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 This is for our information, and not for publication.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 Information requests on matters of personal rather than general interest, and requests for **Prompt Answers by Letter,** should be accompanied with remittance of $1 to $5, according to the subject, as we cannot be expected to perform such service without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Minerals sent for examination should be distinctly marked or labeled.

(1) H. E. P. writes: I have a Leclanche battery of 8 cells, disk form, which has never worked more than 10 minutes at a time. No cleaning will improve it, as the cups are clean inside as well as outside. I think they are not properly filled. Will you please give in the next number of SCIENTIFIC AMERICAN the proportions of the contents of the cups? A. Soak the cells of your Leclanche battery in warm water for several hours. Clean the zinc thoroughly, and refill the porous cells with equal parts of granulated black oxide of manganese and granulated carbon. After filling, seal the top of each porous cell around the carbon rod with pitch, leaving a small aperture for the escape of gas. The Leclanche battery is not adapted to continuous use; a half hour on a close circuit is too long a time for this battery.

(2) J. R. writes: I want to make a small Gramme machine, armature about six or eight inches long. Have you a description of any other construction? A. For a small dynamo, you will find the Siemens machine, described in SUPPLEMENT, No. 161, the best and simplest. It is quite difficult to make a very small Gramme machine.

(3) F. W. T. asks (1) whether flat Norway iron will do in the place of horseshoe magnets in making a small telephone, and will it work without a battery? A. Norway iron will not take the place of the horseshoe magnet, because the permanent magnetism of the horseshoe magnet is necessary to the working of the telephone. 2. Are there any back numbers of the SCIENTIFIC AMERICAN or SUPPLEMENT containing a description of how to make a small telephone that will work for a distance of about half a mile, to work with a battery? If so, what numbers, and what will they cost? A. See SUPPLEMENT, No. 149. 3. What is used in making a telephone battery? A. The battery commonly used in connection with the telephone is that known as the Leclanche battery. See SUPPLEMENT, Nos. 157, 158, and 159.

(4) S. F. E. writes: Please tell us through the SCIENTIFIC AMERICAN the best telephone for us country folks to use, one that we can buy outright and will be durable? A. For short distances, the acoustic telephone answers very well, and is largely used. See our advertising columns for addresses of makers of acoustic telephones. We do not know of any electric telephones that are on sale.

(5) H. S. sends a specimen of a plant for identification. A. The specimen came in altogether too fragmentary a state to make anything out of it. Send us the leaves and flowers carefully pressed, and inclosed between pieces of cardboard, and we will name the plant for you.

(6) J. B.—There is a difference of opinion among mechanical engineers as to the most perfect forms of action of link motion valve gear. There is considerable variation in forms and arrangements among the engineers of England, Germany, France, and the United States, all claiming perfection in their way. We think you will do well to make a thorough study of the work of others as a set off to your own ideas. We recommend: "Link Motion," by Auchincloss, $3.00; "Treatise on Valve Gears," Zeuner, $5.00; "Link Motion," by Burgh, $12.00; which may be had from this office.

(7) G. A. S. asks: How can I tell the temper of a razor when buying same, and also the hardness of the steel? A. Only by actual trial, if you are unwilling to take the guarantee of the manufacturer or dealer.

(8) E. R. asks: 1. Can brass be worked in a drop at all? That is, can it be drop forged, same as iron can? A. Soft brass can be worked very well in a drop press, but not to same extent as hot iron or steel. 2. I was told yesterday by one of your clients that he saw a perpetual motion machine in operation in New York, last spring or early summer, and that the machine would run until worn out unless stopped. Was such a machine exhibited? A. We know nothing of the perpetual motion machine referred to. We do not think a genuine perpetual motion machine has ever been on exhibition in this city.

