

RECENTLY PATENTED INVENTIONS. Electrical Devices.

BURGLAR-ALARM RELAY-DROP.—D. D. FRIEDMAN, New York, N. Y. This invention relates to certain improvements in relay drops especially useful in burglar alarm systems and relates more particularly to a new and improved means whereby the armature of an electro-magnet may be locked in position upon the breaking or closing of the circuit.

TROLLEY-POLE CATCHER.—J. H. WALKER, Lexington, Ky. In this case the invention is an improvement in trolley pole catchers, and particularly in that class of such devices illustrated by Mr. Walker's former patent, and the present invention relates to certain improvements in the track rail and in the carrier operating thereon. In operation, many advantages are secured in manipulating the trolley pole.

Of Interest to Farmers.

COTTON-CULTIVATOR.—R. H. PURNELL, Rosedale, Miss. This cotton cultivator is of simple and inexpensive construction and the cultivator devices proper are adapted for reversal on a beam so that the implement may be used for scraping the sides of a cotton row or for ridging the same by throwing dirt toward the plants, as conditions may require.

POULTRY-FOUNTAIN.—C. F. GILL, La Harpe, Ill. The purpose in this improvement is to provide a drinking fountain for poultry comprising a tank, a tray and means for holding the tank fast to the tray, yet admitting of a ready separation of said parts, the attaching means also serving as a handle whereby to facilitate the ready removal of the device from place to place.

Of General Interest.

TUBULAR WELL-PLUNGER.—E. R. LOCKWOOD, Pratt, Kan. The invention refers particularly to improvements in a device for holding the plunger valve open to permit water to pass through the plunger when it is withdrawn from the well tube, the object being to provide a device for this purpose that will be simple in construction and that will positively hold the valve open.

PUNCH.—S. BOISSEAU, Richmond, Va. The object of the inventor is to provide a construction whereby to simplify the work of those using punches, especially railway ticket agents, by combining in one instrument a series of punches so that the ticket agent may make the several punches in a ticket without putting one punch down and taking another up, and also provide guides to aid lining up the tickets so they may be punched severally at the correct points.

ANIMAL-POKE.—A. WILLIMAN, Washington, Mass. The design of the improvements in this poke or collar is to prevent an animal from passing its head through a wire fence or the like with the intent of passing bodily through the fence. Under ordinary conditions it will not injure the animal, but will slightly penetrate the animal's shoulders should it attempt to break through a fence.

GOODS-HANDLER.—E. E. WELCH, Springdale, Ark. In this instance the invention pertains to goods handlers for lifting boxes from shelves located above hand-reach, and has for its object a peculiar, novel and improved device of the character stated, which in addition to its general novelty, shall be inexpensive to manufacture.

CONVEYER SYSTEM.—J. H. SHAY, Wallace, La. The various objects of the inventor are attained by providing the double block with a peculiarly arranged idler sheave which is located between the two sheaves of the block and separates the skidding and outhaul lines. He also provides a swivel connection between the two lines and interposes swivels into sections of the lines in certain positions so as to prevent disadvantage from the twisting or turning of the lines.

REINFORCED CONCRETE ARCH.—H. M. RUSSELL, JR., Wheeling, W. Va. The object in this case is to provide a concrete arch reinforced by steel or other material, and arranged to reduce the thickness of the arch to a minimum and still contain wholly within the concrete body the straight reinforcing metallic members, located in such a manner as to take up tensile stresses in the most efficient manner.

SEA-ANCHOR.—F. ROUTE, Honolulu, Hawaii. The invention refers primarily to a sea anchor or drag, fitted with a peculiarly arranged oil reservoir by means of which not only may the vessel's head be kept to the wind while lying to, but oil distributed to windward of the vessel, thus breaking the seas and enabling the vessel to ride out a gale with comparative ease.

AERIAL VESSEL.—T. ORGREN, San Diego, Cal. The purpose in this invention is to provide an aerial vessel of light construction, in which folding aeroplanes are employed in conjunction with a gas-containing cylinder, and further to provide a gas reservoir having valved connection with the cylinder, which reservoir when the valve is open automatically maintains a uniform and constant pressure of gas in the cylinder.

