The Effect of Tobacco on Children.

Dr. G. Decaisne has submitted to the Society of Public Medicine the results of some interesting observations concerning the effects due to the use of tobacco among boys. Thirty-eight youths were placed in his charge, whose ages varied from nine to fifteen, and who were in the habit of smoking, though the abuse of tobacco varied in each case. The effects of course also varied, but were very emphatic with twenty-seven out of the thirty-seven boys. With twenty-two patients, there was a distinct disturbance of the circulation, bruit at the carotids, palpitation of the heart, deficiencies of digestion, sluggishness of the intellect, and a craving, more or less pronounced, for alcoholic stimulants. In thirteen instances there was an intermittent pulse. Analysis of the blood showed in eight cases a notable falling off in the normal number of red corpuscles. Twelve boys suffered frequently from bleeding of the nose. Ten complained of agitated sleep and constant nightmare. Four boys had ulcerated mouths, and one of the children became the victim of pulmonary phthisis, a fact which Dr. Decaisne attributed to the great deterioration of the blood produced by prolonged and excessive use of tobacco. As these children were all more or less lymphatic, it was not possible to establish a comparison according to temperament; but of course the younger the child the more marked were the symptoms, and the better-fed children were those that suffered least. Eight of the children in question were aged from nine to twelve years. Eleven had smoked for six months, eight for one year, and sixteen for more than two years. Out of eleven boys who were induced to cease smoking, six were completely restored to normal health after six months, while the others continued to suffer slightly for a year. Treatment with iron and quinine gave no satisfactory result, and it seems tolerably evident that the most effective, if not the only cure, is to at once forswear the habit, which to children in any case is undoubtedly pernicious.—*Lancet.*

Centrifugal Force.

Professors Ayrton and Perry exhibited at a recent meeting of the Physical Society an ingenious lecture apparatus for demonstrating the laws of centifrugal force. As was properly pointed out by Professor Ayrton, the ordinary lecture apparatus of this kind do not really demonstrate the laws of the subject, but simply show the effect; and a new and more scientific class of apparatus is demanded by the extension of scientific teaching. Professor Perry and he had been engaged in designing new apparatus to meet the wants of their City Guilds students, and the apparatus shown was one of the instruments in question. It consists of a rotating vertical axis carrying an aneroid chamber filled with mercury, which also rises in a graduated capillary tube projecting from its middle. A metal arm projects at right angles from the aneroid or diaphragm side of this chamber, and carries a sliding weight which can be shifted to different distances on the graduated arm. On rotating the axis the centrifugal force of the projecting arm pulls on the elastic diaphragm of the mercury chamber, and the mercury within it having more room sinks in the capillary tube by a corresponding number of degrees. The apparatus is capable of demonstrating the law of centrifugal force with accuracy, according to experiments which have been made; and, as Professor Guthrie remarked, it could be used for indicating the speed of wheels and shafts. We may add that there is already a mercury counter in existence, in which a closed mercury chamber is rotated, and the parabolic concavity given to the mercury by the centrifugal force is employed to measure the speed.

Proposed $50,000 Prize for a Gas Engine.

At the recent meeting of the Gas Institute, Sheffield, Eng., Mr. Thomas Warrington read a paper relating to suggestions for increasing the consumption of gas, in which he said:

