A BICYCLE FRAME REINFORCE.

The illustration represents a means of strengthening bicycle frames, designed to enable them to withstand more severe strains on the parts where the severest stresses come, while the total weight may be lessened. The improvement has been patented by Ferdinand F. Ide, and is being introduced by the F. F. Ide Manufacturing Company, Peoria, Ill. It consists of a novel form of reinforcing sleeves to be fitted snugly on the parts of the frame tubes where the greatest strains come. Each sleeve has on opposite sides elongated

IDE'S BICYCLE FRAME CONSTRUCTION.

tongues, which taper gradually and become thinner toward the points. The tongues and sleeves are brazed to the frame tubes, and are designed to take up the strains transversely or widthwise, thus providing the requisite strength at the desired points. The tubes of which the bicycle frame is constructed, which have heretofore been of uniform thickness throughout, may be made much lighter when this reinforce is applied at the points where the greatest strains come.

Notes on Acetylene.

The following notes on acetylene are extracted from recent technical journals:

Acetylene gas is being experimented with in Paris as a means of lighting omnibuses, says the Progressive Age. The gas generator, weighing about 26 pounds, is placed upon the back platform, under the stairway leading to the top seats. This generator will produce about one cubic meter of gas from one charging; but, as recent photometric measurements make the acetylene gas give about fifteen times more light than ordinary gas, this amount provides sufficient light for one trip. The gas is produced from water and calcium carbide, the generator being so arranged as to furnish the gas in a manner exactly proportioned to the consumption under a pressure of only 5·2 inches of water. The light is sufficiently bright to admit the reading of newspapers, and there is no odor. The new light has been too recently introduced to permit any close estimates as to its actual economy, but the cost is said to be less than that of light from petroleum lamps. The electric accumulators previously tried weighed 275 pounds, and the sulphuric acid solution employed was easily spilled and gave trouble.

Some experiments recently completed by Messrs. Berthelot and Vieille, says the American Gaslight Journal, show that considerable precautions are necessary in dealing with acetylene, particularly in the compressed state. The gas in question is an endothermic body—that is to say, a quantity of heat is liberated on decomposing it into its constituents, hydrogen and carbon. Reasoning on this basis, the experimenters determined to try whether the gas could not be detonated by means of a cap of fulminate of mercury. This proved possible, though at atmospheric pressures the explosive wave did not proceed throughout the body of the gas, the decomposition being limited to the immediate neighborhood of the detonation. When, however, the gas was compressed, the experiments showed that it might prove a dangerous explosive. In fact, it was not then necessary to use a detonator, as it was found that the mere heating of the gas by an incandescent platinum wire was sufficient to cause an explosive decomposition of the acetylene. Average figures from a number of experiments made with different degrees of initial compression showed the following rises of pressure:

Initial Pressure Lb. per sq. in.	Maximum Pressure Observed on Explosion. Lb. per sq. in.	Ratio.
31·7	138·7	4·4
49·4	271·0	5·5
85·1	600·0	7·0
160·0	1,312·0	8·2
301·0	3,028·0	10·1

On opening the steel test tube after an experiment, it was found to be filled with a mass of finely divided carbon agglomerated together by the increase of pressure. The rise of temperature at the moment of explosion was considerable, and in the case of the last of the experiments, referred to above, amounted to as much as 2,750° C. It was, moreover, found possible to detonate liquefied acetylene in the same way, a pressure of over 35 tons per square inch being then attained. The explosion was started, as in the previous cases, by means of a white-hot platinum wire. Dropping a bottle of the liquefied gas, or allowing a heavy object to fall on it, proved insufficient to detonate the mixture, although when the bottle was broken by the weight a violent explosion occurred. This, however, arose from the combustion of the gas, and thus differed materially in nature from the experiments previously made, in which the acetylene was merely resolved into its elements.

Devices of Prisoners for Communication With Each Other.

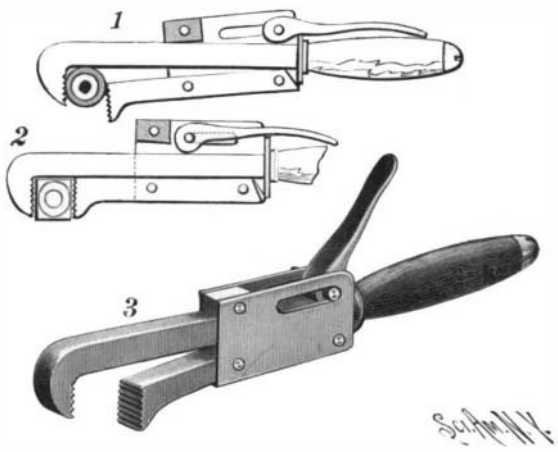
Some of the ingenious tricks resorted to by the inmates of jails and reformatories to hold communication, contrary to the rules, with their fellow prisoners are thus described in an article on prison life in The Hospital (November 14):

