Business and Personal.

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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 This is for our information and not for publication.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 Written Information on matters of personal rather than general interest cannot be expected without remuneration.

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

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(3447) D. E. S. asks: 1. I have commenced to build the electric motor described in SUPPLEMENT, No. 641, and is the wire of the armature core 16 or 18? A. It is immaterial whether you use No. 16 or No. 18 iron wire in the core of your armature. Probably you would find No. 18 or 20 easier to wind. 2. Is all copper wire magnet? A. Magnet wire is copper wire wound with one or two wrappings of cotton or silk. 3. Will it make any difference if the wire in the armature core is in more than one piece? If not, must the ends be abutted or fastened together? A. If you refer to the armature core, it will make no difference whether the cores of the wire are abutted or fastened together. 4. Is the wire on the field magnets copper or iron, covered or bare? A. It is magnet wire. (See answer to No. 2.) 5. What does a one horse power Shipman engine weigh, and would it be practical to run a buggy? Are there any other small engines made that would be better adapted? A. We do not know the exact weight of a Shipman one horse power engine, but we think it must weigh about 150 pounds. It might possibly be adapted to running buggies. We do not know of any regularly made engines for this purpose, but probably one could be designed that would be better adapted to running carriages. 6. Would the above motor be practical to get the power from a dynamo? And how should it be arranged? A. These motors are successfully used for running dynamos. The dynamo is driven by a belt from the fly wheel of the engine. 7. How can I make a positive jet black writing ink that will show as soon as written and not dry for a couple of hours, and that will take a good copy by simply rubbing a sheet of dry tissue paper over the writing with the fingers? A. It is almost impossible to find an ink which fulfills all your conditions, but the following from the new "Scientific American Cyclopedia of Receipts, Notes and Queries" (in press) gives a copy without the use of a press: Nigrosine (aniline black) C. P. fine, 10 oz.; glucose "A," 1½ oz.; hot water, 1¾ pints; glycerine, 1¼ oz. Dissolve the nigrosine by trituration in the hot water, then add the other ingredients and strain through a piece of silk. If too thick when cold, dilute with water. In preparing this ink, it is imperative that the water should be quite hot until all the dye has been taken up by the water. 8. If a fair question, how are you able to so correctly answer the 1,001 questions asked every month? A. We employ a corps of writers who are able to answer many of the questions offhand, while other queries require a great deal of research, and sometimes intricate calculations and experiments. The "Scientific American Cyclopedia of Receipts, Notes and Queries," now in press, is designed to meet the wants of those who seek information of this kind. It is a digest of notes and queries published in the SCIENTIFIC AMERICAN, and contains over 12,000 valuable receipts.

