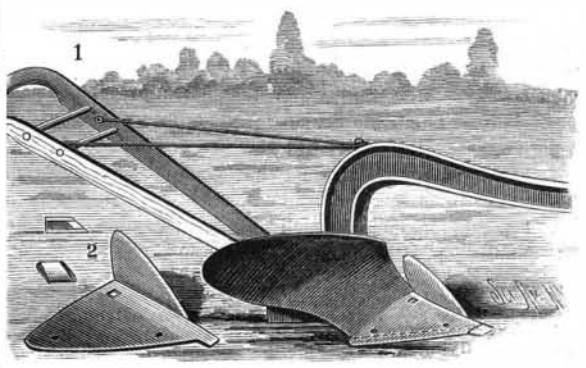
A PROCESS FOR FROSTING GLASS.—To give glass this appearance, it is only necessary to coat it with the following composition: Sulphate of magnesia diluted in beer, with a little dextrine added.

Poisonous Action of Metals upon the Microbia.

To obtain the microbia the author used sea water in which a small quantity of peptone had been dissolved. This liquid rapidly swarms with microbia. He found the metals fatal to microbia in the following order: Mercury, zinc, cadmium, copper, nickel, iron (ferric salts), barium, lithium, magnesium manganese, ammonium, calcium, sodium, and potassium. The poisonous dose for bacteria is in general about twenty times greater than for fishes. The author points out the extremely poisonous character of ammonium and potassium for fishes, while toward microbia they are comparatively inert.—*Ch. Richet.*

PLOW.

An invention recently patented by Mr. Adam C. West relates to the point of a plow, including the colter and share thereof, and is designed as an appendage or sheathing to the cast iron point of a plow, for the purpose of giving thereto good, durable steel edges, which may be sharpened as required. The point of an ordinary cast iron plow, either new or worn out, is covered with an attachment, to give it increased strength, durability, and ease in the performance of its work, which can be applied by a blacksmith of ordinary skill at a comparatively small cost.



WEST'S PLOW.

A steel covering plate is cut and bent to form the share and colter (shown detached in Fig. 2), which may be of any desired shape. The share is made to project over the right hand wing of the point about one and a half inches, or sufficiently to give a good, lasting steel cutting edge that may be sharpened if necessary. The whole may be made from a mainly triangular shaped plate, except the forward lip end, which lies under the detachable cap point (shown at the left of Fig. 2), the left hand portion of the plate being bent up to form the colter, the front edge of which is sharpened. The plate is secured to the cast iron point by the same bolt that holds the cast point to the plow, the bolt first passing through the steel plate, having a countersunk hole in it for the purpose, and by any number of rivets passing through both the steel plate and cast point, the heads being countersunk. The cap point is fitted over the lip end of the plate and the forward end of the point. It is formed of a steel plate cut into suitable shape, and bent around and welded to form a hood or sheath to the forward end of the point, and having a piece of steel welded in it at its front end, sufficiently large to permit of its being sharpened occasionally. The solid point of the cap is hardened to give it durability. The cap is fitted over the plow point by heating it and driving it on.

Further particulars concerning this useful device may be obtained by addressing Mr. Charles V. West, of Blanchard, Mich.

Attraction and Repulsion of Bodies in Motion.

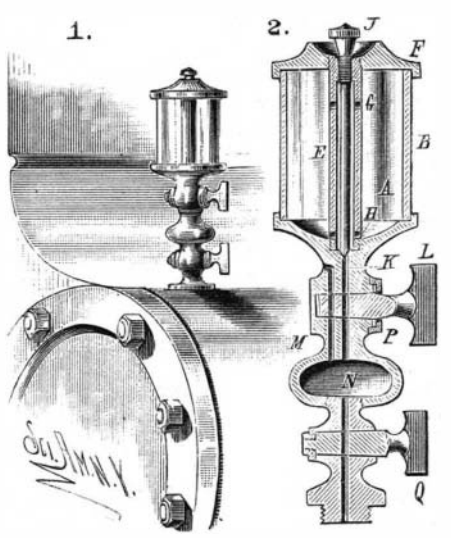
DR. MONKMAN.—The attraction of a light balanced body to a vibrating tuning fork was shown; also the attraction between two disks of paper revolving parallel and in the same direction. The author showed that two smoke rings traveling abreast in the same direction attracted each other, and that two paper rings revolving in the same direction close together attract, while if revolving in the other direction they repel.

Transmission of Power.

