Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion.

Notes & Queries

(1) J. L. L. asks for rules for constructing the body of a microscope, to be 10 or 11 inches in length, to be like that furnished (as far as proportions and make is concerned) with so-called student's microscopes, and to be used with any objectives? A. There are no standard rules for the diameter of the body of the microscope, bnt the makers generally adopt a tube about 1 inch to 1½ inches in diameter. The tubes are either made of heavy sheet metal over a steel mandrel, or cast and finished in the lathe. The best plan is first to procure the eyepiece, and then make the body to allow the eyepiece to fit the upper end of it. At the lower end of the body have a collar with a screw for the object glass. The mountings of all first class English and American object glasses are now made with the screw of a standard size, which originated with the London Microscopical Society, and is known as the society screw.

(2) B. K. D. says: If I take a tank and fill it partly with water, then force air up and through the water, drawing it off at the top, will this air have the same proportion of oxygen as the air naturally held in water? Or will it still have the same, 1 part oxygen to 4 of nitrogen, as before entering the water? A. No. Oxygen is more soluble in water than nitrogen, and, consequently air forced through recently boiled (but cold) water will be found less rich in oxygen than before. If the water is aerated under pressure (by which the solubility of gases is augmented), when the pressure is relieved, the air escaping from the water will be rich in oxygen. By repeated solution in this way nearly all of the nitrogen may be removed.

(3) D. H. S. says: Will you please give me a recipe for something (besides lime, protosulphate of iron and sawdust) for purifying coal gas? I have also trouble to free the gas from tarry matters, which pass through the scrubber to the purifier. A. From what you say we judge that the trouble is not so much with your purifiers as with the washer and scrubbers. Water, good slaked lime, and hydrated ferric oxide are about the only purifiers in use. A larger main, better washing and greater surface, and the scrubbers will no doubt remedy the evil.

(4) J. F. E. asks how he can keep the water in an aquarium free from dirt? A. The only remedy will be to use purer water, or to renew frequently.

(5) C. P. advises C. H. C., who asks how to remove lime from cistern water, to try the addition of hard spring water. The lime is generally derived from poor cement used in the lining.

(6) In reply to E. H.—The paint will answer very well for some purposes, but does not compare with good quality Venetian red in color. It cannot be improved much by heat.

(7) J. E. F. says: I have been using artificial teeth for about 3 years. The plates are made of the material commonly used, a gutta percha composition made nearly the color of the natural gums. About a year ago the plates commenced to grow dark. What is the cause of the discoloring, and please give me a recipe for cleaning them? A. The plates are usually made of vulcanized rubber colored with vermilion. The change of color may have been due to sulphur compounds brought frequently in contact with it, in medicines or otherwise. Try fine emery powder, applied with a splinter of soft wood. If this fails, make a strong solution of iodide of potassium in water, add to it a few drops of hydrochloric acid, and apply, with care not to soil the teeth; then rinse with a little alcohol and wash in plenty of water.

(8) F. W. W. asks for a recipe for washing powder? A. Take sal soda, 12 parts; good quicklime, 5 parts; powder, mix, and keep in covered stoneware jars, or in bottles for use.

(9) C. B. asks (1) for a good cement for lining the inside of a galvanic battery trough, made of wood. The fluid used will be diluted sulphuric acid, 1 part acid to 10 parts water, also bichromate of potash, sulphuric acid, and water in the carbon compartment? A. Melt together equal parts of gutta percha and pitch; apply this hot. Or use a solution of caoutchouc in carbon disulphide mixed with 6 per cent of absolute alcohol; give several coats. 2. What would be the resistance of 150 feet of copper wire No. 14 (Brown and Sharpe gauge) be? A. If of good copper, about ·40 ohms under ordinary circumstances—less in cold and more in warm water. 3. In electrical measurement, what is the difference between 1 volt and 1 ohm? A. The ohm is the unit of electrical resistance, and is equal to the resistance of a prism of pure mercury, one square millimeter (=0·001549 square inch) section and 1·0486 meters (=41·2818091 inches) long, at 32° Fah. The volt is the unit of electromotive force, which varies little from the electromotive force of a standard Daniell's cell.