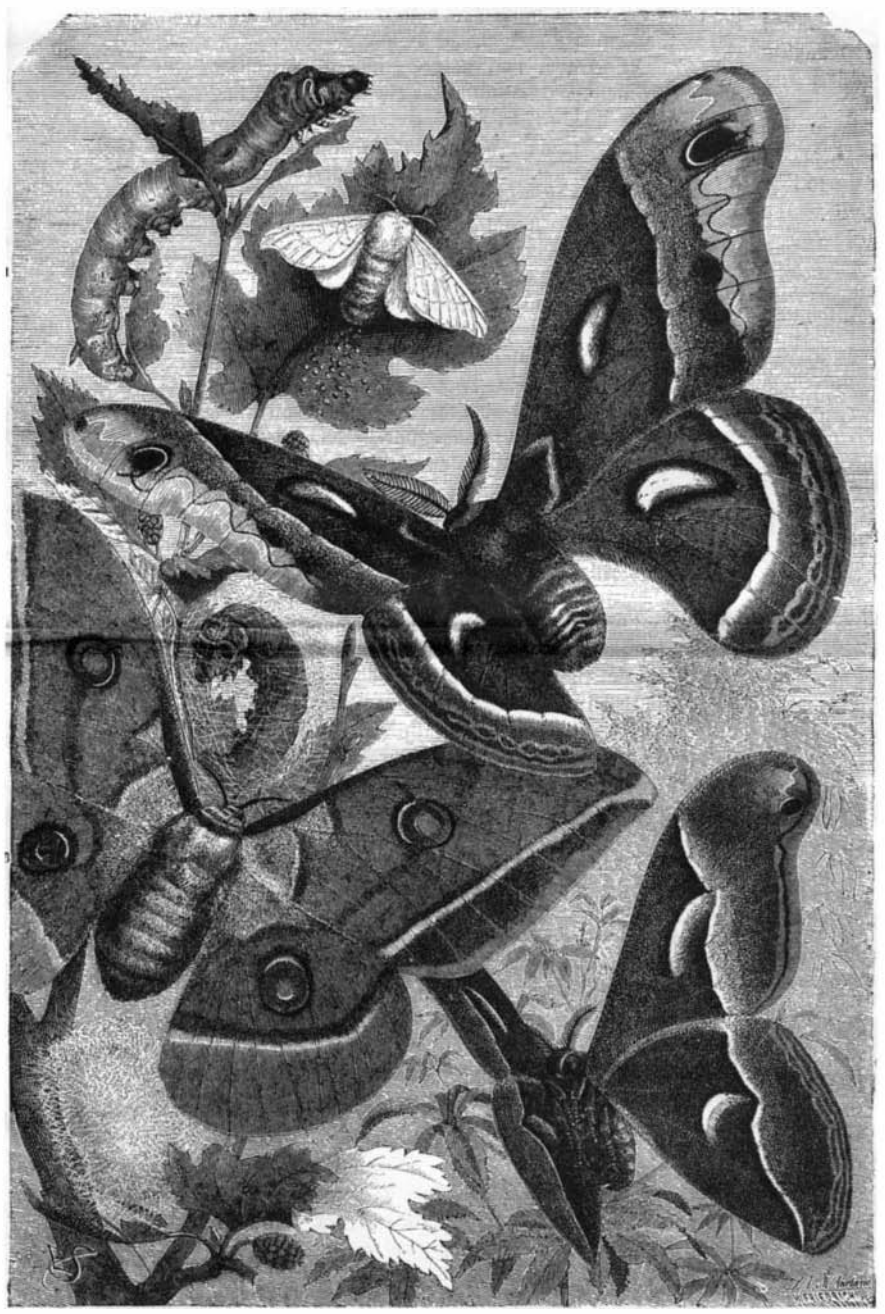
"A good source of profit is the consumption for gas engines; but the use of these is at present limited by their excessive first cost. So long as a steam engine can be fixed for half, or less than a half, the first cost of a gas engine, the latter is too heavily handicapped; and I offer it as a crude suggestion, that the gas companies should jointly copy the system of the Society of Arts, and offer a prize well worth having for a gas engine, satisfactory in all points, which should cost no more to fit up than a steam engine. A prize of £10,000 would be exceedingly well expended on this, and would be a trifle to each subscriber to the fund. It would certainly make a move in gas engines, and stir up the makers in an astonishing way; and a subscription of about £7 from each gas works would cover the total cost.

SILKWORMS AND MOTHS.

The various silk producing moths belong to the family Bombycidæ; upward of forty varieties of these moths may be found in various parts of the world.

"These insects secrete the silk in two large intestine-like vessels in the interior, which contain a gelatinous like substance and become very large before the caterpillar changes into a pupa. Both the silk organs unite in a common tube at the mouth called the spinneret, and through this tube the semi-liquid is ejected. When it comes in contact with the air, it hardens. The caterpillar employs the silk for a cocoon which it gradually forms into an oval shape. The outermost layers are rough and are stripped off before the thread is spun into a hank."

As the most beautiful singers among the birds are clothed in the plainest dress, so with the most useful of all the butterflies, the "mulberry silk spinner." The breadth of the wings is from forty to forty-five millimeters. It is a mealy white color, and the double row of serrations on the antennæ are black. The anterior wings have a crescent shaped point in the deeply curved edges. A yellowish brown crossline is also visible. The caterpillar called the "silk worm" is the most perfect of all the spinners. It is grayish white and has brown and reddish yellow spots on the back. Its only nourishment is the leaves of the mulberry tree. The cocoon is egg shaped, and the loose silken threads surrounding it are either white or yellow.



1.—MULBERRY SILK WORM AND MOTH. 2.—SOUTH AMERICAN SILK SPINNER.
3.—CHINESE SILK SPINNER. 4.—AILANTUS SILK SPINNER.

In all probability the silk worm came originally from China, the native country of the mulberry tree. In the reign of the emperor Justinian two Persian monks smuggled into Constantinople some mulberry plants and eggs of the silk worm, which they had stolen and concealed in their hollow walking sticks. The culture of silk worms has been carried on in Europe since 520 A.D. It was introduced into Greece in the twelfth century, and from Greece was carried through Arabia and into Spain.

In the middle of the twelfth century, through the war which Roger II. carried on with the Byzantine Emmanuel, silk culture was introduced into Sicily and extended to Florence, Milan, and the rest of Italy. In the reign of Henry IV., it was introduced in France, and from there extended farther north. In 1670 the first company for the culture of the silk worm was formed in Germany. Frederick the Great himself introduced this branch of industry in his kingdom, and in the second half of the sixteenth century silk culture had found an entrance everywhere in Germany. The war for freedom gave a blow to this new industry, for the times were not suited to the culture of the worms or the plucking of mulberry leaves. The trees became old, did not increase, and were scarcely valued except by the village youths who ate the sweet fruit. In later times the subject was again agitated, and in Prussia was regarded very favorably. Mulberry hedges were planted, as they furnished the leaves more speedily and conveniently than the trees. Then came the news from the silk producing countries of southern Europe of the appearance of disease among the silk worms, and at the present day, in proportion to the demand for silk, there is comparatively no silk produced.