Will electricity enable us to transmit power in large quantities more efficiently than other means? Will it enable us to transmit small quantities? These questions were put to the Society of Arts, and answered by Professor Osborne Reynolds in his Cantor lectures as follows: Thanks to the experiments of M. Deprez, we can say that a current of electricity, equivalent to 5 horse power, may be sent along a telegraph wire one-sixth inch in diameter, some ten miles long—there and back—with an expenditure of 29 per cent of the power, because this has already been done. Compared with wire rope, this means falls short in actual efficiency, as Messrs. Hems send 500 horse power along a ¾-inch rope. To carry this amount, as in the experiment of Deprez, 100 telegraph wires would be required; these wound into a rope would make it more than 1·4 inches in diameter, four times the weight of Mr. Hems' rope. With the moving rope the loss per mile is only 1·4 per cent, while with the electricity it was nearly 6 per cent; so that, as regards weight of conductor and efficiency, the electric transmission is inferior to the flying rope. Nor is this all. With the flying belt, Mr. Hems found the loss at the ends, in getting the power into and out of the rope, 2½ per cent; whereas, in M. Deprez's experiments, 30 per cent was lost in the electric machinery alone, which is very small as such machinery goes. But this is not all. No account is here taken of the loss of power in transmission to and from the electric machinery. Taking the whole result, it does not appear that more than 15 or 20 per cent of the work done by the steam engine could have been applied to any mechanical operation at the other end of the line, as against 90 per cent which might have been realized with wire rope transmission.

ENGINE LUBRICATOR.

The lubricator herewith illustrated is designed for the cylinders of steam engines. The hollow stem, K, has a circular flange for supporting the glass cylinder, B, which forms the sides of the oil reservoir. The tube, E, forming a continuation of the stem, passes through the cylinder, and has a cap, F, screwed on its upper end for closing the upper end of the cylinder. The flange forms a concave bottom for the cylinder, and the tube is provided with perforations, G, near its upper end, and also with others, H, at the bottom of the cylinder, for the passage of air and oil, respectively, in filling and draining the cylinder. The upper end of the tube is closed by a valve stem, which is made smaller for the most part of the bore of the tube, and its lower end is made conical to adapt it to close the upper end of the bore, K, in the stem, while its upper end is made large enough to close the upper end of the tube into which it screws. In the stem just below the oil reservoir is a two-way plug, L, having one way turned into alignment with the bore, K, in the stem, and the other way aligning with the bore, M, which is formed in the stem parallel with the bore, K, and leading from the interior of the oiling chamber, N, to the outer air. The plug, L, is made slightly tapering, with a reduced portion at its outer end which carries an annular packing nut, P, screwing on a boss of the stem. The oiling chamber is formed in the body of the stem, and is closed from the steam cylinder, into which the stem is to be inserted, by a second plug, Q, having a single way aligning with the bore, K, when turned to proper position. The reservoir is filled with oil through the tube, E, the plug, L, being closed and the plug, Q, opened. When filled the valve stem is returned to position, the lower plug is closed, and the upper plug opened. Then by lifting the valve stem a given quantity of oil is allowed to descend into the chamber, N, forcing the steam therein out through the bore, M. The quantity of oil allowed to descend from the reservoir is gauged by a graduated scale on the glass cylinder. After the desired quantity has descended, the upper plug is closed and the lower one opened to allow the oil to pass into the steam cylinder.



HORN'S ENGINE LUBRICATOR.

This invention has been patented by Mr. William J. Horn, of 606 West 12th Street, Chicago, Ill.

Chlorozone.

When chloride of lime, or bleaching powder, is decomposed with cold hydrochloric acid, and the chlorine thus liberated and mixed with air is passed into a solution of caustic soda, it is absorbed and forms a liquid of unknown chemical composition. The liquid possesses bleaching and decolorizing properties. De Dienheim-Brochowski, of Paris, was the first to prepare this liquid, and to it he gave the name of "chlorozone."

Prof. Mill has recently proved, says the *Farberei-Muster Zeitung*, that this substance is not identical with the well known bleaching salt called hypochlorite of soda, and which one would naturally expect to have formed by this reaction. In fact, it differs from the latter in color, odor, and its more energetic bleaching power.

Chlorozone forms a clear liquid having a specific gravity of 1·27, is of a yellow color, and possesses a characteristic odor. When kept in glass carboys, in a cool, dark place, even if very concentrated, it keeps quite well, decomposing but slowly and giving off oxygen. More dilute solutions—"chlorozone water"—are more permanent.