(9) E. N. P. writes: 1. I have a large quantity of No. 16 cotton covered and No. 36 silk covered copper wire; can I use this in constructing a hand power electrical machine, as described in SUPPLEMENT, No. 161? A. You can use your No. 16 wire to very good advantage in the electric machine referred to, but the No. 36 is too fine. 2. A cheap battery for induction coil described in SUPPLEMENT, No. 160? A. Grenet's battery, or the plunging bichromate battery, described in SUPPLEMENT, Nos. 157, 158, and 159, will answer your purpose. 3. What alterations must be made in the electric machine to use it as a motor? Also, how many cells of battery, and what kind? A. Use less wire on the field magnet, and wind the armature with coarser wire, say No. 16. 4. Can the electric machine be used for nickel or silver plating? If so, what changes must be made? A. It can be used for plating without any change.

(10) M. M. M. writes: I have made a clay contour map. I should like to know of some material with which I can coat it, rubber, papier mache, or something of the sort, with which I can take an impression without first making a female cast in plaster. I want only one impression. A. We think that very thin sheets of gutta percha softened by immersion in warm water will answer your purpose.

(11) R. N. asks: Can you explain why 18 karat gold, being alloyed with silver and copper equal parts, cannot be beaten out into a thin leaf, when each of the above metals can be separately, and the best way of solving the question? A. The behavior of alloys can never be predicted by an examination of the separate metals. An alloy of silver and copper with gold is harder and more brittle than finer gold, therefore cannot be as readily beaten out into leaf.

(12) J. M. A. writes: I wish to put up a short telephone line, using an acoustic (advertised in SCIENTIFIC AMERICAN), and want to know if uncovered copper wire will answer the purpose as well as covered? If not, why not? Does the use of batteries improve the working of such lines, or do they only operate call bells? A. If your wire is well supported by insulators, the uncovered wire will answer a very good purpose. The batteries used in connection with this telephone, we believe, are merely for operating the call bells.

(13) J. C. O'D. asks: If I use two siphons, each having a two inch bore, to empty a large vessel, and allow the discharge end of both to be at the same level, but the elbow of one is 2 feet above surface of water and of the other 20 feet above water surface, from which pipe will most water flow, and from which will it fall with greatest force? A. From the shorter pipe. The friction of the longer pipe will retard the flow of water.

(14) L. D. B. writes: 1. I made an electric motor on the principle of the revolving turntable for store windows; the cores are five-sixteenths diameter wound with 6 layers of No. 16 wire; it works very well. Wishing to make a more powerful motor, I took nine-sixteenths inch iron, wound them with 8 layers No. 24 wire, and used 6 armatures fastened parallel to the shaft in the style of a water wheel. This machine does not equal the first either in speed or power when I use the same battery on each, which is a carbon battery with electropoion fluid in the porous cup. Is it due to the fine wire that it does not work as it should? A. Your difficulty is due to the resistance of the fine wire with which your magnet is wound. If you had wound your larger magnet with the No. 16 wire, you would have succeeded better. 2. What is the limit to the number of armatures that can be used with one magnet? A. We do not know that there is any limit, but we think there is no advantage in a large number of armatures, when used in connection with a single magnet. 3. Will not an intensity battery work much better on a magnet wound with coarse wire than a quantity battery on a magnet with fine wire? A. Yes; but it would be best in all cases to adapt the battery and the magnet to each other. 4. Is there any other way to obtain the speed of small motors when a pencil tied to the shaft with a piece of paper drawn over it reduces the speed, even when making an almost imperceptible mark? A. You can do it by allowing the armature to act as an interrupter to a jet of air. The motor will then act as a siren. The tone produced may be compared with that of a musical instrument; and as the rate of vibration required to produce such a tone is known, you can readily decide as to the velocity of your motor. 5. What is India ink made of, and why has it such an abominable smell after standing mixed for some time? A. India ink is made of extremely fine lamp black and a gum. The smell to which you refer is due to the putrefaction of the gum.