The Chinese oak silk producing moth has yellowish brown wings, with a fine white line passing through them, bordered on the inside by a slender brown line, with crosslines of brown. On each wing there is a round dark spot broken by a white marking. Three days after pairing, the females lay their large brown eggs in heaps upon the sides of their dwelling place. Eight or ten days later the black caterpillars emerge from the eggs. After the second changing of the skin the worm becomes a yellowish green. In about fifty-two days they begin to spin.

The growing caterpillar is distinguished from the very similar Japanese silk spinner by a brown, dark spotted head, which gives it the name of the "brown headed oak caterpillar." It eats night and day with only a short intermission. This butterfly has in its native country, as with us, two broods in a year. After a report made by Abbe Paul Perny of the province of Kuy Tscheu, to the Parisian Company, the second brood with the pupas were kept through the winter in rooms, and the temperature was carefully regulated day and night. The females were placed in willow baskets, where they laid their eggs. After the caterpillars came out of the eggs, oak branches were put in the baskets. As soon as they could crawl, they were transferred to an oak forest which consisted only of an undergrowth; the ground was kept clean, so that the down falling worms could be easily picked up. For this purpose, and in order to frighten away the birds, a watchman was provided for each colony.

In forty or forty-five days after the caterpillars emerge from the eggs the cocoon harvest commences. The best ones are sought out for further breeding. The rest are placed upon bamboo hurdles and a fire built beneath them, to put the pupa to death. They are then placed in a vessel of boiling water for from eight to ten minutes. Then two handfuls of buckwheat ashes are put in a bowl of water, and the mixture added to the boiling water in which the cocoons are placed.

The Chinese dry the stalks of the buckwheat in the sun, after the grain is harvested, and set fire to the heap. The ashes are supposed to have the same effect as potash. The cocoons are then moved around with a spatula until the threads are loosened and wound around the spatula. Then five or eight threads, according to the strength desired, are placed in the opening of a reeling machine, and the cocoon is wound off. The second brood is treated in the same way as the first. The Chinese reap a rich profit from these silk spinners. The silk is firmer and cheaper than that of the mulberry spinners.

The ailantus silk worm feeds upon the leaves of the ailantus tree. Rearing this moth is easy, as the caterpillars remain upon the tree and spin their cocoons in the branches. The color of the caterpillar is greenish yellow marked with black. The ground color of the moth is a velvety reddish brown, the bands white; the edge of the crescent-shaped spot is yellowish. The worm is hardy and not subject to many diseases to which the silk worm is liable, and seems to be free from the fungoid parasite which often destroys so many silk worms. The silk is strong, but does not have much gloss.—*From Brehm's Animal Life.*

Coal Gas and Water Gas.

In response to a resolution of inquiry from the Board of Aldermen of Brooklyn, N. Y., as to the relative qualities inimical to health of coal gas and water gas, a report has been made containing analyses and statements by Professor Ira Remsen, of the Johns Hopkins University, who says that coal gas contains 7·9 of carbonic oxide in 100, and water gas 28·25 parts to the 100. Carbonic oxide is a deathly gas, and either of these illuminating gases, if inhaled in sufficient quantities, would produce death, but long before enough of either to produce bad effects could accumulate in a room, it would necessarily be detected by its odor. In case the occupants of the room were asleep, it was possible a fatal effect might be reached a few minutes earlier in the case of water gas than in that of coal gas.

A SIX-POUND pickerel, caught near Shelby, Iowa, had attached to it a complete set of fishing tackle, except the pole.

Chemical Appliances for Extinguishing Fires.

It hardly seems to be an open question concerning the value of apparatus intended to extinguish fire through water impregnated by gases antagonistic to combustion. In the earlier days of chemistry, it was discovered that carbonic acid would extinguish flame, and in one form or another the principle was applied in Europe.

When William A. Graham filed at Washington his caveat for a fire extinguisher, the patent officials were unable to determine whether this was a new invention, and a special act of Congress was passed authorizing the issue of the patent, dated July 9, 1878, entitling his administrator to manufacture, use, and sell apparatus for extinguishing fires by the use of carbonic acid gas. Under this patent seven licenses were granted, yet all but one of these licenses were allowed to lapse. This has occasioned a tedious lawsuit, which ended in a very positive decision, May 9, 1883, by Judge R. W. Hughes, presiding over the United States Circuit Court in the Western District of Virginia, sustaining in every point the claim of the patentee, and giving the sole right to Charles T. Holloway to manufacture or to sell apparatus for extinguishing fires by the use of carbonic acid gas.