(3448) W. J. M. asks: 1. What would the voltage of a single cell of the dry copper-zinc battery described in query 3271 on page 123 of the issue of August 22, 1891, be, if the blotting paper was 2×3 inches? A. The E.M.F. of the battery referred to is about 1 volt 2. Does the size or thickness of the plates affect the strength of the current? Also, is it necessary to put each element in a separate jar, or could I put a number of elements together in an air tight box? A. The current is dependent upon the size of the plates. It would be better to put the elements in separate cells, but undoubtedly you could get very good results from a number of elements arranged in the form of a pile. 3. How many 24 volt 32 candle powder lamps could I light with 30 elements connected in series, the lamps being arranged in parallel? A. This battery is not at all adapted to running electric lamps, in fact it would be practically impossible to use it for this purpose, on account of the great resistance of the battery. 4. What is the amperage of a single cell of this battery? A. Probably from one-fourth to one-eighth of an ampere. 5. What is the voltage and amperage of a single cell of Daniell battery? Also, does the size affect the E.M.F., and could I put the bluestone in the bottom of the cell instead of having a pocket? A. About one-third of an ampere. The size of a Daniell battery has no effect upon the E. M. F. The only effect of putting the bluestone in the bottom of the jar around the porous cell would be to impede the action of the porous cell 6. If I had a battery giving 30 volts at 20 amperes, could I light five 24 volt lamps arranged in parallel, if each lamp requires 4 amperes? If not, why? A. If your battery will yield a 20 ampere current having an E. M. F. of 30 volts, with the 24 volt lamps in circuit, you can undoubtedly run the lamps, but the resistance of your lamps will cut down your current so as to render this impracticable. 7. Which is the best way to connect up the eight light dynamo—series or shunt? If series, how many pounds of No. 12 wire should be wound on each leg of field magnet? A. For arc lighting, connect up the 8 light dynamo as a series machine; for incandescent lighting it would be better to arrange it as a shunt machine. It will require about 17 pounds of No. 12 wire for the field magnet. 8. Would a medical coil made as follows be very powerful? If not have you any description of how to make one? A piece of ½ inch iron pipe 7 in. long. On this at each end are fitted two pieces of wood 1 inch thick to confine the wire. Then four layers of No. 23 cotton-covered magnet wire is put on for the primary coil. Then 17 layers of No. 30 cotton-covered wire for the secondary. When the winding is finished, a brass tube is fitted on the coil. The inside of the iron pipe is filled with No. 18 iron wire. I would like to know if a current of from 2 to 4 volts were used, whether this would make a good coil. Also would you feel the current stronger if a person had hold of handles than from simply a bare wire? A. Your proposed induction coil would be defective, first on account of using the gas pipe as a portion of the core. The core should be formed entirely of soft iron wire to insure a rapid magnetization and demagnetization. Your primary wire is too fine. You should use two layers of No. 16 instead of four layers of No. 23. Two cells of bichromate battery should give you a strong current. Handles are more effective, as they give a greater surface for the distribution of the current. 9. What is the best wire to use on an outdoor electric bell line? A. Common telegraph or telephone wire will answer if supported upon insulators, or you can use office wire or any of the various insulated wires in the market. 10. What is the price of the Edison dynamo described in SCIENTIFIC AMERICAN of July 25, 1891? A. For prices we must refer you to the Edison General Manufacturing Company, Broad Street, N. Y. 11. Is the electric light line wire that is used out doors iron or copper? A. Electric light wires are generally made of copper.

(3449) W. M. writes: 1. I have made a Faradic instrument with battery to operate it, and have made the connections as I have been instructed from a work on induction coils, that is, I have connected a wire from the pillar carrying the platinum screw to the battery, then one end of the primary wire to the pillar carrying the spring, then the other end of the primary wire to the battery. The battery I use is the bichromate of potash. The solution I have made as follows, according to instructions: To 1 pint of water 2 ounces of finely powdered bichromate of potash; this I have boiled when cold. I added to this 1 ounce of sulphuric acid when it was cold; the instructions claimed it was ready for use. The elements are composed of 1 zinc to 2 carbons. I have tried the battery on the machine, and for about 15 minutes it kept up a very powerful and steady shock; then it gradually decreased in power till at last there was no perceptible shock. Thinking that it ought to maintain its power for a longer time than that, I would ask you to be kind enough to tell me where the trouble lies? A. Your battery solution is too weak, and probably your zincs are not thoroughly amalgamated. Make a solution as follows: Make a saturated solution of bichromate of potash or soda in water; to this add one-fifth its bulk of commercial sulphuric acid. It is well also to add a small percentage of sulphate of mercury to keep the zincs amalgamated. If the solution boils at the zincs, you will need to remove them and amalgamate them by sprinkling on a little mercury and spreading it around by means of a brush or swab. 2. Give me a receipt for a cheap solution, dip or process for blacking or bluing brass work, something that will hold good for some length of time. A. Lustrous black on brass.—Mix equal parts of copper sulphate and sodium carbonate; these solutions must be hot. Wash the precipitate as it lies on the filter paper and dissolve immediately in an excess of ammonia. Dilute the solution with water and add a small quantity of plumbago, 20 to 50 grains, depending on the amount of solution used, then heat to 100° Fah. The brass articles must be thoroughly cleaned and left in this bath until they are black. Wash well in water and dry in sawdust. Prepare only as much solution as is wanted for immediate use.

(3450) W. D. K. asks how impression wax is made. A. Temper paraffine wax with olive oil to suit conditions. Mix a little whiting with it while hot.—From "Scientific American Cyclopedia of Receipts, Notes and Queries." In press.

