Business and Personal.

The charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

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 This is for our information, and not for publication.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). G. E. S. asks (1) for information about hay caps. What size ought they to be, and what is the waterproof composition that they are covered with? A. Hay caps are from 4½ to 6 feet square. They are made of good muslin, and should be hemmed on the two torr. edges. It is best to have a cord hemmed in all around the cap provided with a loop at each corner, through which a wooden pin is stuck into the hay, thereby holding the cap on. It is not considered necessary to have them made waterproof, as they will sufficiently shed water if properly put on. The following preparation, however, will render them thoroughly mildew proof, and will enable the caps to shed water like a goose's back: Make a solution by soaking a bushel of wheat bran in 10 gallons of water for 48 hours; then boil for one hour, and strain. To this liquor add 2 pounds of alum. When completely dissolved, put in the caps, boil for 15 minutes, then wring out and dry. 2. I am thinking of putting in a hydraulic ram to force water up into my house and stock barns. The distance from brook to house and barns is about 350 yards, and the height from water to second story in house is between 50 and 60 feet. Can this be done, and with what fall? A. This you can readily accomplish. In order to elevate water to a height of 60 feet, we know theoretically that the quantity raised should be to the water supply as the fall in feet is to the height in feet, but practically we are compelled to allow for friction, etc., which varies widely. In actual practice only one half of one-sixth, or one-twelfth, could be delivered. Douglass makes an excellent ram, but many think that A. Gawthrop's Son, of Wilmington, Del., furnishes something better. It should be placed in a frost proof building, and the pipes must be laid in a trench below the reach of frost.

(2) J. R. asks: 1. Can mustard be easily raised on common soil? A. Yes. 2. Is rich or poor soil the best? A. Rich soil. 3. Can it be thrashed with the common thrashing machine? A. Yes. 4. How much does it produce per acre? A. From twenty to forty bushels. 5. How many acres will a bushel sow? A. Six. 6. How much is it worth per bushel? A. From 3½ to 4 cents per pound. 7. Where can I procure the seed? A. Any seedsman. 8. What is the proper season to sow it? A. As early in spring as it is possible to work the ground well. 9. Can it be harvested with the self-binder? A. Yes, if done as soon as ripe, and when damp with dew. 10. Can it be cleaned out of the ground by fall plowing, or what is the best way to prevent it from growing the next year? A. Thorough cultivation will clear it out. 11. Which is the most profitable millet to sow for seed? A. Genuine millet for feeding purposes. 12 What variety and what kind of land is the best adapted to its culture? A. Any good, rich land; a clay loam is excellent. 13. The proper season to sow it? A. Not till the weather is settled and warm. Say June 15, in central Illinois. 14. Can it be harvested with the self-binder? A. Yes. 15. How much is sown per acre? A. According to the richness of the land, from ½ to 1 bushel. 16. How much does it produce per acre? A. From 15 to 40 bushels. 17. Is there any machine that will thrash beans without splitting or damaging them? A. There is. 18. If you know of any, please give me the firm's address? A. A. J. Edicks, Wright's Corners, N. Y. 19. Also if you know of any way to plant beans so they will all ripen together? A. Plant clean seed that is all of one variety. 20. What is the best way to clean the grease off of gummed axles and old machinery? A. Caustic soda or potash will remove all grease from axles and machinery.

(3) A. S. writes: Can you tell me the secret of plastering a house so that the walls will not show cracks? I am just about to plaster my new residence, and upon inquiry I find some houses have been allowed to stand for months, and yet the cracks occur after plastering. Timbers guaranteed seasoned and no perceptible settling in walls, and the same thing occurs. So that I am inclined to believe that it is perhaps in the mixture and application of the mortar or plastering. A. Cracks sometimes occur in walls that have had the best of care. Apart from allowing time for the wood work to season, the best advice that we can give is to finish with 3 coats, as in our best work. First a scratch coat. When this is well dried, put on the brown coat. When this is well dried, finish with a white coat which has plaster of Paris in it. This is sometimes called a stucco coat. Sometimes a little hydraulic cement is mixed with the first coats to harden them. It makes them less liable to shrinkage.