This long legal fight and clear decision have brought chemical extinguishers into greater prominence, though they should be familiar objects to every observant man. It would seem as though Brooklyn, as a great oil refining center, would patronize largely the manufacturers of chemical apparatus, yet the *Spectator* Year Book reports it as having no extinguishers in its fire department. Brooklyn has nineteen steam fire engines, and last year $11,000 were raised by taxation to add new apparatus. Over five months ago the Fire Commissioner asked the Aldermen for authority to use a portion of the money already in the treasury to buy two chemical engines. The request was referred to the Sewerage and Drainage Committee! and has laid there five months. A testimony to the value of chemical apparatus was signed by officers of New York insurance companies representing assets to the amount of forty-five million dollars. Meantime the committee has not drained a dollar into their pockets, and the bill remains under duress. This condition of affairs seems remarkable, and at the present time not even a common extinguisher belongs to the fire department of Brooklyn.

Buffalo, with less than one-quarter of the population of Brooklyn, has five chemical engines; Albany reports twenty-five chemical extinguishers as belonging to the fire department, and Chicago possesses five chemical engines and eighteen chemical extinguishers, besides those carried by Ben Bullwinkle's fire patrol. Boston has seven chemical engines and thirty-eight chemical extinguishers, and the enterprising town of Weymouth, Mass., owns a chemical engine and seventy-five chemical extinguishers. Detroit has two chemical engines and six extinguishers in the department, while Cleveland only reports ten extinguishers. Philadelphia is not credited with any chemical appliances, but lately it has roused from slumber and sent a liberal order for these adjuncts to steam fire engines. New York city has nine chemical engines and 108 extinguishers in the department, and at every fire there is a race between the fire laddies and the patrol boys to see who shall be the first to get into a building with an extinguisher, which is frequently used with good effect. New Orleans has five chemical engines, and the Pennsylvania Railroad owns eleven chemical engines and numerous extinguishers. The Baltimore fire department used chemical extinguishers 684 times in 1881 and 813 times in 1882, putting out a large proportion of all fires without using water from the fire plugs or engines. Outside of that city, in the hazardous manufacturing district of "the Belt," one efficient department has been organized with chemical apparatus only, having nine engines and many portable extinguishers. Its efficiency was well tested at the explosion of two stills in a coal oil refinery, January 7, 1882, when two chemical engines checked the fire, to the surprise of all spectators. Water will not extinguish burning coal oil; besides, every gallon in a chemical tank is as effective in checking an ordinary fire as forty gallons of water.—*Insurance World.*

The Antiquity of Man.

An interesting discovery, of much importance for geological and archæological science, has recently been made in a coal mine at Bully-Grenay, in the French department of Pas de-Calais. A new gallery was being pierced, when a cavern was broken into, which discovered the fossil remains of five human beings in a fair state of preservation—a man, two women, and two children composed the group. The man measured about seven feet, the women six feet, and the children four feet and rather less than this. In addition, some fragments of arms and utensils of petrified wood and of stone, with numerous remains of mammals and fish, were brought to light. A second subterranean chamber inclosed the remains of eleven human bodies of large size, several animals, and a large number of various objects, with some precious stones. The walls of the cave exhibited drawings representing men fighting with gigantic animals. Owing to the presence of carbonic anhydride a third and larger chamber, which appeared to be empty, was not searched. Five of the petrified human remains will be exhibited at the mayoralty of Lens. The remainder of the bodies which have been brought to the surface are to be conveyed to Lille, there to await a thorough examination by the experts of the Faculte des Sciences. Information has been telegraphed to the representatives of the Academie des Sciences of Paris and to those of the British Museum. If the discovery be a real one, no doubt can be entertained of the value of the find, which would on the face of it seem to show that prehistoric man is anything but a myth.—*Lancet.*

The Geology of Philadelphia.

In a lecture before the Franklin Institute, Prof. H. Carvill Lewis gave the following:

Recapitulating the various surface formations here distinguished occurring at Philadelphia we have, beginning with the most recent:

Formation.	*Geological Age.*
Recent alluvium.	Modern.
Trenton gravel.	Post-glacial.
Philadelphia brick clay.	Glacial.
Red gravel.	Glacial.
Yellow gravel.	Pre-glacial.
Bryn Mawr gravel.	Tertiary.

In these six deposits is written the ancient history of the Delaware Valley. If we read the record aright, they tell us that, long ago, before man was created, when strange mammals roamed abroad, and when all southern New Jersey lay deep beneath the Atlantic, the waves of the ocean broke upon the hills of Bryn Mawr, Chestnut Hill, and Media. At the same time, an inlet from the sea extended over a great part of the Montgomery County limestone valley, depositing clays holding extensive beds of iron ore. This region, then 450 feet lower than now, was afterward slowly upheaved, and as the waters retreated, the yellow gravel was probably formed. Afterward, and perhaps in consequence of this rise, the climate grew colder, and glaciers crept down from Greenland and Labrador, forming a huge *mer-de-glace* thousands of feet in thickness, which advanced to within 60 miles of Philadelphia. Again the land descended 175 feet lower than it now is, and again the waters covered the city. This time it was fresh water of icy coldness, bearing great icebergs, which stranded on the shores formed by the hill at Wayne Junction, Belmont, George's Hill, Hestonville, Haddington, and Swarthmore. At this time the river Delaware was 10 miles or more in width, nearly 200 feet deep, and, as a roaring flood, deposited the red gravel and left in it the records of its waves. As the flood became more quiet, though still filled with mud derived from the base of the glacier, the brick clays were laid down, the floating ice floes meanwhile dropping their far-carried bowlders all over our city.

