

**AN AMPHIBIOUS TRICYCLE.**

The "Amphibie" is the name M. Theodorides has christened his new nautico-terrestrial tricycle, which we illustrate herewith, and which has recently been tried in France.

The tricycle is constructed entirely of aluminum, with the exception of the chain and certain other parts which require the use of steel. The wheels have enormous inflated rubber tires, which give them a diameter of 3'83 feet, and which make each wheel a water-tight float, buoying up the machine on the water.

The tricycle can be used indiscriminately on land or water, and although it does not run very rapidly, it may be of considerable use in special cases.

It weighs but 66 pounds and sinks, when fully loaded, to a depth of only 12 $\frac{3}{4}$  inches. Our engraving shows very well the appearance of this curious machine while navigating on the water.

**Cheap Cab Service in New York.**

The General Carriage Company, of New York, is to be incorporated for the purpose of constructing and maintaining hacks or other vehicles for hire on the public roads, streets, or highways of cities of the first class, which, of course, means New York and Buffalo. The corporation has the right to establish the time service and the distance service, and to subdivide the latter into a mileage and circuit service. It can charge rates of fare not exceeding 75 cents an hour for each person in the time service, and not to exceed 25 cents per mile for each person for the mileage service, and not to exceed 25 cents a person on the circuit service. It is proposed to establish cheap cab service such as now exists in London and Paris. There is a great field for cheap cabs in New York city, and the electric vehicles which have been in operation there for a long time have won a deserved popularity.

At the sale of the Morrison cameos in London, a Greek gold ring from Tarsus with an intaglio of Bacchus was sold for \$1,150. Another ring with the figure of Bacchus brought \$925. The signet of Asander, King of the Bosphorus, from Kertch, brought \$2,300.

**Lord Charles Beresford and Automobile Cabs.**

Lord Charles Beresford in his recent trip to America pointed out how much Great Britain is behind the times in the use of electricity. He was amazed to see how much work was done by electricity on board American warships where the English use steam. He is a warm advocate of automobile cabs. He attributed

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the congestion of London streets to the use of horses. He said, "While I was in New York I was supplied with a motor car which had the appearance of a cab and the manners of a kangaroo, but it always got me safely to my destination."

**The Building Edition for May.**

The Building Edition for May is a beautiful number and its contents are more than usually diversified. A residence at Newark, N. J., forms the subject of the colored cover. It is a handsome brick colonial house built by Messrs. McKim, Mead & White. There are also a number of fine interior views of this house. The stable for the same residence represents a unique treatment of a problem which is often neglected.

There are a number of other interesting houses illustrated. The literary contents are fully up to the usual standard, the editorials being "An Architectural Symposium," "Equestrian Statues," "What to Do With Our Backyards," and "Architectural Education in the United States." There is also an excellent example of an old colonial doorway, reproduced from a measured drawing, and also an interior view of the Cathedral of Münster and the plan of the Palace at Düsseldorf.

**The Current Supplement.**

The current SUPPLEMENT, No. 1219, has many articles of great interest. The University of Pennsylvania Lecture Course is represented by the second part of Dr. Herman V. Ames' "Peculiar Laws and Customs in the American Colonies," which is concluded. "Wireless Telegraphy" is represented by an article which describes the Ducretet system. The usual notes and consular matter is published. "The Alkali Soils of the Yellowstone Valley" describes some very interesting investigations which have been carried on by the United States Department of Agriculture, in the interests of the inhabitants of this valley. "Electric Traction and its Application to Suburban and Metropolitan Railways," by Philip Dawson, is an important and exhaustive paper on the subject. "The Intelligence of Tropical Ants" is a most attractive paper by

Dr. Eugene Murray-Aaron.

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**RECENTLY PATENTED INVENTIONS.****Agricultural Implements.**

**HARROW.**—WILLIAM M. BAKER, Fortville, Ind. This harrow employs a series of revolving teeth in connection with rollers, the teeth being so mounted that, should one of them be broken, another may be readily substituted therefor. The depth to which the teeth may enter the ground may be regulated by plain rollers which are carried by hanger-arms. The adjustment of the hanger-arms regulates the depth to which the teeth enter the soil.