(4) E. M. S. asks: 1. Give composition of a good cheap varnish to be rubbed on furniture with a rag, which will restore the original appearance where varnish has been scratched, etc.? A. See "Furniture Polish," in Scientific American for March 28, 1885. 2. A man is selling a liquid solder to the people about here to mend tinware, etc. Please tell what liquid solder is made of, and how? A. Dissolve as much zinc sulphate as possible in one pint of alcohol, and then add one ounce glycerine. 3. Please explain to us the astronomical terms, right ascension and declination. A. See Webster's dictionary under term of ascension. 4. What is the composition of window and tinware polish which looks like balls of chalk? A. It is difficult to say just what the article is unless we have a sample. A great many polishing powders are white. See the article on "Polishing Materials," in Scientific American of January 17, 1885.

(5) C. E. F. asks (1) the proper instrument to test lye to its degree of strength, and how much it costs. Do you refer to common caustic soda in your answer (17), March 28, 1885, or double refined greenbank 98 per cent? A. The instrument used is Baum's hydrometer for liquids heavier than water. Price is 75 cents. It will be best to use the greenbank alkali although any good caustic lye will answer. 2. Receipt for making compressed yeast? A. There is a "patent yeast" made as follows: Simmer 6 ounces hops in 3 gallons water for 3 hours; strain it, and in 10 minutes stir in ½ peck ground malt. Next reboil the hops in water, and add the liquor to the mash already made, which must be well stirred, covered up, and left for 4 hours; then drain off the wort, and when cooled down to 90° Fah., set it to work with one pint yeast (patent is best); after standing for 20 to 24 hours, take off the scum, strain it through a coarse hair sieve, and it is ready for use. One pint is said to be enough for 1 bushel of bread.

(6) T. D. B. asks: 1. How are the carbon filaments fastened to the platinum wires in the miniature electric lights? A. By electro soldering. 2. How are these very small lamps made? A. You will find information on this subject in the back numbers of the Scientific American and Supplement. This subject is too extensive for treatment in these columns. 3. Would an exhausted incandescent electric light globe answer for a Geissler tube by using an induction current? A. No. 4. I have broken the platinum wires off short to the glass globe of a miniature incandescent globe; can you tell me how to repair it so it can be used for a stationary lamp? A. Fasten a wire to the glass with cement so that its ends will touch the platinum wire if possible. then complete the connection with a little amalgam scraped from a back of a mirror, and softened with a very small quantity of mercury.

(7) C. C. B. asks: 1. Is the process of burnishing electro silver plated goods a difficult one to learn? Does it require any particular knack or skill to accomplish? A. Burnishing silver plated ware is not difficult, provided the silver is deposited in a soft state and the burnishers are in good condition. Burnishers may be of hard steel or of bloodstone. They should be highly finished, and should be polished from time to time by rubbing them on a strip of sole leather charged with fine rouge. The burnishers should be wet while in use with a solution of white Castile soap with a little alkali added. 2. How is double or triple plating put on? A. By simply leaving the work in the battery for a longer time. 3. Is gilding burnished the same as silver plating? A. Yes. 4. How is the resistance coil or switch attached to or used with batteries? A. The resistance coil is connected with the battery, so that more or less of the length of wire of which it is composed may be introduced to the battery circuit at will.

(8) A. H. B. writes: Having constructed a Carre dielectric machine capable of a spark about an inch long, I am desirous of some experiments to perform with it, especially those which illustrate luminous effects. Would a glass tube with wires sealed in each end, and exhausted by boiling water in it and then sealing, transmit the electricity with that glow peculiar to the Geissler tube, or would the moisture in the tube carry away the charge invisibly? A. We do not think you could produce any visible effects in the vacuum tube prepared in this way. 2. Would boiling mercury in a tube produce the desired effect? A. You might, with sufficient care, be able to produce a vacuum that would answer the purpose. You should not inhale the vapors of the boiling mercury. 3. Are there any fluids or solids which become luminous when the current is passed through them? I don't mean the galvanic current, but the current produced by an electrical machine? A. The current from your machine would render fowls' eggs luminous. 4. I have one Geissler tube with vase of uranium glass, and want to know if there is any way I can produce the necessary vacuum without an expensive air pump? A. No. 5. I have heard that sulphate of quinine fluoresces on the passage of the current. Is this true, and on what conditions must the quinine be in? A. The solution of sulphate of quinine must surround the vacuum tube.

(9) E. N. L. asks: Has there ever been a telephone yet made, or device by which the voice of one talking in the transmitter at one end of a given line is reproduced or heard at the other end of the line, speaking the words out loud, so that it can be heard two or three feet from the receiver, and on how long lines? A. Edison loud speaking telephone does this. It works on lines of the usual length.

