Notes & Queries

A. A. can separate aluminum by the process described on pp. 99, 116, vol. 32.—T. H. Y. can make garden walks by the method described on p. 50, vol. 32.—E. L. S. can silver plate his iron knobs by using the preparation described on p. 187, vol. 30. It would be better to copper them first, see p. 90, vol. 31.—M. J. G. will find directions for bronzing on iron on p. 283, vol. 31, and on brass on the same page.—J. D. C. can raise water by the device described on p. 259, vol. 31.—H. E. L. will find a recipe for a dip for gilding brass on p. 332, vol. 30.—H. D. G. can solder iron to iron by the method described on p. 123, vol. 30.—E. B. can construct a continuous battery by following the directions on pp. 315, 362, vol. 31.—E. C. B., H. M., and others can cement brass lamp fittings to glass by using the preparation described on p. 27, vol. 30.—M. A. G. can make condensed milk by the method described on p. 343, vol. 30.—F. E. W. can remove mildew from cotton cloth by washing with soap. A recipe for acid dip for castings is given on p. 107, vol. 31.

(1) C. J. M. asks: In burglar alarms, how is the gas lighted when an alarm is given? A. By a friction match, in many kinds of alarms.

(2) C. H. A. asks: 1. What is the meaning of the word ohm, in electrical science? A. A unit of resistance. 2. I am making the positive element of a Smee's battery (the silver plate) by depositing the silver on tin foil. How can I get the foil off the plate? I cannot remove it successfully by melting. What acid will dissolve it without affecting the silver? A. Cover the foil with plumbago before depositing the silver. 3. I have made several Leyden jars lately, but they do not work properly. The foil was attached to the inside and the outside of the jars with ordinary flour paste. The machine (plate 16 inches, 4 rubbers) works admirably, giving a spark of from 3 to 4 inches, but I cannot accumulate a particle of electricity on the jars. A. Connect all the outer coatings together for one side and all the inner coatings for the other. 4. How can I manage to deposit a film of silver on polished copper, so that it can be removed without solution of continuity? A. Cover with plumbago.

I have a coarse-grained grindstone which, with considerable labor, I had fitted to my lathe. Owing to the swelling of some wooden wedges near the center, the stone split into two pieces. What cement can I use to repair the damage? A. Try a mixture of black japan varnish and white lead.

(3) J. B. C. asks: How are steel magnets, to retain a large quantity of magnetism, made? What kind of steel is used, and how is it tempered? A. Steel magnets designed to possess strong magnetic power should be made in sections and fastened together. In order to retain their power the poles should be connected together by an iron keeper.

(4) W. E. D. asks: 1. Is the Smee battery a good and desirable one for running a short telegraph line? A. Yes. 2. What is the best solution to use with the above battery, the zinc plates being amalgamated? A. 1 part sulphuric acid to 20 water. 3. How often would a battery of 5 one quart jars of the Smee pattern require cleaning and fresh solutions, in running a line one mile long in close circuit? A. If you use magnets of 200 ohms resistance, probably the battery would run six months. 4. Would the above battery be sufficiently strong for nickel plating? A. Yes. 5. We have a telegraph line nearly one mile in length, with eight offices; would it not be best to have all the batteries of the line divided and half of them placed at each end rather than have three or four at each office on the line, it being a close circuit? A. It makes no difference where you put the batteries in the line. 6. I had occasion to repair a small sounder; and on taking off the paper covering of one of the spools, I found the spool was wound with No. 26 wire, not insulated; but between each layer of the wire was a piece of paper to insulate the layers from each other. Please explain the *modus operandi* of this. A. The wire is wound in such a manner as to keep the different turns from touching. Many regard this method as better than insulating the wires with silk or cotton.

(5) C. J. H. says: You give a recipe for making a blue black ink which calls for sulphate of indigo in the form of a thinnish paste, and which should be neutral, or nearly so. Please give me the formula for making this ingredient for this purpose. I have made the sulphate of indigo as follows: 8 ozs. sulphuric acid (commercial), and 1 oz. indigo in powder, carefully mixed. With what shall I neutralize the acid? I have tried carbonate potassa, powdered chalk, and marble dust; either will neutralize the acid, but on filtering out (after mixing with water) the chalk or marble dust preparations, the coloring matter combines with the lime, and the liquor passes off clear, leaving the coloring matter in the filter. If I use the carbonate of potassa to neutralize the sulphuric acid, the soluble sulphate of potassa goes into the ink: and in using a steel pen, the sulphate attacks the pen and leaves an annoying crust upon it. Can you help me out of my difficulty? A. Add small quantities of indigo until the solution is neutral, or nearly so.