After many thousands of years, the "Great Ice Age" at length came to a close, the land rose to about its present level or somewhat higher, the waters retreated, and finally, as sudden elevations of temperatures thawed the glaciers still remaining in the head waters of the Delaware, there came those last great floods which deposited the "Trenton gravel." The Delaware, then so wide as to submerge most of Trenton, all of Bristol, and the river front of Philadelphia nearly up to the State house, was again filled with floating icebergs. The walrus played in its waters, while the reindeer and the mastodon roamed on its banks. Man also then first appeared. With habits most probably like those of the Esquimaux, living in most primitive ways, he hunted and fished on the banks of the swollen Delaware, and occasionally dropped into the water his rude stone implements, long afterward to be found to tell the story of their makers.

Finally, the land began the sinking which is now in progress, the climate grew warmer, the Red Indian was introduced, and the modern era began.

This, in brief, is the tale told by our clays and gravels. Surely the long despised cobble stones of our ill-paved streets become more worthy of our respect when we know their story. Still more interesting do they become when we learn that they can tell us of the early history of our own race.

The Metallization of Wood.

Les Mondes describes the following process invented by Mr. Rubennick for metallizing wood:

The wood is first immersed for three or four days, according to its permeability, in a caustic alkaline lye (calcareous soda) at a temperature of from 75° to 90°. From thence it passes immediately into a bath of hydrosulphite of calcium, to which is added after twenty-four or thirty-six hours a concentrated solution of sulphur in caustic potash. The duration of this bath is about 48 hours, and its temperature is from 35° to 50°. Finally the wood is immersed for thirty or fifty hours in a hot solution (35° to 50°) of acetate of lead. The process, as may be seen, is a long one, but the results are surprising. The wood thus prepared, after having undergone a proper drying at a moderate temperature, acquires under a burnisher of hard wood a polished surface, and assumes a very brilliant metallic luster. This luster is still further increased if the surface of the wood be first rubbed with a piece of lead, tin, or zinc, and be afterward polished with a glass or porcelain burnisher. The wood thus assumes the appearance of a true metallic mirror, and is very solid and resistant.

Etching Liquid for Steel.

Mix 1 oz. sulphate of copper, one-half oz. of alum, and one-half a teaspoonful of salt reduced to powder with 1 gill of vinegar and 20 drops of nitric acid. This liquid may be used for either eating deeply into the metal or for imparting a beautiful frosted appearance to the surface, according to the time it is allowed to act. Cover the parts you wish to protect from its influence with beeswax, tallow, or some similar substance.

Refrigerator Cars.

At the annual convention of the Master Car Builders' Association, held in Chicago in June last, a committee reported on refrigerator cars after an examination of the productions of thirteen different builders, the cars costing from $600 to $1,200 each. The committee said:

"There are now before the public three kinds of refrigerator cars. The first is a car built on the supposition that all that is needed is a cool temperature. These cars are built on the principle of an ice lined box, with the ends, sides, and roof fitted with ice boxes, no arrangement having been made for the circulation of air or absorption of moisture. The second kind of car is that which provides a cool temperature, and also a circulation of air. The third kind is that which provides a cold temperature, and a constant circulation of air that is pure and dry. Your committee are of the opinion that the last named car meets the want of carrying perishable lading. To make a refrigerator car what it ought to be, it is our opinion that there should be a circulation of dry, pure air; the ice boxes should be exposed on all sides to the car, thus getting the cold radiation from them and allowing the air to circulate freely around them; the drainage should be perfect, so that the water would not slop over and spoil the freight; the cooling properties of the water should be utilized before escaping from the car. We think that the car should be built longer than the ordinary box car, so that after taking up space for the ice chambers, etc., there would still be room for a full car load of freight. We would also say that the insulation should be as nearly perfect as possible."

New Photo-Electric Apparatus.

A new photo-electric apparatus, by M. Londe, is intended to make proofs in regular and mathematical order for medical investigations. A doctor desiring to study the different phases of an epileptic attack takes a dozen portraits of the patient, each portrait having the same lapse of time. This is obtained by means of an ordinary metronome, such as is used by students in music to measure time correctly. A steel bar is placed at the axis of the pendulum, to which is attached two needles which dip into a mercury bath at every oscillation, thus allowing the current to pass slowly or rapidly according to the wish of the manipulator. The current turns a disk in the camera, which contains nine lenses, and each lens is uncovered and exposed in a regular manner.

A Town almost Destroyed by a Waterspout.

