## RECENTLY PATENTED INVENTIONS.

### Railway Appliances.

CAR COUPLING.—John La Burt, New York City. With this device the cars will couple automatically, so that it will not be necessary for the brakeman to go between them, while they may be easily uncoupled, the link having a laterally curved coupling arm, and a rearwardly curved arm with a slot engaged by a pin moving vertically in the drawhead, a lever mechanism connected with the pin extending to the top and sides of the car.

### Mechanical.

NUT TAPPING MACHINE.—Clarence L. Chapman, Erie, Pa. This invention covers an automatic device for removing the nut blanks singly from the hopper and delivering them regularly in proper position to the tap, which is automatically fed and lifted, and removed from the spindle to dump the threaded nuts, the machine cutting the thread in punched blanks without any manual labor except filling the hopper with blanks.

CARVING MACHINE. — Joseph Rohlmann, St. Joseph, Mo. This is a machine adapted to carve simultaneously a number of blocks after one pattern, there being combined, with the frame carrying the cutters and tracing tool, universal joints supporting the ends of the frame, pivoted brackets supporting the joints, and a counterbalanced lever connected with the free ends of the brackets, a pivoted arm carrying a shaft on which the lever is pivoted, with other novel features.

SPRING MOTOR.—Daniel B. Merry and William M. Shelman, East Las Vegas, New Mexico. This is a device for running sewing machines, etc., and is so constructed that a series of springs, all having connection with one drive shaft, may be wound from one stem, the springs being so arranged that when one spring is unwound it will release the next for unwinding, the idle springs not retarding the movement of the drive shaft.

### Miscellaneous.

LAMP BLACK MANUFACTURE.—Robert Dreyer, Halle-on-the-Saale, Prussia, Germany. This is an apparatus for the manufacture, in which a series of closed reservoirs communicating with each other are supplied with a cooling liquid, while a hollow rotary shaft carries burners and scrapers below the reservoir, to produce lamp black, carbon black, etc., from carbureted hydrogen gases or suitable oily or fatty substances, at the same time utilizing the heat generated during the process.

ROTARY GAS SCRUBBER. — William Mooney, North Plainfield, N. J. The scrubbing frames, consisting of segmental and transverse perforated plates, and rods or spindles, are carried by wheels revolving in a tank supplied with water, whereby the frames will be kept wet, and will mechanically remove from the gas passed through them any tarry matters, ammonia and carbonic acid remaining in the gas being taken up by the water.

WATER GAUGE.—Ira A. Fuller, Pepin, Wis. This is a device designed to give notice of the rise of water in the hold of a barge or ship, and is made with a float in a vertical case having an attached scale which appears at a window, there being also an electric bell and battery whose circuit is closed by the rising of the float.

DRAWING INSTRUMENT. — George A. Brown, Park City, Utah. This instrument has a fixed base plate on which a T-square is held for longitudinal movement, a protractor being detachably connected to the blade and having a longitudinal movement on it, with other novel features, making a convenient drawing instrument which can be readily adapted for architectural or surveyors' uses.

WIRE REEL. — George E. Dixon, Beacon, Iowa. This is a combined reel and stretcher, light and durable, and so made that the reel will be locked when rotation in a certain direction has ceased, preventing slack or unwinding, and making a serviceable device for the construction and repair of wire fences, equally adapted for barbed or smooth wire.

SELF-CLOSING CAN. —Stephen O. Myers, Mount Vernon, N. Y. By this invention a spring-pressed valve is adapted to close the neck of the can from the inside, the construction being simple and durable, and the can being designed to hold ether, chloroform and other liquids, which will thus be prevented from spilling, no matter in what condition the can is left.

PIANO PEDAL AND GUARD.—Walther T. Stirnenberg, New York City. This pedal is made with laterally projecting shoulders, practically concealing the slot through which the pedal passes, while the guard plate combined therewith protects the polished face of the case and is designed to give a more than ordinarily attractive appearance to the front of the instrument.

VENETIAN BLIND.—Charles Niss, Jr., Milwaukee, Wis. The supporting frame or receptacle for the slatted blind is provided by this invention with novel devices for supporting and adjusting the slats, either to elevate or depress them, or to rock each slat edgewise when the blind is in lowered adjustment.