PAPER-FILE.—C. F. MCBEE, Athens, Ohio. In the present patent the invention is an improvement in interchangeable and permanent files for holding papers, and is especially designed for filing railroad tariffs and expense

bill receipts, but which may be used for any other desired purpose. Its index sheets may be employed to great advantage in filing the above-named tariffs and receipts.

NON-REFILLABLE BOTTLE.—H. O. MCCLURG, Baltimore, Md. The bottle has a new form of valve closure or stopper which permits the overflow of the liquid contents, but effectually prevents inflow of liquids. The stopper is so constructed and secured in the bottle neck that it cannot be removed therefrom, while the valves are so protected that it is impossible to reach them with an inserted tool or instrument.

ERASER FOR TYPE-WRITERS.—E. C. MCFADEEN, Short Hills, N. J. This eraser is designed to render writing invisible as produced by the machine, without the need of rubbing it from the paper, as is the usual practice, but effecting the erasing by reproducing coincident therewith the characters desired to be erased and in an ink of the same color as the background of the paper or other material on which the characters appear.

ORE-MILL.—J. JOHNSON, Mesa, Ariz. Ter. This mill is intended and adapted for crushing, grinding, and thus pulverizing ore and other substances, and belongs to the class distinguished by a toothed, or armed, cylinder or shaft, rotating in fixed bearings, and a greatly enlarged drum, or cylinder, inclosing such cylinder or shaft, and revolving around it by the impact or friction of the two.

DISPLAY-SHELVING.—R. T. JOYCE, Mount Airy, N. C. The invention pertains to improvements in shelving used more especially in hardware stores wherein the shelving is arranged in the form of compartments to hold the various articles of hardware, and has for its object to provide an attachment for displaying samples of the articles contained in each compartment and also for indicating the condition, or rather quantity of stock on hand.

LABEL-PASTER.—G. N. BYL and J. KOEHLER, Jersey City, N. J. The purpose of the improvement is to provide an economic device for applying labels in quantities to an adhesive surface and so distribute the labels on the surface that while the labels lie close to each other, one will be independent of the other, and to accomplish the work systematically and with dispatch.

MARKER.—C. BECKMANN, New York, N. Y. This invention has reference to a marker or marking device adapted to be used by tailors or artisans for marking or laying out work. The object of the improvement is to produce a device which is simple in construction and which may be operated readily to produce a clear and well defined mark.

WEIGHING-SCOOP.—F. C. HOWE, El Paso, Texas. This scoop is for use in stores or similar places in selling products such as flour, sugar, etc. The weighing mechanism in connection with the scoop accurately indicates the weight. The handle is provided with a light which may be lit at will, so as to enable one using the scoop to illuminate the surroundings, in dark closets or under similar conditions.

Hardware.

PERMUTATION-PADLOCK.—M. J. O'LEARY, Chickasha, Ind. Ter. The invention relates to improvements in permutation padlocks and has for its object to produce a padlock of the type set forth, which shall be simple, efficient, and one which can be readily operated and the combinations (of which a great number may be used) changed at will in a simple manner without dismembering the component parts.

STAY-BOLT CUTTER.—E. T. STRONG, Urbana, Ill. The improvement refers to boiler-maker's implements, and its object is to provide a cutter arranged to permit of conveniently and quickly cutting the stay bolt inside of the sheet, to facilitate removal of a worn-out fire-box of a locomotive or other boiler, and without first requiring the removal of the back sheet of the boiler.

CLAMP FOR BASIN-COCKS.—T. L. CECIL, Coldwater, Mich. The invention is an improvement in clamps for basin cocks or faucets and has for an object, among others, to provide an efficient and simple locking means to positively prevent the cock from becoming detached from the basin, yet to allow the ready removal of the cock, without difficulty.

Heating and Lighting.

AUTOMATIC SAFETY-BURNER.—N. WISE, New York, N. Y. The object of the inventor is to produce a gas burner adapted to be used for illuminating or heating purposes, and which is constructed in such a way that, if the flame becomes extinguished by accident without the gas having been turned off, the burner will automatically shut off the flow of gas.

Household Utilities.