(10) Electric subscriber asks: What solution and quantities thereof is best for generating electricity with carbon or zinc in the same jar or cell without using the porous cup, and if sufficient strength to run a dwelling annunciator of 4 or 6 magnets with 5 cells of 1 gallon each? A. Amalgamate the zinc, and use water mixed with about 5 per cent of sulphuric acid. Six cells should be amply sufficient. The Leclanché cell is now generally preferred for annunciators.

(11) H. H. finds cracks in his stove and asks if there is any cement which can be used to fill them? A. Yes, make and apply a paste of finely pulverized iron (obtained at the druggist's) and water glass. The hotter the fire, the more the cement melts and combines, and the more completely the crack becomes closed.

(12) A. G. says that small metal fancy articles, which are in show cases, become rusted easily and lose their polish. Is there any way of protecting them? A. See that the cases are moderately tight, and keep in each a small lump of quicklime in a saucer.

(13) J. S. asks how to drill a hole in a china plate? A. Use a copper drill and emery moistened with spirits of turpentine.

(14) G. A. asks how to cut battery carbons? A. Use a hand saw moistened in water.

(15) W. B. asks whether paraffin candles can be dyed with aniline colors? A. Yes.

Is there any difference in strength of timber from different sides of the same tree? A. It is said that the strongest side of the tree is that which in its natural position faces the north.

How can I keep my fish net from rotting? A. Steep in melted paraffin, or boil in decoction of oak bark.

(16) F. H. B. asks what plaster moulders use to cover the insides of moulds? A. Lard and oil mixed. Glycerin is also said to be good.

(17) A. P. C. inquires how to find the speed of a belt in feet per minute? A. Multiply the diameter of either pulley in feet by 3·1416 times the number of revolutions that it makes per minute.

(18) E. T. asks: What mordants are commonly employed in dyeing with sumac? A. Either tin, acetate of iron or sulphate of zinc. The first gives yellow, the second gray or black, according to the strength, and the third greenish yellow.

(19) J. N. B. asks (1) if sumac leaves are substituted for bark in tanning leather? A. Yes; for some kinds. 2. How are the leaves prepared? A. The leaves are thoroughly dried, and ground to a fine powder 3. Where can a market be found? A. The chief market is New York city.

(20) W. B. P. asks: What can I do for my lips to make them tough so they will not chap? A. Apply twice a day a lotion of borax, 2 scruples: glycerin, ½ oz.; water, 7½ ozs.

What will restore the ivory mouthpiece of my flute to its former whiteness? A. Brush over with pumicestone and water and expose to the sun under glass until bleached.

(21) J. E. W. asks for a recipe for cleaning marble that has become rusty or mossy by exposure to the weather, and which will not injure the stone? A. Mix up a quantity of the strongest soap lees with quicklime to the consistence of milk, and lay it on the stone for 24 hours; clean it afterwards, and it will appear as new.

(22) S. W. L. asks: 1. What size wire would be required to convey an electric shock sufficient to kill a horse, or other large animal, and would a number of small wires, aggregating the same size, be preferable to a single large wire? A. No. 16 Brown and Sharpe's gauge. Yes, if it is likely to be bent or twisted. 2. What size battery would be required to produce the shock, and would it matter if the jars were covered so as to prevent spilling if upturned? A. It would require about 800 square feet of Leyden jar surface, or a very powerful induction coil, and battery. No.

1. What effect have air and water on rubber when it is exposed to their combined action? A. It destroys its elasticity. 2. In what thicknesses is good elastic rubber impervious to air? A. $\frac{1}{16}$ of an inch. 3. How can I estimate the horse power required to work an air pump which is to be used to keep a vacuum? A. Multiply the number of square inches of piston surface by 15, and by the number of feet it travels in a minute; divide this product by 3,300; the result will be the horse power required; to which one fifth should be added for friction.

(23) G. A. F. asks: What is chymogene, used for ice making, and how is it used? A. Chymogene is simply high gravity gasoline at about 110°. It passes with rigoline as the first product of petroleum distillation. See article on ice machine in this issue.

(24) J. T. W. asks: If the back motion eccentric rod of a locomotive is a little too short or a little too long (say ¾ inch) what effect will it have on the valve in forward motion? A. None.

