Notes & Queries

A. J. C. and B. B. L. should consult a physician.—R. F. will find a good recipe for burnishing liquid for the heels of boots and shoes on p. 347, vol. 31.—F. K. will find a recipe for cement for china on p. 346, vol. 24.—J. C. T. should consult an engineer.—A. K. will find a recipe for root beer on p. 138, vol. 31.

(1) H. J. R. asks: How do you suspend the the sheet of zinc in the galvanic battery, mentioned in a recent issue? A. Suspend it upon any insulator. Wood will do.

(2) G. F. H. asks: 1. Is there any better insulator than gutta percha or glass for the key of a telegraph instrument? A. Yes. Bone or rubber. 2. Do operators ever lose the use of their arms, by electricity passing through gutta percha insulators? A. No. 3. Is there anything that will counteract the effect of electricity on the nerve? A. No.

(3) E. L. G. asks: What is the best battery for making an electric light? A. Fifty cells of Bunsen.

(4) P. Q. S. asks: 1. In the following battery, what is the least number of cells that will give a perceptible shock? It consists of a glass jar 5x4 inches, covered by a piece of wood, suspended from which are two pieces of coke 5 inches long by 2 wide; between these is a piece of zinc of the same size. The liquid is bichromate of potash, 2 parts, dissolved in 20 parts hot water and 1 part sulphuric acid. A. One hundred cells would give a slight shock. 2. Should the zinc plate be amalgamated? A. Yes. 3. How many cells would be necessary to nickel plate buttons, etc.? A. One cell. 4. Which is the positive plate? A. The zinc. 5. In a recent issue of your journal, you published a recipe for amalgamating zincs. I tried it, but it was a total failure. I could not dissolve the mercury. What is the trouble? A. You need not dissolve the mercury. Clean your zincs with muriatic acid, and the mercury will adhere.

(5) J. S. F. asks: 1. If a plate electric machine is arranged with metallic disks and points on both sides of the plate, for conducting the electricity to the prime conductor, would it conduct more of the fluid with the same friction of the plate than it would if there were disks on one side only? A. Yes. 2. If the points are a quarter of an inch apart instead of half an inch, would it catch more of the electric fluid with the same friction of the plate? A. Yes.

(6) R. S. says: I have constructed a line of telegraph to connect my store and house, distance half a mile, and have found it impossible to make any circuit by the ground. I commenced with 4 cells of Daniell's battery; then I increased to 7 cells, and carried ground wire at each end into the cellars; these I connected with a piece of gas pipe 8 feet long, driven the whole length into the ground and surrounded with a quantity of scrap metal of different kinds, yet it does not work, and I had to put up a return wire. It works splendidly with the second wire, but I wish to make it work with the single wire. Can you inform me how it can be accomplished? A. Bury two copper plates, six feet square—one at each end of the line—in earth which is always saturated with water, and solder the ends of the wire to the plates.

(7) W. S. H. asks: What should be the members of a saline battery for constant action, the solution to be similar to sea water? A. Zinc and copper.

(8) B. P. D. says: In a recent issue you say that the resistance in the pencil of charcoal developes heat, producing incandescence. Is any effect produced by this intense heat where the carbon comes in contact with the glass cylinder? Or, more to the point: Is heat generated at all in this partial vacuum, I mean of course to any considerable extent? A. Machine electricity is not sufficient in quantity for the production of light with carbon pencils.

(9) A. asks: 1. How can I make a Leclanché battery? A. See p. 73, vol. 31. 2. How many Léclanché cups are required to make an electric light? A. Seventy-five, of large size.

(10) C. S. W. asks: Am I correct in claiming that light travels faster than galvanic electricity? A. Yes, as a general statement of fact. Galvanic electricity could travel as fast as light if it had a conductor without resistance, but that is difficult to secure.

(11) M. M. asks: Has there been in this country any practical application, to the artificial lighting of buildings, of the electric system of the Russian inventor, M. Ladiguin, described on p. 373, vol. 32? A. No.

(12) R. H. S. asks: 1. What does the following mean, in relation to lenses: "$\frac{1}{20}$ inch, angular aperture 175°," and "$\frac{4}{10}$ inch, angular aperature less than 90°, without adjustment"? A. These questions relate to compound microscopic objective lenses; $\frac{1}{20}$ inch means that the magnifying power of the combination is equal to a single lens of $\frac{1}{20}$ inch focus, or $\frac{20}{1}$ x 8=160 linear, when it would be used alone without an eyepiece. Angular aperture 175° means that the extreme rays which can converge in the axis of the lens from the edge of any object, and reach the eye, make in that axis an angle of 175°. Four tenths of an inch means that the magnifying power is equivalent to that of a single lens of $\frac{4}{10}$ inch focus, or $\frac{10}{4}$ x8=20 times linear. Angular aperture less than 90° means that the lens does not admit rays more oblique than those which make ½x90 or 45° with the axis. Without adjustment means that the lens has not the adjustment required for high power, by which the relative distance of the achromatic lenses, of which the lens is composed, can be shifted so as to adapt the lens to different thicknesses of glass crossing the object. 2. What are an immersion lens and a dry lens? An immersion lens is one of which the curves are calculated in such a way as to be only adapted to be used with a drop of water between the lens and the object. Dry lenses are the ordinary lenses.