**Bicycle-Appliances.**

**BICYCLE-SUPPORT.**—BURR HUBBELL, Kelly's Corners, N. Y. The support has a column on which a body portion is mounted, provided with laterally-projecting lugs. A jaw is pivoted on the body-portion between the lugs, and, when drawn toward the body-portion, clamps the frame of the bicycle. A fork is attached to the body portion and engages the front wheel of the bicycle; and an arm held by the body portion engages the saddle-post tube.

**SADDLE.**—FREDERICK C. AVERY, 6104 Butler Street, Chicago, Ill. The object of this invention is to provide a saddle in which the seat will sustain all the weight and the horn no part of the weight. The horn is supported by an independent spring, and is made separate from the seat portion. The pommel-spring is attached to the middle plate adjustably; and the same bolt which secures the rear end of the pommel-spring also secures the front end of the seat-support connection. The saddle-cover not only covers the seat and extends forward to form the horn, but also lies over the sides of the saddle. If it be so desired, removable pads can be used between the seat portion and seat cover.

**Electrical Apparatus.**

**TELEPHONE-TRANSMITTER.**—EDWARD H. JOHNSON, Omaha, Neb. The transmitter devised by this inventor is designed to multiply the sound-impulses against the diaphragm so that they may be increased in the receiver. The transmitter comprises a diaphragm against which a ring of resilient material, a series of contacts on the ring, and another series of contacts with which the first-named contacts engage. The vibrations of the diaphragm will set the several rings in equal vibration; and the impulses will be generally multiplied through the contacts.

**Engineering-Improvements.**

**VALVE-OPERATING GEAR.**—AUSTIN H. KRAUSS, Wymore, Neb. Upon the engine-shaft a hub is secured having flanges, one of which is provided with a slot, extending diametrically. To the other two flanges a plate is fastened, which is provided with a slot controlling the position of the eccentric. The principal feature of the invention lies in the form of this slot, which is neither

straight nor the arc of a circle. The slot is divided into three parts, the central one of which is straight and the end portions curved. By means of this slot the eccentric may be adjusted to give the valve the desired lead for any amount of travel.

**Mechanical Devices.**

**FOLDING AND CREASING MACHINE.**—JOHN F. and JAMES A. CAMERON, Brooklyn, New York city. This invention provides a machine for folding, creasing, and cutting cloth into handkerchiefs before or after stitching. The machine is designed to take a bolt of cloth and to turn both edges over simultaneously, so as to form the folds necessary for stretching the edges, and to cut one edge so that it may be torn into designated lengths. The machine comprises folding-guides adapted to engage and fold the side edges of the handkerchief stock. A supporting-plate, which is cut away between the guides, permits the center of the stock to drop between them. Rollers engage and compress the folded edges of the stock.

**CRANE.**—ALEXANDER GRAFTON, Bedford, England. This crane is provided with a so-called "derrick-motion," for varying the radius of the crane by varying the vertical length of the jib. The improvement devised by the inventor consists in a means for indicating the radius and the load which may be safely carried at that radius. The means consist in the combination of the jib-adjusting gear with a dial and index, one of which is carried by a rotatable axis in gear with the chain-barrel or pulley, so as to be revolved thereby, the gearing being so proportioned that the rotary part will make less than one revolution for the maximum number of revolutions of the barrel or pulley required for adjusting the jib between the extreme limits employed in practice.

**Railway-Contrivances.**

**BOLSTER FOR LOGGING-CAR FRAMES.**—SURY PARKER, Pinetown, N. C. The bolster is provided with a standard movable on the bolster, extending above the surface thereof when in use, and below the top surface and out of way when loading or unloading. A retaining device holds the standard on the bolster, guides it in its up-and-down movement, and limits the sliding movement. The standards always remain on the bolsters, and can be readily lifted into an extended position and locked to retain the logs, or released to permit the lowering of the standards for loading or unloading the logs.

