Notes & Queries

S. W. & Co. will find a recipe for black finish on German silver instruments on p. 283, vol 31.—W. H. S. will find a recipe for fine blacking on p. 283, vol. 31.—J. G. will find a recipe for hair stimulant on p. 363, vol. 31.—R. can clean his rusty guns by using the method described on p. 299, vol. 31.—A. C. C. can stereotype by the paper process as described on p. 363, vol. 30.—J. B. J. can cement marble to granite by using the preparation described on p. 251, vol. 31.—J. B., Jr., will find a full description of colored glass on p. 43, vol. 32.—W. H. H. can preserve eggs by the process described on p. 219, vol. 31.—F. W. A. can mend cracks in cast iron stoves with the cement described on p. 409, vol. 31.—J. C. J. will find directions for making picture canvases on p. 75, vol. 32.—H. L. W. and others will find a description of the production of gelatin relief plates on p. 272, vol. 32.—W.S. H. will find directions for gilding with leaf on p. 347, vol. 31.—W. B. can bronze iron articles by the method described on p. 283, vol. 31.—J. K. A. will find a recipe for a depilatory on p. 362, vol. 32, and for indelible ink on p. 111, vol. 27.—J. McS. should consult Bourne "On the Screw Propeller."

(1) L. J. asks: What composition can I apply to an irregularly shaped brick wall, so as to protect the mortar effectually from the effects of the vinegar generated in apple pomace? A. Coat with tar.

(2) J. H. S. asks: What will remove so-called indelible ink from linen without injury to the fabric? A. Marking inks containing nitrate of silver may be removed by rubbing the spot with a little cyanide of potassium; but it is well to caution those who use this latter salt for this purpose, as it is a dangerous corrosive poison and should be handled with the greatest care, always avoiding any possibility of its getting into an open cut.

(3) A. T. asks: Which is the best external coating with which to paint a cask in which soda water is to be charged and kept for six or seven months? The coating should prevent the escape of carbonic acid gas. A. The carbonic acid would make its escape through any such coating on a cask.

(4) A. B. S. says: Along the Mississippi river, where the water is used for drinking purposes, it is the custom to draw twenty or thirty gallons, which is put into a large earthen vessel, and then a teaspoonful of powdered alum is added and stirred up with the water to clarify it and throw down the sediment, which it does effectually. How does it act? A. The sulphuric acid of the alum unites with the lime held in solution in the water, and forms an insoluble salt which precipitates, and in settling carries down the other impurities with it.

(5) H. E. N. asks: Where can I find a description of Pettenkofer's method for estimating the carbonic acid and ammonia in the air? A. Consult Angus Smith's work entitled "Air and Rain."

(6) W. W. F. asks: 1. What is the gravity of a body which weighs 900 lbs. at the earth's surface, at the distance of 3 miles in the air? A book states that, at 1,656 miles, any object would lose ⅓ of its weight. Please give a simple rule to work this. A. The question is solved by the equation: $g = g' \frac{(R+h)^2}{R^2}$, where g is the intensity of gravity at the hight required, g' its intensity at sea level, R = radius of the earth, h = the hight desired. If $g = 32$ feet, R = 4000 miles. h = 1656 miles, then $32 = g' \frac{(4000 + 1656)^2}{(4000)^2}$, and $g' = 16$ feet, which is one half its value at sea level.

(7) R. asks: Will an ordinary gas meter register more without the gas being lighted than if it is lighted, the burners in each case being open alike? A party connected with one of the gas companies of New York has been appealed to, and he states as the result of experiments that about 4 per cent more gas passes through the burners when unlighted than when lighted. Is this correct? A. The difference in rate is due to the difference in density and temperature of the unlighted gas and the products of combustion.

(8) M. W. M. asks: What is the simplest and most effective hygrometer now in use, and how can I make one? A. Place side by side two accurate thermometers, the bulb of one of which should be covered with muslin and kept constantly moist by means of a string or small wick which dips into a reservoir of water below. Evaporation takes place from the moistened bulb which depends upon the dryness of the air; and by the coldness thus produced, the mercury in the thermometer is correspondingly depressed. By comparing the difference between the two thermometers, and referring to a published table, you can easily determine the dew point, etc.

(9) J. W. D. E. asks: Is there any kind of cement or other substance that would render a wooden vessel impervious to air and water under a pressure of from 2 to 4 atmospheres? A. You failed to state for what purpose the cask is intended to be used, or the nature of its contents, whether liquid or gaseous, or the conditions of temperature. It is obviously necessary that all this should be known before any one cement can be recommended.