(3451) W. P. H. asks: 1. From what and how is oxygen made for commercial purposes, also hydrogen? A. Oxygen is made by heating a mixture of chlorate of potassium and binoxide of manganese. By Brin's process, which has been introduced in England on the large scale, it is made with barium oxide as a base from the air. See our SUPPLEMENT, No. 623. 2. Please refer me to engravings and details of construction of the calcium light. A. We refer you to manuals on the magic lantern, such as Hepworth's "Book of the Lantern," price $2. "The Magic Lantern, its Construction and Management," price $1 by mail postpaid. An annular burner is described also in "Experimental Science."

(3452) B. A. W. asks how insects, flowers, etc., and their elements may be preserved so as to look as if they were in their natural state. A. Place the specimens on a bed of fine dry sand in a vessel having sufficient depth to extend above the specimens. Carefully sift fine sand over the objects until they are completely buried. Set the vessel in a warm dry place, and allow it to remain there until the objects are thoroughly dry. Remove the sand carefully, and where gloss is no objection, the articles may be dipped in melted paraffine which is just warm enough to be limpid.

(3453) F. J. F. writes: Can you give me a receipt or process for bluing over a gun barrel where it has been scratched? A. The barrel should be repolished with the finest flour emery cloth, and evenly heated until the blue color is produced, then cooled in water, dried, and varnished or oiled. It is a difficult job for an amateur. We recommend you to employ a gunsmith.

(3454) E. E. asks: What are the approximate composition and the properties of the principal fire-resisting materials used in furnace construction? A. Alumina is the fire-resisting element. Fire bricks are made of clay, hydrosilicate of alumina, colored slightly buff by admixture of oxide of iron. 2. What is the most suitable non-conducting material for covering pipes, boilers, etc., to prevent loss of heat? A. Magnesia felting and boiler covering.

(3455) W. asks: Will whitewood boards shrink lengthwise? For example: A counter is made of two whitewood boards, tightly matched together, and bolted. There is now a crack between them about ¼ inch wide. Did the boards shrink? A. The soft woods shrink slightly endwise in seasoning.

(3456) J. D. writes: I am making small dynamo, described in SUPPLEMENT, No. 161, and would like to know if I could shellac the bore of the field magnet also the outside of armature (Siemens) to prevent rusting. Would it detract from the power of the dynamo by so doing? A. There is no objection to shellacking the field magnet and armature of your dynamo.

(3457) W. C. W. asks: Has copper or brass ever been hardened and at what time and by what nation or nations, and have they by such hardening lost any of their properties or not? By hardening, I mean tempering, in the ordinary sense of the word, as steel is tempered. A. Pure copper cannot be hardened like steel. The hard copper tools of the ancients were made of an alloy of copper and tin. Such tools can be made now that will cut stone or wood. The proportion is 72 parts copper, 28 parts tin. It must be cast in the shape required and ground sharp. It cannot be hardened by tempering.

(3458) R. H. S. asks for directions for making "P. and B. electrical compound" for coating wood storage battery cells, acid, water, and alkali proof, applied with a brush the same as ordinary paint. A. We have not the formula for the compound referred to. The following has been recommended: Stockholm tar 10 parts, rosin 10 parts, gutta percha 30 parts. Coal tar pitch answers very well. See next query.

(3459) R. H. S. asks (1) how to make a varnish for the inside of a wooden battery cell that would not be affected by acid or alkali. A. For this purpose a mixture of gutta percha, Burgundy pitch and ground pumice stone with a little boiled linseed oil is recommended. Melt it in with a hot iron. 2. Please reply about the sample of salt sent. A. The white salt said to be used for the inner cell or porous cup of a sulphuric acid battery is nitrate of potassium.

(3460) G. V. asks as to the correctness of the statement of the Johnstown flood in A. S. Barnes & Co.'s brief history of the United States, latest edition. This book says that the waters rushed down the valley at the rate of 2½ miles in one minute. A. This rate is somewhat conjectural, and we cannot find a really satisfactory basis for an opinion.