(10) P. P. B. writes: I have built a dynamo machine similar to that described in Supplement, No. 161, only twice the size of one described. I wound the armature with 5 layers of No. 14 wire, the field magnets with 7 layers No. 12 wire. The machine weighs about 160 pounds. It will heat a 16 candle power incandescent lamp white hot, but will not heat it sufficient to make scarcely any light. Can I do anything to improve my machine? If so, what? Communicator springs are 2 inches wide; is that sufficient? How fast should it run to get best results? A. Try placing two lamps in multiple arc. We think you would succeed better by using more lamps of smaller candle power; say 8 candle power each. The speed of the armature should be from 1,500 to 2,000 revolutions per minute.

(11) M. V. C.—There is no danger attending the washing of the bedsteads with hot soap suds, provided, of course, that the mercury or quicksilver compound does not penetrate into the flesh through open cuts, etc., or in other words, it cannot be considered more dangerous than if cold water was used.

(12) J. G. D. asks: What will cement celluloid letters to the outside of show window? A. Try a thick solution of marine glue in wood naphtha, or else melt resin and stir in calcined plaster until reduced to a paste, to which add boiled oil, a sufficient quantity to bring it to the consistence of honey; apply warm.

(13) H. F. asks how to find the horse power of boilers. A. Divide all the surface that is exposed to the fire and heat, in square feet, by 14, which is the nominal horse power.

(14) W. R. J. asks the cause or causes of sound from stretched telegraph wires. A. The sounds are produced on the principle of the Æolian harp, the wires being set in vibration by the motion of the air.

(15) G. W. H. asks: What danger is to be apprehended from running electric wires underground, several united and insulated, in a cable, or in near proximity, as in usual street construction? This applies to electric light wires as well. A. No danger if the wires are properly laid and protected.

(16) C. J. G. asks how to soften a leather carriage top which has been varnished. A. You will find the removal of the varnish a somewhat difficult task. Benzine or turpentine will probably help some. Caustic soda will cut the varnish, but it will also ruin the cloth unless great care is taken. Turpentine and soap is used to remove varnish.

(17) R. L. H. writes: I make ink under a recipe taken from your Supplement. The proportions and ingredients are: 168 grains extract of logwood, dissolved in one pint of either hot or cold water, and add 14 grains yellow chromate of potash. Sometimes add 20 grains common washing soda to prevent decomposition on exposure. This ink is somewhat objectionable because it is too pale, and eventually loses all its color. It however flows readily, and is the best non-corrosive ink I ever used. I can find nothing which will improve its quality; in fact, nearly all chemicals will destroy it. Can you suggest any additional chemical which will make it a good permanent black ink? A. It is very doubtful if the ink you describe can be improved. It is generally known as Runge's ink, and a great number of formulas exist, slightly differing from each other. The following is one of the many modifications:

Sodium carbonate	30 parts.
Warm water	1300 "
Extract of logwood	30 "

Dissolve, and add then a solution of 5 parts potassium bichromate in 100 parts of water. The addition of sulphate of indigo or of a small quantity of soluble aniline blue to the ordinary gall inks is recommended for the purpose of increasing their blackness. A superior quality of gall ink is composed of:

Galls	45 parts.
Ferrous sulphate	15 "
Gum	5 "
Water	200 "

(18) L. D. B.—There is considerable flax raised in this country. Its principal use until recently was for the production of the seed, but latterly it has been used for coarse carpet warp. The imported flax is of finer quality, and is used for the manufacture of thread.

(19) C. L. N. asks: 1. How is water power best used to compress air? A. By a water wheel working a pump. By a direct acting water and air pump. By an injector. By the falling of water down a long pipe. 2. How many pounds of dead weight will be lifted clear of the ground by 1,000 cubic feet of nominally pure hydrogen gas? A. 1,000 cubic feet hydrogen gas will lift 70 pounds. 3. Is there any process by which silk or other woven fabric can be made impervious to hydrogen gas? A. Varnish the silk with India rubber cement thinned with naphtha. Can be obtained at any rubber factory.