PAN-SUPPORT.—R. P. COOK, Hastings, Mich. Generally stated, the invention consists of clamping jaws with suitable operating handles adapted to be applied to the pan handle and adjusted thereon, to bring a base plate carried by them in the same plane with the bottom of the pan, thereby forming a support from the handle slightly spaced from the pan, making it impossible to accidentally turn the pan over.

BED-BOTTOM.—G. BEZANGER, Boston, Mass. The object of this invention is to provide a device which may be applied to beds or couches

of the common type without change or alteration in the same, and which affords means for raising or elevating the mattress at different points and in different degrees. It is especially useful in connection with beds and the like, intended for use of invalids or those having physical disabilities.

Machines and Mechanical Devices.

CHANGEABLE DRIVE-GEAR.—J. WIECHMANN, Albany, N. Y. The invention relates to the transmission of power, and its object is to provide a drive gear, arranged to insure an easy yet powerful transmission of power from one shaft to another, and to allow convenient and quick change of speed and reversal of the motion without danger and shock to the connected parts.

DITCHING-MACHINE.—W. UMSTEAD, Jerseytown, Pa. The purpose in this case is to improve upon the ditching machine for which Letters Patent were formerly granted to Mr. Umstead, whereby the point of the plow is given downward curve at its working end, rendering it more effective in service, and ground entrance more gradual, and further making the point detachable and providing a long flat surface for the working face of the plow at the point, and imparting a twist to the plow where the point joins the mold-board section in order to start the ground to the section to be moved along by the cleaning wing at the surface of the ditch.

TYPE-WRITING MACHINE.—R. REIN, Sebastianstrasse 14, Berlin, Germany. In accordance with this invention several defects are obviated. To this end the device for releasing the locking pawl is positively connected with the operating lever in a certain manner. The arrangement is such that the disengagement of the pawl is effected by means of a special manipulation of the lever carrying the operating pawl, for example in such a manner that this lever is displaced from its position of repose in the direction opposite to that in which it is moved for line spacing. By this arrangement many advantages of great importance in the use of the machine are obtained.

CARPET-BEATER.—O. O'HALLORAN, New York, N. Y. This portable beater is especially adapted to be operated by hand. One of the purposes of the inventor is to so construct the device that in operation beater arms of opposing series will be automatically and intermittently raised and permitted to drop under spring control, thus whipping a carpet in the same manner as practised by hand.

SOAP CUTTING AND PRESSING MACHINE.—H. W. MCEWEN, Chicago, Ill. The invention comprises an improved machine for cutting long bars of soap into short sections and pressing each of said sections into a regular sized cake. The object is to produce a device which is automatic in its operation and which carries on all the necessary steps in their regular sequence without the aid of or attention of a skilled operator.

Prime Movers and Their Accessories.

VALVE-GEAR.—H. LENTZ, 123 Kurfürstendamm, Halensee, near Berlin, Germany. The object of the inventor is to provide means for obtaining an additional opening of the exhaust valve during the period of compression when starting the motor. The means for diminishing the counter-pressure consist in a movable boss arranged in the reciprocating distributor containing the valve, which boss rocks with the distributor, being pressed toward the interior of the distributor by the spring and caused to project by the displacement of an axial wedge or an equivalent part, in order to act upon the exhaust member.

ROTARY ENGINE.—F. R. BUSSARD, Hays, Kan. In the present patent the invention has reference to improvements in rotary engines, the object being the provision of a rotary engine of simple construction, and that may be operated by an economical amount of steam used expansively, or by direct pressure from the boiler.

Railways and Their Accessories.

SWITCH.—W. J. MCKEWEN, Philadelphia, Pa. In carrying out the present invention which has reference to switches designed to be used in connection with motor cars, the inventor has for his object in view the provision of means adapted to hold a switch point locked firmly in position when adjusted.

Pertaining to Recreation.

AMUSEMENT DEVICE.—W. T. WATSON, Vancouver, British Columbia, Canada. The object of the invention is to provide means whereby the car-carrying wheel moves around in a circle with the supporting platform, but whereby the wheel is caused to continuously rotate in opposite direction. This produces an unusual motion. The invention relates to improvements over the device disclosed and claimed in a former application by Mr. Watson. This inventor has secured a patent on another amusement device, its object being to increase the movement imparted to the cars making the movements diverse and confusing, thus increasing the interest of passengers. This end he attains by causing the wheel or wheels not only to revolve on their own axes, but to move bodily in a circle or other fixed path.