FIRE ESCAPE.—Samuel M. Stevenson, Bastrop, La. This escape is made with a double-walled fireproof car, a transverse shaft in which has a friction drum and flanged pulleys, in combination with fireproof ropes and a brake mechanism, etc., whereby attachment may be made to an upper window of a structure, and its occupants safely and speedily lowered to the ground when other avenues of escape have been cut off.

CLOTHES PIN. — Charles A. Ostrom, Hans H. Thiellesen, and Samuel C. Wampler, Custer City, South Dakota. This is a spring wire clamp, the ends of a spring wire being formed into jaws having sides inclined toward each other, a slide engaging the sides to open and close the jaws, and a spring catch locking the slide in place, the device being exceedingly simple, strong and efficient.

WASTE PIPE. — Thomas Keely, Memphis, Tenn. This is an improved attachment for refrigerators in which a drip pipe projects downward into a waste pipe proper, but is not arranged in contact with it, there being combined with the outer pipe an inner drip pipe having an inwardly curved point terminating in the center line of the pipe.

WATER CLOSET CISTERN.—Charles G. Zeilman, Albany, N. Y. This invention provides a cistern designed to be very sensitive and positive in operation, to prevent all leakage and overflow, a pipe sliding on a stationary overflow pipe to form an extension thereof, while a float is supported on the pipe and a siphon held on the float to charge and empty the siphon, the construction being simple and durable.

BACK BAND.—Willie L. Johnson, Lake City, Miss. This is an improvement in back bands for plow harness, and provides a combination of buckles and snap hooks and movable connections whereby the height of the traces may be quickly adjusted and the draught so regulated as to increase or diminish the depth of the furrow cut by the plow.

STIRRUP.—George A. Kerns, Victoria, Texas. This stirrup consists of a struck-up metallic body portion with outwardly projecting flanges, leather covering and securing pieces, and other novel features, designed to afford a stirrup of great strength and lightness, and which will also be ornamental and inexpensive to manufacture.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.





## 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.
**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.

(2728) J. F. W. asks: If there is a substance, as elastic and equally as good otherwise, as India rubber. A. No. The substitutes treated of in our SUPPLEMENT, Bolas' lectures on India rubber, etc., are but poor apologies for the true article.

(2729) T. A. M. asks: Could a hollow airtight float for a steam trap be practically made, thereby doing away with the hollow spindle, opening to the outside, which is the common form? Would the condensation of the inclosed air reduce the buoyancy of the float, or necessitate a much heavier metal to withstand the steam pressure? Would it be practical to fill the float with some buoyant gas, under pressure enough to equalize that of the steam? What would be a good battery for electroplating small articles, such as keys, etc.? A. Hollow ball floats are now used for steam traps. You require no gas or other substance in them. Only make them heavy enough and perfectly tight. The difficulty in making them tight is the reason that they are not generally used. Any of the batteries described and illustrated in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 157, 158, 159, will answer for electroplating, 10 cents each mailed.

(2730) R. T. B. asks: Will you please give me a recipe for making moulds to work plaster ornaments, known in the trade as gelatine? Its proportions in bulk, weight or measure. A. Good glue soaked and swelled. Pour off excess of water. Mix, glycerine six times the weight of the dry glue used. Heat and evaporate water sufficient to make the mixture of the proper consistence.

(2731) R. says: I cannot wear flannel drawers without experiencing the most intolerable itching, chiefly along the front of the leg between the ankle and the knee, but more or less over the whole leg. It commences at about the end of the first ten days after putting on the flannel, and continues for a month after it is taken off, even though left off at the end of the first two weeks of wear. The skin shows no sign of irritation, save what follows from scratching. The intense itching makes it absolutely impossible to abstain from scratching. This is caused by the best quality of Dr. Jaeger's natural wool, as well as by ordinary flannel and cotton, half of each. As to red flannel, it is worse, if anything could be more disagreeable. I could as well wear the shirt of Nessus. The flannel shirt is not so bad, though it does cause an itching of the forearm. Be kind enough to answer through your Notes and Queries: 1. What causes this effect? A. The flannel, and it is a personal idiosyncrasy. 2. What will prevent it, the flannel still being worn? A. Nothing; perhaps by silk or linen underwear interposed between wool and skin. 3. What will allay the itching within any reasonable time? A. Leaving off flannel or wool, or according to suggestion in No. 2. 4. If it cannot be prevented, flannel being worn, what substitute, not subject to the same objection, for the flannel can be worn in cold weather? A. Silk, or following No. 2.