**Miscellaneous Inventions.**

**ACETYLENE GAS GENERATOR.**—JOHN CARLSON, Mandan, N. D. In this machine an ordinary bell-gasometer floating in a water-tank is used in connection with a generator. A valve-controlled pipe connects the water-tank with the generator, the valve being held normally closed by a lever. An arm is pivoted upon the bell and is adapted to engage the lever to open the valve when

the bell descends, in order to permit more water to reach the carbide, and thus generate a new supply of gas.

**DISPLAY-RACK.**—JOHN B. CROWDER, Talucah, Ala. This improved display-rack is especially intended for holding nails, brooms and tinware, and is provided with an upright or post having upper and lower rings. Nail-boxes furnished with broom-holders, are seated at their lower ends on the lower ring and have hooks engaging the upper ring. On the post, above the upper ring, a tin-holding frame is mounted.

**APPARATUS FOR SEPARATING AND RECOVERING VALUABLE VAPORS.**—JAMES R. WHITING, Stamford, Conn., and WILLIAM A. LAWRENCE, Waterville, N. Y. In the separation of air from the hydrocarbons known as the "lighter products of petroleum," while they are in a vaporous state, valuable products are lost by mixture with air. The inventor of the present process prevents this loss by employing a series of cooling-tanks and vapor-collectors by means of which the loss of the volatile products is prevented. These products, it is said, are recovered not only without detriment to the previous operation of evaporation and condensation, but assistance is rendered to the previous operations by removing from them all back pressure of this vapor.

**CLOTHES-PIN.**—MELVIN E. THOMSON, Clermont, Penn. By means of the clothes-pin devised by this inventor, it is possible to secure the clothes without fastening them directly upon the line. A wire structure is employed having at its top a hook, and at its bottom clamping devices by which to engage and removably hold the clothes.

**WATER-FILTER.**—SAMUEL M. SUMAN, Riverside, Cal. The water filter comprises a series of filter-beds, each having an inlet at the bottom and an overflow at the top. Between adjacent filter-beds, charcoal-receptacles are arranged to receive the water from one filter-bed and to deliver it to the inlet of the next following filter-bed, each charcoal-receptacle being provided with a top portion over which the water flows. The filter is designed to be used in dwellings, hotels, soldiers' barracks, and miners' camps.

**FIREPROOF STRUCTURE.**—GEORGE SPRICKERHOFF, Manhattan, New York city. The present invention provides a fireproof structure such as a floor or ceiling, which structure is light, yet strong. The structure consists of beams to which stirrups are attached. Supporting-strips are sustained by opposite stirrups; and tie-rods are extended through openings in the strips. To the tie-rods a netting is secured which forms a support for a fireproof cement or concrete, filling the space between the netting and the top of the beams. The structure, besides being strong and light, has the merit of being readily put in place.

**SUSPENDER-BUCKLE.**—MAX RUBIN, Manhattan, New York city. The buckle comprises two U-shaped sections pivoted together to form a loop, the other ends of the sections overlapping each other. Each of these

ends is formed with a jaw. A spring engages the sections to hold the jaws in clamping position. The jaws hold the suspender-tips and are capable of being separated by a pressure upon the body of the buckle, and of being automatically restored to locking position by the spring.

**WIND-WHEEL.**—OREN RUBARTS, Newport, Ore. This wind-wheel is provided with a turn-table from which arms extend in opposite directions. A vane is mounted on one of the arms, and a shaft is mounted in bearings on the other of the arms. To the outer end of the shaft a hub is fixed, on which blades move axially. On the shaft a governor-disk connected with the blades is mounted to slide. A governor-rod has connection with the disk and is mounted to slide on the arm supporting the shaft. On the turn-table a pulley is supported, over which a chain extends, connecting with the rod forward of the pulley. Another chain extends over the pulley and connects with the rod rearward of the pulley. A balancing weight is adapted for connection with either of the chains. By increasing or decreasing the weight, the speed or power transmitted can be increased or decreased.