(20) F. H. B.—You cannot kill the life of steam until it is entirely condensed, and it might pass a thousand elbows, if they were near together, with a loss on a hundred pounds pressure of 25 per cent. The fact that the crosshead has an upward bearing while a locomotive is running forward should be apparent to any one. If the cylinders were placed behind the drivers, then the action would be the same as in the stationary engine. By studying the push and pull of the piston with the upper and lower position of the connecting rod, the philosophy becomes very plain to the most casual observer.

(21) W. B. B.—The best forms of wind mills develop from ¼ to ¾ horse power for a 12 foot mill. The tensile strength of Bessemer steel varies from 72,000 to 76,000 pounds per square inch, and occasionally will run up to 100,000. Hammered bar Bessemer has been tested to 150,000. The Siemens-Martin costs about 10 per cent less than for Bessemer. Bessemer for merchant bar, about $50 per net ton. Siemens-Martin, about $45. The prices vary very much according to sizes and shapes.

(22) W. K.—The only peculiarity in hardening mill picks is, to leave the edge thick, say one-sixteenth inch. Harden at the lowest heat that the particular kind of steel will take, in clean water at about 60°. Draw temper as little as possible, which may be ascertained by trial at a straw color to begin with. Do not draw temper with the same heat used for hardening. The pick after hardening should be tried with an old fine file, which by a little experience will tell you if the hardening is even. Then grind, and heat from the center for color drawing. If you use low grade steel of first rate quality, the color temper may be dispensed with. The greatest difficulty is caused by burning the corners in forging or in heating to harden. Therefore use a dull charcoal fire if possible with light blast. Blast often ruins the finest steel.

(23) G. C. K. writes: 1. A tank filled with water, 50 feet high and 10 feet in diameter, with a spigot at the bottom, 1 inch flow, what rate per cent will the first 25 feet of water run out faster, if any, than the last 25 feet? A. The average flow of the upper half of the tank will be equal to a pressure of 37½ feet, while the average flow of the lower half will be equal to 12½ feet pressure. The upper half will flow three times as fast as the lower half. 2. It is claimed that the standard of gas burning is a fifteen hole Argand lamp, interior diameter 0·44 inch, consuming 5 cubic feet per hour, evolving a light from common coal gas of from 10 to 12 sperm candles, 6 to the pound. How is this number of candle light power ascertained, when making a comparison with gas light to candle light? A. There

are many ways of making the photometric comparison between a standard candle and the standard Argand burner, but mostly by the unequal distance of the two lights when their shadow images are alike. For interesting illustrated descriptions of photometers and their use, see SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 283, 378, 284, and many others in our classified catalogue.

(24) J. M. W. writes: A says that a No. 10 shot gun, 32 inch barrel, will burn only 4½ drachms first quality powder when loaded in the ordinary way, 1¼ ounce shot. B says that same gun will burn any reasonable amount up to 8 drachms or more. Which is correct, if either? A. A is right. The larger amount is not all burned, but thrown out, as may be proved by firing through waxed paper at a few feet distance, when the unburned grains will be found sticking to the wax. You can find the exact amount that is effective by the penetration of the shot in a soft pine board or a ream of paper.

(25) C. W. H. asks: 1. Can you mention any compound or article that could be mixed with charcoal and niter that will on burning (smouldering) emit chlorine for disinfecting? A. Chloride of lime may be sprinkled on wet paper, which when dried may be burned. Carbolic acid may be used in the same way. These are both also volatile without heat. 2. Also, what is a good disinfectant for any room, that can be burned (smouldered)? A. Chromic acid and sulphur mixed in small quantities with sawdust or paper, and left just moist enough to smoulder, make most effective disinfectants. In disinfecting by burning, caution should be used regarding quantity used where persons are present. The vapor of the tincture of iodine is also a disinfectant: this has only to be evaporated from cloth or paper, and the cloth or paper burned after drying.

(26) G. E. K. asks (1) if there is any danger in drinking water filtered through commoncoke. A. No, provided the charcoal is renewed from time to time. 2. Do you know of any other substance better than charcoal, coke, or pumice stone for filtering water? A. We do not; metallic iron is sometimes used. 3. How can pumice stone be made into any desired shape? A. Pumice stone can be ground into powder or it can be cut into shape, but it is not moulded, as far as we know.