(2732) P. C. asks: 1. Which is the most convenient shade to be given to the walls of a photographic dark room? A. An orange red color. 2. How should the glasses of its window be coated, and which is the most expeditious way to do so? A. Insert between two plain glass windows fine sheets of oiled post office paper. This makes a safe light. 3. Would you give the receipt for a good gold paint to be applied with a brush to iron or wood? A. Use bronze powder, applied with copal varnish. As a permanent mixed paint use linseed oil and japan as vehicle.

(2733) G. N. asks: 1. Can a boiler explode with plenty of water, and what would cause it to explode? A. A boiler may explode by over-pressure or by becoming too weak at some point for the pressure. 2. Which explosion would have the greater force—a boiler with low water and a high pressure of steam or a boiler with high water and high pressure of steam? A. Undue pressure, by the sticking of the safety valve, has often been fatal. A full boiler is more disastrous than one with low water, when it explodes, owing to the steam liberated from the larger body of water. 3. How much coal does the City of Paris consume on a trip across the Atlantic? A. The great steamers consume 200 to 350 tons of coal for 24 hours.

(2734) S. F. S. asks: 1. Is it not possible to telephone as far as to telegraph? Why not? A. On account of the escape along the line of the secondary current used in telephony. Also on account of induction and earth currents and time required for static charge and discharge of line. 2. If copper wires instead of platinum were used in incandescent lamps, would the expansion of the wire be too great or not great enough to correspond with the expansion of the glass bulb? A. For 1° in a length of 100 feet glass expands 0·000574 inch, platinum 0·000571, and copper between 0° and 212° 0·00115 for each degree.

(2735) F. G. asks: 1. Is there any danger of an explosion when nitric and sulphuric acids are mixed together in equal parts without being reduced to the temperature that they usually are when used for nitroglycerine? A. No. 2. If the glycerine was added suddenly, would it not cause an instantaneous explosion? A. Probably not, as mixture would be required. 3. If it would cause an instantaneous explosion, would the effect be as great as if it had been manufactured into nitroglycerine? A. No. 4. Why is there more silver in a standard dollar than there is in two half dollars? A. The subsidiary coin is only a legal tender for amounts up to and less than $10. Its value is statutory for these cases. The dollar is legal tender for unlimited amounts.

(2736) E. asks: 1. What is the difference, if any, between ordinary coal gas and that produced from gasoline, and what are the elements and signs of each? A. Gasoline gas is of far higher specific gravity (0·800 or more) than coal gas (0·450 to 0·500). It contains more carbon and differs in odor. 2. How can one produce chemically the different constituents of coal gas, separately, and then combine them to produce a gas equal or like coal gas? A. This is hardly practicable on the large scale. The chemical manuals tell how to prepare hydrogen marsh gas, olefiant gas, and carbonic oxide. These can be mixed so as to closely approximate to coal gas. 3. Would the act or operation of manufacturing them separately and combining be attended with more danger than the handling of coal gas? A. Yes; it would multiply operations, and there would be much more danger of explosions, etc.

(2737) A Subscriber asks: Would you have the kindness to publish the recipe for the painless extraction of teeth? A. The best known method is the use of nitrous oxide or "laughing gas." It has been used in hundreds of thousands of cases, and no deaths have occurred.

(2738) J. H. asks for a good cement to fasten square gold and silver wire inlaid in wood. A. Try marine glue or bicycle tire cement. Do not use common glue, as it will never adhere.

(2739) S. E. L. writes: I have a meerschaum pipe; the stem is broken off; please write me what I can use to mend it. A. Dissolve caseine in water glass. You may mix with it some powdered meerschaum or even carbonate of magnesium. Prepare the caseine by curdling skimmed milk and filtering out the precipitate and afterward washing it thoroughly. Also see next query.