FIGURE TOY.—A. R. REIHNG, Toledo, O. The invention is an improvement particularly

in toy fowls or birds, and the object is to provide a construction in connection with a toy representation of a hen and a spring for causing the same to rise from its nest, of means for restraining the action of the spring, and egg delivery devices operated from said restraining means.

Pertaining to Vehicles.

SPRING-WHEEL.—W. O. TUBBS, Lubbock, Texas. The invention pertains to improvements in wheels for vehicles, its object being to reduce jar and produce a wheel which shall be cheap and efficient. Pneumatic tires generally used on vehicles, such as automobiles, are costly and extremely liable to puncture and other damage, to repair which involves considerable time and expense. The improvements of Mr. Tubbs overcome the above objections.

MANUFACTURE AND APPLICATION OF RUBBER TIRES TO WHEEL-RIMS.—I. W. GILES, New Bedford, and C. W. TOBEY, Fairhaven, Mass. In this case the invention has reference to the manufacture and application of rubber tires to wheel-rims, the object of the improvement being to provide a method whereby rubber tires may be quickly and securely attached to wheel-rims without the use of the tools commonly used for that purpose.

RUBBER-TIRE FASTENER.—I. W. GILES, New Bedford, and C. W. TOBEY, Fairhaven, Mass. These patentees employ circular rods embracing the rubber tire at the metallic tire. At intervals the rods pass through eyes formed on the ends of a turn buckle device extending crosswise of the tire and which may be adjusted by a wrench to tighten or loosen the clamp rods.

EXTENSIBLE WAGON.—E. RIEDINGER, New York, N. Y. In the patent of Mr. Riedinger the invention has reference to wagons, and the object of the improvement is the provision of a construction for the body which will enable the same to be extended when desired and locked to the extended position.

BICYCLE.—H. GARZA, Monterey, Nuevo Leon, Mexico. An auxiliary propelling mechanism is actuated by the swinging of the outer section of the handle-bar, it being evident that when the section is swung forwardly the gear wheel will be rotated and when the section is swung rearwardly the pawl will slip idly over the ratchet teeth. Rotation of horizontal gear wheel is imparted through a gear wheel to the sprocket wheel and by a chain and other sprocket wheel to the rear wheel.

LINING FOR PNEUMATIC TIRES AND OTHER PNEUMATIC ARTICLES.—F. PETMECKY, Austin, Texas. In the present patent the object of the invention is the provision of a new and improved lining for pneumatic tires and other pneumatic rubber articles, and arranged to immediately, efficiently, permanently and quickly heal or close a rupture in the article.

WAGON-GEAR.—W. A. MURRAY, Sanford, Fla. The object of the invention is to provide a wagon gear combining maximum strength and lightness and durability with adaptability for economy in manufacture. Draft and other strains are applied to the axle at various points throughout its length, so that a smaller and lighter axle may be employed than is usual in this class of wagon gear.

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.



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.

(10524) C. F. G. asks: Will you kindly give in your Notes and Queries column a process for preserving botanical specimens unchanged in color and form? A. There is no liquid which will preserve all botanical specimens unchanged in color and form. Fungi cannot be preserved without loss of color by any means, whatever. A weak solution of formalin, say one or two per cent, will act as well as any.

(10525) J. B. writes: Referring to the solution of a problem in SCIENTIFIC AMERICAN, March 16, 1907, page 239, number of answer 10439, P. A. O., I would say that I cannot understand why you make such an elaborate statement to show the best mathemati-

cians in that particular town how to solve such a simple problem in proportion. Furthermore, the chances are that the best mathematicians in that town do not comprehend your statement and solution. The solution is as follows (three known and one unknown quantity): Woman is to man as man is to woman and pig.

Therefore $139 : 160 :: 160 : 139 + x$.