(3461) J. F. D. asks whether there are any chemicals that will resemble fire after dark. A. Try a solution of common phosphorus in olive oil, or Balmain's luminous paint, described in our SUPPLEMENTS, and sold by large dealers in paints.

(3462) N. W. writes: I want to get some instructions to repair mercurial barometers. Can you put me on track of any work published for that business? A. Read "How to make a Barometer," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 309, illustrated.

(3463) A. U. asks: Will you be kind enough to inform me how to prepare barrels in order to keep spirits put in them perfectly white? I have a very fine well of water 72 ft. deep, 8 ft. square; the sand coming in with the stream of water gives me a great deal of trouble. Could you advise me how to overcome it? A. The method of preparing barrels for pure spirits as practiced by our rectifiers is to steam the barrels by placing them bung down over a small steam pipe projecting into the barrel. Continue this for an hour or more, according to the condition of the barrel. Then fill the barrel with clean water in which a half pound of sal soda is dissolved. Soak for 2 or 3 hours and thoroughly wash out with fresh water.—The only remedy for sand coming into your well that can be applied easily is to drive several pipes of large size, made like the points of drive well pipes, down to a lower stratum, leaving their tops below the low water surface. This will relieve the pressure that lifts the sand and tend to increase the flow of the well.

(3464) F. V. Y. writes: Will you please publish an article in your SCIENTIFIC AMERICAN or SUPPLEMENT on the construction of a transit strong enough to see the rings of Saturn, or if you have published such, will you please tell me what in, and send price? A. You will find interesting details of telescope construction in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 581, 582, 583, and eyepieces for telescopes in SCIENTIFIC AMERICAN SUPPLEMENT, No. 399. 10 cents each. You will also find the transit illustrated and its use defined in "General Astronomy," by Young, $3 mailed.

(3465) A. C. O. asks: How can absolutely pure air be obtained for the purpose of aerating milk? How would air be affected by passing it successively through hot and cold tubes and thus exposing it to great extremes of temperature? A. Pump the air in small streams through a perforated plate, immersed in solution of permanganate of potassium. The other method you give would answer excellently if the air was finally passed through solution of caustic soda.

(3466) "Argentum Purificatum" asks: 1. Is there a better way of reclaiming the silver from photographic clippings than burning the clippings, and reducing the resulting ash to metallic silver, in a crucible, using carbonate soda and carbonate potash (2 to 1) as a flux? A. The method you describe is the surest and simplest. 2. How much nitrate silver can be produced from 1 oz. pure silver? A. About one and one half ounces.

(3467) H. S. writes: I have imported a glass filter for the household, and would like to know whether its efficiency is thoroughly reliable. A. No filter is thoroughly reliable. If properly used and cleaned, a good filter will do good, but cannot be depended on in all cases, as many injurious ingredients will pass through the finest pores.

(3468) F. A. F. asks for some ingredients he could mix with wax to harden it for use, to make perfectly firm. A. Try paraffin or lead oleate (lead plaster).

(3469) E. H. K. asks how to waterproof boots. The following methods are from the new "Scientific American Cyclopedia of Receipts, Notes and Queries." A. A coat of gum copal varnish applied to the soles of boots and shoes and repeated as it dries until the pores are filled and the surface shines. Or try the following mixture: 100 oz. best white wax; 6 oz. Burgundy pitch; 8 oz. ground nut oil; 5 oz. iron sulphate; 2 oz. essence of thyme.

(3470) J. S. W. writes: 1. I have 4 oz. of No. 36 copper wire, and want to make an induction coil. What number wire shall I use for the primary coil, and how many layers of wire? A. Use two layers of No. 18 wire for your primary coil. 2. How long should I make the core, and how large should the heads be? A. Make the core about 3 inches long and ⅜ inch in diameter; the heads might be 1¼ inches in diameter. 3. How is carbon made, such as used in batteries? A. For directions for making carbons see SCIENTIFIC AMERICAN, vol. 60, page 397. Also consult "Experimental Science." 4. Why is it that electric conduits are not used in New York for the cars? Is it because it is against the law or too expensive? A. Electrical conduits are not in use in New York City. It seems a difficult problem to apply them successfully. 5. How is it that an induction coil has as many as 50,000 volts and it does not kill a man, when a dynamo of 1,000 is enough to kill a man? A. A current from an induction coil has an exceedingly low amperage or quantity; still we do not think it safe to take a shock from a large induction coil.