"The prisoners . . . make every conceivable effort to hold intercourse of some kind with their fellow culprits, if only to relieve the silence and solitude—intolerable to persons of their class, who have not sufficient cultivation of mind to supply them with food for thought. . . . Knocking on the walls of separation between the cells, scratching sentences on the sides of the baths or the bottom of the tins used to contain their gruel, and many other devices of that inadequate nature, are instantly detected and stopped by the officials. The chapel is perhaps the most favorable ground for enabling them to let their presence at least be known to acquaintances who have been incarcerated at an earlier or later period from themselves. The male and female prisoners are, of course, rigidly separated during the services. A high and strong wooden partition divides the portion of the building they respectively occupy, but they do not allow this serious obstacle to deter them altogether from the communications they specially desire to hold with the opposite sex. In singing the hymns they often try to introduce words of their own, or make very peculiar responses, which can be understood over the wall. A male prisoner will be afflicted with an extremely bad cough, which, in measured attacks, makes known to a lady friend on the other side that he is 'in quod;' but he is seldom oppressed by this bronchial malady on more than one occasion, since the governor informs him that, as his cough is so distressing, he is to remain in his cell and not be exposed to the air of the chapel until he is better—a cure for his complaint which is at once perfectly complete. On the female side of the partition a woman permitted to take her infant, born in prison, to chapel with her, pinches the unfortunate mite till its shrill yells reveal her proximity to its father attentively listening through the wall.

"Recently the governor of one of our county prisons was greatly perplexed by the discovery that the female criminals in his charge managed in some mysterious manner to ascertain the presence of every individual man on the other side of the impervious dividing barrier. One of the women inadvertently let drop the fact that she had recognized her husband, whose position there must, according to rule, have been completely unknown to her. None of the officers could account for an unpermitted knowledge which was found to be shared by all the other women. At last a very careful examination of the chapel gave an explanation of the mystery. Although strictly divided, as we have said, both the male and female prisoners faced the altar in their seats, and over it had been fixed a very large brass cross against the wall, so highly polished as to form a very good mirror. In its clear surface the women saw the reflection of every man as he passed to his place, and had enjoyed the spectacle with impunity, till a wife, much interested in the appearance of her spouse, had made an imprudent remark to one of the officers, which revealed the fact. The brass cross instantaneously disappeared, and the blank wall behind it no longer tells any secrets."—The Literary Digest.

A NOVEL WRENCH.

The tool shown in the engraving is adapted for use either as a pipe wrench or a monkey wrench, and has a novel and convenient adjustment for the movable jaw. It forms the subject of a patent recently issued to Murat K. Flye, of Sharpsburg, Texas. In Fig. 1 it is shown in use as a pipe wrench and in Fig. 2 as a monkey wrench; Fig. 3 representing the improvement in perspective. The shank of the movable jaw is connected to the main shank by a yoke whose side plates have longitudinal slots in which is movable a cam lever, and when the latter is at the rear end of the slots, the wrench is especially efficient as a pipe wrench, the yoke then having a rocking movement, which is facilitated by the beveled rear end of the movable shank. The parts are in the position shown in Fig. 3 when the wrench is to be adjusted to a pipe, the throwing down of the cam lever then bringing the jaws into