For convenience call $139 + x$ simply x .

$$\frac{160 \times 160}{139} = \frac{24}{139} x$$

$$184 \frac{24}{139} = 45 \frac{24}{139} \text{ pounds.}$$

45 pounds and nearly 3 ounces weight of pig. A. We have received many letters concerning the man and woman who weighed the pig without scales, by balancing on a pole laid across a rail. Most of them are critical, and charge that we give too long a solution. The solution above is a sample of these claimed to be better than ours. If that is the sort of thing any one wants, as Mr. Lincoln said, it is just the sort of thing any one would want. We submit that it does not explain itself at all. If any one could solve the problem, he would not require it; and if he could not solve the problem, this solution would be of no assistance to him in his effort to do so. It gives no reason whatever for any step taken. Every solution for the use of one who is to be instructed by it, ought to make clear each step, and lead the learner along from step to step clearly. The problem is one of a lever with unequal arms balanced about a fulcrum. Our solution recognizes that fact, and not one of those sent in by our critics makes any mention of the principle upon which their solutions are based.

(10526) J. M. B. writes: In Notes and Queries 10439, in your issue of March 16, you published a problem and answer relating to the properties of the lever or arm and fulcrum. I think that you have kindly and obliging feelings toward your readers when you take notice of such, as it does not seem to me to be in your line. I discovered a rule bearing on the matter while investigating the same properties. I have never seen it published, and think that it is a new one, although I may be mistaken; however, it is a simple one, and may be useful to some of our friends who are not posted in algebraic formula. I inclose it herewith, as you may think it available for publication. Proposition: If an arm is balanced on a fulcrum by unequal bodies on each end, the weight of each being known, if on reversing the position of the bodies it is required to be known how much to add in weight to the lesser body to preserve the balance. Observe the following rule: Let the value of the arm be put = 1. This value of the arm in this rule is arbitrary and is the exception; let x = the weight required. Then it will be: As the sum of the weights is to the difference of the weights, so is 1 to the difference of segments of 1; and by rule $\frac{1}{2} \pm \frac{1}{2}$ of the quotient will give the segments. Then the difference of the weights \div the lesser segment will = x , the weight required. This rule is constant and invariable, and the proof of the work is found by the fundamental rule that the product of the weight and segments of each side are equal to each other.

(10527) E. A. P. says: I have a "Brownie" camera No. 2, and have taken eighteen snapshots (three films). When I came to develop them, the pictures were all black, so that I could not see anything. Can you tell me what it was that made them so black? I am sure that I developed them right. First: I put the pictures in the water. Second: In the hypo-soda. Third: In the developing powders. Fourth: In water to rinse. A. You began at the wrong end. If an exposed film is placed in hypo first, then in the developing solution, it will blacken over. The rule is to moisten the film first with water, then place it in the developing solution, then rinse with water, and lastly put it in the hypo-soda fixing bath until the creamy white portions are entirely dissolved out. Then it is washed in water for half an hour and hung up to dry.

(10528) B. & Co. say: Will you kindly give us the horse-power that a heavy-duty horizontal Atlas engine will develop with inside diameter of cylinder 12 x 18 inches, running 175 revolutions per minute with 100 pounds steam pressure? A. The horse-power which a steam engine will develop depends entirely upon the point of cutoff, when the size, boiler pressure, and speed are given, or in other words, upon the fraction of the stroke during which steam is being admitted to the cylinder. It is possible to have the cutoff so early that the average pressure in the cylinder during the stroke will be approximately equal to zero. With the cutoff at about one-third the stroke, the boiler pressure 100 pounds, and the revolutions equal to 175 per minute, the horse-power of your engine would be approximately 85.

(10529) L. L. L. says: If a pipe 2 inches in diameter, connected to a larger pipe carrying a pressure of 100 pounds to the square inch, had a nozzle put on it with a 1-inch hole in it, would it discharge as much water as the pipe would before the nozzle was put on? If the water would not have a greater pressure at the nozzle, but have an

increased velocity? Where does the lost pressure go to if it is not in the velocity? How can we increase the velocity of anything without increasing the pressure? A. We would say that there would be a smaller quantity of water discharged through the 1-inch nozzle than would be discharged through the 2-inch open pipe, but the velocity would be greatly increased, and the pressure in the 2-inch pipe would also be increased by this use of the nozzle. It is impossible to increase the velocity of a liquid flowing from a nozzle without increasing the pressure at the same time.