Its remarkable bleaching power is increased by sunlight or the addition of acids and bromine. In bleacheries, dilute solutions, having a gravity of 1·07 to 1·03, are employed. Both this and the concentrated solutions of chlorozone are commercial articles.

When chlorozone is used for bleaching purposes, the tanks in which the operation is conducted must be lined with pitch or asphalt; wood weakens its action, because it is itself attacked, and vats made of sandstone are liable to cause iron stains. The bleaching follows directly after the alkaline bath, first in the cold, then at a temperature of 120° to 140° Fahr. The wringing, acidifying, and rinsing are the same as in the ordinary process of quick bleaching.

Chlorozone is well suited to replace chloride of lime for bleaching cotton, flax, linen, jute, and hemp, but is not adapted to silk and wool. In very dilute solutions of 1 to 400 it is recommended as a substitute for chloride of lime in the household and for public laundries, being easier to manage and less dangerous, although more efficient. When dilute, as 1 to 39, it removed old stains of red wine in half an hour.

It may also be stated that chlorozone is a powerful disinfectant.—*Deut. Industrie Zeitung.*

Coloring Soft Solder Yellow.

When brass is soldered with soft solder, the difference in color is so marked as to direct attention to the spot mended. The following method of coloring soft solder is given by the *Metallarbeiter:* First prepare a saturated solution of sulphate of copper (bluestone) in water, and apply some of this on the end of a stick to the solder. On touching it with a steel or iron wire it becomes coppered, and by repeating the experiment the deposit of copper may be made thicker and darker. To give the solder a yellower color, mix one part of a saturated solution of sulphate of zinc with two of sulphate of copper, apply this to the coppered spot, and rub it with a zinc rod. The color can be still further improved by applying gilt powder and polishing.

On gold jewelry or colored gold, the solder is first coppered as above, then a thin coat of gum or isinglass solution is applied and bronze powder dusted over it, which can be polished after the gum is dry and made very smooth and brilliant; or the article may be electro-plated with gold, and then it will all have the same color.

On silverware the coppered spots of solder are rubbed with silvering powder, or polished with the brush and then carefully scratched with the scratch brush, then finally polished.—*Deut. Ind. Zeitung.*

Electric Lighting in Europe.

Frederick A. Gower, the well-known telephone inventor, was eight years ago a journalist at a small salary in Providence, R. I. Last year his telephone interest in England alone was sold for $700,000 in cash. "Electric lighting in Europe," Mr. Gower informs the New York *Tribune*, "is advancing more rapidly than the American public seem to realize. Gas is usually far poorer in quality than here, and modern improvements in making it are slowly adopted. It is rarely used in bedrooms and almost never in parlors of good houses. And when it is used, the law, in Paris for example, requires the pipes to be accessible, which means being in sight and a blemish in a finely decorated room. You can imagine the pleasure given by a good incandescent light, under such conditions. It is much the same in industrial establishments. The Bon Marche, at Paris, where 1,500 clerks are employed, tried 400 electric lamps, and has now increased the order to 2,000. The St. Lazare railway station tried a few lamps in the vestibule, and will now extend the system to the whole vast establishment, covering some twelve to fifteen acres. The Grand Opera House at Paris, with its 1,100 permanent employes, has a gas bill of $60,000 a year, and it has been experimenting, for the last two years, with almost every known system of electric lighting, American or otherwise. The result has finally been in favor of the Edison system, and I learned in Paris lately that the contract with that company had been concluded. A rather curious result goes with this one. The Director of Public Works in Paris has said that whoever won the Opera would stand first for the concession for that great central lighting station in Paris which will be one of the marvels of Europe, a few years from now. In Milan, the Manzoni Theater is lighted by electricity, and the vast theater, La Scala, now has a complete equipment of engines, boilers, and dynamo machines from New York, adequate to 10,000 lamps, in position under the shadow of the great cathedral, without so much as a wire or a puff of steam in sight from the cathedral itself. Wires in the air, as we have them here, would not be tolerated in any city on the Continent. Several systems to avoid this danger, as well as the terrible disfigurement of the streets, are in use abroad. In Paris there are, of course, the sewers. In other localities, pipes are laid near the curbing, with openings at intervals of 1,000 feet or so, through which the wires can be pulled as required, and occasionally a case occurs where the wires are laid in leaden tubes roughly buried in trenches. A few cities, like Antwerp and Brussels, where central station systems are in hand, have allowed the wires in the air, as an experiment to show the workings of the system, and also in cities like Amsterdam and Venice, where the 'streets' are so moist that digging is unhealthy. Generally speaking, a European architect, who usually has charge of a building as long as it stands, hates the sight of a wire on a roof, and prevents it if he can. The architect thus in charge of the Louvre refused to allow an experimental wire to cross that half mile of splendor, even to oblige the Government of the Republic—and I think he was right. The Americans are lighting the House of Commons, though the awarding of the contract to them was opposed in the House by a young sprig of the more recent aristocracy, who indulged in some vulgar twaddle about 'encouraging Yankee adventurers.'"