**CLARINET.**—GUSTAV L. PENZEL and EDWARD MÜLLER, Manhattan, New York city. The G-sharp key in this clarinet consists of a pivoted finger-piece formed with a rearward extension and a key proper having a connection with the finger-piece whereby it will open when the finger-piece is depressed, but will move independently of the finger-piece when the latter is depressed. A trilling-lever actuated from the key F-sharp is arranged to engage with the key G-sharp proper in order to trill that key when the finger-piece is depressed. Keys B-natural and C-sharp provided with finger-pieces, lie over the rearward extension of the finger-piece of the key G-sharp, whereby the key G-sharp may be trilled when either of the B-natural or C-sharp finger-pieces is depressed.

**BREAST-SHIELD.**—EBENZER MURRAY, Deadwood, S. D. The breast-shield comprises two cup-shaped breast-covers having diametrically opposite, horizontal tabs in line with their centers. A cap is hinged to each cover at the side of the aperture. A body-strap connects the outer tabs; and shoulder-straps connect the body-band with the breast-covers.

**FURNACE-ATTACHMENT.**—GEORGE M. LINDSAY and GEORGE SAUNDERS, Andover, Mass. The object of this invention is to provide a simple attachment by the use of which all cold air will be drawn from the hot air flue by the furnace-draft, the same draft serving to force the hot air through the flue, thus distributing the hot air uniformly. Connected with the hot air flue leading upwardly from the furnace, is a tube communicating with the interior of the flue on the lower side of a horizontally-disposed portion of the flue, and also with the furnace near the bottom.

**VEHICLE-WHEEL.**—WILLIAM W. KITCHEN, Rochester, N. Y. The wheel devised by this inventor com-

(Continued on page 315.)

prises an inner rim supported by a hub, and band-springs interposed between the two rims. The springs are secured to one another and to one rim, and have their ends adjustably secured together and to the other rim. The inventor claims that a wheel thus constructed possesses all the buoyancy of a pneumatic-tired wheel, and that it has the advantage of being much stronger and of being more easily repaired.

**PROCESS OF TANNING.**—GEORGE W. HOUSTON, Marietta, Fla. Instead of using red-oak bark or any of the other tanning agents, the inventor of this new process employs an ooze made from a shrub commonly known as "horse-wickey" or "stagger-bush." This ooze, it is stated, will not only tan leather more quickly than other materials in common use, but is also much more plentiful and economic, and produces a fine grade of leather at less expense. According to the strength of the ooze and the character of the hides, the tanned leather can be given various shades.

**WINDING-FRAME.**—CORY JONES, Long Island City, N. Y. This invention provides improvements in silk-winding frames in which quills are held by cones and in which the spindles are removably connected with the driving mechanism. The improvements in question provide means whereby the quill and the filling disconnect automatically the spindle from the rotating well to permit a convenient removal of the quill and spindle from the machine without danger of entangling the silk. The improvements also permit the substitution of an empty quill for the quill-spindle, and the automatic connection of the spindle with the driving mechanism.

**PROCESS OF MANUFACTURING MINERAL WOOL.**—ALEXANDER D. ELBERS, Hoboken, N. J. It is the purpose of the present process to provide a means for making mineral wool which is more free from sulfur and therefore of a better quality than can be produced by the methods at present in use. The process consists in remelting hardened blast-furnace slag in a cupola-furnace in admixture with the sulfates of alkaline earths and blowing it into mineral wool.

**BLACKING-BRUSH.**—JOSEPH R. DE WITT, San Antonio, Tex. Upon the back of a blacking-brush a wheel is mounted connected by arms with a dauber and with a box of blacking, the wheel being operated by a rod. In its normal position the box is held in place by a catch. When it is desired to replenish the dauber's supply of blacking, the rod is pushed forward, thus causing the wheel to carry the box over the bristles of the dauber. When a sufficient amount of blacking has been gathered by the dauber, the rod is pulled back, thus causing the box to be returned to its normal position.

**LINE-PEN.**—LYMAN H. ZEIGLER, Millbank, S. D. The pen provided by this inventor is designed to facilitate rapid adjustment, thus enabling lines of varying width to be conveniently and effectively drawn. The pen has two pivotally connected arms pressed apart by a spring. Two fingers are attached to the arms and coact with each other to form the pen, the spring serving to keep the fingers together. A thin plate is held between the fingers and has its free portion twisted to spread the ink.