(3471) G. M. B. asks for a receipt for mending porcelain. A. Milk is coagulated with acetic acid, and the casein thus formed is thoroughly washed in water and dissolved in a cold saturated solution of borax. The clear solution thus formed is superior to gum arabic; for porcelain, mix with finely powdered quicklime. Apply to the ware immediately. Bind up with cord and expose to gentle heat.—From "Scientific American Cyclopedia of Receipts, Notes and Queries." (In press.)

(3472) A. K. B. asks: 1. What chemicals are used in taking tintypes, and how to use them? A. Collodion, a nitrate of silver bath, sulphate of iron, acetic acid and cyanide of potassium. We refer you to Estabrook's "Ferrotyper's Guide," price $1. 2. Can a camera be constructed for taking tintypes without a lens? Can the aperture be a small pin hole instead? A. Yes; but it will take too long. The plate would spoil. It must be exposed while wet. You may be able to obtain sensitized dry ferrotype plates from E. & H. T. Anthony & Co., 591 Broadway, New York. But they will not give as satisfactory results as by the wet plate process.

(3473) E. H. asks how to take fatty stains out of bones. A. Much may be removed by soaking in naphtha. As a final bleach, mix 1 part bleaching powder, 2 parts washing soda and 16 parts boiling water, and soak the bones therein, after it has cooled. Wash thoroughly, best with some dilute sulphuric acid.

(3474) F. G. C. asks: 1. What will take peach stains out of white table napkins without injuring the fabric? A. Try Javelle water or weak solution of oxalic acid. Wash out thoroughly. It is well to follow Javelle water with a weak solution of sulphurous acid. 2. What is the specific gravity of erbium, caesium, yttrium, and glucinum? A. Caesium, 1·88; glucinum, 2·1. The others are not known.

(3475) A. C. D. asks for a receipt for making a polish for cleaning glass, composed of whiting, etc., formed into a ball. A. Mix the whiting with soft soap, kneaded well, form into balls and dry in the sun. Or make the balls of pure whiting by hydraulic pressure.

(3476) J. C. M. asks: 1. Will a tube of hard rubber hold mercury for any length of time? A. It will hold it for an indefinite period. There is a possibility of its contaminating the mercury, but if its inner surface is polished, it will not do so. 2. What other materials, besides iron, could be used for the purpose? A. Nothing is superior to glass. Platinum also will answer, as it only amalgamates under special conditions.

(3477) H. W. asks what natural gas consists of? If it is of same substance as coal gas, or can coal

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gas be used for the same purpose as natural gas? I am trying to find out if I can use coal gas for welding iron on a small scale. A. Natural gas contains hydrogen, nitrogen, marsh gas and other hydrocarbons, carbon monoxide, etc. Coal gas is inferior to it for welding, because it contains too high a percentage of carbon. It can be used with a hot blast with some success. Water gas made by passing steam through white hot coal is superior to either for welding iron.

(3478) E. D. H. asks: 1. What is the best formula for making dry hop yeast? What is the best mode of drying it? If dried by heat, about what should the temperature be? A. Mix 3½ ounces of hops with 15 quarts hot water and 3¾ pounds rye flour. When it has cooled to a lukewarm temperature only add ½ pint of beer yeast, and allow it to ferment. After standing over night add 7¼ pounds of corn or barley meal, knead into dough, and roll out to a thickness of ½ inch. Cut this into small cakes and dry in a warm room or in the sun, turning from time to time. To use, a piece is soaked in warm water left to stand 12 hours in a warm place, when it is ready for use. 2. Is there any cold air process by which it can be dried by evaporation? A. It can be dried by being placed in a tight jar in which a lump of quicklime is placed. The yeast must of course be in its own proper receptacle, and not in contact with the lime.