(13) S. M. says: I have run my lightning rod into my well as a ground connection. As water is a good conductor, I supposed this would be the best possible way. Is this correct? A. Yes.

(14) W. M. Q. asks: 1. Is there a telegraph insulator in use that the wire simply passes through? A. Yes. 2. Would a glass tube passing through the cross bar be as good as the common insulator? A. No.

(15) W. O. C. asks: 1. Will a battery consisting of two 1 quart cells (copper and zinc) be of sufficient power to silver plate small articles? A. Yes. 2. How can I construct such a battery? A. See p. 26, vol. 32. 3. Can electricity be felt by taking hold of wet sponges attached to the wires? A. No. 4. What is the least number of cells required to plate small articles, coins, etc.? A. One cell. 5. How much and what kinds of wire should I use to make an induction coil two inches long with? A. Use 500 feet No. 40 and 50 feet No. 16 wire.

(16) O. C. says: 1. I have had an electro-magnet made of ½ inch iron, U-shaped (the arms 4 inches long), wound with 650 feet No. 23 cotton-covered copper wire; with two cells of Léclanché battery it attracts the armature ($\frac{1}{16}$ of an inch from the poles) with a force of about 4 ozs. Is that as much as I ought to expect of it? A. The Léclanché battery is not well adapted for power. You would get much more power from a single cell of Bunsen than from a dozen of Léclanché. 2. How shall I connect the cells together to get the greatest attractive power of the magnet, carbon of one cell to zinc of the next, or all the carbons together and all the zincs together? A. Connect all carbons together and all zincs together.

(17) E. C. says: I have made two Morse sounders, ½ inch cores, 2x1½ inches spools, with 500 feet No. 26 wire. How many cells Callaud battery shall I want for 600 feet No. 12 iron wire? A. Six.

(18) C. H. W. says: 1. In a recent article on electro-metallurgy, you stated that lead articles should be electro-coppered before silver would deposit. Is the solution for this purpose the same as that for electrotyping? A. Yes. 2. You also gave the proportion of ingredients for silver bath, using cyanide of silver. What would be the proportion in using nitrate of silver? A. Nitrate of silver will not answer. 3. How many Minotti cells with 2½ inch disks should I use for plating in a ½ gallon bath? A. One.

(19) G. A. C. says: I tried to make a battery by taking a glass jar and putting sulphate of copper in the bottom, and water on top, with a piece of copper in the bottom, and a copper wire leading from it, and zinc above with copper wire leading from it also. I cannot feel any electricity going through the wires. Is the battery too weak? A. A single cell would not have force enough for you to feel the electricity.

(20) J. W. W. asks: Is there a method of creating a vacuum, however small, by means of an electric current? A. We do not know of any.

(21) E. F. M. asks: What effect will heat lightning have on a balloon if the air is hot? A. We have no positive data to guide us upon this point but should think the heat lightning would not affect the gas.

(22) S. E. P. says: In melting ore in a small crucible, can I put in anything to make silver flow freely and separate from the other matter? A. Melt your silver with a small quantity of lead in an ordinary cupel.

(23) C. W. H. says: If a piece of glass is placed between the heat of a fire and the hand, the heat will not be felt. But if you place the glass between the hand and the sun, the heat will be felt as if the glass were not there. Why is this? A. Heat radiations are classified under two heads, luminous and obscure. A plate of glass, while it freely transmits all the higher heat vibrations or luminous heat rays, wholly arrests the obscure ones. The rays from the stove are possibly all obscure, or of slower vibration, and are therefore completely arrested by the glass plate, while the sun's heat radiations are mostly of the luminous kind (the obscure rays having been sifted out in their passage through the aqueous vapor in our atmosphere), and pass with little loss through the glass.

(24) K. H. asks: How can I color the hair on a buffalo robe, so as to make it a dark brown, nearly black? A. It will be necessary to first thoroughly cleanse the hair of all dirt, etc., as it is impossible to get any satisfactory results until this has been done. For the above purpose, the following has been used with advantage: Sufficient aqua ammonia is added to a pint of water to make the whole pungent. Afterwards wash with clean water. Then use the following dye: To a saturated solution of sulphate of copper, add ammonia until the precipitate which falls is wholly redissolved. For a mordant, to be first applied, use a saturated solution of ferrocyanide of potassium.