Fire Protection in New York.

Between Broadway and West Broadway, Canal and Duane Streets, this city, is contained merchandise of a greater value than in any other section of like size in the country. This district has no adequate water supply, the pressure in the mains being too low to be of much use against a fire of any magnitude. To partially relieve this condition of affairs the fire commissioners have adopted a plan which provides for two movable tanks, 18 feet in length and 6 feet in width and depth, to be mounted on wheels and drawn about as required by horses. Water from the North River is to be forced by the fireboats through 3¼ inch hose into one end of these tanks, and pumped out at the side by fire engines. Each tank will hold 4,000 gallons, and will afford work for three fire engines. No point in the dry goods district is more than a mile from the river, and the fireboats have often sent water through more than 1,200 feet of hose. The boats are now relied on to force water through 4,000 feet of hose, and the fire engines to carry it the rest of the mile. The somewhat peculiar configuration of New York, being simply a long, narrow tongue of land with deep tide channels on each side, renders such, or some corresponding project, extremely feasible.

A New Process for Making Dyuamite.

Although dynamite is less dangerous to handle than nitro-glycerine, its preparation, involving as it does the nitration of the glycerine, is not less easy nor is it safer. When the glycerine enters the mixture of nitric and sulphuric acid, the reaction takes place with such violence as to produce a large amount of heat.

According to the *Polytechnisches Notizblatt*, a much safer method is now in use by Boutmy & Faucher in their powder works. Here the operation of nitrating takes place in two stages. The glycerine is first converted into a sulpho-acid by the action of strong sulphuric acid. An acid mixture is prepared separately from equal parts of nitric and sulphuric acid. The two liquids are then mixed. The sulpho-nitric acid absorbs nearly as much heat in liberating the glycerine from its combination as is formed by its combining with the glycerine; hence, it acts as a refrigerant to keep it cool, and the process is not attended with much increase of temperature.

In the new process the nitro-glycerine is not formed so suddenly as in the old way, but slowly and steadily, settles rapidly, and can be easily washed, while the yield, it is claimed, is greater. Nevertheless, Boutmy & Faucher have taken every precaution to avoid explosions and to protect the workmen from fumes.

What the Colors of Buoys Mean.

"When you enter any harbor in the world," said a pilot to a *Sun* reporter, "where the channel is marked by buoys, you will find that those on your right as you pass in are painted red, and those on your left black. If you should see one painted in red and black horizontal bands, the ship should run as close to it as possible, because that indicates the center of a narrow channel. Buoys with red and black vertical stripes always mark the ends of spits and the outer and inner ends of extensive reefs, where there is a channel on each side. When red and black checkers are painted on a buoy, it marks either a rock in the open sea or an obstruction in the harbor of small extent with a channel all around. If there are two such obstructions and a channel between them, the buoy on the right of you will have red and white checkers, and the one on your left will have black and white checkers. When a wreck obstructs the channel a green buoy will be placed on the sea side of the wreck, with the word 'wreck' plainly painted on it in white letters, provided there is a clear channel all around it; otherwise, an even number will be painted in white above the word 'wreck' when the buoy is on the right side of the channel, and an odd number if the buoy is on the left."

Composite Pavements.

An experimental length of composite pavement of a novel character is, says *Engineering*, now being laid in Cannon Street, opposite the Mansion House Station of the Metropolitan District Railway. It was devised several years ago by Mr. H. F. Williams, a well known engineer and contractor of San Francisco, and in several of the principal streets of that city the pavement has been subjected during the past seven years to the test of traffic at least as heavy as that of Cannon Street. The fact that after this prolonged and severe trial it remains to-day, except for a slight wear of the surface, in as good condition as when it was laid down, is sufficient proof that the system possesses such excellent qualities of resistance to wear as to render a fair trial of it advisable for the metropolis.