**ORE-LEACHING APPARATUS.**—ALBERT F. DUEY, Salida, Colo. The apparatus includes a leaching-tank in the bottom of which is a perforated pipe connected with a compressed air supply. The tank containing the leaching liquid is connected with the air-supply pipe, whereby the air and liquid are injected together. The stirring of the ore by the bubbles of air serves to increase the efficiency of the solvent liquid, so that the mineral is more quickly dissolved than would otherwise be possible. The apparatus can be used in chlorination and in the cyanid or other chemical processes of treating ores, performing its work, it is claimed, from one to thirty-six hours more quickly than has hitherto been the case.

**ORGAN-ACTION.**—JOSEPH SLAWIK, Bloomfield, N. J. The invention provides an organ-action whereby the playing either of the upper or lower key-board causes a sounding of its sounding devices, and by the use of the desired couplings the playing of one of the keyboards causes a sounding of both sets of sounding devices simultaneously to produce a grand-organ effect. A pneumatic coupler-action is provided comprising an exhaust-valve over an outlet in the passage between the upper keyboard-valve and its action. On the valve-stem are a series of diaphragms over which air-chambers are located. By means of coupler draw-stops the air is exhausted from the chambers. By means of connections with the diaphragms from the valves of the lower keyboard the exhaust-valve is actuated on playing the keys of the lower keyboard.

**HEEL-RUBBER.**—JOHN H. MORROW, Chicago, Ill. The heel-rubber is designed to prevent the slipping of the foot on frozen or wet sidewalks, and is provided with a bottom which is made in the shape of the bottom for the heel of a shoe or boot, and which has a flange fitting the sides and back of the heel. The heel-rubber is furthermore provided with a jointed front flange which can be secured on the front portion of the heel.

**WRENCH.**—JAMES L. MARTIN, Marion Center, Penn. This nut-wrench has its jaws in the form of two spring-prongs adjusted toward and from each other by a screw, and adapted especially for application to a bit-brace. In wrenches of this class the spring-tongs frequently twist, and by being forced too closely together, are prematurely broken. In order to overcome this objection, the inventor provides the jaws with lugs, to one of which the adjusting-screw is rigidly secured. By means of this construction the true movement of the prongs toward and from each other is assured, and their springing out of alignment prevented.

**SMOKER'S TRAY.**—PERCY S. COOK, Manhattan, New York city. This invention provides a tray so constructed that ashes deposited at the margin will be directed to a well extending from end to end and from side to side of the tray. The invention also provides a match-receptacle adapted to receive loose matches or a pedestal capable of holding boxes of matches of different sizes in an upright position.

**SMELTING-FURNACE.**—CHARLES BISHOP, KDOXVILLE, Cal. This furnace provides for a concentration of the heat above the arch upon which the ore is to be placed for

smelting. In the central chamber a settling-pot provided with bullion and slag off-takes is located. An apertured ore-supporting arch is mounted above the settling-pot; and into this arch the fire-boxes open. Apertured flues in opposing sides of the central chamber lead through the sides of the arch; and apertured flues in the other two opposing sides of the chamber lead through the top of the arch at the ends. The slag and bullion are automatically distributed; and the vapors from the ore will be condensed in the off-take flue, means being provided to receive the metal thus condensed.

**GASOLINE-LAMP.**—JAMES A. YARTON, Omaha, Neb. This lamp is designed to be used in order to heat a mantle to incandescence. The lamp comprises a chamber having a gas-supply pipe entering one side, and an upwardly-curved deflecting plate in front of the opening of the pipe. A gasoline-tube extends vertically through the chamber and has perforations in its sides within the chamber. A ring supported at the upper end of the tube serves the purpose of distributing the gasoline evenly. A series of wires are suspended from the ring and within the tube, and conduct the heat down to insure the perfect volatilization of the gasoline.