(27) H. F. R. writes: I made an electric machine as described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 161, and used 2 pounds of No. 18 cotton covered copper wire on magnets, and about 40 feet No. 16 on armature. I did not insulate the wire from the core on the armature; will it make any difference? Would like to make a motor out of it, but do not know how to proceed to do it. A. You should have used the No. 16 on your magnet and the No. 18 on your armature. It would have been safer if you had covered the armature with insulating material, but if you have no leakage from the wire to the iron, it will of course make no difference. The dynamo answers very well as a motor without any additions or alterations. You will not need a fly wheel.

(28) McN. desires a recipe for making a good tooth wash, to be made into cakes soft enough for the brush to take it and strong enough to clean on one application, and like it to be pink in color. A. Take 1 pound Paris white, ½ pound rose pink, 3 ounces orris root, alum ½ ounce, oil of cloves and nutmegs each 1 drachm. Use honey enough to form a paste. A finer article is made as follows: Take of prepared chalk 3 ounces, cuttle fish bone and white sugar (powdered) of each 2 ounces, orris root (powdered) 1 ounce, smalts 2 to 3 drachms. Mix with sufficient sirup of violets to make a paste. Use carmine for coloring.

(29) J. G. asks: 1. In constructing a wooden trough battery to be powerful enough to strongly magnetize steel bars of ½ pound weight, what number and size of cells will be necessary for using zinc and carbon plates 5x6 square? A. Six cells. They should be large enough to permit of readily plunging the elements, and should contain enough solution to enable the battery to run for two or three hours. Probably ¾ inch larger than the electrodes all around would answer. 2. If zinc and copper plates are used instead (5x6), what should be the number of cells? A. Same size and number. 3. If a different form and size of plates would answer better, please name them? A. If you use a bichromate solution, plate 3x6 inches would answer. 4. How thick should the carbon plates be to answer for a short time? A. ¼ inch. 5. Would the battery described in SCIENTIFIC AMERICAN of April 11 answer for operating microphones, bells, etc.? A. Yes, but we think a Leclanche would suit you better. 6. How far should naked wire be placed from a building heavily coated with lead paint, to not be influenced magnetically by it? A. The distance is immaterial. 7. Is galvanized steel wire suitable for magnetic line wire, and as good as iron wire? A. Yes. 8. How small wire will work a call bell ¼ to one mile? A. Use No. 12. 9. Should all wires for magnetic purposes, running through damp cellars, be insulated? A. It should be insulated.

(30) G. W. B. asks: 1. What kind of battery is used for telephones? A. Generally the Leclanche. 2. Are same sized cells used for long as for short lines? A. Yes. 3. About how many cells are used to a mile of line? A. One to two cells for any length of line. 4. Is the earth ever used to complete the circuit, as in telegraphy? A. Almost universally. 5. How many ohms resistance has an ordinary "bell" receiver? A. 25 to 75. 6. Size of wire? A. No. 36.

(31) W. G. G. asks: 1. If a party gives written guarantee in purchase of boiler that it shall be tested usual boiler test, and warrants it safe, and has not done so, is he liable? A. Party is liable under the common law for violation of contract. 2. When he cements up a crack and paints it over, with same representation, and you find on getting up steam that she is not fit at any pressure, is it not criminal? What is the remedy? A. The fact of imperfect work concealed does not constitute a crime, we believe, under the statutes. If you have paid for the boiler, you may sue in court for damages to the amount of the bill, using the guarantee as evidence of agreement, and prove by witness the worthlessness and dangerous condition of the boiler.

(32) F. T. writes: I have made dynamo full size as described in SUPPLEMENT, No. 161. Would it make machine of double its power, by placing another pair of field magnets at the other end, and using the same armature? A. It would increase the power somewhat but would not double it.

(33) O. F. McP. asks: 1. If the north and south poles of a permanent magnet be connected by a common copper wire, does the same effect take place as if they were joined by the regular iron armature? If so, why has it no effect on the ordinary coils of a telegraphic sounder? A. The copper wire being non-magnetic is not appreciably affected by the magnet. 2. Which is the simplest method of producing a spark from a permanent bar magnet, and, if impossible, how can it be done with a horseshoe magnet, giving a description of apparatus and parts used? A. With a small magnet this is impossible. With a large magnet you can produce a spark by applying the poles of the magnet to the poles of an electro magnet which is wound with very fine wire; on suddenly withdrawing the permanent magnet from the electro-magnet, the spark will be seen between the terminals of the electro-magnet if they are sufficiently near together. 3. Also describe a spark coil. A. See SUPPLEMENT, 160. 4. Also a formula of the best concrete which is used for the foundations of large buildings. A. See SUPPLEMENT, Nos. 183, 285, 418, 36, 338.