(3479) L. S. says: We send inclosed two worms found in a piece of plush. Would you kindly tell me what they are and whether they are liable to injure goods? The darker worm was found in a substance resembling silk and which adhered pretty firmly to the plush. A. Reply by Prof. C. V. Riley.—One of the larvæ forwarded had transformed to pupa in transit, but the other is still active. It is the larva of a beetle of the family Cleridæ and the genus *Corynetis*. This family of beetles is, as a rule, carnivorous or predaceous in the early stages. It is therefore probable that the larvæ were attracted to the goods by the presence of other larvæ, the latter probably of some of the common "clothes moths." I hope to rear the imago and should much like to have other specimens. If it turns out, as seems probable, that this larva will prey upon the various clothes moths that so trouble the housekeeper, it is well to know the fact, as possibly it may be encouraged and utilized to advantage. On the other hand, one of the species of the genus, namely, *Corynetis rufipes*, is known to be injurious to preserved meat and has been found particularly bad in hams. An account of its injuries has been published by me in my Sixth Report on the Insects of Missouri, page 98. The species sent by your correspondent is smaller, yet all the species of the genus in the larva state, so far as known, feed on dead rather than live animal matter, and the presumption is that in this case the two specimens had left some such matter and got on the plush accidentally, or they may have fed on the exuviæ of the clothes moths. The substance resembling silk may have been the cocoon of the clothes moth larvæ or else a cocoon made by the *Corynetis* larva itself, preparatory to pupation.

(3480) W. R. B. asks how to make beef, iron and wine. A. Liebig's extract of beef ½ ounce avoirdupois, ammonio-citrate of iron 256 grains, spirits of orange ½ fluid ounce, distilled water 1½ fluid ounces, sherry wine sufficient to make 16 fluid ounces. Dissolve the ammonio citrate of iron in the water, dissolve the extract of beef in the sherry wine, add the spirit of orange and mix the solutions.—Beef, iron, and wine for soda fountains: Beef, iron, and wine 1 ounce, vanilla sirup 3 ounces.—For dispensing: For 2 quarts, concentrated extract of beef, 2 ounces; pyrophosphate iron, ½ grain. Dissolve in ½ pint boiling water. Add tincture curacoa, 2 ounces; tincture orange peel, 2 ounces; sirup, 12½ ounces; alcohol, 12½ ounces; solution citrate of ammonia, 2 ounces; sherry wine, 23 ounces. The information given above is taken from "The Scientific American Cyclopedia of Receipts, Notes and Queries." In press.

(3481) G. L. B. asks how to make bluing for laundry use. A. 1. Dissolve good cotton blue (aniline blue 6 B) in cold water. 2. Dissolve fine Prussian or Berlin blue with ½ part of oxalic acid in water, or use ferrocyanide of potassium (1-12 part) in place of oxalic acid. 3 A disinfective laundry blue.—Mix together 16 parts of Prussian blue, 2 parts of carbolic acid, 1 part of borax, and 1 part of gum arabic into a stiff dough. Roll it out into balls as large as hazel nuts, and coat them with gelatin or gum, to prevent the carbolic acid from escaping. 4. Water 15 parts; dissolve in this 1½ parts indigo carmine, add ¾ part gum arabic. From "The Scientific American Cyclopedia of Receipts, Notes and Queries." In press.

(3482) K. F. asks: 1. What will cement thin ivory pads on nickel-plated steel triangles without coloring the ivory or injuring the triangle and that will set in 48 hours or less? A. Mastic varnish 1 part, isinglass 2 parts. Dissolve the isinglass in as little water as possible with a little alcohol, and mix with the varnish. The latter is prepared by making a strong solution of gum mastic in alcohol and benzine. 2. What is the best book on surveying, more especially with the transit? A. We recommend and can supply Johnson's "Theory and Practice of Surveying," price $3.50 by mail, also Gillespie's "Practical Treatise on Surveying," price $3.50. 3. What is the best book on mining surveying? A. We recommend Brough's "Mine Surveying," price $2.50 mailed.