(2740) H. C. C. asks: 1. What is the best cement (or how to make it) for mending and repairing broken glass, porcelain, crockery ware, etc., that will be (near) water and fire proof, or that will hold together strong and lasting? A. One-third of a pint of milk is curdled by adding vinegar. The whey is taken and the white of an egg is stirred into it. Finely divided quicklime is added and the mass is thoroughly mixed with a knife or spatula and applied to the surfaces. After drying in air it is heated over a stove or in a rather cool oven. 2. How to bend on shape an amber tube such as the stem or mouth piece of a smoking or tobacco pipe. A. Slight heating softens amber, but it is dangerous to attempt to bend it unless you have had experience. 3. How best to clean a meerschaum and brier root pipe. A. For cleaning a meerschaum pipe see queries No. 2364 and 2474. For a wooden pipe simply scrape, buff, and sandpaper it. 4. What is the best or good book of practical receipts for mechanic, for mending and repairing household articles, etc.? A. The "Techno-Chemical Receipt Book," $2; "Workshop Receipts," 4 vols., $8; "Dick's Encyclopedia," $5.

(2741) W. L. G. asks: How can plaster of Paris casts be cleaned, without being affected as they are by water? A. There is no good way short of rubbing with ground pumice or very fine sand paper. Various methods of rendering them impervious are given in the receipt books, a polish being imparted that enables them to be satisfactorily cleaned. Otherwise the best plan is to keep dust off, as once it has obtained a hold it adheres tenaciously.

(2742) N. A. asks how much wire is required to wind sewing machine motor as described in SUPPLEMENT, No. 759; how much for field, No. 16 double C C, and for armature No. 20 double C C magnet wire? A. About 3½ pounds of No. 16 wire for the field magnet and ¾ pound No. 20 for the armature.

(2743) G. B. J. asks one or more of the best formulas or processes of waterproofing compressed

paper so that it will not be affected by either hot or cold water. A. Parchmentizing by treatment in a relatively large quantity of a mixture of 2 volumes sulphuric acid with 1 volume water is the best. This may be applied to single sheets afterward compressed into pasteboard. After immersion in acid it must be washed off with water and dilute ammonia. The requirement of resistance to hot water excludes paraffin and varnishes generally from the list of substances which might answer your requirements.

(2744) S. P. asks: What will put a gloss finish on oil cloth that won't crack when rolled up? A. We can only suggest the best quality of varnish applied in successive thin coats. Possibly celluloid varnish would answer. Japanning would be excellent if the goods would stand the heat.

(2745) O. A. R. writes: I have a meerschaum pipe which when warm I have been rubbing with white wax to make it color. I have rubbed in too much; can you tell me how to draw the wax out? A. Keep on smoking the pipe and wipe off the wax as it exudes from the pores. The trouble will thus be rectified.

(2746) C. W. C.—The best information we have places the annual consumption of borax in this country at about 2,000 tons.

(2747) W. J. R. asks: Will you kindly tell me how to make a good sticking paste for sticking stamps and labels on beer kegs. We experience a great deal of trouble in cold weather by stamps blowing off. A colorless paste would be preferred. A. If rye flour paste will not answer, try freshly made solution of gum tragacanth, or try one of the pastes given in the SCIENTIFIC AMERICAN, November 1, 1890, page 281, and October 11, 1890, page 227.

(2748) I. T. E. asks how to make a cheap flour paste, such as is used by paper bag manufacturers on machinery. A. Rye flour paste, made by boiling rye flour with water, is the best of the simple pastes, and is used by bag makers. For other formulas see SCIENTIFIC AMERICAN, as in preceding query.

(2749) C. W. H. asks (1) for a recipe for making a chemical ink eraser. A. Mix equal parts of oxalic and tartaric or citric acids in powder. When to be used, dissolve a little in water. It is poisonous. 2. A recipe for making mucilage in stick form. A. Mouth glue is what you refer to. Soak good glue in water for a day or more until softened. Pour off excess of water and melt the glue. For each part of glue used add one-half part of sugar; mix and pour into moulds.

(2750) W. H. E.: How can I make a thin skin that I have, tough and strong? A. Massage or rub the skin thoroughly with flesh brush. Bathe frequently with cold water. Once or twice daily sponge with solution of coarse salt in alcohol or water.

(2751) W. E. B. asks: What is the best material to make the covering of a balloon that will hold hydrogen without leaking? A. Indiarubber cloth or sheet is the only tissue that can be recommended, and it is too heavy and expensive. The gas is almost impossible to retain. For regular balloon varnish, its preparation, etc., we refer you to our SUPPLEMENT, No. 726.

(2752) G. H. W. asks for dimensions of induction coil for telephone transmitter, viz., size and amount of wire in primary and secondary coils. A. The Bell Telephone Company's coils are wound thus: Primary, ½ ohm, No. 18 to 24 wire; secondary, 80 ohms, No. 36 wire. This gives for No. 18 wire a length of 75 feet, for No. 36 wire a length of 186 feet. Other lengths can be found in electric resistance tables.