(6) W. B. H. says: I wish to bring a stream of water from a reservoir, in 3 inch pipe, down a hill, and across a wide ravine, and up an inclined plane on the other side. The fall from the reservoir to the bottom of the ravine is 150 feet, and from the bottom of the ravine, up the hill on the other side, to the discharge is 50 feet rise. 1. What would be the pressure to the square inch at the bottom of the ravine? A. About 65 lbs. when the flow of water is stopped at the outlet, and 22 lbs., *plus* the friction, or say 25 lbs., when the water has free discharge. 2. Would the pressure be greater in consequence of the rise of the pipe on the other side? A. Yes, when running free; no, when stopped. 3. Would material that would make a pipe one inch in diameter, that would sustain a pressure of 150 feet fall, make a three inch pipe that would sustain the same pressure, or must the strength of the pipe be increased in the proportion that the size is increased, to enable it to sustain the pressure of the same fall? A. No; the strength must be increased in proportion to the diameter of the pipe. 4. How high would it throw water from a common hydrant through an ordinary hose pipe? A. From 40 to 75 feet, according to the material of which the pipe is made and the number and abruptness of the bends in it. 5. Would 50 feet rise on the one side be exactly equaled by 50 feet fall on the other, leaving, at the discharge, the full force of the remaining 100 feet fall, or would the force of the remaining 100 feet fall be made less by the effect of 50 feet rise? If so, how much? A. The force would be less in consequence of the friction in the extra length of pipe. How much less will depend upon the velocity of discharge, the material of the pipe, and the care with which it is laid.

(7) T. H. R. asks: Has electricity ever been used as a motive power for running light machinery, such as printing presses, sewing machines, etc.? A. Not with any practical success.

(8) B. J. A. says: I have seen attached to the guards in front of show cases a class of electric machines for giving shocks, constructed in the following manner: The guard (generally of wood) is covered with metal or some other conductor, and, as far as I could see, one pole of a cell of battery was connected with one end of the guard, and the other pole with the other end. A person putting both hands on the metal would instantly receive a shock. I have constructed one on the above principle, and it will not work. Can you inform me where the trouble lies? A. The circuit must be so arranged that the current shall pass through the person.

How much nitrate of silver can be made from one ounce of pure silver? A. One ounce of nitric acid will dissolve one ounce of silver.

(9) W. L. R. asks: What size of insulated wire is the best to make electro-magnets for attracting weights? A. No. 16. 2. Will cotton-covered answer as well as silk-covered? A. Yes.

(10) A. B. asks: 1. How shall I proceed to set up a Callaud battery? A. To set up the battery, place the coppers in the bottom of the jars, fill with blue vitriol to a level with the tops of the copper; suspend the zincs in position so that the bottom of each shall be about two inches from the top of the copper. Connect the copper of each cell to the zinc of the next, fill the cells with pure soft water to cover the tops of the zincs; then put the battery on short circuit for twenty-four hours, or until the solution immediately under the zinc appears clear and white, when the battery will be ready for use. No acid or quicksilver is used. The zincs must not be amalgamated. After the battery has been in use a few days, the zincs may be lowered half an inch to an inch, care being taken not to allow them to touch the blue solution. Lowering the zincs decreases the battery resistance, and is only necessary where a number of wires are worked from one battery. About two pounds of sulphate of copper per cup is required to charge the smaller cells, and four pounds the larger. A little oil poured upon the surface of the solution in the cells prevents evaporation and creeping over of the zinc solution on the edge of the jars. When oil is not used, it is better to charge the battery with a smaller quantity of blue vitriol, a little being added from time to time, as the supply is exhausted. 2. Please explain the meaning of the word ohm, as applied to telegraphy. A. The ohm is a unit of resistance. 3. I have a sounder marked 6 ohms. Will this work on a metallic circuit of 1,700 feet with 3 cells of a Callaud (local) without a relay? A. Not very well. You will require about 10 cells. You will achieve success if you persevere. Reading by sound requires a great deal of practice.

(11) A. N. W. says: I am making an electrial alarm clock to be operated from the front door of the house. The circuit is about 60 or 70 feet, with No. 20 copper wire supported on wooden brackets, with one Callaud's cell. The magnet consists of 2 pieces of soft iron ⅝ inch diameter, 3 inches long, screwed into one piece (2½x½x⅝ inches). I have about ¼ lb. very fine insulated silk wire coiled on magnet; but it will not work. Can you tell me the reason? A. Use No. 20 wire for magnets. Put armature within sixteenth of an inch of poles, and use ten cups of battery arranged in two series.

(12) G. asks: How many cubic feet of gas will one gallon of gasoline make at ordinary burning gas pressure? A. The quality of gasoline varies greatly; but 200 cubic feet would be a fair average.