(10530) W. P. D. says: I am informed by an experienced miller that in the running of his turbine wheels he always has to turn off part of the water at dark to maintain a uniform rate of speed of his millstones. Is this a scientific fact noted and established in the working of water-power wheels? If so, why? A. We would say that we do not know why the miller has to turn off part of his water supply at the time you mention, but it is probably for some other reason than because of darkness. It does not make any difference whether it is daylight or dark, the same energy has to be expended to do the same amount of work. 2. Also I have frequently noticed (as well as being asked by others who have noticed it) that in riding a bicycle during twilight or after dark the machine appears to require less power than during daylight. Is this real or imaginary? If real, why? A. The reason that it seems easier to ride a bicycle after dark, especially upon a road which is familiar to the rider, is that the rider cannot see the road over which he is riding, or the stationary objects along the road, as plainly as he does in the daylight, and consequently does not seem to realize that he has exerted or is exerting as much energy as he would be exerting if it were daylight, in riding over the same road. He seems to be moving faster than he really does, and thus feels that little exertion is required. 3. In your issue of March 16 you work a problem regarding the weight of a pig by algebra. To the majority of your readers, who like myself do not work algebra, your solution is lost. Here, however, is a solution to it in ordinary arithmetic, by a rule we used to call "position" or "supposition": First suppose the plank to be 12 feet long. This multiplied by the weight of the man, 160 pounds, and divided by the combined weights $160 + 139 = 299$ pounds, would give 6.4214 feet, which subtracted from the 12 feet, would give 5.5786. These two numbers give the relative lengths of beam from the point of balance. Now as the man (160 pounds) is to be on the long end of the plank next time, $160 \times 6.4214 \div 5.5786$ will give the weight required on the short end. This is 184.17 pounds; that is, the woman and pig, 184.17 — 139 leaves 45.17 pounds, the weight of the pig. A. We would say that your method of solving the problem described is correct. There are several ways of arriving at the correct result of the problem, we believe; and the method used, either the algebraic or "supposition," is dependent upon the principle of solving an equation for unknown quantities, whether these quantities are represented by letters or "supposed" figures.

(10531) D. L. M. says: Will you kindly answer through your Notes and Queries the compound used for brazing cast iron? A. We would say that the flux used in brazing cast iron is powdered borax. The spelter used is prepared especially for brazing cast iron, and is generally in a granular form, the grains averaging perhaps the size of coarse sugar. The composition of this spelter depends upon the nature of the iron to be brazed, or rather the heat which the iron will stand, as the spelter must melt and flow readily at a temperature below that of the melting point of the iron. The brazing metal is made of copper and zinc in the proper proportions.

(10532) B. W. H. asks how to make tracing paper. A. A German invention has for its object the rendering more or less transparent of paper used for writing or drawing, either with ink, pencil or crayon, and also to give the paper such a surface that such writing or drawing may be completely removed by washing, without in any way injuring the paper. The object of making the paper translucent is that when used in schools the scholars can trace the copy, and thus become proficient in the formation of letters without the explanations usually necessary, and it may also be used in any place where tracings may be required, as by laying the paper over the object to be copied it can be plainly seen. Writing paper is used by preference, its preparation consisting in first saturating it with benzine, and then immediately coating the paper with a suitable rapidly drying varnish before the benzine can evaporate. The application of varnish is by preference made by plunging the paper into a bath of it, but it may be applied with a brush or sponge. The varnish is prepared of the following ingredients: Boiled bleached linseed oil, 20 pounds; lead shavings, 1 pound; zinc oxide, 5 pounds; Venetian turpentine, $\frac{1}{2}$ pound. Mix, and boil eight hours. After cooling, strain, and add 5 pounds white copal and $\frac{1}{2}$ pound sandarac.