(25) A. F. W. asks how to zinc coat or galvanize malleable castings? A. Clean in sulphuric acid and water, wash, scour with cocoanut husk. Dip in melted zinc covered with sal ammoniac. Drain. Wash in cold water.

(26) S. R. H. asks: What can I clean brass shells with, such as are used in breechloading guns? A. 1 oz. oxalic acid, 6 ozs. rottenstone, ½ oz. gum arabic in powder, 1 oz. sweet oil, and enough water to make paste. Apply and rub dry with flannel.

(27) D. T. S. says: I have some silk covered copper wire which is bare in places; how shall I insulate it? A. Apply gutta percha dissolved in benzole or bisulphide.

(28) A. P. asks for a recipe for red printing ink, vermilion red? A. It consists usually simply of vermilion ground up with prepared linseed oil. To 6 quarts of boiled oil add 6 lbs. of rosin, and when this is dissolved add 1¾ lbs. of dry brown soap of best quality cut in slices. Then mix in and grind the pigment.

(29) F. S. asks how bronze is dyed on leather with anilines? A. Dissolve aniline violet in water and brush over the leather.

(30) E. B. R. asks how to clean plate glass? A. Try a strong solution of carbonate of potash.

(31) T. P. J. says: Will you please inform me concerning the *modus operandi* of the Mt. Washington railway? Is the track an ordinary one with the addition of a central rail, upon which a cog wheel on the engine works? A. The construction of the railroad is as you suppose. Very efficient means of stopping are provided, consisting of a pawl and ratchet, in addition to air brakes, and when descending, air is admitted into the cylinder of the locomotive, and the exhaust is controlled by the engineer, so that the train is regulated in this manner also. You will find a detailed account of the railroad in the *Proceedings of the American Society of Civil Engineers*, vol. 3, p. 12.

(32) K. L. D. asks for a cement which will withstand the effects of hot water; the cement to be used for uniting pieces of a porcelain vessel. A. Quick lime mixed to a cream with white of egg.

(33) A. D. B. E. asks how a room 40 by 14 without the agency of steam heating, in the most economical way can be made into apartments for Turkish baths, so as to answer the purpose? A. A water heater, such as is used on many railroad cars, will answer the purpose.

(34) T. L. C. asks how to make a soap that will remove grease, etc., from silk or woolen goods without removing the color? A. Aqua ammonia 2 ozs., soft water 1 quart, saltpeter 1 teaspoonful, shaving soap in shavings 1 oz. Mix.

(35) C. M. S. says: Will you inform me how many lbs. of No. 32 cotton-covered copper wire it would take to construct a machine capable of giving an electric light; the machine to be run by an engine and to be similar to Gramme's? A. About 25 lbs. of No. 32 wire, but this size, being so fine, would require an especial winding to adjust the necessary relative resistance of the armature and magnet. It would be better and less expensive to use 17 lbs. of No. 20 for the magnet, and 8 lbs. of 32 for armature.

(36) H. W. B. says: In a discussion relating to the safety of lightning rods, it was claimed that no rod, that is considered a good conductor, could detract the thunderbolt from its course, even if it did fall within the space equal to that of a circle described with the height of the rod as radius, and that the rod might possibly save the house if the bolt happened to strike the rod; it was claimed that if the bolt was "headed" toward a certain point it would go there, regardless of all rods, conductor, etc., even if the said point was within ¼ inch from a rod. I claimed that the rod protected a space equal to the circle, with the hight of the rod as radius, and that if a bolt was coming towards any point within this circle it would be changed from its course and conducted down the rod. A. It is generally estimated that a properly constructed lightning rod protects an area whose radius is double the height of the rod extending above the structure. This rule is not now, however, considered very reliable, by reason of the extensive use of gas and water pipes in dwellings. When electricity finds several paths it will prefer the best, it is true; but some portion will also pass along the poorer conductors. It is a good plan to connect all pipes and metal work of any extent in the building with the rod. The rod offers most efficient protection to buildings by discharging silently the accumulated electricity at the earth's surface, thus, in great measure, preventing the possibility of a disruptive discharge from the clouds.

(37) G.M. asks for a good method of dyeing silk seal brown? A. For 10 yards—Boil fustic 1 lb., logwood 3¼ ozs., cudbear 2½ ozs. Cool to 200° Fah.; enter and winch for 20 minutes, air out, repeat: sadden to pattern with 4 ozs. copperas; wash and dry.