(3483) H. G. J. asks: What is the velocity of light and of the electric current? A. The velocity of light is 185,420 miles per second. Wheatstone gives the velocity of static electricity as 288,000 miles per second, which is greater than that of light. Current electricity, where it meets with no resistance, has about the same velocity as light. The velocity of electricity on an iron wire is variously estimated at from 18,400 to 62,100 miles per second, and on a copper wire 111,780 miles per second. The nature of the conductor and its environment has an influence on the velocity.

(3484) C. A. W. asks: Which travels the faster—light or electricity? Please state also the rate of each. A. See reply above.

(3485) I. E. asks: 1. Is alumina manufactured in the United States anywhere. If so, where and by whom? A. Address the Pennsylvania Salt Company, Philadelphia. It is a dyer's chemical. 2. Could gas be compressed in tank and carried any distance and used to drive an Otto gas engine, and would the tanks empty themselves through the engine without any pressure above atmospheric pressure? A. Yes. 3. Where could I get a cheap work on the use of gas or its manufacture? A. We can supply you with works on this subject such as "A Treatise on the Manufacture of Illuminating and Heating Gas," by Burn-, price $1.50, also Richard's "Practical Treatise on the Manufacture and Distribution of Coal Gas," price $12 by mail post paid.

(3486) J. C. writes: 1. In speaking of the resistance of fields in a shunt dynamo as being 14 times that of the armature, do you mean all the wire on armature or only half between the brushes, or as some say only a quarter of the armature wire is taken as the resistance of armature when comparing it with fields. A. The resistance of the armature is meant. This is one quarter of the resistance of the total length of wire on the armature, for the reason that the current goes through the two halves of the wire in parallel, thus reducing the length of the conductor one-half, and at the same time doubling its sectional area, thus reducing the resistance as above stated. 2. Does the same resistance do for motor shunt-wound? Yes.

(3487) R. N. asks: During an argument in this city a few days ago, as to the component parts of glass, one party asserted that glass could be manufactured from straw. Immediately a bet was made that he was mistaken, and the parties to the wager agreed to leave it to the SCIENTIFIC AMERICAN for decision. A. The ashes of straw might be fused into a species of glass. To this extent the assertion is true.

(3488) F. F. writes: Can you tell me of a glue or cement, for the purpose of attaching cloth or felt to garments, that is absolutely waterproof, and will resist 140° Fah. of heat, also dry quickly? What is the best method of using same? A. We know of nothing better than the sheet gutta percha used by tailors for the purpose you mention. It answers to all the qualities you call for except the heat. It softens under heat. In use place a sheet of the percha between the two surfaces of fabric to be joined, and press the same with a hot flat iron. The operation is quick and effective, provided the heat is maintained long enough to penetrate the fabric and melt the percha.

(3489) E. G. H. asks (1) for some preparations that will render cane pole fireproof. I refer to the "fishing pole" grown in the South. In working the material I have considerable waste and propose to make pipes, for smoking tobacco in, so want to "get on to" a treatment not expensive, that will admit of using them in that way. Would like a chemical that they could be soaked in, and that would not give off any unpleasant odor or taste. A. Soak the cane in a solution of phosphate of soda. 2. A good formula for marking ink to be used in laundry for marking clothes, that will not require to be (the goods) prepared in any way before or after marking, but be ready to go into the wash. A. For ink formulæ in general we refer you to our SUPPLEMENT, No. 157. 3. Can you give me an idea of some preparation for bleaching in laundry work, better than chloride of lime? A. For real bleaching we cannot. For laundry work in general we refer you to SCIENTIFIC AMERICAN, No. 9, vol. 61; SUPPLEMENT, No. 577.

(3490) G.—A machine that will always keep itself in motion without exterior aid, and without consuming fuel, might be termed a perpetual motion. No reward offered.

(3491) M. S. P. asks: What can I coat tin battery cells with to make them acid proof? A. Try a coating of coal tar pitch.