(10533) S. J. M. asks how to detect sulphuric acid in vinegar. A. We have received so many letters on this subject that we

are compelled to decline publishing many good methods which our correspondents have forwarded. The following, however, will give housekeepers, and others to whom chemical processes are not accessible, an opportunity of testing the purity of the article. The following is Fresenius' test, simplified for general purposes: Put a wine glassful of the vinegar into a china tea cup, and let the cup float in water in a pint cup of tin or other metal that will stand heat. Boil the water till half the vinegar has evaporated, then drop into the cup a piece of (cane) loaf sugar about the size of a grain of wheat. Continue the boiling till the liquid in the cup has evaporated, when, if the vinegar contains free sulphuric acid, the dry residue will be found to be blackened. The charring of the sugar is due to free sulphuric acid.

(10534) A. P. W. asks how to deodorize petroleum. A. Mix chloride of lime with petroleum in the proportion of three ounces for each gallon of the liquid to be purified. It is then introduced into a cask. Some muriatic acid is added and the mixture is well agitated, so as to bring the whole of the liquid into intimate contact with the chlorine gas. Finally the petroleum is passed into another vessel containing slaked lime, which absorbs the free chlorine and leaves the oil sufficiently deodorized and purified.

NEW BOOKS, ETC.

ELECTRICITY AS APPLIED TO MINING. By Arnold Lupton, G. D. Aspinall Parr, and Herbert Perkin. Second edition, thoroughly revised and enlarged. London: Crosby Lockwood & Son. New York: D. Van Nostrand Company. About 190 illustrations; 8vo.; cloth; 320 pages. Price, \$4.50.

Such wide use is made of electricity in mining, that there is need for a textbook on the subject. The volume of which we are now writing should meet the need very well. It contains descriptions of dynamos, ways of transmitting current, transformers, motors, and their application to the operation of mining machinery, systems of lighting, and the use of electricity in exploding blasts.

THE THETA-PHI DIAGRAM. Practically applied to Steam, Gas, Oil, and Air Engines. By Henry A. Golding. Second edition, revised and enlarged. Manchester, England: The Technical Publishing Company. 16mo.; cloth; 126 pages. Price, \$1.25.

This work is a presentation, in as simple and practical a manner as possible, of the use of the temperature-entropy diagram and the various methods of drawing it for different heat motors. This most important subject has been too rapidly slurred over in the past, owing to the mathematical difficulties surrounding its study. Now, since the publication of Mr. Golding's book, these difficulties have been largely removed, and the science put in a form where all may readily approach it.

THE COMMON BACTERIAL INFECTIONS OF THE DIGESTIVE TRACT AND THE INTOXICATIONS ARISING FROM THEM. By C. A. Herter. New York: The Macmillan Company. 12mo.; cloth; 360 pages. Price, \$1.50 net.

This volume embodies views recently presented by the author to the New York Academy of Medicine, in a lecture before the Harvey Society for the Diffusion of Medical Knowledge. The object of their publication in book form is to place before the notice of practitioners and investigators a number of important details, not suited for publication in a medical journal. The work is in no sense a popular treatise, but could be profitably read even by the layman, for there is no question of such vital importance as that of bacterial action in the digestive tract.

HOW TO BUILD A DIRECT-CURRENT ONE-KILOWATT DYNAMO OR A ONE HORSE-POWER MOTOR. By A. E. Watson. Lynn, Mass.: The Bubier Publishing Company. 16mo.; cloth; 100 pages; illustrated. Price, \$1.

A complete set of directions for making and assembling the parts of a practical and up-to-date dynamo or motor. This book is not a "boy's handbook," but a technical work of merit and usefulness.

A GLOSSARY OF TERMS USED IN ENGLISH ARCHITECTURE. By Thomas D. Atkinson. New York: William T. Comstock. With 265 illustrations; 320 pages; 16mo.; cloth. Price, \$1.50.

A very good glossary, limited to the historical aspect of architecture, yet devoting especial attention to that part of the subject which bears on social and religious life.

RACE CULTURE; OR, RACE SUICIDE? (A plea for the unborn.) By Robert Reid Rentoul. London and New York: The Walter Scott Publishing Company. 8vo.; cloth; 182 pages. Price, \$3.

The increased complexity of modern social conditions is forcing a very disagreeable question before our notice; namely, the question of race perpetuation with regard to race improvement. In America we are somewhat ahead of Great Britain, yet Dr. Rentoul's book has many suggestions that we might profitably apply to our conditions over here. His plan

imposes less hardship upon the class it deals with than any other that has been put forth up to date, while, at the same time, it seems to offer the desired cure for the evils it is intended to do away with.