After a heavy rain and thunderstorm lasting nearly all night a suburb of London, Ontario, was, on the morning of July 11, almost wholly destroyed by a sudden flood caused by the bursting of a waterspout, or by a "cloud burst," several miles up the valley of the Thames. The heavy storm had passed away and all was still, when the roar of the water was heard by those who remained awake at about two o'clock in the morning. Alarms were made and most of the people escaped; but the water rose so rapidly that the overflow of more than twelve feet above the spring floods swept away or undermined two hundred dwellings and other buildings and destroyed about fifty persons. The damage to property is estimated at $500,000.

New Process for the Extraction of Fish Oil.

The fish is sprinkled with 5 per cent of its own weight of ferric chloride or sulphate solution (45° B.), and can then be kept three or four days without undergoing alteration. It is then crushed, made into a paste, and pressed, when a large quantity of water and oil is forced out. The cake from the press dries readily, becomes friable, and is easily pulverized. A further quantity of fatty matter may be obtained from it, either by pressing between heated metal plates, or by extraction with benzine or carbon bisulphide. The residue forms an excellent fertilizer.—*Pharm. J. Trans.*

Paper Mills in the World.

It appears from statistics that there are in the world no less than 3,985 paper mills, producing yearly 959,000 tons of paper made from all kinds of substances, including rags, straw, and alfa. About one-half the quantity is printed upon; and of these 476,000 tons, about 300,000 tons are used by newspapers. The various governments consume in official business 100,000 tons; schools, 90,000 tons; commerce, 120,000 tons; industry, 90,000 tons; and private correspondence another 90,000 tons. The paper trade employs 192,000 hands, including women and children.

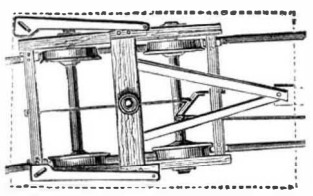
THE proportion of doctors to population is given as follows by the *Siglo-medico:*

France	2·91 per 10,000.
Germany	3·21 "
Austria	3·41 "
England	6 "
Hungary	6·10 "
Italy	6·10 "
Switzerland	7·06 "
United States	16·24 "

M. HERVE MANGON, having observed that *Mesembryanthemum crystallinum* takes up from the soil an extraordinary quantity of alkaline salts, proposes to employ it for removing the excess of such salts from land on the sea coast and in salty deserts, so as to make it gradually fit for ordinary vegetation.

Improved Car Truck.

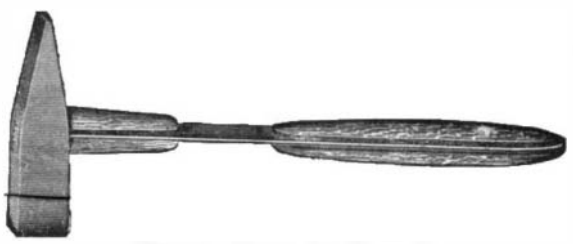
In passing around a curve pivoted trucks always change position relatively to the longitudinal center of the car, and as the outer wheels crowd against the outer rail, their tendency is to cross it or "jump" the track. This is especially the case in curves having a short radius. By means of the slotted side bars shown in the engraving this is prevented, as they limit the movement of the trucks on their pivots, or, in other words, allow them to assume only such angles to the longitudinal center of the car as is compatible with safety.



This angle is approximately indicated when the cross beams or bolsters of the truck are at right angles to radii of the curve, and should the wheels on one side of the trucks meet a surmountable obstruction, the slotted bars tend to prevent the trucks being turned crosswise of the track. As a further means for keeping the trucks in proper position on the rails, a V-shaped frame and link are employed. The bars composing the V-frame are rigidly attached to the swinging bolster near its ends, and the link is pivoted to the apex of the angle formed by these bars and to a frame or piece of lumber or iron which extends across the base frame of the car. When the trucks turn in running curves, the V-frame and link will serve to hold them within the limits of safety. This invention has been patented by Mr. Horace Resley, of Cumberland, Md.

Improved Hammer Handle.

The hammer shown in the engraving is provided with a spring handle of peculiar construction, which not only enables better and truer work to be done, but saves muscle and nerve, while admitting of more rapid work. The spring handle, as will be seen by reference to the cut, consists of a flat steel spring riveted in the hammer head and supported by two wooden keys, which extend a short distance down the spring. The handle proper is formed by riveting to the spring two wooden half handles with an interposed strip of leather.



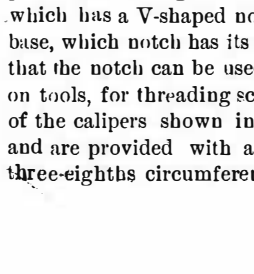
Spring Hammer Handle.

The chief advantages of this handle are that it enables the user to deliver more powerful blows, while rendering the labor lighter and pleasanter. It is very strong and not liable to break, and there is no danger of the head coming off. The hammer provided with this handle is adapted to the use of all mechanics, for heavy as well as for light and medium work. The handle is applicable to all forms of hammers and can be used on all tools with which blows are struck.

Any further information in regard to this invention may be obtained by addressing Messrs. Paul Forchheimer & Co., 38 Park Place, New York city.