**INTRENCHING-TOOL.**—LUTHER H. WIGHTMAN, Boston, Mass. Various tools have been designed for digging trenches, but they have been either too heavy to be conveniently carried or too small to handle sufficiently large quantities of earth. The tool provided by this invention, in order to overcome these objections, is provided with a pointed and curved body having a tang at one end. The edge of one of the sides of the body is sharpened. A hollow handle is riveted to the tang and also has a portion riveted upon the body. This tool has a weight of about one and five-eighths pounds, and has a dirt-holding or lifting surface of about thirty-four square inches.

**ARTIFICIAL TOOTH CROWN AND BACKING.**—CERPHAS WHITNEY, Kingston, Jamaica. The present invention provides a backing and crown for artificial teeth so constructed that the facing or porcelain, if fractured, may be readily removed and another substituted. A crown or cap is also provided which serves materially to hold the porcelain in proper position and to prevent the porcelain from chipping at its cutting edge. The backing enables a tooth to be applied to crown or bridge work in the customary manner, if it be so desired.

**MICROMETER DEPTH-GAGE.**—CLAUDE L. WATERS, Stamford, Conn. This micrometer gage is arranged to permit direct reading of the depth of a hole without further mental calculation and without covering up the graduations. The gage has a base capable of bearing firmly upon the object to be measured. On the base are fixed a threaded micrometer-spindle and a barrel inclosing the spindle. An indicator-sleeve screws on the spindle and slides between the barrel and the spindle.

**HAT-FASTENER.**—SHELDON A. STENBARGER, Augusta, Ill. In the hat-fastener there are combined a frame on which are collars lengthwise movable, combs pivotally attached to the collars, a spring serving to draw the collars toward each other, and tapes attached to the combs, serving to move the collars outwardly and to throw the combs downwardly. When the hat is placed upon the head the collars enter the hair, and assume a horizontal position by the action of the spring, thus causing the hat to be effectually secured. By drawing the tapes outwardly the hat may be lifted from the head, the combs sliding out without injuring the hair.

**ROPE-CLAMP.**—LEWIS W. SAMMIS, Greenpoint, Brooklyn, New York city. The rope-clamp comprises two parts—a body and a dog. The body has two separate arms provided at their outer ends with pivot-lugs extending toward each other. The dog fits between the arms of the body and has recesses receiving the pivot-lugs. One arm of the dog and the corresponding end of the body are adapted to clamp a rope between them; while the other end of the dog acts as a lever to hold the parts together, the lugs being held in engagement with the dog.

**CONSTRUCTION OF METAL-CONCRETE-ARCH BRIDGES.**—HOWARD V. HINCKLEY, Topeka, Kans. A novel construction in metal-concrete-arch bridges has been devised by this inventor, whereby the difficulties hitherto encountered are overcome. With the series of parallel metal I-beams extending longitudinally through the arch are connected a series of bars or clamps having integral, hooked ends clamping the longitudinal flanges of the beams. These clamps are also embedded in the concrete so that they tie the I-beams together against lateral movement. Concrete spandrel-walls are erected on the arch. Metal anchorage-frames held rigidly to the beams extend up into the spandrel-walls and support them. In order to prevent the cracking of the spandrels an expansion-joint is employed.

**DISPLAY-STAND.**—CLARK R. REID, Piqua, Ohio. This invention seeks to provide a means for supporting advertisements so that they can be moved around a circle. In connection with the advertisements, a concave or convex mirror is employed which is rotated with the advertisements, so that the image of the face reflected will be distorted. The mirror serves the purpose of attracting attention to the advertisements.

**COMPUTING-SCALE.**—WILLIAM R. DUNN, Alton, Ind. The scale has a platform actuating beams, and has, furthermore, two weights working on the beams and referring to weight and price, so that upon the proper adjustment of those weights according to the price and the desired amount of the article, the balancing of the scale will indicate that the proper amount of the commodity is on the scale.

#### Designs.

**BEARING-PLATE FOR VEHICLES.**—GEORGE W. MCCONNELL, Carrollton, Ohio. The plate has an opening provided with a horizontal lug at the top and a horizontal lug at the bottom. The opposite side of the plate has a vertical lug at each side of the opening in the plate.