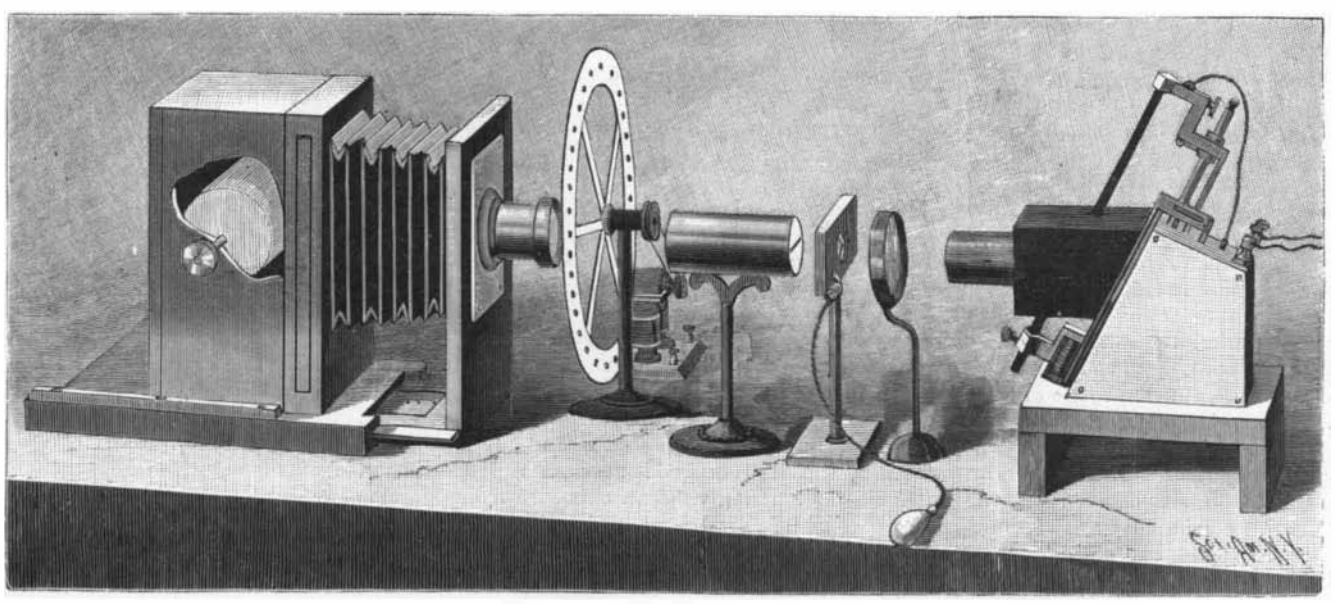


FLYE'S IMPROVED WRENCH.

closer engagement. With the cam lever shifted to the forward end of the slots, as shown in Fig. 2, the sliding shank is brought close to the main shank, and, after adjusting the wrench to a nut, the lever is thrown down, clamping the movable jaw in place, with both jaws at right angles to the body of the wrench.

METHOD OF MEASURING THE SPEED OF CAMERA SHUTTERS.

Captain W. de W. Abney explained before the Camera Club, of London, a short time ago, his method of measuring the speed of photographic camera shutters, which has special advantages as regards accuracy and facility of record, brought about in a somewhat novel manner. In a report of his lecture, which we extract from the London Amateur Photographer, are several interesting facts. The lecturer pointed out that it was quite as important to know whether we were giving an exposure of say $\frac{1}{20}$ or $\frac{1}{60}$ of a second as one of 5 or 15 seconds. The apparatus enables us not only to measure the time of exposure, but also causes any kind of shutter to draw its own diagram, and from this diagram several things are made known, e. g., how long it took to open, and to close, and how long the working aperture of the lens was fully open, etc.—



APPARATUS FOR MEASURING THE SPEED OF CAMERA SHUTTERS.

three points of very great practical importance. The apparatus employed is somewhat as follows:

A source of light; in this case the electric arc, but magnesium can be used: the essentials being a steady and strong actinic light.

A supplementary positive lens. This is so placed that it throws an image of the carbon points upon the lens in the front of the camera.

The electric arc lamp will be noticed at the right hand of the end of the engraving, which projects a beam of light upon the condensing lens supported on a stand, and this in turn concentrates the beam upon the shutter to be tested, which is held in an upright stand next to its left. The actuating bulb of the shutter will be seen upon the table. Different makes of shutters can be held by this stand. The stand next on the left supports a spectroscope tube without any lens, having the slit two inches long by $\frac{1}{10}$ of an inch wide, in a horizontal position. A cardboard with a slit cut in it, inserted in the tube, answers as well as the regular slit. The condensing lens is adjusted with reference to the light so as to fully cover the whole of the horizontal slit. The motion of the shutter is in the direction of the length of the slit in the card.

At the left of the spectroscope stand is a rotating circular cardboard disk divided into six sector openings divided only by a narrow radial bar. The apparatus reminds one of a wheel with only six spokes. Along the rim are punched out a series of small holes, equidistant. Six of these holes correspond to each sector opening, so that there are thirty-six holes in all. The apparatus is made to revolve (about its center) in a vertical plane just in front of the lens of the camera, and as each spoke of the wheel passes in front of the lens, and is parallel to the slit in the tube, it intercepts the light. The wheel is made to revolve at a uniform speed by a small electro-motor which will be seen to the left of it. It is important to know the wheel's rate of revolution. This may be done in two ways. First, by blowing air through a small tube perpendicular to the plane of the sector, and just opposite the row of the thirty-six holes, it becomes (effectively) a siren. The pitch of the note gives the number of air puffs passing through the holes, and so the rate of revolution is known. For example, suppose the air puffs gave a note agreeing with a tuning fork which was known to vibrate 720 per second, we should know that 720 air puffs had passed through the tube and holes opposite in a second. Dividing this number by the number of holes in the rim, viz., thirty-six, we get twenty complete revolutions per second, and since there are six spokes in the wheel, one spoke would follow its neighbor in front of the lens in $\frac{1}{120}$ of a second.