(10) W. P. K. asks: 1. Can borax be used for toning photo prints in lieu of gold? A. Borax has been used with chloride of gold, in place of carbonate of soda. 2. What can cheaply replace gold chloride? A. The old process of sulphur toning is sometimes employed for cheap prints; but although the tone produced by this method bears a close resemblance to that produced by the gold bath, it renders the picture less permanent. The process of sulphur toning consists in adding to the fixing bath of hyposulphite of soda, on immersing the print therein, a few drops of acetic acid, which renders the bath opalescent. This is due to the liberation of sulphur in a very finely divided condition.

What can be used in a small blast lamp furnace? A. Alcohol.

How can I mount a thin glass electrical wheel so that it shall run truly, the center hole being small? A. Place at each side of the plate a small thick disk of hard rubber, fastened securely to the axle, and having between it and the plate a thin washer of soft rubber, the same size as the disk.

(11) J. H. asks: 1. How can I distinguish an imitation from a real diamond? A. In the case of certain silicates, hydrofluoric acid would answer by attacking them; but in the case of various other imitations, it would be necessary to resort to other measures, such as specific gravity, difference of refrangibility of light, etc. 2. Would fluoric acid act on a real stone? A. Hydrofluoric acid is without action on the diamond.

(12) C. F. G. asks: What is the best kind of iron for electro-magnet cores? A. Swedish charcoal iron.

(13) W. O. asks: Will a lightning rod be safe if it runs down inside of a barn, boxed up? I built an addition to my barn on the side where the rod formerly went down on the outside, leaving the rod where it was, and boxing it. A. If the rod was safe before, it is so now. The main thing is to make a good ground connection. It should terminate in earth constantly wet, and have two or three long lateral branches.

(14) L. & D. say: 1. We have a telegraph line ⅝ of a mile in length, of No. 11 galvanized iron wire, and want to use four sounders, magnet wire No. 23, copper covered. How many cups of 4½×7 inches Callaud must we use? A. Twelve cells. 2. What is the most suitable battery to use on 70 feet of copper circuit for an electric bell, and how many cells? A. Six cells of Léclanché. 3. What kind of battery shall we use for nickel plating? A. Two cells of Callaud.

(15) J. M. says: I tried the recipe given by W. H. S. on p. 132, vol. 32, for making a cheap galvanic battery for plating. I used a quart fruit jar and sheet iron for plates. What kind of wire should I use? Will it succeed? A. Use copper and zinc plates instead of iron. This will answer best for plating. You will find instructions for gold, silver, and nickel plating in recent back numbers.

(16) E. W. P. asks: 1. In making electro-magnets, is the wire wound on the cores in a continuous coil, like cotton on a spool, or is each layer wound separate and the ends afterwards joined together? A. In a continuous coil. 2. In the Tom Thumb battery, is it absolutely necessary to have a septum of paper around the zinc plate? A. Yes. 3. How large a battery would it take to drive an electric engine for a small boat 3 feet long? A. About 150 of Bunsen's large sized cells.

1. Does the term squaring the circle mean finding a square of the same area as the given circle? A. Yes. 2. Why will not the square root of the area of any circle give the length of one side of a square of equal area? A. It will; but how do you measure your circle?

(17) B. S. F. asks: 1. How can I make iron soft for making electro-magnets? A. Anneal it. 2. Can steel be made softer than iron? A. No.

(18) B. B. asks: Please give me directions for making a small galvanic battery. A. Take a glass tumbler, and place in the bottom a sheet of copper, having an insulated wire attached and extending out of the tumbler. Cover the copper with blue vitriol, and suspend a sheet of zinc near the top. Fill the tumbler with water. Connect the zinc and copper together for 48 hours and the battery will be ready for use.

(19) H. S. J. says: In your issue of April 7, in answer to the question: "How can I prepare mucilage for office use?" you tell F. M. A. to "add a little Blättersulphate of quinine to it, to prevent molding." What is Blätter sulphate of quinine, and in what does it differ from the officinal sulphate? A. The term Blätter sulphate of quinine probably refers to the bisulphate, which crystallizes in thin plates, and not to the normal sulphate, which forms silky needles.

(20) G. C. M. asks: How can I purify fat oils? I have filtered them and obtained them in a very clear state, depriving them of their color, but I am at a loss how to rid them of their taste and smell. A. Try the addition of a very small quantity of iodate of calcium, and allow to stand 24 hours or more before filtering.

(21) G. W. H. says: 1. I want to light gas by electricity. What size and length of platinum wire shall I use for one burner? A. Of the size of a pin and half an inch long. 2. I want to make an electro-magnet to lift a small weight. What sized wire, and how much, shall I wind on it? A. Seventy-five feet of No. 14 copper wire.