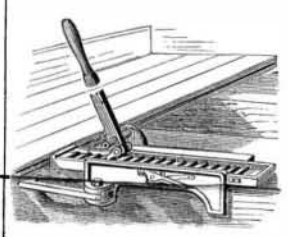
Improved Calipers.

The calipers shown in the engraving are for ascertaining the circumference, area, and weight of bars, rods, balls, etc. They are formed with two curved pieces, which are pivoted to each other, and are provided at their free ends with shanks, the inner edges of which are in radial lines drawn from the center of the pivot uniting the two curved pieces. If the diameter of a rod or bar is taken between the base ends of the shanks, the points of the shanks will show the circumference, or fractions thereof, of the said rod or bar. These calipers can also be used to ascertain the weight of bars, rods, tubes. On the free ends of the pieces, A (Fig. 1), shanks, B, are formed, the inner edges of the shanks being on radial lines from the center of the pivot by which the two pieces are pivoted to each other. Notches, *a*, are formed in the inner edges of the shanks, B, at this base, and notches, *b*, are formed in the inner edges of the shanks at the upper ends. The outer prongs formed by the notches, *b*, indicate the circumference of bars, etc., the diameter of which is taken between the shanks at the lower prongs, *e*. The shanks are provided with a scale used as a gauge for rods bars, etc., to measure the diameter, and for the purpose of ascertaining the area in square inches of a cross section of rectangular bars. The calipers shown in Fig 2 have short, tapering shanks, each of which has a V-shaped notch, *n*, in its inner edge, near the base, which notch has its sides at an angle of sixty degrees, so that the notch can be used as a gauge for grinding the edges on tools, for threading screws, etc. The ends of the shanks of the calipers shown in Fig. 2 are flattened and pointed, and are provided with a transverse mark, *o*, which shows three-eighths circumference of a bar or rod held between the bases of the shanks. At the ends of the shanks one-half circumference is shown, and at the lower corners, *l*, formed by the notches, *n*, one-third the circumference is shown. This invention has been patented by Mr. Andrew Nimmo, of Bristol, R. I.



New Floor Plank Clamp.

The engraving shows an improved device for pressing floor planks together before nailing them to the beams. The device consists of a frame containing a sliding rack plate, the end of which can be pressed against the edge of the end plank by means of a pivoted lever having a pivoted pawl engaging with the rack. The frame is provided with two laterally swinging arms having prongs which can be driven into the beam for holding the frame in place, and the frame is also provided with a pawl lever for automatically locking the sliding rack plate in place on the frame. This useful invention has been patented by Mr Grafton H. Duvall. For further information address B. Thomas, 117 Market St., Philadelphia, Pa.



A Novel Experiment in Silk Weaving.

That hand loom weaving is doomed is a fact too well known to require any further remarks. There is less of it left in England than abroad, though many people would be surprised to hear of the number of hand looms still going in this country, and we fear we should run the risk of being put down as, we will say, inventors, if we stated how many hand looms are still working on cotton ginghams within a radius of say five miles from our offices. But the greatest number of hand looms in Great Britain is running on some special classes of woolen goods, on carpets, and on silks, though all these are extensively made on power looms.

The perfection to which power looms have now been brought have made it not only possible but profitable to produce almost any kind of textile fabric on them, and their introduction abroad, though now not so rapid as some years ago, is making steady progress.

A branch of the trade which has long resisted the introduction of the power loom is the silk industry, partly, says the *Textile Manufacturer*, because the more costly material could afford to pay higher wages, and partly because the better classes of silks required such care in weaving that a power loom could only run at a slower speed, and thus, considering its expense, lose much of its advantage to the manufacturer. Plain silks have for years been woven on power looms in this country and abroad, but goods which required several shuttle boxes, a shaft machine, or a jacquard, could still hold their own on the hand loom. But even this stronghold is being assailed, and nowhere more vigorously than in its citadel, the town of Lyons, whose very existence is almost bound up with the silk trade.

Power looms have for some time been at work in several establishments of Lyons, but their extension has met with a difficulty which is produced by the very existence of a great number of hand loom weavers. Through the great ramifications of the silk industry at Lyons a considerable number of small masters have sprung up who employ two or more hand looms each in their own dwellings, and work for factors or merchants. These small masters are not the men to go into a mill to work before a loom, and their property, consisting of a certain number of hand looms, is also an item to be considered in any change in the trade. The extension of power loom weaving in the ordinary way means working in mills and the employment of women, and is thus antagonistic to a domestic industry carried on by a large number of small masters whose very existence depends upon the retention of existing arrangements inherited from the past.

Under these circumstances a number of the most prominent silk manufacturers of Lyons have tried to combine the two modes of working, and, as it would appear, with every likelihood of success. Their idea is to retain the hand looms for the present, to supplant them gradually by power looms, but to continue the existence of the small domestic establishments, for which purpose they intend to supply the small masters with power in their own dwellings derived from small gas engines.