A second method, and the one employed on this occasion, was that of pressing into our service an old turnstile counting apparatus. This was attached to the axis of the revolving sector, and its index watched for a set time, say 10 seconds, the number read off and divided by 10 to give the number of revolutions per second.

Behind the sector wheel is seen the lens and camera arranged in the same plane with the other parts of the apparatus, having a special chamber in the rear, holding a metal drum five inches in diameter, extending transversely across the interior of the camera to its full width. The drum turns about a horizontal axis that is parallel to the slit in the spectroscope tube and perpendicular to the optic axis of the line of the apparatus. One end of the axis projecting through the side of the camera has a pulley disk on the end. The cylinder may be seen through the broken portion of the camera. The camera lens is adjusted to throw a sharp image of the slit in the spectroscope, upon the center of the surface of the cylinder in the camera. The cylinder is covered with a strip of sensitive (e. g., bromide) paper held in position by elastic bands.

In place of the cylinder of bromide paper a circular sensitized glass plate can be fixed in a vertical plane in the back of the camera and made to rotate or whirl at a given speed, the flashes of light through the slit impressing it in the shape of radial lines, their number determining the rapidity of the shutter.

If now light from the lantern passes through the slit lens, etc., on to the front of the revolving paper on the drum, it would trace on the paper a rectangle image of the same width and length as the slit, the vertical length depending upon the rate of the drum revolutions, i. e., how much paper turned past the image of the slit. If the sector be set revolving, every time a spoke or bar came in front of the lens it would cut off the light while it was passing. On developing the paper we should have a dark rectangle crossed by bars of light corresponding to the transits of the spokes. Suppose now the shutter to be of that form which causes a rectangular opening to pass in front of the lens. As the beginning of the opening was commencing to travel across the slit we should get an image of a portion only of the slit formed on the front of the revolving drum, and similarly as the opening commenced to close it would cut off more and more light from the slit, and so on, the image dwindling from a line to a point.

In Fig. 3 we have some such result. If we suppose the drum and sector to be stationary, we should get an image of the slit as a straight line as H_1H_2. If the drum revolved and the sector was stationary, this straight line would be drawn out into a rectangle. If the sectors revolved, we should find this interspaced with clear parts, but suppose the shutter to commence slowly opening at the end H_1, and go on until the whole slit H_1H_2 were fully covered by light for a time and then begin to close up again from H_1 toward H_2, the sector and drum revolving at the time, we should have some such figure as N M K L. The triangular part, M M′ N, corresponding to the time the shutter took to get fully open, the rectangular part, M M′ L L′, being the time that it remained fully open, and the triangular part, L L′ K, the period of closing. On further examining this diagram we note two complete bar spaces, and a little portion outside each, together equal to about that between two clear spaces. If now the sector were revolving at the rate above supposed and described, i. e., $\frac{1}{120}$ second between each bar space, we should say that the shutter took then something between two and three such intervals to open, say, $\frac{1}{60}$ to $\frac{1}{40}$ second to get fully open; remained fully open about two spaces, i. e., say, $\frac{1}{60}$, and closed in a little more than one space, $\frac{1}{120}$ to $\frac{1}{100}$ second. The ideal or theoretical perfect shutter is one which takes no time to become fully open and to close as quickly, but as this is as yet not a practical thing, we have to accept this as a mental conception, and compare the actual performance of any shutter with it by contrasting its practical efficiency with its theoretically possible efficiency; we thus need but compare the area, M M′ L L′, i. e., the period of full opening, with the corresponding area, N N′ K K′, i. e., the base, N K′, with base, L M′.

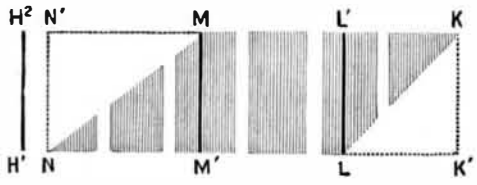


Fig. 3.

In Fig. 4 we have two other diagrams yielded by shutters opening and closing at the center. The areas inclosed by the dotted lines correspond to the ideal unit of efficiency. We can see at a glance that the A shutter is much more efficient than the other, i. e., B form, which latter takes quite a comparatively long time to open as compared with the time it is fully open, but closes quicker than it opens. Examination of many shutters has led the lecturer to the conclusion that very few of them had more than about 65 per cent efficiency.

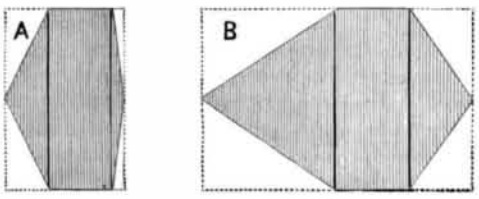


Fig. 4.