**NOTE.**—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of this paper.

#### NEW BOOKS ETC.

**HINTS ON AMALGAMATION AND THE GENERAL CARE OF GOLD MILLS.** By W. J. Adams. Chicago: Modern Machinery Publishing Company. 1899. Illustrated. Pp. 111. Price \$2.

Practical men in all parts of the world are rapidly improving mining processes, and it is necessary for those who are engaged in any mining or metallurgical pursuit to keep up with the times. It is for this reason that we welcome any book written by a practical mining engineer, like the present volume. It is a reference book of actual gold milling practice as determined by an experience of twenty years and it is written in language which can be understood by all.

**SMALL ACCUMULATORS. HOW MADE AND USED.** Edited by Percival Marshall. New York: Spon & Chamberlain. London: E. & F. N. Spon, Limited. 1899. Fully illustrated. Pp. 80. Price 50 cents.

The author treats briefly of the theory of the accumulator, and then describes how to make a four-volt pocket accumulator and a twelve-volt accumulator, and finally describes various types of storage batteries and gives directions for charging and using them. It appears to be a very useful little book.

**SANITARY ENGINEERING OF BUILDINGS.** By William Paul Gerhard. Vol. I. With 103 illustrations and 6 plates. New York: William T. Comstock. 1899. Pp. 454. Price \$5.

The author is a well known sanitary engineer, and we do not know of any one who is better qualified to deal with the subject, which is of vital importance. Another volume is in active preparation, but each volume is complete in itself. Nearly every phase of modern sanitary plumbing is treated. The book is printed in large type and is well illustrated.

**STEVENS' MECHANICAL CATECHISM FOR STATIONARY AND MARINE ENGINEERS, FIREMEN, ELECTRICIANS, ETC.** By H. G. Stevens, M.E.E. Chicago: Laird & Lee. 1899. 18mo. Pp. 335. Price \$1 and \$1.50.

All of the subjects are treated in the most interesting and thorough manner and it is written in plain language. The popular question and answer system is used and there are over 240 sectional cuts and illustrations. There is a great deal of literature already on the subjects treated in this volume, but there is no question that the present work will prove useful to practical engineers and machinists and those who aspire to master these trades. One thing which we like particularly is the clear way in which many of the diagrams are lettered. The book is handsomely printed and bound.

**THE ARITHMETIC OF CHEMISTRY. A Simple Treatment of the Subject of Chemical Calculations.** By John Waddell. New York: The Macmillan Company. London: Macmillan & Company, Limited. 1899. Pp. 133. Price 90 cents.

Chemical arithmetic is now being taught in many colleges with the aid of a special text book, and though there are already several chemical arithmetics on the market, the present volume will certainly prove valuable. Many of the questions have been actually used in examination papers at British and American universities. The subject possesses no real difficulties when properly explained, and the volume before us will accomplish that work.

**SHOE AND LEATHER REPORTER ANNUAL.** New York: Shoe and Leather Reporter. 1899. Pp. 693. 8vo.

The Shoe and Leather Reporter Annual is of great value to the shoe trade, as it contains a list of all the shoe manufacturers and dealers in the United States and Canada, as well as leather dealers and manufacturers in all countries. It is evidently a great task to compile a book of this nature, and it is to be hoped that the trade will appreciate the efforts of the publishers.

**ANNUAL REPORT OF THE BOARD OF REGENTS OF THE SMITHSONIAN INSTITUTION. Showing the Operations, Expenditures, and Condition of the Institution to July, 1897.** Washington. 1898. Pp. 686.

The Annual Report of the Smithsonian Institution is really much more than a report, for the report proper only occupies some 80 pages of the 686. The rest is taken up by what is called "General Appendix," which furnishes brief accounts of the scientific discoveries in particular directions, including reports on the investigations made by collaborators of the Institution and memoirs of a general character or on special topics that are of interest and value to the numerous correspondents of the Institution. The articles are admirably selected and are splendidly illustrated, the whole really forming a remarkable collection of brief monographs.