The mode of construction of this pavement is very quickly described. A thoroughly good concrete foundation is necessary, faced with cement which must be set hard and quite dry before the superstructure is laid on. This consists of wooden blocks about 8 inches long by 4 inches deep by 1½ inches wide, which are set upon the foundation like bricks on edge, and with the end of the grain—that is, with the 1½ inch side—uppermost. Previously to being thus set, each block is dipped to half its depth in a boiling mixture of Val de Travers asphalt and Trinidad bitumen. Thus coated the blocks are laid side by side so as to break joint, and as close together as the coating of asphalt will allow, the covering insuring a space being left between the blocks of about one-eighth inch all round, while at the same time it cements them firm to the foundation.

The spaces are afterward filled up with boiling asphalt so thoroughly as to hermetically seal up each block, and cement it to the adjacent ones; in this way a perfectly homogeneous covering is laid over, and cemented to, the foundation. Upon this covering is then spread a coating of asphalt about half an inch in thickness mixed with coarse sand or grit; the coating must essentially be of a different character to the material used for inclosing the blocks, since it has to resist the wear of the traffic, and not to take the simply passive part of the latter. At the same time the surface covering is not so hard as that of the ordinary asphalt paving, but while thoroughly able to resist any deformation from passing loads or alteration in structure from heat, the mixture employed has sufficient elasticity and grip to make it free of the greatest drawback and most serious evil of asphalt pavement—its slipperiness when humid.

This important advantage is secured partly by the blending of different kinds of asphalt, but chiefly from the existence of the elastic cushion of cemented wood interposed between the covering and foundation. Properly laid the pavement is, as long experience has shown, an admirable one, but evidently its success or failure depends, probably more than that of any other system, upon the care with which it is laid down. The absolutely essential conditions for success are, besides the proper selection of materials, a hard, regular, and dry foundation; a thorough cementation of the wood blocks to this foundation; the thoroughly complete incasing of the blocks with the asphalt glue, and the efficiency of the latter in making the whole structure homogeneous throughout; the use of very small gravel or coarse sand properly mixed with the harder asphalt, which forms the wearing surface.

It is evident that to secure all these conditions essential to success, considerable skill is necessary to lay the pavement, and especially everything must be kept quite dry, and the asphalt applied as hot and liquid as possible. Without these precautions being taken, the pavement, which is of comparatively slight proportions, must inevitably fail under the stress of incessant and heavy traffic. We point out these facts because the Williams pavement in San Francisco has proved itself to be all that its inventor has claimed for it, and because in our opinion the Cannon Street sample has not been laid under the conditions necessary to secure the success that may fairly be anticipated. Should experience show that we are right in this conclusion, the failure ought to be ascribed not to defect in the principle, which has been fully established, but to the imperfect manner in which the work has been carried out in the absence of the inventor.

THE Bureau of Education at Washington has recently received a communication from the Royal Institute of Higher Practical Studies of Florence, Italy, stating that the competition for the Bufalini Prize is open to all nations and that the time for the competition will close on October 31, 1884. The amount of the prize is 5,000 lira=$965, and the subject of the thesis is the experimental method in science. The thesis must be written either in Italian or Latin. This will be the first competition for this prize, which is designed by the will of the founder to take place every twenty years. The object of the competition is to show the superiority of the experimental over the *a priori* method of reasoning, and to give a short history of the progress of experimental science since the bestowal of the last prize.

Improvement of Galveston Harbor.

Galveston is throwing up her hat in honor of Capt. Eads' answer to her committee's letter relating to her bar. The Captain says that if Congress will give him $7,500,000 he will guarantee 30 feet of water, and maintain that depth for twenty years at a cost of less than $100,000 a year. He proposes to give the city 22 feet of water within two years. A Texas newspaper says that with 30 feet of water on her bar Galveston will soon rank New York city.

New Discoveries of Cave and Cliff Cities.

Mr. James Stevenson, of the Geological Survey, has reported to Major Powell, as one of the results of his last season's field operations, the discovery of several more ruined cave and cliff cities, differing in some respects from any he had before examined. The most remarkable was a village of sixty-five underground dwellings, situated near the summit of one of the volcanic foothills of the San Francisco Mountains, in the San Juan region of Arizona. The surface stratum of the hill had by exposure become hardened, and formed the common roof for the entire community. The dwellings were excavated after a common pattern, and a description of one gives an idea of the whole. They had no intercommunication beneath the surface, and were only accessible by means of square holes leading from the surface by a vertical shaft to the floor of the main room of the dwelling. Foot rests—holes at convenient distances along the sides of the shaft—served the purposes of a stairway.

