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 the following week's 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 This is for our information and not for publication.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 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.

(3626) J. C. R. asks: 1. How much bichromate of potash will saturate a gallon of water? A. 12·8 ounces avoirdupois. 2. After treating a black ink stain on linen with chlorine there remains a yellowish stain. What will remove it? A. After moistening and blotting off the spot apply weak oxalic acid. 3. What artificial light will answer all the purposes of sunlight in evening lecture room experiments, such as producing the solar spectrum, polarization, etc.? A. No artificial light will answer all the purposes of sunlight, the nearest approach to it is the arc electric light. 4. I am unable to charge my Leyden jar with my induction coil. What special precaution is it likely that I have omitted? A. To charge your jar you should place it upon an insulating stand, and arrange the terminals of the secondary coil so that one will discharge into the interior of the jar and the other into the outer coating. 5. In using a 6 inch emery wheel for grinding lathe tools what is the most advantageous speed? A. If the wheel is of a reliable make, it should run from 1800 to 2000 revolutions per minute. 6. What will remove printers' ink from linen? As it is mostly carbon, I think it cannot be susceptible to chemical bleaching influences. Am I right? A. Printers' ink cannot be removed successfully from paper; benzine will soften it and remove it to some extent, and alcoholic solution of caustic potash will do the same. It is not a bleaching action, but a destruction of the vehicle carrying the carbon that is to be sought for. It cannot be bleached.

(3627) G. G. asks: What is the best method of building with brick and mortar during freezing weather? Should the mortar be heated, and will it dry out fast enough, so that the frost will not injure the wall?—How is the gas made which is used in inflating the toy rubber balloons, and where can the balloons be purchased? A. The heating of mortar will do in very moderate frosty weather. If there is convenience for warming the bricks also, it will help matters some. This method works fairly well when the day temperature is above freezing and the night temperature but slightly below freezing. Even then the tops of the walls should be protected by planks and bagging. The use of common brown sugar in mortar has been made, and not only shown great resistance to the disintegrating influence of frost, but made the mortar actually stronger than mortar made in the usual way. Mortar made with 2 pounds of coarse brown sugar to 1 bushel of lime and 2 bushels of good sharp saud has been found best suited for the purpose. Dissolve the sugar in water sufficient to make the mortar and add slowly to the slaked lime paste and mix with the sand. It is said that the sugared water increases the solvent qualities of the lime and that this accounts for its hard setting. The mortar should be mixed in small quantities and used quickly, as with cement.—Ordinary coal gas is used in toy balloons. It requires a small pump or gas holder that can be weighted after filling, to give pressure, as the gas house pressure is not sufficient for filling. The rubber houses furnish the balloons. They require to be varnished after filling with a thin mastic varnish in alcohol, to keep the gas from passing through the rubber.

(3628) J. B. McK. says: I have been making a black polish for leather of gum shellac, alcohol and lamp black, but to get a good polish the liquid has to be made too thick. Can you inform me of something to add which will give the desired luster, also is there anything which can be added which will lessen the cost of production?—What articles, and in what proportion, are put in buckwheat flour to make self-raising? A. Pure asphalt added to your varnish will help the polish and be cheap, but for a fine polish black japan varnish (air drying) is the proper thing.—For baking powder use 9 parts bicarbonate of soda and 8 parts of tartaric acid by weight. Mix thoroughly, dry and pulverize with 10 parts ground orris root, or rice flour, or the buckwheat flour that has been thoroughly dried. Add ½ to ¾ of an ounce of the powder to one pound of buckwheat flour, more or less, which you must find best with your quality of flour.

(3629) J. F. C. says: My object in writing to you is as follows: I am a member of the high school of this town, and in a recent discussion on the term horse power, one scholar said the term was derived from a horse, saying a horse could lift 33,000 pounds one foot from the ground. I said that the term horse power had nothing whatever to do with a horse; moreover, a good draught horse could not lift 33 000 pounds one foot from the ground. A. The term horse power was derived from the power of a horse, as established by James Watt, who found by experiment that the average mill horse could lift 150 pounds, when attached to a rope over a pulley, at the continuous speed of 220 feet per minute or 2½ miles per hour: 150 ×220=33,000 pounds lifted one foot per minute. This has since been verified in England by an average on the continued day work of 144 horses used in plowing, when the average work was found to be 163 pounds lifted 220 feet per minute, or at the rate of 2½ miles per hour. This somewhat exceeded Watts' assignment of the horse power of work.