(3492) E. B. C. asks: 1. Where can I obtain paramidophenol to be used for a developer as described in your paper of August 29? A. From the principal dealers in photographic materials in New York. 2. How much does it cost? A. $8 per ounce. 3. In what proportions should I use it in developing? A. In the proportions given in SCIENTIFIC AMERICAN. 4. Is it poisonous, and if so, what forms a good antidote for it? A. Yes, to take internally. Antidote, a strong emetic. 5. Is hydroquinone poisonous, and if so, what is a good antidote? A. Yes. Antidote, a strong emetic. 6. What is the formula of paramidophenol? A. The chemical formula is $C_6H_4(NH_2)OH$. 7. How much did the Philadelphia cost? A. $1,350,000. 8. What is her type? A. See SCIENTIFIC AMERICAN, vol. 61, Nos. 6 and 11, for illustrations of her. 9. Is there any good book published exclusively on the new American navy? And if so, how much does it cost? A. Consult the back numbers of the SCIENTIFIC AMERICAN. There is no book on the subject. 10. I have a room, size 25 x 30 feet, in which there is a fireplace that is 6 feet long, and whenever a fire is lighted it will always smoke unless a window is opened, and no matter how little the window is opened, the fire stops smoking. Now, how can I fix it so that I can have the windows all shut, and have the fire not to smoke? A. Conduct a special air flue under the floor from the outside of the house to the fireplace, having the aperture at the grate closed with a register. This will supply a constant current of air when the room is closed. 11. How much about per night would it cost to run a lime light in a Marcy sciopticon, for say about two hours at a time? A. The cost for gas will be about $3.50, for lime 10 cents. 12. Would it be safe to use a lime light, and what good book can I get on the subject, and how much does it cost? A. It will be safe to use the lime light if the gases are compressed in iron cylinders. We refer you to the "Book of the Lantern," by T. C. Hepworth, which we can send by mail. Price $2.

(3493) J. M. L. writes: I have a well about 105 feet deep. When the well digger got down some 85 feet, the solid rock was struck. Then a hole was drilled 15 feet, water was found in either slate or soapstone, judging from the appearance of the material that stuck to the drill. The water rose within 3 feet of the top of the rock. I have a windmill which pumps the water out faster than it comes in, although two men say that they can hear the water rushing through the bottom of the well. I want to know what I ought to have done to increase the supply of water. I have been told if I drop into the hole 2 pounds of quicksilver, it will cause the water to come in more freely. I am told of a man in Quincy who wanted to dry up his well; he was told to put quicksilver in it; he did so, but it had the contrary effect. The water rose in the well, flooded his cellar, and he had no relief until he connected with the sewer. Can you give me any information if the quicksilver will have the desired effect? I have built small fish pond, and I want to keep it supplied with water from the well. A. We have no confidence in the quicksilver yarn. Drill the hole deeper to get more water.

(3494) R. W. S. asks: 1. If a rifle ball be fired perpendicularly into the air, what velocity will it have when it returns to the earth? 2. If at close range it will penetrate 5 inches into a piece of wood, how far will it penetrate the same piece of wood after falling from a perpendicular shot? A. The return velocity depends upon the initial. The greater difference with the greater height that the ball reaches before returning. The friction of the air retarding the velocity both ways. We cannot give definite figures on account of the uncertainty of muzzle velocity and height of projection, as well as relative densities of bullet and air. An elongated and globular ball having different frictional exponents. Under all circumstances the return will have a greatly lessened penetration.

(3495) E. P. G. says: Kindly inform me through the inquiries column in your paper what is the cheapest way of dressing the surface of a grindstone which has worn unevenly, to produce an even and true surface again? It is not valuable enough to warrant purchasing a diamond tool, and I am not in or near a town where such a tool is owned, the use of which could be hired for this one occasion. A. Nail or fasten a block of wood across the frame as close as possible to the stone; use a piece of ¾ or 1 inch gas pipe, with the end resting on the block, and the edge against the stone; by rolling the gas pipe back and forth along the face of the stone it can be turned off true. Use no water.

(3496) P. W. K. asks: Will it make any difference which way you jump (while in a car moving at the rate of 60 miles per hour), either against or with the motion of the train? By the difference I mean difference in distance jumped, measuring from a certain spot in the car floor. A. It will make no difference which way you jump; the distance jumped will be the same, as you are moving with the same motion as the car.

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