When working the apparatus as above described, when the speed of the sectors and bars was a knowable quantity, there was no necessity to measure the speed of the revolving drum. All that was required was a fairly steady motion, and that it be fast enough. This the lecturer easily attained for the demonstrated experiments by revolving the projecting axis by means of the fingers or a piece of string in the same way that one may cause a top to spin. If, however, the measuring of the speed of the sectors be a difficulty or objection, the following device may be substituted: a vibrating (tuning) fork of known frequency has attached to one of its arms a small reflecting mirror, which throws an independent point of light through the lens on to the face of the drum. When the fork is made to vibrate and the drum to revolve, the light from the small reflector traces a wave curve, and since the frequency of the fork's vibrations are known, this wave curve forms a time scale alongside the slit diagram. Examples of this method were shown upon the screen.

Numerous examples were shown and explained, one especially demanding mention being that of a shutter which, when set at a rather slow speed, gave a fairly satisfactory record of its performances, but when set at a higher speed clearly betrayed the fact that it rebounded to such an extent that a slight secondary exposure was made. Under such circumstances obviously it would not be likely to yield satisfactory negatives. This shutter acted satisfactorily at about $\frac{1}{35}$ second, but when its speed was about $\frac{1}{60}$ or $\frac{1}{70}$ the rebound exposure rendered it useless. A drop shutter, with elastic band, giving an exposure from start to finish of about $\frac{1}{100}$ second, yielded a diagram similar in shape to that in Fig. 3, but the time during which it was fully open was only about $\frac{1}{300}$ second. Generally speaking, the smaller the stop, the higher the efficiency.

Bicycle Notes.

Verdi is trying to eclipse Cato's feat of learning Greek at eighty by riding a bicycle at eighty-two.

Of 28,000 applications for patents in England so far this year, more than one-third are for improvements in bicycles.

It is reported, says Uhland's Wochenschrift, that the pneumatic tires for the bicycles used in the French army are now to be made of leather.

The average pedestrian moves about thirty inches at each step. The wheelman mounted on a bicycle of average gear covers about 8½ feet at each downward movement of the legs, which makes half a revolution of the pedals.

The city of Kobe, Japan, has issued a set of regulations governing the use of bicycles in its streets. They are much the same as those adopted in this country, except that riding for pleasure is prohibited after dark. One may ride on business, provided he goes slowly and carries a lantern.

Ripley Church, southwest of London, is being turned into a sort of bicyclists' Westminster Abbey. It has now a memorial window to H. L. Cortis, who held a number of records a dozen years ago, and another window put up by cyclists to the memory of the hostesses of the Ripley Inn.

Lady bicyclists have begun to utilize their discarded bicycles for ornamental purposes. When a bicycle has had its day it is dismembered, limb from limb, and the parts hung up on the drawing room wall. On nails that once supported china brackets, over doors where fans held position, all the remains of the old cycles are displayed to view.

A foolhardy feat has been performed by a young cyclist at Atlanta, Ga. He rode a bicycle down an inclined board platform two feet wide from the top of a high building into the waters of the adjacent lake. Four men held the machine while he mounted, and at the word "go," he was sent off, and in an instant shot into the water, going over the handlebars of his machine. Both rider and bicycle were fished out in good condition.

The most stupid anti-cyclist law, and there have been many of them, says the American Wheelman, is reported from Austria, where, in the district of Neustadt, the gendarmes have been arresting all cyclists riding in daytime without lanterns. The cyclists of Vienna, the most progressive wheelmen in the empire, where the sport is not yet free from many vexatious restrictions, fomented the most active resistance to the law. A leading journal of the city called on the 20,000 riders of the captial to visit Neustadt en masse and, by compelling thousands of arrests, to show the stupidity of the law.

Chainless bicycles, in which two pairs of bevel gears are used instead of the chain, are reported to have proved their superiority over the present style of wheel in a test, in which a wheel was run thirty-nine thousand miles without adjustment or appreciable wear, says Engineering News. "Dynamometer tests also show that the bevel gears run with less frictiou than the chain. It is stated that one of the largest manufacturers will soon put these wheels on the market. An obstacle to their rapid introduction is the time required to construct the machinery necessary for turning out the bevel wheels, which must be mathematically accurate in form."

A duel on bicycles was fought in the Boulevard Ney, Paris, recently, says the Westminster Gazette. A large party of young fellows had been out cycling all day and were returning home, all very hilarious, when two of them quarreled, and they decided to settle the dispute by a duel with swords on their bicycles. The two combatants were placed fifty yards apart and then ordered to charge. They rode at one another at a furious pace, but overshot the mark and failed to meet. Wheeling quickly round, they returned to the charge, and this time came together with a terrific shock. Both were thrown, while the seconds, who were following behind also on bicycles, fell in their turn, and both were injured. Neither of the combatants touched the other with his sword, but, in falling, one ran his weapon into himself, and his opponent injured his leg.