(15) P. E. writes: 1. After dissolving one gramme of rock phosphate in half an ounce of HCl to keep the iron and alumina in solution, I add citric acid in crystals, but I get a precipitate, which I think ought not to be. What can be the cause? A. We think that the precipitate will be avoided if you use, for every two grammes of the rock, 2½ grammes oxalic acid and 4 grammes citric acid dissolved in 10 c. c. of acetic acid, instead of the crystallized citric acid. 2. Then I have to neutralize the solution with ammonia until a faint precipitate appears, and have to redissolve the precipitate with a small quantity of HCl, and have to add oxalic acid to precipitate all the lime present. What is the quantity of oxalic acid I must make the solution of to add to the precipitate; make alkaline with ammonia, and allow to stand for 12 hours? A. A concentrated solution, almost up to saturation, can be used. 3. To the filtrate, which I have to make strongly alkaline with ammonia, I must add a quantity of chloride of ammonia to prevent any magnesia being precipitated, and then I have to add magnesia mixture, to precipitate all the phosphoric acid. A solution containing how much chloride of ammonia must I use, and how many c. c. of the magnesia mixture? A. The quantity of ammonium chloride required depends upon the strength of your magnesia mixture. It is best to use a standard magnesia mixture solution, from which you can readily calculate the proper amount of the ammonium salt necessary. The quantity of phosphoric acid contained in your rock determines the amount of magnesia mixture required; 45 grammes of the crystallized sodium acetate. Teschemacher and Smith published in London, a few years ago, a little book on the proper methods to be used in analyzing phosphate rock, which would doubtless be valuable to you.

(16) J. E. W. asks: Will quicksilver, if thrown in a canal or pond, work its way through the bank or dam, and thereby cause a leakage and break? A. Quicksilver tends to penetrate porous substances only by its weight or gravity. It does not wet or attach itself to the surface of the particles of sand as water does, and hence has not capillary attraction to help draw it through a porous substance. This we think partially counteracts its superior gravity, and will make it no more liable to filter through a canal bank than the water itself; certainly not to the extent of displacing the material or facilitating the flow of water.

(17) T. J. B. writes (1) for a recipe for preparing a good glue to use with pine wood. A. Use an ordinary glue to which a little glycerine has been added. It is best to use the glue while hot. 2. A recipe for preparing a walnut and mahogany stain? A. To stain black walnut: Take 1 quart water, 1½ ounces washing soda, 2½ ounces Vandyke brown, ¼ ounce bichromate of potash. Boil for ten minutes, and apply either in a hot or cold state. For mahogany: Boil ½ pound madder and 2 ounces logwood chips in a gallon of water; brush well over the wood while hot; when dry, go over the whole with pearlash solution, 2 drachms to the quart. 3. What kind of varnish to use after such furniture is stained? A. A good mahogany varnish consists of sorted gum anime 8 pounds, clarified oil 3 gallons, litharge and pure dried sugar of lead each ¼ pound; boil till it strings well, then cool a little, thin with oil of turpentine, 5½ gallons, and strain.

(18) W. G. J. asks for any mechanical method whereby the air can be taken out of water. A. You can free the water from air by boiling, or by a vacuum pump. With your unlimited water power, you may set the freezing cans or boxes filled with water into a chamber capable of withstanding a vacuum pressure, and then pump the air from the chamber, when the air will also leave the water. A chamber made so that a half dozen water cans would just fill it could be so arranged as to complete the operation every half hour, and in this way, with 2 or 3 chambers, make many tons of water airless per day. If the freezing cans could be made strong enough, no chamber would be necessary, only caps with rubber rings with a pipe leading to the air pump.

(19) R. H. E. K. asks the best mode of cleaning the grooves of a Smith & Wesson No. 3 United States Army revolver, without risking blunting sharp edges. A. Make a little scraper out of stiff iron wire by screwing the wire in a vise and hammering the end over the edge of the vise jaw, then file to fit the pistol groove. Take the barrel out of the stock, and hold up to the light, when you can see to scrape out the grooves. If they are badly leaded, you may have to make a chisel shaped scraper, with which you can plow out the grooves.

(20) W. W. C.—A hot cannon ball cools from the outside. If cooled in water, the surface may be black while the center is red hot. A cannon ball or any ironwork will sink to the bottom of the ocean as fast as gravity will carry it through the water. No matter how great the pressure is at great depths from the superincumbent mass of water, the specific gravity of the water is but little greater than at the surface. Hence all substances as stone, sand, mud, clay, shells, etc., exist at great depths with but little variation, except from the effects of decreased light.

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November 3, 1885,

AND EACH BEARING THAT DATE.

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