(3630) R. A. writes: 1. Please give a description of the simplest and most efficient form of Barlow wheel? A. The simple smooth-edged wheel or disk is as good as any with mercury tangential contact, and with the field pieces close together and of large facing area. This gives the lowest possible reluctance to the magnetic circuit. 2. How is the silver plate used for the cathode of Smee's battery platinized? A. The surface of the plate is roughened by nitric acid, and the platinum is deposited by electro-deposition. 3. Will copper plated with silver and then platinized answer this purpose, or is solid silver necessary? A. A good heavily silver-plated copper plate will answer. 4. Can a silver-plating solution be made by taking the proper proportion of cyanide and water and allowing a plate of silver to stay in the solution until enough is dissolved? A. Not satisfactorily. For the removal of your mercury stain you might try a hot iron.

(3631) C. A. M. asks: 1. What are the chemical changes that occur in exposing a blue print made from a bichromate of potash and ammonio-citrate of iron solution? A. The ordinary blue print reaction, namely, reduction of a ferric iron salt to the ferrous state, takes place and is accompanied by the rendering insoluble by the action of light of the bichromatized sizing of the paper. 2. Give directions for making a small photographic camera for five by eight plate. A. The SCIENTIFIC AMERICAN, vol. 59, No. 21, contains a description of a simple camera.

(3632) M. B. R. asks: Does the crosshead of a horizontal engine make a stop at the ends of the slide, while the crank is in motion, say when the crank passes dead center? A. Yes, the crosshead stops at the end of each stroke. The time may be infinitely small, yet it must stop in order to take up its return stroke.

(3633) J. S. McG. asks: Is the burning of natural gas in a public assembly room in a stove with no connections with chimney injurious to health? How do the deleterious results (if any) compare with the burning of hard coal in a similar way? A. The burning of natural gas in a public assembly room, especially if filled with people, is highly deleterious to health. Possibly not so much so as the burning of hard coal without chimney connection, which should not be tolerated under any circumstances.

(3634) P. B. asks if there is any kind of a cement I can use that will join together pieces of porcelain, that will hold together in a high degree of steam heat, say 300° or thereabout, and not part. A. For a porcelain cement to stand heat: Mix very finely ground glass 10 parts, ground fluor spar 20 parts, with a saturated solution of water glass 60 parts. Mix quickly and apply the paste to the joints. Will harden in a few days.

(3635) F. H. F. writes: Give me a recipe for polishing the wooden casement of an electric push button in a tumbling barrel in quantities of eight to ten thousand at one time. A. If there are no recesses in the part to be polished, tumbling in ground pumice stone and then in sawdust will make a tolerable polish.

(3636) W. G. H. asks which of the two following words is the more correct to use—aluminum or aluminium. A. Either is correct. The first named is the shorter and to that extent preferable. The new metals generally have names ending in "ium"; hence a preference for "aluminium" is often expressed.

(3637) C. M. H. asks for a solution that will render cardboard fireproof. A. Sodium tungstate or sodium phosphate are good anticombustible agents. Use in aqueous solution. A little glycerine may be added, but this will tend to keep the object moist.

(3638) H. A. A. asks for a solution or dip to produce terra cotta color on brass goods. A. Dip the clean brass in a solution of 16 drachms nitrate of iron, 16 drachms hyposulphite of soda, in 1 pint of water, until the desired color is obtained.

(3639) E. K. J. asks: In steering a boat is it not the stern which is first moved before the course is communicated (inversely) to the bow, or is the bow the first to be affected by the action of the rudder. Would it be correct to assume that the steering of a boat is conducted upon the principle of the lever, holding the rudder to be the lever, the water the fulcrum, and the headway of the boat the applied power. A. The rudder acts as a lever as you suggest and throws the stern from the line of the course, but the boat swings on its center of gravity; the bow swinging in the opposite direction from stern, from the moment the rudder is thrown out of line. Of course there are exceptions, as with sailing vessels when the sails are not balanced, or with propellers, which have a side thrust which has to be steered against.