(2753) C. L. S. asks for the best polish to use on pianos and organs, etc., something easily applied, that will give a good gloss. A. Apply olive oil and water mixed on the palm of the hand. No severer treatment than this should be necessary. Rottenstone and oil may be applied with a piece of fine cloth in very bad cases, to be followed by the hand rubbing described.

(2754) J. M. F. asks for a good receipt for making a cement to put paper on iron pulleys. A. Use fresh and thick solution of gum tragacanth.

(2755) W. M. C. asks: Wishing to freeze ice for my own family use, I write to ask how I can freeze it in boxes, what kind of boxes, and how I can get it out of them? A. Water can be frozen by freezing mixtures, such as 1 part nitrate of ammonium and 2 to 3 parts water, but on a small scale it is expensive and unsatisfactory. Most of the salt can be recovered by evaporation. The freezing mixture can be applied in an ice cream freezer. The ice can be removed from the boxes by pouring hot water over them while inverted. Use tin boxes. The freezing mixture must be stirred vigorously.

(2756) J. I. C. asks: Of what is the red material on the edge of tablets composed? A. Glue 50 parts, glycerine 9 parts, water enough. Color to suit with aniline or cochineal. Soak glue in water alone, then dissolve, and finally add glycerin.

(2757) A. C. W. writes: To settle a dispute, and one which is liable to bankrupt somebody unless nipped in the bud, I would ask, as I agreed to foot it, if ice forms underneath or on top, *i. e.*, after say 3 inches is formed, does it continue to form underneath or does it form on the top? A. It forms underneath, sometimes snow and slush add to its thickness by freezing on its surface after becoming solidified by rain or thawing.

(2758) W. H. M. writes: I am troubled with an over production of fatty matter from the sebaceous glands, and my nose keeps shiny and greasy all the time. Can you kindly suggest something to dry these glands up? A. It would not be advisable to dry the glands up, but the secretion may be diminished and the unpleasantness removed by the use of Castile or ivory (toilet) soap applied thoroughly with nail brush about three times a week, or oftener. Sponge the nose gently with ether on the alternate days. Or you may use a saturated solution of boric acid and alcohol applied with soft linen rag three or four times a day.

(2759) C. O. D. asks: Will you be kind enough to tell me, if you can, how to reduce paraffine wax so that it can be worked with the hands? I wish to make plaster of Paris moulds in wax for confectionery uses. I have used glycerine, also lard, but have had no success yet. I know it can be reduced and worked in that manner, but don't know how to do it. A. Mix the paraffin with olive oil, melting all together.

(2760) J. R. H. asks: 1. What is the pressure per square inch at a depth of 1,000 feet below the surface of the water, and what is the rule for finding the same? Also is it true that a weight that will sink a man to a depth of 50 feet will sink him to any depth. If the pressure on the inside of a cannon at the time it is fired is 60,000 pounds per square inch, what is the pressure at the time the ball leaves the cannon or gun, say it is 60 feet long, as, for instance, a pneumatic gun now in use? Could you please give me the rule for finding the pressure of powder or dynamite when it is exploded? A. Multiply the feet in depth by 0·433 for the pressure, which at 1,000 feet is 433 pounds per square inch. Any body that will sink 50 feet will go to the bottom at any depth. The pressure in a gun is relieved at the instant that the ball passes the mouth. It is the relief that makes the report. The pressure in a pneumatic gun varies from 100 to 700 pounds per square inch as the charge moves along. The pressure in the best ordnance is from 40,000 to 50,000 pounds per square inch. The rule is derived from the power of the powder or dynamite, of which the expansive test is the principal factor. See article "Projectiles," in Chambers' Mathematics, $1.50 mailed.

(2761) H. T. B. asks: Will you please give a formula for magnesium powder, such as is used on the stage? A.

Chlorate of potash.....3 parts.
Perchlorate of potash.....3 "
Magnesium powder.....4 "

(2762) W. S. F. asks how to make a shoe dressing for ladies' shoes. A. We can supply you with "Workshop Receipts," 4th series, $2, which contains numerous receipts for blackings. Also consult query No. 1704.