**THE SPIRIT OF ORGANIC CHEMISTRY. An Introduction to the Current Literature of the Subject.** By Arthur Lachman, B.S., Ph.D. With an Introduction by Paul C. Freer, M.D., Ph.D. New York: The Macmillan Company. 1899. 12mo. Pp. 229. Price \$1.50.

This book is intended primarily as a supplement to text books of organic chemistry. A beginner coming upon the 10,000 pages which mark the annual growth of the literature of organic chemistry cannot but be bewildered, and it is to answer the questions which naturally arise in the minds of the students that the present book has been compiled. The articles which make up this volume will be regarded as an important contribution to the history of science. It is to be regretted that organic chemistry is regarded as a labyrinthian specialty, but Prof. Lachman's book will tend to clear up many difficulties and is a contribution to the history of science as well.

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#### Notes & Queries

##### HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication. References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and though we endeavor to reply to all either by letter or in this department, each must take his turn. Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same. Special Written Information on matters of personal rather than general interest cannot be expected without remuneration. Scientific American Supplements referred to may be had at the office. Price 10 cents each. Books referred to promptly supplied on receipt of price. Minerals sent for examination should be distinctly marked or labeled.

(7658) F. L. asks: 1. Can a water power be utilized economically or not for producing heat capable of steaming up a boiler, heating driers on a paper machine, or giving heat for any industrial purpose? A. We know of no mode in which a water power can be used in any direct manner for producing heat. 2. I know of paper mills which have a surplus waterpower which could be utilized for producing heat for their driers, thus doing away with fuel. I know that a dynamo can produce heat, but I am informed that the objections in using it for steaming a boiler are too many to be practical. I am also informed that using a current inside the driers is not practical, as the dampness of the paper will neutralize the efficiency of the current. Is that correct? A. We do not know of any instance in which electricity has been used to heat the driers of a paper machine; but we can see no reason why it cannot be used, except its cost. If it can be produced at a low figure, it can be used for any heating purpose whatsoever. 3. A dynamo can be used for producing carbide, which can be transformed into acetylene gas, with which a boiler can be made to steam. Is this practical where the water power is abundant? Will the economy in fuel derived by using said carbide warrant the cost of the installation of a carbide plant, even considering that the surplus carbide could be sold to the trade? Or will it pay better to sell the whole production of carbide to the trade, and buy coal for the boilers? You must not lose sight of the fact that I am talking of paper mills having a surplus waterpower, and using at present coal for heating, worth about 40 francs per ton, and using all the way from one to five tons daily. A. Water power is used for the production of most of the carbide which is made. We should think that it would be better to sell the carbide and buy coal than to use acetylene gas as fuel for heating purposes. 4. Can heat be produced with compressed air, viz., by reheating the outlet pipe of a reservoir? A. Compressed air is not an economical source of heat. 5. Do you know any other way for producing heat by means of a water power? A. No.

(7659) H. S. asks: What size of wire, B. & S., would be necessary for primaries for 500 four-watt 16 candle power lamps, 4 miles from center of distribution, 2,200 volts on line and 10 per cent loss? A. A single phase alternate current circuit would require No. 4 wire, B. & S. gage. A three phase circuit would require No. 7 wire, B. & S. gage.

(7660) M. F. K. writes: While reading your "Notes and Queries" in the SCIENTIFIC AMERICAN I noticed that you answer fully all questions on electricity. Have you any one book from which you get this information, or any set of books? If so please name them in your reply to this letter, and also prices of same. A. There is no one book from which we obtain our answers to queries. If there were, we would not tell what it is. Of course not. Our business would be gone. Nor is there any set of books. Practical questions can only be answered from practical experience, and knowledge and books cannot give that. We have served a long apprenticeship to get it.

(7661) R. W. S. says: Please give recipe for solution which, when applied to glass, dries giving a ground glass effect. Solution does not injure the glass. A. Try the following:

Sandarac.....90 grains.  
Mastic.....20 "  
Ether.....2 ounces.  
Benzole..... $\frac{1}{2}$  to 1

The proportion of the benzole added determines the nature of the matt obtained.