(13) X. Y. Z. says: I have a block of buildings, 28 feet deep, with a roof of slate of 7 feet pitch. During the winter I have been extremely annoyed by the snow and ice crowding over the eaves. It seems as if the sun softened the snow and partially melted it, and saturated that in the gutter with water. At night it would freeze into ice, and again melt upon the roof next day. The snow would slide off, and crowd this gutter ice until it would project a foot or more over the eaves, and produce a very unpleasant drip, besides being absolutely dangerous in case of falling. What is the best and at the same time economical remedy? A. Take a plank 12 inches wide, set it up vertically about 6 inches back of the gutter, block it up about 3 inches, and brace it with iron braces from the top back to the roof; this will hold the snow and let the water run through. But the snow will cause some of the water to remain on the slate, to make its way through the joints thereof by capillary attraction. It will therefore be necessary for you to take off the lower corners of slate for about 4 feet in hight, and relay this portion with tin only.

Can anything be put into white lead paint to prevent its turning yellow? A. Enough blue paint is sometimes put into white lead, at the time of mixing, to give it a slightly bluish cast, and to counteract its tendency to turn yellow.

(14) T. B. asks: 1. What is the best paint or other substance, to put on a smoke stack where the heat has heretofore burned off everything we have tried? A. Coal tar, commonly called black varnish. 2. Would tubes put into a boiler, parallel with the central flue, be likely to make it generate steam more quickly? A. Yes, if put in by a good boiler maker.

(15) C. M. A. asks: I propose to put in a cistern, the water of which is to be used for drinking purposes. What is the best kind of filter to use? It strikes me that a wall across the cistern, of porous brick, would be the cheapest. How would it answer? How thick should it be? A. Brick is frequently used for this purpose; the wall may be built across one side of the cistern, and, as the water will be always of nearly the same hight on both sides of it, 4 inches thick will be sufficient. 2. If I put the cistern in my cellar, would any ill effects arise from dampness, etc., in the horse? A. Not if properly covered in and ventilated from the outside.

(16) M. A. says: I have an underground cistern, walled with brick laid in cement, and plastered in the usual way, Rosendale cement being used. At about 18 inches from the bottom there is a leak, the water rising in the cistern to about the hight of 1 foot. I have tried several plans, but have not succeeded in keeping the water out. In one instance I dug a hole, six inches in diameter, four feet below bottom of cistern, into which the water drained: into this I put a pump, and kept the water level below the bottom of the cistern. I now put another coat of cement on, keeping the water pumped out till the cement was well hardened, took out the pump, tamped the hole with clay to within 3 or 4 inches of top, and filled with cement; but it would not hold. The pressure of water broke the cement, which did not adhere to the old cement. What is the remedy? A. The best Portland cement is very much superior to the Rosendale for the purpose you refer to, but it should have a chance to set before it is immersed in the water. To do this, build the bottom and about 2 feet in hight of the sides of the cistern above ground; supply it with as much water as it will absorb easily in setting; let it stand until it gets as hard as stone; then lower it into the excavation and build the remainder of the cistern upon it. This bottom tub may be built of brick, well grouted in the cement, or with cement concrete, composed of broken stones, bricks, gravel, sand, and cement. The proportion of the ingredients may be as follows: 1 measure of cement powder, 3 measures of clean sharp sand, and 3 measures of broken stone and gravel. To resist pressure, the bottom may be built of a concave or arching form, like a dome reversed. The following is an instance of the capabilities of concrete to resist the action of water: At the harbor of Cherbourg, France, the blocks, of 12 feet by 9 feet by 6½ feet, containing 712 cubic feet, and weighing 52 tuns, were built up of mortar and stone, like rubble masonry, without molds. The mortar contained one measure of Portland cement powder to three of sand, and occupied from ⅛ to ¼ of the entire mass. Blocks of this kind, 9 months old, showed a compressive strength of 113 tuns per square foot, which is but little inferior to that of Portland stone. Their cohesive force was about 200 lbs. per square inch. After becoming hard, they were slung to pontoons and thrown loosely into the sea. Some of the 52 tun blocks have in heavy gales been thrown up from the bottom of the sea (30 feet deep) and lodged on top of the breakwater, entirely uninjured.

(17) W. M. asks: 1. Our steam gage indicates 12 lbs. steam even when the boiler is cold, and there is no steam at all. Will the gage show 12 lbs. more than the true pressure when the steam rises? A. Yes. 2. We are running a 6 inch circular saw at about 500 revolutions per minute. We have gummed the saw twice, and have taken off about ⅛ inch in the diameter of it; but since we gummed it the last time we have been troubled by the saw running toward the log. What is the remedy? A. The saw ought to be hammered. 3. The saw is not flat: the side toward the log is convex about ¼ inch. Ought this to be so? A. No. It is the cause of the difficulty before mentioned.