A military tandem bicycle has been designed by an officer of our army and is illustrated and described in the Journal of the United States Artillery for November-December, by Lieut. William C. Davis, U.S.A. The feature of the device is the absence of sprocket and chain. The two riders sit directly over the front and rear wheels respectively, and the crank axles are geared up to the proper speed by a suitable mechanism in a gear box on the axle. This is a simple epicycle gear, giving two revolutions of the wheel to one of the axle. The front or steering wheel is analogous to the "geared ordinary," and the two wheels are connected by a Humber frame. The gearing is in a dustproof gear box, and is oiled through the hollow axle; the frame may be hinged to make it more portable, and the weight of this bicycle need not exceed 40 pounds for the roughest service. It is designed to carry two riders and 40 pounds additional weight of equipment. The same article describes a number of bicycles designed for military use in the French and German armies, but all of these have chains.

Recent Archæological News.

It is said that an unknown ruined city of large area, with two temples and two pyramids, has been discovered in the state of Gurrero, Mexico, by Mr. William Niven, a well known mineralogist.

Gross vandalism has destroyed some interesting Druidical remains on Dartmoor. The stone avenue at Bel Tor corner on Sherburton Common and many "hut circles" and "menshirs" have disappeared. The stones have been broken up by contractors to furnish material in mending adjacent roads.

In one of the chief squares of Patras some important sculpture and an ancient mosaic pavement have recently been discovered. The most important piece is a statuette which is undoubtedly a copy of the Athene Parthenos of Phidias. The head and arms and part of the shield are missing, but it is hoped they may be found on further excavation.

A heathen burying ground, with giant skeletons, was recently dug up at Mitterndorf, in the Austrian Salzkammergut. Many of the bodies were six feet seven inches tall: they were all buried with the feet to the east, each inclosed in a circle of stones, with a stone under the head. Large earrings and finger-rings were found on them, and one skeleton held a knife in its hand. No signs of Christian burial were discovered.

A new "Survey of London" is being prepared, under the editorship of Sir Walter Besant, which will give an account of every important building, institution, and company in the whole of Greater London. It will contain a history of the city, its trade, political power, and customs, and will be a complete record of its condition at the end of the nineteenth century. The book will be in eight quarto volumes, fully illustrated, and will be published by the Blacks.

Cornell University, which for some years has had the finest archæological museum of any American university, has just added to it a collection of rare specimens of ancient Greek pottery, showing the development of the art from the beginnings about 1500 B. C. to its perfection about 450 B. C. These were purchased for the university by Prof. B. I. Wheeler while in charge of the American School at Athens last year. A collection of ancient Greek coins, bought from the same appropriation, has not yet been catalogued.

The London Society for the Protection of Ancient Buildings has written to Lord Cromer concerning the defacement of Nile scenery in consequence of the blasting operations now being carried on for the purpose of obtaining limestone for the embanking of the river. The petitioners point out that although stone has always been obtained from the cliffs of the Nile, yet the ancients never procured it in the present wasteful manner, and suggest that certain spots should be selected to take the stone from, and that in future the quarries should be driven into the rock, instead of prominences being blown away.

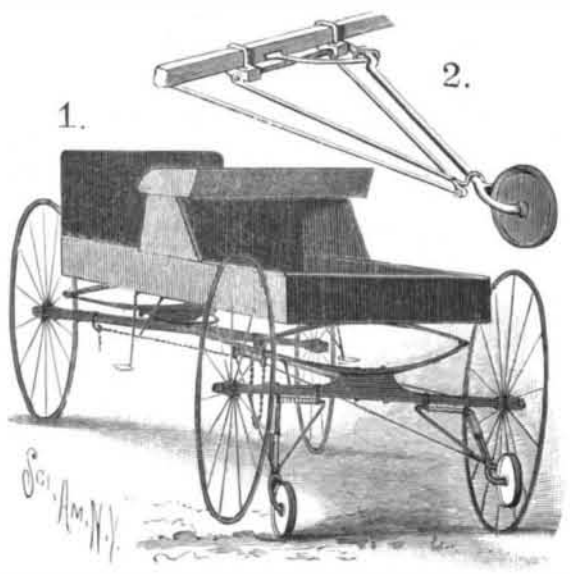
At a recent sitting of the Academy of Inscriptions, a letter was read from M. Gaukler, Director of Antiquities in Tunis, reporting the discovery at Susa of a well preserved mosaic, the central figure in which is believed to be Virgil. Dressed in a white toga with blue border, he has on his knees an open papyrus containing the eighth line of the first book of the Æneid. The Muse of History and the Muse of Tragedy, standing on each side, are listening. The central figure, beardless and with short hair, agrees with ancient miniatures of Virgil, the only portraits hitherto known. The mosaic is thought to be a contemporary copy of some celebrated work, perhaps of one of the vignettes mentioned by Martial. The Academy showed great interest in this discovery.