To test the matter in a practical way, rooms have been taken in a central situation, with two gas engines, one of half-horse and one of one-horse power. The latter drives six power looms, two with jacquard and four with shafts, while the former gives motive power to four converted hand looms, one with jacquard and three with shafts, and also to a pirn winding machine. This trial has now been carried on for more than a year, and we see in a report of the manager that it has been crowned with every success. The power looms have done what could be expected of them, running from 90 to 180 picks per minute, and producing per day an average of 19 yards of satin, or 19,000 yards per year of 250 working days for four looms, the wages paid being about 3d. per yard. The converted hand looms turned out only about eight yards of satin, but they could be attended to by girls instead of men. To favor the experiment, the gas company made a reduction in the price of the gas, charging only about 2d. per cubic meter, upon which basis the one-horse engine, working 296 days, cost 2s. per day for gas. It is not our intention to reproduce here all the items of calculation of the report in question, which, moreover, is not sufficiently complete for our readers to examine satisfactorily to themselves, but we may mention that the interest of the manufacturing community of Lyons has been sufficiently awakened when we state that during the year this trial establishment has been visited during four hours per day, set aside for that purpose, by 200 manufacturers and over 3,000 operative weavers. It would thus appear that it may be of advantage to supply the small masters with gas engines, and thus gradually to introduce power looms, which meets with so much less difficulty in a town like Lyons, where people live in flats, and where, of course, the houses are larger and stronger and more adapted to the introduction of power than most of the cottages would be with us. The matter is, however, of sufficient importance to be called a complete revolution in the silk trade, and one more significant than many other revolutions which have been originated in the French capital of the silk industry.

Progress of Cotton Seed Oil Manufacture.

Among other interesting statements by Professor Goode, United States Commissioner to the International Fisheries Exhibition, was one that the "sardine" manufacture of Maine was of a yearly value of $825,000, the sardines being young herrings packed in cotton seed oil. At the Cotton Seed Crushers' Convention held in Chicago, June 26, 27, and 28, the president stated that there were 85 cotton seed mills in operation in this country, crushing, the last season, 554,600 tons of seed, and there were exported an average of nearly 13,000 barrels of oil yearly, each barrel having a capacity of forty-five gallons. On account of the complaints of olive oil makers in Spain, the Spanish government had imposed a duty that renders the shipment of cotton seed oil to that country unprofitable. In this country cotton seed oil is largely used for cooking purposes, taking the place of lard. It is known as "olive butter," although no attempt at concealing its actual character is made. At the convention a physician and chemist of Chicago exhibited specimens of cotton seed oil which had been deprived of its natural gluten and paraffine, and was equal to the best lubricating oil, having been tested on sewing machines and on watches. The commercial, domestic, and manufacturing value of cotton seed is rapidly increasing. In 1876 there were only twenty-four crushing mills running in this country; now there are eighty-five, and next season there are to be one hundred and ten, even if the number of those now projected should not be increased.

Manufacture of Date Sugar in Bengal.

The supply of coarse brown sugar or molasses in Bengal is mainly derived, not from the cane, but from the date tree, and the date plantations have, during the last fifty or sixty years, enormously increased over several well known districts—Jessore, Burdwan, Baraset, and Nuddea.

The trees are planted in rows or clumps, and are not grown for fruit, as in Arabia or Beluchistan; but the tree becomes profitable after seven years' growth, and may continue to yield a return for thirty or forty. In the month of October the ryots are seen ascending their date trees, and making incisions on alternate sides, in alternate years, on the lowest branch of the feathery tuft at the top. An earthen pot is placed under each incision, and when the cold nights begin, the liquid flows slowly into the pot beneath, whence it is removed in the morning. The colder and stiller the weather the greater the flow of juice. Rainy weather, such as now and then interrupts the enjoyable climate of the cold season, stops the flow of juice for a time, but the process goes on, with few intervals, between November and March. The juice is boiled down and clarified by means of a coarse weed that grows in almost every tank, and the whole cultivation is highly remunerative. The spaces between the trees in a date plantation are turned to account otherwise, for early rice and for the second crop of mustard. Many substantial ryots own 400 to 500, and even 1,000 of these trees, and the traffic in *goor* or treacle adds life and animation to the interior of Bengal.

Blood at $31.25 per Ounce.

Edward Banks, a colored man, has begun suit in the Sixth District Court, this city, before Justice Kelly, against Dr. Henry J. Garrigues and Charles J. V. Okerberg, for $350, as the value of eight ounces of blood taken from Banks and injected into the veins of Mr. Okerberg. It appears that on February 7 last this gentleman went to bed in a small, close room, blowing out the gas. In the morning he was found insensible. Dr. Garrigues and Dr. Frederick E. Valentine treated him, and at the suggestion of the former the operation of transfusion was performed. The patient recovered, and now Banks, who furnished the material for the operation, claims what he considers a fair compensation.

The Earth more Rigid than Steel.

Professor Sir W. Thomson in his new treatise on natural philosophy is led, by a consideration of the necessary order of cooling and consolidation of the earth, to infer that the interior of our world is not, as commonly supposed, all liquid, with a thin solid crust of from 30 to 100 miles thick, but that it is on the whole more rigid than a continuous solid globe of glass of the same diameter, and probably more rigid than such a globe of steel.