Descending the shaft the explorers found themselves at the side of an oval shaped, arched roofed room, about twenty feet in its smallest diameter. At the ends and on the side opposite the entrance low doorways connected the main room with smaller rooms, the whole suit, or dwelling, consisting of four apartments. One of the smaller rooms had its floor excavated to a depth of two or three feet below those of the other rooms, and is supposed to have served the purpose of a storeroom or cellar for the ancient occupant. The other small rooms may have been bedrooms.

A groove eighteen inches deep by fifteen in width, extending from the floor of the main room up one side of the shaft to the surface of the hill, its bottom filled with ashes and its sides blackened by smoke, formed the fireplace and chimney of the establishment. Around the mouth of the shaft a stone wall was found, forming by its inclosure a kind of door yard to the dwelling below. The wall doubtless served the double purpose of guarding against snow slides, which might otherwise fill up the rooms and bury the occupants, and against the accidental fall of an inhabitant into his own or his neighbor's dwelling, upsetting the dinner pot, and possibly breaking his neck in the operation.

Considerable debris was found in these ancient dwellings, an examination of which led to the discovery of many curios illustrating some of the social and domestic customs of the extinct race. Stone mauls and axes, the implements used in excavating the dwellings; pottery bearing a great variety of ornamentation; bone awls and needles of delicate workmanship; the metate or family grinding stone for grain, its well worn surface indicating long use; shell and obsidian ornaments and implements of wood, the uses of which were undiscoverable, were among the trophies of the exploration.

Search was made for a watercourse or spring, but no appearance of the existence of water in the neighborhood during recent centuries was discovered. There were signs of intercommunication between this village and a cliff city some fifteen miles distant—also a new discovery—which indicated the contemporaneous inhabitancy of the two. This city, or rather cluster of villages, occupied the sides of a cañon which has recently been christened Walnut Cañon. It is an immense fissure in the earth, with nothing above the general level of the country to indicate its existence to the traveler until he stands upon the sides of its almost precipitous brink. The sides have been gullied by storms and torrents, leaving shallow, cave-like places of great length at different heights, along the bottom of which, whenever the ledge furnishes a sufficient area, dwellings in groups or singly were built.

The group or village which was most narrowly examined was about three-quarters of a mile in length, and consisted of a single row of houses, the common rear wall being the lining rock, while the sides and fronts were made of large squared stones laid in clay. A narrow street or pathway leads along the entire front. Other and similar villages could be seen along the cañon for a distance of five miles. Among the relics found here was a wooden spindle whirl, similar to those in use by the Pueblos of the present time, but unlike them in the apparent manner of its manufacture. Nothing indicating the use of metallic tools of any description was discovered. The surface of the wood of which the whirl was formed had apparently been charred and then ground down to the required size and shape by rubbing it upon sandstone. A shaft of reed similar to bamboo, a species entirely unknown in that region at this time, still remained in the whirl. It had been broken by the ancient workman and neatly mended by winding about it a piece of fine twine. The ends of this twine being examined under the microscope disclosed the fact that its fiber was of very fine human hair.

Articles of wood, corncobs, and even the perfect grains of corn; walnuts, bones of elk, antelope, and wolf; portions of wearing apparel of a fabric resembling the mummy cloth of Egypt, but made from material unfamiliar to the explorers, and other perishable articles were found in abundance buried in the piles of debris which partially filled these deserted homes, and would at first thought seem to indicate somewhat recent inhabitancy. On the other hand, however, the preservative qualities of the atmosphere of this region are remarkable, and it is the belief of the explorers that centuries have elapsed since the last of the departed race or races occupied these old cities and villages as homes.

The absence of weapons of war, of works of defence, other than such as are constituted by the selection of almost inaccessible localities, of temples or idols, of hieroglyphics or pictures, together with the durability and solidity of the dwellings, so different from anything to be found of the handiwork of existing uncivilized races of that region, and the wide extent of these ruins, which indicate the existence of allied races, covering large portions of the present territories of Arizona, New Mexico, and Utah, as well as Northern Mexico, are the elements of the problems involved in the origin, history, and disappearance of these races—problems which seem no nearer solution than when Colorado, nearly four hundred years ago, made a raid for the purposes of conquest among these places, and through his priests gave to the world the first meager accounts of them—then as now vacant and ruined.

Affairs at the Patent Office.

WASHINGTON, D. C., January 7.