The Norwegian traveler, Sven Hedin, has contributed to a German journal, Globus, an interesting account of his journeyings in Central Asia, in the district north of the Kwenlung Mountains. Ruins of large towns were discovered which have been buried by successive sandstorms spreading over a thousand years; hence very modern from a Petrie point of view. Separate houses were uncovered of very fragile construction, consisting of wooden pillars, while the walls were put together of plaited reeds covered with mud. The latter were rendered at once impervious and suitable for decoration by being coated with white plaster. Drawings were discovered on these walls, and well executed, of human figures, horses, dogs and flowers, and, judging by the copies which have been brought back, of no small artistic merit. Small figures of Buddha were also dug up, as well as various fruit trees, which told a tale of the bygone days when this arid surface was once made fertile by the waters of the river Kerija.

Dr. Dörpfeld, in one of his recent lectures in this country, expressed the opinion that the latest archæological explorations in Greece, richly rewarded as they have been, instead of exhausting the field, have, as yet, barely made a beginning in the work of bringing to light what Greece has to offer in the way of archæological information, says the American Architect. So far as the classical period of Greece is concerned, Delphi, Olympia, and the cities of Asia Minor have still much to show, but the greatest discoveries are probably to be made in the ruins of the prehistoric period, at Mycenæ, Argos, Medea, Orchomenos, and other places. The remains of ancient Argos, which, according to the legend, was built by seven one-eyed giants from Asia, have hardly been touched, and, after the discovery of the body of Agamemnon amid the ashes of his palace at Mycenæ, it would be hard to say that the bones of Jason, if not, indeed, the talking prow of the Argo, may not be exhumed in the more ancient city, which, even in historical times, showed the tomb of Ariadne. It seems to be settled that the inhabitants of Argolis at the Homeric period were ignorant of the use of writing, thus confirming the ancient tradition, that the poems of Homer were not written, but handed down by verbal repetition for many generations before they were committed to writing; and everything that can be learned about the people who have for three thousand years been regarded as demigods and heroes is doubly interesting, not only as an addition to the legends which have made Jason and Medea, Orpheus, Æsculapius, Theseus, Castor and Pollux, Admetus and Atalanta, and the other Argonauts, nearly as familiar to us as they were to the Roman youths two thousand years ago, and to the Greeks a thousand years earlier still, but as a contribution to the early history of the human race.

A VEHICLE RUNNING GEAR ATTACHMENT.

To facilitate the making of short turns with a vehicle is the object of the improvement shown in the accompanying illustration, according to which two small wheels or casters arranged beneath an axle may be made to engage the ground and lift the main wheels, so that the distance between the wheels supporting the axle will be diminished. The improvement has been patented by Archie D. Blodgett, of Berlin, N. H. Clamped to the rear axle are clips with bearing plates in which are held two horizontal shafts, each carrying



BLODGETT'S VEHICLE RUNNING GEAR.

at one end a vertical shaft and at the other end a downwardly extending brace, the lower ends of the braces having bearings for the lower ends of the vertical shafts, and each of the latter carrying a caster wheel, as shown in Fig. 1. Springs connected with the vertical shaft tend to keep the axes of the casters transverse to the reach and springs on the horizontal shafts tend to throw the vertical shafts rearward and upward, away from the ground. Rigidly held on the under side of the reach is a guide plate, on each edge of which is a slide co-operating with an arm carried by a thumbscrew in the sides of the reach, the arms swinging to allow the slides to move freely or hold them at the limit of their movement. Projecting downward from each slide is an arm, and both arms are connected by rods with the bearings of the shafts near the casters, the arms being adapted to be locked, to be moved in unison, and being also connected by chains to each side of the front axle. The arrangement is such that, as the vehicle turns to the right, the left hand chain will be drawn on, moving the left hand slide, and swinging the corresponding vertical shaft downward, when its caster engages the ground and lifts the left hand main wheel. When it is desired to have both the casters engage the ground, the slides are connected with each other by a locking bolt, when both casters will engage the ground as the vehicle turns in either direction. Fig. 2 represents a modification of the improvement in which the use of the spiral springs is avoided, and spring arms carried by the rear axle are employed, the modification being more especially adapted to vehicles in which it is inconvenient or undesirable to attach the rods to the reach.