(2763) G. V. A. asks: 1. Does heat applied to a casting with a hole in it increase or diminish the size of the hole? For instance: I saw an engineer undertake to remove a crank pin from a large cast crank by heating the whole to almost a red heat and then cool off the iron about the pin before undertaking to remove it. His philosophy was that the cooling contracted the iron away from the pin, thus loosening it. A. The expansion or contraction of a hole in a mass of iron depends very much upon the relative thickness of the iron in proportion to the size of the hole. If uniformly heated, the hole and metal expand together by heat, while in a large mass of metal heated, the hole will enlarge by cooling the metal immediately around it while the outside remains hot. This is on the principle that the metal is somewhat elastic and yields to the expansion strain of the heated outer mass. In the case that you state it was of course necessary to cool the crank pin as much as possible. 2. When a boiler is worked with a high pressure and shut down for the night, everything being tight, what sort of a vacuum will be produced in the cooling down? Can it in any way become dangerous? Will the water in the boiler show its natural or true level while there is a vacuum? A. The cooling of boilers that are tight often produces a partial vacuum, which is of no harm, as a perfect vacuum is never over 15 pounds to a square inch, and the vacuum in boilers seldom reaches 10 pounds, for which they are amply strong. The case is different in the copper boilers of our kitchens, which are very thin and have been known to collapse by vacuum. The vacuum does not affect the water gauge.

(2764) G. A. K. asks whether fluor spar is found in ore, or not, and the color of the same. I have found a certain ore which I have reason to believe contains something of that mineral. A. Fluor spar is found as a natural deposit in great quantities and in various colors. It may be transparent and crystalline or massive and opaque.

(2765) M. McI. asks: What is the simplest method of making rubber stamps? A. By pressing a sheet of mixed rubber against a plaster matrix while heated to about the temperature of boiling water. A small press is used. By increasing the heat, the rubber being still in press, the curing is effected. The matrix may be made from plaster of Paris by casting it upon the face of oiled type. We also refer you to query 2696.

(2766) J. W. F. asks (1) how to dissolve crude or virgin rubber. What I want is to soften the rubber so I can work it into a round ball and remain pliable to collect waste gold around the finisher's bench. A. Chloroform, turpentine or benzol are recommended as solvents. You can soften the gum by low heat, about that of boiling water, and press it into shape. Coat your mould, etc., with talc powder. The best substance of all for this purpose is what is known as "burned rubber," sold for artists' use in removing crayon marks. For full particulars of manipulation of India rubber, burned rubber, etc., we refer you to "Rubber Hand Stamps and the Manipulation of Rubber," which when published we will supply by mail for $1. 2. Also how to water silk. A. Silk is watered by hot calendering between engraved surfaces.

(2767) W. H. G. writes: I had an argument the other day with a friend of mine, and he said if you could dig a hole through the center of the earth to the antipodes, and then drop a stone down from the top, it would hang in the middle with nothing to hold it there; another one put in on the other side would come up to meet it, and both would hang there without anything to hold them up. Will you please give me your opinion on this subject? A. The stone would naturally seek the sides of the hole. If it remained effectively equidistant, it would act as your friend describes, after oscillating up and down for a while. The second stone under the same conditions would act as described.

(2768) J. W. B. asks: 1. Has muriatic or sulphuric acid greater effect in dissolving wrought iron? A. There is little or no difference between them. 2. Will sirup of 24° Baume density fall over a vertical row of horizontal tubes as rapidly as water in 160° heat and 21 inches vacuum? A. It will not, as it will continually thicken and concentrate in its descent. 3. Can you give any preparation with which to paint wrought iron, which will withstand 220° heat and muriatic acid? A. Nothing reliable can be given. 4. Can you also name a preparation which will prevent iron from rusting and which will run off when heated to 190°? A. Try paraffine wax, made more fusible if necessary by olive oil.

(2769) J. B. S. writes: Would you have the kindness to give me a simple rule, and an illustration of the following: How many superficial feet are there in a marble slab ⅞ inch thick and 18 by 18 inches? A. The superficial feet in one face are given by multiplying the width and length together, both expressed in inches or in feet. If in inches, the product is divided by 144 to reduce to superficial feet. If to be reduced to feet one inch thick, multiply by seven and divide by eight. Thus 18 by 18 = 2¼ superficial feet. This reduces to 1 1/32 superficial feet one inch thick. If the entire superficies, both sides and edges, is meant, we must take double the area of a single face to give both sides and add the product of ⅞ by 72 inches (the perimeter) = 63 square inches or 7/8 superficial foot. The total therefore is 2¼ + 2⅛ + 7/8 = 4 1/16 superficial feet.