Although the Patent Office deals in dry, hard facts, and the applicant for a patent and the examiner who investigates his claim have generally no more humor in them than a graven image, there are many things that have a humorous side to them even here. In looking over the list of applications the other day, I made some curious discoveries which I think worthy of mention. Marc Antony wanted a patent for a fruit can; T. Allwood for a barrel platform; D. T. Apple had applied his ingenuity to the construction of a pie baker; W. B. Argue appeared as an attorney of record for a claimant, and J. Broom got a patent for a refuse ejector. O. Bottles had discovered a new beer faucet, and S. A. Beer had invented a distillery worm. E. Buss wanted a patent for a gas engine; J. Bumhill for a planter; H. Boot for a shoe horn; A. Christ for a torpedo; Crofut & Knapp for felt hats; Car Carpenter for a car heater; L. Cutshawl for a churn; A. J. Dine for an earth auger; and a gentleman rejoicing in the extended name of Ludovic Charles Adrien Joseph Guyot D'Arlincourt applied for a patent for an improved magnet.

One Preserved Fish wanted a patent for a mast for vessels; while Lazarus Fried had turned his attention to toy watches. F. F. Foot very properly had turned his inventive genius to boots and shoes, and O. Faucet had looked after drain pipes. H. Goodenough wanted a patent for a horse shoe; M. Glasscock for a plow; J. S. Gold for a show case; I. Glassblower for a draught equalizer, and C. J. Glover, of Gloversville, N. Y., for a glove fastener. C. X. Harmony had invented an improved cornet mouthpiece; T. January a fluting machine; E. Kiss an omnibus pole; and C. Lightsinger a harmonica. W. Legg was made happy by a patent for a boot upper; A. North has one for a refrigerator; E. B. Meatyard one for a butcher's saw; Modest Merke for a fly trap; F. Million for a gas engine; Mustapha Mustapha, of Zagazig, Egypt, for a cotton gin; and Rob Roy McGregor for a milk can. Every one knows that W. D. Puffer has patents for improved soda fountains, but J. D. Peck had invented a patent measure—probably a peck measure, and Perry Prettyman, of Paradise Spring Farm, Oregon, has a lamp burner. H. Sandhop has a patent pavement driver; Scripture and Stackman a car heater; E. B. Turnipseed, a beehive; D. T. Trueblood, a medicine spoon; C. E. Plugge, a tobacco cutter; and Wall Work a car signal.

Among other curious names are V. C. A. P. D. G. Compte d'Ayapruck, Lio Louis Aime Elie Picot de la Peyrouse, Gallup & Hurry, Jackson Martin Van Buren Ilgenfritz, M. J. Laughter, E. S. Laughinghouse, J. Midwinter, J. D. Miracle, Return Jonathan May, C. E. Marychurch, W. Morningstar, J. E. Mustard, Return Jonathan Meggo Only, N. W. Playmate, F. Pickup, W. Rainbow, W. G. Rawbone, M. Rainwater, W. H. Rushforth, L. Soarback, J. M. Scantlin, B. Sloppy, J. F. Sheepshank, B. Silvernail, J. Snowman, W. S. Sharpneck, D. Shirtsleeve, W. Stonebraker, A. T. Timewell, Liberty Walkup, Pleasant Witt, Twentyman Wood, M. C. Younglove, E. Children, Church & Chaplin, A. Colderhead, S. Cornfield, W. Clucken, T. Curbsetter, W. B. Cowlock, Cook Darling, O. Drinkwater, A. Doll, I. Edge, W. S. Earwig, P. T. Earlywine, Lewis Finger, S. Forehand, Amy Fullalove, D. Goodwillie, Wm. Goforth, W. H. Goodchild, J. L. Greatsinger, Sampson Goliah, C. M. Henn, T. Oxyard, W. Onions, B. Overstreet, and N. W. Playmate.

The Secretary has decided that where an applicant files two or more applications for patents for divisions of the same subject matter of invention, the references from one application to another required by rule 42 of the rules of practice relating to such cases must specify the applications particularly by stating the dates of filing and serial numbers.

There has been but little of importance done in the Patent Office during the past week, the holidays having interfered with the regular work. FRANKLIN.

Variations of the Magnetic Needle.

An Oregon correspondent, formerly of the U. S. Land Survey, says that, in the Willamette Valley, in 1850, the magnetic needle showed a variation of 20° E., where now it is 21° 10′ E., thus indicating that the magnetic pole is there moving eastward about .2° a year. He has noticed greatest disturbance in vicinity of recent volcanic upheavals, varying as much as 20° in a mile, and suggests that the thickness of the earth's crust or the natural heat of the earth may have some effect.

TO WRITE UPON TERRA-COTTA TABLETS.—Dip the clay tablet in milk with a few drops of acid added, and then dry. When this is done you can write upon it as easily as upon paper.