(22) W. J. T. says: I have just finished the construction of a Rhumkorff coil; it gives a severe shock but no spark unless the ends of the secondary wire are almost touching, when a minute spark is perceptible; and the increase of battery power does not increase the length of spark. The coil is constructed as follows: Primary wire, No. 16, copper, about 150 feet, cotton covered. Secondary wire, 7,000 feet No. 24 American gage, copper, not covered, but wound so that a paraffined cotton thread of the same size as the wire is interposed between each coil. Each layer of secondary wire is insulated from the succeeding one, by two thicknesses of paraffined paper, care being taken that, at the ends of the coil, the wires did not slip over the insulating paper and so come in contact. The core consisted of No. 20 annealed iron wire, ¾ inch in diameter and 10 inches long, cemented together with paraffin and introduced in the primary wire. The condenser has 60 sheets tin foil, 5x11 inches, laid between paraffined paper 7x11, and properly connected with the two parts of the circuit breaker. What is the trouble? Probably the first thought that would occur to you would be that the condenser was either improperly made or improperly connected with the primary wire; but that is not the case, as the same condenser works well with another coil in which the secondary wire is somewhat finer, but no longer. A. Use No. 40 wire for the secondary coil.

(23) A. W. asks: Is a quantity of frictional electricity as intense as a similar quantity of voltaic electricity? A. Yes, very much more.

(24) A. R. says: 1. A Russian claims to have invented an electric light: A small tube of glass is filled with a pencil of charcoal, the air is exhausted, and the tube hermetically sealed. A moderate current of electricity is then passed through the charcoal from an ordinary electro-magnetic machine, causing it to glow with a very brilliant, but at the same time soft, light. It is stated that the charcoal lasts for an indefinite period, and that the current required is so small that two hundred of these lights can be easily maintained by a single machine. Does such an apparatus require two carbon points slightly separated, or is the carbon in one piece, filling the tube as described? A. Two carbon pencils are used. One is attached to one pole of the machine, and the other to the other. 2. What is meant by the single machine? A. A single machine means simply one machine. No such results as claimed can be attained.

(25) G. J. W. asks: How can I dye kid gloves black or brown? A. The dyes may be applied either by immersion or by brushing over the surface. The latter method is more ordinarily practised.

(26) W. B. asks: What is suitable for staining a brick wall cherry red, so that it will hold its color? A. It is the practice to paint such walls. Clay can be so stained by oxide of iron, but not the finished brick.

(27) E. E. M. says: I have a work on electricity which tells me that a hollow coil of wire, through which a current of electricity is passing, will draw in an iron bar. I have been trying to make such a coil, but have failed. Will you give me the proper directions? A. Take a small rod of wood 4 inches long, and fasten at each end a disk of wood 2 inches in diameter. Wind copper wire, covered with cotton in close spirals, over the rod and between the two disks, filling the entire space. Then remove the coil and you have the helix. Now connect the two ends of the wire of the helix with the poles of a battery of two large Bunsen's cells, and the coil will attract a small iron bar to its center.

(28) J. G. T. says: 1. I wish to bring a stream of water from a reservoir, in a 1 inch pipe, down a hill and across a level to the bottom of the hill. The fall is 100 feet. How high will it throw the water at the foot of the hill? A. If your pipe is smooth inside, has no sudden bends, and is not too long, and you place at its lower end a conical jet of small aperture, you may throw it half the hight of the fall, or a little more. 2. How high would it throw water if the length of the pipe were 600 feet? A. For such a distance you will need a pipe of larger diameter, otherwise you may not throw the water up more than 20 feet or thereabouts. 3. How much pressure will there be on the square inch under 60 feet head and 100 feet head respectively? A. At 60 feet 26 lbs., at 100 feet 43 lbs., provided the water is at rest; when running, the pressure becomes much less, and then depends on the velocity of the flow and the distance from reservoir.

(29) W. P. D. asks: How can I calculate the amount of air in a given quantity of water, at ordinary temperatures and pressures? A. Water at the moderate temperature of 68° Fah. and 30 inches barometric pressure (15 lbs. to the square inch) contains 0·042 volumes of air, or a little over 4 per cent; a cubic foot (1,728 cubic inches) will contain 72½ cubic inches of air. But the air differs from the ordinary air in that, while the latter consists of 4 parts of nitrogen to 1 of oxygen, the air contained in the water consists of 1 part nitrogen to 2 of oxygen. When the temperature descends, the water dissolves more air; at 50° Fah. the proportion is 0·05 parts or 5 per cent, at 32°, 0·06 or 6 per cent. When the temperature ascends, the air is driven out; while, when the pressure increases, the volume of air contained is exactly proportionate to the pressure, so that, at 2 atmospheres or 30 lbs. pressure, water will dissolve 8 per cent of air, at 6 atmospheres or 90 lbs., 24 per cent, etc.