(2770) G. A. G. writes: We had a call for some extract of smoke to put on meat instead of smoking it. Do you know of any such extract? A. Crude pyroligneous acid comes the nearest to your requirements. Nothing can supplant the smoking process for real efficacy.

(2771) J. H. M. asks: What chemical change, if any, takes place in the atmosphere of a closed room heated by a red hot stove? A. It is believed that carbon monoxide gas, which is poisonous, can pass through red hot iron. There is some doubt, however, as to how far the action may go, and as to whether it may be enough to be injurious or not.

(2772) P. B. writes: I find that a plunge battery, or rather a chromic acid battery, of very large current can be constructed with the carbon cup of the Laclede battery, using for zinc a zinc of the Bunsen battery, pint size. The zinc is to be bent out so as to set in the end of the jar, and a channel cut into the carbon cup to allow the zinc connection to pass out without touching. The bending must be done before amalgamation. I do not know the amperage of a cell thus constructed, but it is quite large, for one cell will heat a short piece of platinum wire, such as goes in lamps, almost white hot. It has a very good life, and with small zincs will, I think, maintain its initial current for five or six hours, which is doing very well, considering that each cell holds only a quart of solution. I have been experimenting by using iron in place of zinc in plunge batteries. It appears to give almost as good an electromotive force as zinc, and I believe can be used with much stronger solutions, and does not heat like zinc when unamalgamated. It is certainly much cheaper. The iron I found best adapted to that use, of any I used, was the largest size of iron wire nails, or wire rods. Should any of your correspondents experiment in this direction or find out the amperage of the cell mentioned, I, and I am sure others, would be glad to hear from them. I desire to ask you how the white surface caused by dilute sulphuric acid falling on colored marble can be removed. A. By repolishing by means of powdered pumice stone followed by putty powder.

## NEW BOOKS AND PUBLICATIONS.

THE LIFE OF JOHN ERICSSON. By William Conant Church. Illustrated. 2 vols. New York: Charles Scribner's Sons. Pp. xii, 303; x, 357. Price $6.

In these two books the complete biography of Ericsson is given by one selected by the great engineer as his biographer. Whatever popular renown has been attained by the more public achievements of his busy life, many of the most interesting and characteristic features of John Ericsson are unknown to the public. He was so particular in his work, and so mindful of his reputation, that he hesitated to divulge much that he did which was in itself of the highest merit. All through the two volumes instances of his skill and ingenuity in engineering are met with. It is refreshing to read of his way of meeting the conservatism of old-time prejudices which so often sought to thwart him. It is an excellent lesson for the inventor of to-day when told that he is striving after the unattainable. But the moral effect of the lifework of Ericsson and some few others has been felt in this direction, and people have learned to be more cautious than hitherto in pronouncing things to be impossible of execution. We have already in our columns given *resumes* of the work of Ericsson. We are exceedingly glad to find his full biography so handsomely and adequately presented to the public in book form. His views on mathematics are sometimes evidenced strikingly. He held that the ordinary mathematician had no reasoning power, or he would not be driven to the use of symbols unintelligible to others. He wrote a letter giving a short method for determining the thickness of iron plates, ending with the note, "A great mathematician would cover half a dozen sheets with figures to solve the above problem." His absolute reliance on his drawings appears when he rejected the use of measurements of partially completed engines having keyways cut and all arranged by the drawing only. The account of the caloric steamship Ericsson, with her giant cylinders 14 feet in diameter, of her stormy voyage to Washington, of the perfection of the machinery, which proved unable to impart the necessary speed, of her sinking off Sandy Hook, with a view of the vessel at sea, reads like a novel. The plan was abandoned, to Ericsson's most bitter disappointment. Column after column could be filled with the accounts of the inventor and of his work. The book itself must be recurred to by those interested in one of the most picturesque lives of the present day.

A handsome calendar for 1891 has been issued by Messrs. Styles & Cash, printers and stationers, No. 77 Eighth Avenue, New York. It has attractive views in colors of the old colonial days in New York, and a large plain dial, with prominent figures and pointer, for each month.



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