(38) A. S. says: Please tell me the difference in the pressure of water in an upright tube 33 feet high and 1 inch in diameter, and a tube 2 feet high and 6 inches in diameter? A. If you mean the pressure per square inch on the base, it will be in direct proportion to the height of column, and you can estimate that each inch of height corresponds to a pressure of about 0·036 lbs. per square inch.

(39) I. N. D. says: 1. What kind of water wheel should I use for a water power of 3 feet head and 4,000 cubic feet per minute, having reference more to economy in building than extreme economy in the use of water? A. A breast wheel will answer. 2. How can I convey such power to a distance of 80 feet at an angle of 30° up, having in view economy of construction as much as saving of power? A. You can use two universal joints. 3. If I should use a breast wheel, what would be the proper diameter, and length and size of buckets, and what percentage of the power due to such head and quantity of water, under such conditions, could I expect to realize? A. Professor Rankine gives the following data in his "Treatise on the Steam Engine, and other Prime Movers," which you may consult for further particulars. Efficiency of breast wheels, 70 to 80 per cent. Ordinary velocity for outer surface of wheels=6 feet per second. Q=cubic feet of water discharged per second. w=surface velocity of wheels in feet per second. r=radius of wheel in feet. b=depth of bucket, from 1 to ¾ feet; length of buckets in feet $= \frac{3Q}{2wb\left(1-\frac{b}{2r}\right)}$

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges with much pleasure, the receipt of original papers and contributions upon the following subjects:

On the History of Coal. By R. P. S.
On Curious Blood Disks. By J. M.
On Our Thrushes. By E. I.
On the Torpedo Balloon. By F. P.

HINTS TO CORRESPONDENTS.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Inquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

WANTS AND BUSINESS INQUIRIES.

Almost any desired information, and that of a business nature especially, can be expeditiously obtained by advertising in the column of "Business and Personal," which is set apart for that purpose subject to the charge mentioned at its head.

We have received this week the following inquiries, particulars, etc., regarding which can probably be elicited from the writers by the insertion of a small adver-

tisement in the column specified, by parties able to supply the wants:

Where can I obtain English steel stamps with two shears?

Who manufactures dynamite?

Who makes engines for propelling steam plows?

Where can felt cloth be obtained, suitable for rubbing crayon marks from blackboards?

OFFICIAL.

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were Granted in the Week Ending

October 23, 1877,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list including both the specifications and drawings, will be furnished from this office for one dollar. In ordering, please state the number and date of the patent desired, and remit to Munn & Co., 37 Park Row, New York city.

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Vehicle axle skein, S. P. Lovelace 196,367
Vehicle dash board, G. M. Peters 196,475
Vehicle seats, lazy back for, J. J. Newsom 196,377
Ventilator and chimney cap, C. A. Vaile 196,504
Violins, attachment for, H. Barrenther 196,325
Washing machine, G. Buchanan 196,427
Water closet hopper and seat, W. G. Rhoads 196,388
Water gate, D. T. Perkins 196,474
Water meter, G. O. Schneller 196,483
Water meter, rotary, H. C. Ahrbecker 196,411
Waterwheel, G. W. Earl 196,344
Weather strip, A. F. Van Dolsen 196,318
Wheel, endless track, J. T. Brooks 196,331
Wire-barking machine, D. C. Stover 196,313
Wire rods, rolling, W. W. McCallip 196,371
Wire stretcher, D. A. Smith 196,392
Wrench, pipe, J. W. Vermillion 196,401
Zinc-smelting furnace, O. Lumaghi 196,369

DESIGNS PATENTED.

10,279.—CARPETS.—Arthur Martin, Paris, France.
10,280.—CARPETS.—W. A. Pardoe, Yonkers, N. Y.
10,281.—PICTURE FRAME.—Ulysses Racine, New York, N. Y.
10,282.—PENCIL CASES.—J. D. Cobb, London, England.
10,283.—HAND WHEELS FOR VALVE.—Albert H. Jarecki, Erie, Pa.
10,284.—UMBRELLA HANDLE.—F. Julius Kaldenberg, New York, N. Y.
10,285.—CARPETS.—Eugene Daniel, Paris, France.