Oils and Driers.

It is very necessary that the painter should know something about the oil he uses, as well as the pigments. It is apparent to every one that has used linseed oil that, as it dries, it undergoes certain changes. One authority computes that on the average linseed oil paint or varnish takes about three months to dry. As the oil grows harder it protects itself against the air—that is to say, its surface prevents the air from getting at the oil underneath the surface. It assumes the character of a solid hard leather, which contracts in drying and pulls itself together; the effect of this pulling or contracting is to produce cracks. The contraction of oil in becoming hard, and its sudden contraction under cold, are the chief causes of the difficulty experienced in varnishing. Varnish and oil usually crack in a direction across the grain of the wood, the chief reason of which is that wood does not contract in its length, and therefore the varnish in contracting cracks. Mr. C. L. Conder, in his useful book on painters' materials, observes that "oil dried in the sunlight and exposed to the direct rays will not last nearly so long as oil in the shade. Painters assert that oil dried in the coldest weather lasts the longest; it is difficult to see why this should be so, unless on account of the small loss of not-drying oil. When the oil is dry or hard, the loss of not-drying oil goes on very slowly." We must refer the reader to the work of Mr. Conder for an examination of the causes of cracking; suffice it to observe, that all painters are aware that too thick a coat or too many oil coats in one painting will cause cracking. Speaking of driers or "siccatives," which have an important bearing upon the subject, Muckley says that gum mastic, in the mediums used by English artists, has been a great injury to their pictures, and recommends copal varnish as the best drier. Others find the siccative of Harlem, made with gums, of value; but copal was largely used as a medium by the old masters. Driers harden the oil by turning it into soap; but this also may be destructive if the oil is made too hard.—*Building News.*

A New Belt on Saturn.

At a recent meeting of the Royal Astronomical Society, Mr. Ranyard read a note on a narrow belt which he had seen on the planet Saturn. He said that he believed narrow belts similar to those seen upon Jupiter were very rare. There were many observations of broad belts of a bluish-brown color upon the ball of the planet; but he was not aware of any other observation of a sharply defined narrow belt. While observing the planet on the evening of November 4, with an 18 inch silver-on-glass reflector, he noticed a narrow dark belt which stretched across the disk, and at moments of good definition could be seen to fade away toward either limb; but he thought that the decrease in intensity was not as marked as in the case of similar belts upon Jupiter.

The color of the belt was a dark blue-gray, strikingly different from the reddish-brown of the belts upon Jupiter. On the 4th November it was a striking object, nearly as easily seen as the Cassini division on the ring, though not so dark. He estimated its breadth as not double the breadth of the Cassini division, where it is seen broadest in the ansæ. The belt was again seen on the 13th of November, but was not then so conspicuous, and the definition was not as good as on the 4th.

On the 21st he saw it again, and it was also seen by Mr. Hopkins, who observed it with him. He had tried to find whether any other persons had seen it, and found that Dr. Copeland had on the 6th November seen a dark belt, which he described as in about 20° south latitude, sharp toward the equator, and shading off toward the pole. He estimated its breadth at about twice that of the great division in the ring. It should be remarked that taking ten and a quarter hours as the rotation period of the planet, the opposite side of the ball would have been turned toward the earth at the time of Dr. Copeland's observation as compared with Mr. Ranyard's observations of the 4th and 13th.

A Model School Building.

Hartford, Conn., has recently completed a new high school building to replace one burned two years ago. The building is 236 feet by 100 feet, two stories high, with basement and attic; a clock tower 126 feet high and an astronomical tower 98 feet high. The building is of brick with stone trimmings, and the total cost was $255,000. The floors are on brick arches supported by rolled iron beams; the stairs are of stone on brick arches; the heating boilers are in a detached building; the walls of the main building are twenty inches thick, inclosing an air space from foundation to roof of four inches width, and the entire structure is intended to be perfectly fireproof. There are ten class and recitation rooms, play rooms for inclement weather, a hall capable of seating 1,200 persons, a large lecture room, chemical laboratory, and observatory with dome 17 feet in diameter containing an equatorial telescope with 9½ inches aperture, from the Alvan Clark manufactory, at Cambridgeport, Mass.

A New Method of Oxidizing Sewage.

Professor J. Koinig proposes to purify town sewage and the waste waters of slaughter houses, dye works, breweries, etc., by allowing them to trickle over a network of wire, thus exposing a large surface to the oxidizing action of the atmosphere. He recommends that the coarser impurities should first be removed by means of settling tanks.