(25) J. F. W. says: A jeweller recently had several watches in his front window, and at a flash of lightning he felt the glass in his window move. On taking down a watch, on the face of which was a small compass, and laying the watch down face upwards, he noticed the compass out of order. It would first start and turn rapidly to the right for a good many revolutions, then poise for a second, and then revolve rapidly to the left, which it continued to do for two days, when the owner took it out. Was the watch electrified by the lightning? A. You should have stated whether the working parts were in motion or not. If in motion, the phenomenon is easily explained; some of the movable steel parts of the mechanism have, from some cause or other, become magnetized (possibly from the cause mentioned), and at every change of position they alternately attract and repel the opposite poles of the compass needle.

(26) A. S. says: I have about 300 bottles of Burgundy which has turned slightly sour. Can you tell me how to cure it? A. Try the old German method of putting into the wine a small quantity of charcoal, shaking it, and, after allowing it to stand 48 hours, decanting from the sediment.

(27) H. S. F. says: 1. On my barn there is a metallic vane. The vane is higher than anything else in the vicinity, though there are plenty of trees about. The soil is very dry. Knowing that lightning rods are seldom put up properly, is the barn safer without or with them? A. If you follow the advice given on p. 145, vol. 31, on constructing and placing the rod, there will be no doubt of its efficient protection over your property. 2. Why do trees tend to protect a building from lightning? A. Tall oaks and elm trees some times offer some protection to low buildings; but in most cases this protection is rather uncertain.

(28) O. C. L. asks: How many revolutions of Robinson's cups are equivalent to one mile traveled over by the wind? A. Dr. Robinson concluded himself warranted in laying down, as a general law, that the cups on a horizontal windmill of this description move with one third the wind's velocity, except so far as they are retarded by friction.

1. What is the simplest method of determining when it is exactly noon at New York, so as to regulate time pieces? A. The methods of determining true local time by observation are several. (1) By equal altitudes of a star or opposite sides of the meridian. Observe the time when the star has equal altitudes before and after passing the meridian; the middle point between these times is the time of the star's passing the meridian. By comparing this time with the known place of the star, we may obtain the error of the clock. (2) By equal altitudes of the sun. Since the declination of the sun changes from morning to evening, the time of the sun's arriving at a given altitude is affected by this motion, and we must compute the correction to be applied to the mean of the times observed. (3) By means of the transit instrument. The instant of the sun's passing the meridian is the time of apparent noon; and hence, if we compare the sun's passage over the meridian with a chronometer, we shall obtain the deviation of the chronometer from apparent solar time. If to this we apply the equation of time with its proper sign, we shall obtain the error of the chronometer in mean time. 2. Will a sun dial serve this purpose, and if so, how can I make one? A. Sun dials are not very accurate chronometers.

How can I make a self-registering rain gage? A. A graduated bottle with a small funnel placed in its mouth is the simplest of the various pluviometers in use, and is, perhaps, as accurate as any of them. We do not know that any self-recording instruments of this kind have yet been constructed.

(29) A. L. F. B. says, in reply to S. L. G., who asks if violin tops and bottoms are sawn thin and then bent, and also if there is a block or anything of the kind inside the violin, to glue the neck to, or is the neck simply glued to the outside: I give some extracts from the "Practical School for the Violin," by U. C. Hill: "Wood for the belly or sound board should be split so as to have a full inch thickness toward the bark or outer side, and a quarter of an inch towards the heart of the tree. Sycamore, for the back, must be cut in the same manner, with this exception: It should be split, in pieces not less than 6 inches wide, and 2 inches in thickness, at the back edge. It is then sawn in two, breadthways, or sliced into two pieces. These two pieces are then glued firmly together, with the edges nearest to the bark of the tree inwards. The under side is planed flat, and the upper or outside is, in the first instance, planed down, somewhat in the form of the roof of a house, that is, higher in the center, and sloping down gradually towards the edge. The form or model is then scooped or worked out according to the taste of the artist. It should be observed that the end blocks, which are placed one at the extremity of the neck, and the other at the bottom of the instrument, immediately under the tail-piece, are never omitted even in the commonest violins. It may not be amiss to remark that, in the oldest instruments, the upper end block is not a detached piece, but, in fact, a continuation of the neck, the ribs being let in on each side; but this system is now exploded. The neck is merely glued, and not fastened on with either a nail or a screw."

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

H. J.—It is flint.—H. S.—It is a poor quality of hematite.—J. R.—Nos. 1 and 2 are mica schist. No. 3 is quartz rock, containing iron pyrites. No. 4 is