(34) H. R. S. asks: 1. Will the telephone employing U magnets, described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 142, work on telegraph wire the distance of six blocks, with ground connections and two Leclanche batteries at each end? A. One Leclanche cell will work a transmitter to that distance or farther, but a good magneto telephone ought to work that distance without a battery or transmitter. 2. If so, will I be infringing on any patent by using the same, using a strap key and common call bells, with a double pointed switch, by the use of which the bells can be rung and then switched so as to connect the telephone, then, when through talking, switched back, so the bells can always be rung by pressing the strap key. A. The Bell Telephone Company claim to control all speaking telephones. 3. Would magnets 3½ inches long be big enough? Also how long should the iron core be. Do the small binding screws on the back of the concave flange, E, touch the diaphragm or not? A. A magnet of that size would be large enough. The iron core should belong enough to reach through the bobbin and nearly touch the diaphragm. 4. Will you please tell me how to make an ordinary acoustic telephone (the diaphragm especially), and how far would it work? A. Two diaphragms of wood or metal supported at the edges and having their centers connected by string or wire, or still better a fine wire cable, form a good acoustic telephone, which will work under favorable circumstances for half a mile.

(35) J. E. J., Jr., writes: A man has been going through this city for some time past selling a silver plating preparation in small clear glass bottles. It has the appearance of pure spring water, and is as liquid as the same. He cleans off a bit of brass, copper, or silver, and starts to polish it with this stuff, and in a few minutes the article has the appearance of silver. A. It is probable that the solution to which you refer is simply a solution of nitrate of mercury and water. This solution can be readily made by dissolving a small quantity of mercury and nitric acid, and diluting the acid with water. But the mercurial coating applied in this way is not durable, and would prove injurious if applied to table ware. The following is recommended for applying a thin coating of pure silver: Nitrate of silver 80 parts, dissolved in 36 parts of pure water; add 40 parts of salammoniac and 160 parts of hyposulphite of soda and 160 parts of whiting. Apply with a chamois skin or piece of cloth.

(36) F. E. C. writes: I have a drive well; point down about 35 feet, and in sand. Water was at one time moderately hard, but has in the last two or three years become soft, and in the last few weeks tastes and smells bad. A vigorous pumping of several minutes does not improve it. Can you explain it? A. It is possible that the surface drainage has found access to your well. If so, it might possibly be stopped by puddling with clay, but it is best never to take any chances of using water contaminated from such cause.

(37) T. A. J.—To demagnetize a watch place it in a helix formed of about 100 convolutions of No. 16 insulated wire. Connect the helix with a current reversing key, and connect the key with a plunging bichromate battery of about 6 cells. Plunge the elements, and while slowly withdrawing them from the solution work the current, reversing key at the rate of about two movements per second. If the elements of the battery are large, it would be well to tip the battery, so that the zincs may leave the solution cornerwise. It would perhaps be well to experiment on some other magnetized object before trying the watch.

(38) W. V. L. asks for any cheap substance or material that can be applied to the wires of a fence between the posts to which they are attached, that would effectually prevent the lightning from passing over it, from post to post. There is general complaint in that vicinity (Iowa) on account of the accidents resulting from this source, and some are discarding the wire on that account. A. We would suggest that you provide your wire fence with efficient ground connections at intervals. Nothing can be applied to the wire which will prevent the lightning from passing over it.

(39) F. I. M. asks (1) why a smaller gravity battery cup is used on a main line circuit than is used on a local circuit. A. From motives of economy; the current required for the line is an intensity current capable of overcoming the resistance of the line. 2. The difference between a battery connected for quantity and one connected for intensity; how are they connected and why so? A. A battery is said to be connected, for quantity when all the zincs are connected together to one of the conductors, and all the copper plates are connected together with the other conductor. A battery connected in this way acts precisely like a single large cell. A battery is said to be connected for intensity when the zinc of one cell is connected with the copper of the next, and so on throughout the entire series. A battery so connected has a high resistance, and is capable of working over a circuit of high resistance when the battery connected for quantity would not. 3. How to maintain, and detect when a battery is getting weak? A. An acid hygrometer is generally used to determine the condition of the battery.

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June 2, 1885

AND EACH BEARING THAT DATE.

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