FIRE ASSAYING. A Practical Treatise on the Fire Assaying of Gold, Silver, and Lead, Including Description of the Appliances Used. By Evans W. Buskett. New York: D. Van Nostrand Company. 16mo.; cloth; 105 pages; illustrated. Price, \$1.25.

A very good short work on assaying, containing directions and descriptions of apparatus. It is especially to be recommended for those who have had the practical experience without the technical education.

EXPERIMENTAL ZOOLOGY. By Thomas Hunt Morgan. New York: The Macmillan Company, 1907. 12mo.; 448 pages; cloth; 25 illustrations. Price, \$2.75 net.

A collection of the results that have been obtained in the field of experimental zoology during the last fifteen years. Many details that an exhaustive treatment would demand have been omitted, as only such cases have been selected as are the most typical and the most instructive. The chief stress of the work is laid upon the determination of the conditions under which changes in form occur. The book should appeal to all intelligent readers who are interested in this fascinating subject.

BOILER WATERS, SCALE, CORROSION, FOAMING. By William Wallace Christie. New York: D. Van Nostrand Company. 8vo.; cloth; 77 illustrations; 235 pages. Price, \$3.

This work is intended to furnish steam users with information regarding water, its use, and the troubles arising from the presence of impurities in it, as well as with their proper remedies wherever possible. Analyses of various boiler waters are given, and the effects of the dissolved substances discussed in each case. Means of detecting the more common scale forming and injurious compounds are presented, enabling the engineer to make his own preliminary tests without calling in a chemist.

A GERMAN SCIENCE READER. With Notes and Vocabulary. By William H. Wait, Ph.D. New York: The Macmillan Company. 12mo.; cloth; 321 pages. Price, \$1 net.

It is the aim of this work to give to those who desire a knowledge of technical and scientific German a conveniently arranged collection of articles covering the principal sciences. The selections are so chosen that a specialist in one subject can profitably read the portions of the work devoted to the sciences which are related to the one he is chiefly interested in.

AN ELEMENTARY TREATISE ON THEORETICAL MECHANICS. By J. H. Jeans. New York: Ginn & Co. 8vo.; cloth; 364 pages, illustrated. Price, \$2.50.

Although quite young, Prof. Jeans is regarded as the physicist of the greatest promise of the present day. In the realm of mechanics he is particularly at home, especially from the theoretical standpoint; so that the present book, intended to furnish a short course for beginners, is of double value. The subjects dealt with are the general principles of dynamics, the laws of motion, statics, dynamics of a particle and of rigid bodies. The treatment aims at elucidating physical principles rather than at elaborating a mathematical theory. Care has been taken to illustrate all principles and results by a series of practical examples and applications. The amount of mathematics in the text has been reduced to the minimum which is consistent with giving the student exact ideas and the knowledge necessary for performing exact calculations. A great many exercises and problems are inserted for solution by the student, and especial care has been taken to make these as representative and as illustrative as possible.

THE BOOK OF VEGETABLES AND GARDEN HERBS. A Practical Handbook and Planting Table for the Vegetable Gardener. By Allen French. New York: The Macmillan Company. 12mo.; cloth; 312 pages, 144 illustrations. Price, \$1.75 net.

An alphabetically-arranged list of vegetables suited to cultivation in the northern United States, with the best times for planting them, and the conditions and methods of cultivation most favorable to their growth. To all who own gardens this book will come as a great help, giving, as it does, not only practical advice in how to plant, but assistance in choosing what to plant in order to obtain the greatest yield.

INORGANIC CHEMISTRY FOR SCHOOLS AND COLLEGES. By James Lewis Howe. Being a second edition of Inorganic Chemistry According to the Periodic Law, by F. P. Venable and J. L. Howe. Easton, Pa.: The Chemical Publishing Company, 1907. 12mo.; cloth, 409 pages, 70 illustrations. Price, \$3.00.

An excellent general and descriptive book, dealing with the theory of the subject from the modern physico-chemical standpoint. The author preserves a very just balance between theoretical and practical considerations, making the work of the greatest service for all