DOMESTIC fowls have two diseases of a diphtheritic nature, according to a report of M. Gallez to the Belgian Academy of Medicine. One is a contagious catarrh, called also morve, or fowl glanders, which is very contagious and fatal to hens and may give diphtheria to human beings. The other, though called fowl diphtheria, has nothing save the name in common with human diphtheria.

Science Notes.

Prof. Fresenius disclaims any confirmation of M. Barrière's alleged discovery of a new element, "lucium."

The tercentenary of the birth of Descartes was celebrated at Tours, recently, by the local archæological society.

The collection of fossils made by the late Prof. Sir Joseph Prestwich has been presented to the Geological Department of the British Museum by Lady Prestwich.

Dr. Roux has accepted a decoration from the German Emperor. Pasteur declined a similar honor, but the conditions were slightly altered in the present case, and Dr. Roux very properly did not decline the honor.

A magnificent daylight meteor was seen by Prof. Brooks at the Smith Observatory, Geneva, New York, on the afternoon of January 19, soon after sunset. It exceeded Venus in brilliancy and moved slowly southward across the eastern sky.

By thermo-electric methods Messrs. Holman, Lawrence, and Barr have recently fixed the melting points of the following metals: Copper melts at 1,095° Cent., silver melts at 970° Cent., platinum melts at 1,759° Cent., and aluminum melts at 660° Cent.

M. Levat has recently made a communication to the Paris Academy of Sciences on the tempering of steel in phenol. From comparative trials on the same steels tempered in water and phenol respectively, it has been found that the hardness and elasticity in the latter case was much greater than in the former.

In mediæval times rhinoceros horns were employed for drinking cups by royal personages, the notion being that poison put into them would show itself by bubbling. There may have been some truth in the idea, as many of the ancient poisons were acids, and they would decompose the horny material very quickly.

A bill to promote aerial navigation has been introduced by Representative Baker, of New Hampshire. It is proposed to give $30,000 to Prof. Langley, $20,000 to James Selden Cowden, of Virginia, and $20,000 to the War Department. There is little chance of such a bill being passed, and it is a question if public money should be used for such a purpose.

M. Gaston Tissandier, who, for the last quarter of a century, has presided over La Nature, our excellent French contemporary, has just retired from the editorship and M. Henri de Parville has succeeded him. The character of this model scientific journal will not be changed, and it is to be hoped that the high degree of success which has attended this journal in the past will continue to be enjoyed by it.

Krafft-Ebing, of the University of Vienna, according to the Medical Times, New York, enlivened his instruction lately by allowing a madman, one of his patients, to lecture on mental diseases in his stead. The man is afflicted by periodic attacks of mania, during which he is much more clever and witty than when sane. His lecture on "The Mental Condition of the Maniac in Periodical Attacks of Madness" was a brilliant success. After it was over he was shut up again.

The hot lakes district of New Zealand, covering an area of 1,000 square miles, is very actively and peculiarly volcanic. The particular attraction of the district lies in the changes that are continually taking place in it. Almost from day to day extraordinary transformations are worked by heat, fire and steam. The greatest of the volcanic mountains, Ruapehu, rises to a height of 9,000 feet, and one of the geysers is estimated to throw water and steam to a height of 180 feet, while the lakes, ponds and pools contain water of every degree of temperature.

The toxicity of the flesh of poisoned animals may easily prove a source of danger, and at a recent meeting of the Medical Society of Berlin, Lewin recounted some interesting experiments made to determine the toxicity of such flesh. Having given 20 centigrammes of strychnine to a fowl, he gave its flesh to a dog to eat. After the first 225 grammes the animal became ill; after a second portion it was seized with tetanic convulsions and died. The experimenter found that some animals are very tolerant of certain poisons, for example, fowls to strychnine, goats to hemlock, partridges to arsenic, rabbits to nicotine. He considers, says the Pharmaceutical Journal, that although animals may have ingested poisons without inconvenience to themselves, it may easily follow that their flesh will prove toxic to man if used as food.

Wm. Crookes, F.R.S., of thallium and radiometer fame, in lecturing on "Diamonds," at the Imperial Institute, says Knowledge, disclosed some interesting facts. He mentioned that the four principal mines (Kimberley) employed about eight thousand persons. From two to three million carats of diamonds were turned out in a year, and up to the end of 1892 ten tons of diamonds, valued at £60,000,000, had come from those mines. In 1895 there were found 2,435,541 carats of diamonds, realizing £3,105,958, at an expenditure of £1,704,813, and leaving a profit of £1,401,145. The largest known diamond, weighing 970 carats, was found at Jagersfontein mine, and was now being cut at Amsterdam. But even diamond mining has limitations, for Mr. Crookes said the mines were capable of yielding more, but they were limited to a certain output in order to maintain the price.