(3640) W. G. asks: 1. What is the method to manufacture peroxide of hydrogen, if any other than by the action of aqueous acid solution on peroxide of barium? And what acid is the best for its manufacture? A. This method is the one to be recommended: Use dilute sulphuric acid, at least 5 parts of water to 1 part of acid. 2. A clearer method to obtain it of certain number of volumes at will; for instance I wish to make three solutions of say 10, 15, and 20 volumes respectively. A, 168·8 parts of pure peroxide of barium will give 34 parts of hinoxide of hydrogen, using 98 parts of sulphuric acid. But as the commercial article is never pure, it should be analyzed. On these figures you can base the strength, remembering that it becomes more explosive with concentration. 3. How long will these solutions last in good order if carefully bottled and stoppered, for future use? A. No definite answer can be given. Dilute solutions, if the corks are wired in, will last a long time.

(3641) N. C. Y. asks: 1. What are the best ways of testing impure water besides the permanganate test and analysis? A. Bacterial examination, with microscopic determinations of the organisms found. 2. The best method to obtain the nickel in a pure state from alloys of the metal. A. Dissolve in hot hydrochloric acid, to which from time to time a little nitric acid is added. Boil when dissolved to expel all free chlorine or nitrogen oxides, cool, add a small excess of hydrochloric acid, and precipitate the copper with sulphureted hydrogen. Filter, and separate the nickel from the filtrate by precipitation with potassium hydrate solution and reduce with hydrogen at a red heat. 3. Is a common analyzing chemist's work injurious to health if carried on in a ventilated laboratory? A. Not unless the person is very sensitive.

(3642) G. B. B. asks for a filling to resemble ivory that would hold very firm and be hard and durable to fill in a chipped ivory billiard ball, also composition balls. A. For a cement for cracks in billiard balls, melt white wax resin and turpentine equal parts and mix dry colored paints, to match for color; use zinc white for white, vermilion for red, smalts blue, etc. Crowd the melted paste into the cracks. It will be ready for use as soon as cold. If a piece is chipped off the outside, it must be plugged with ivory, using the cement for holding it.

(3643) W. W. H. asks: Which is the oldest, also which is the latest metal in the world? Also where and when was gold first mined? A. Gold was probably the first metal discovered and used. It was mined in Egypt and well known in the eastern empires 1800 years B. C. It was probably known and used in India many hundred years before this period. The latest metal is assyme, derived from the metal tine. Melts at 429° Fah., and has some of the peculiar qualities of tin.

(3644) F. B. asks the best method of obtaining superheated steam from boilers. We run our boilers at eighty pounds pressure and desire to take steam from the boilers to a grain drier, conveying it some little distance through pipes. In the grain driers we desire to use superheated steam; please inform us the best method to obtain it in this condition. A. For superheating steam it will be necessary to have a separate furnace so built that the amount of superheating can be controlled. For this purpose a cast or wrought iron pipe coil of the proper size to give an easy flow of steam through it, corresponding with the size of the steam pipe, say 75 feet of pipe in the coil, which should be put in a brick chamber and not in immediate contact with the fire. See Carvalho's system of superheating steam in SCIENTIFIC AMERICAN SUPPLEMENT, No. 112, illustrated. Also No. 372 on the economy of superheated steam.

(3645) C. C. N. asks: What two metals will produce an electric current when acted upon by heat? A. Brass and German silver or iron and an alloy consisting of antimony 2 parts, zinc 1 part. A pair of plates of almost any dissimilar metals will generate a current. 2. What degree of heat is required to generate the electric current? A. A current will be generated whenever there is a difference in temperature of the ends of the element. 3. In what manner must the metals be brought into contact to produce the desired result? A. The metals are joined by soldering.

(3646) D. L. W. asks: If a thin metallic disk, supported at the rim, be sprung from a plane surface by pressure at the center, would it take a parabolic form, or what form would it acquire? Would such a surface be near enough perfect for the mirror of a reflecting telescope? Can you refer me to SCIENTIFIC AMERICAN SUPPLEMENT containing information in regard to reflecting telescopes? A. rule for calculating the size of cone pulleys. For example, in a foot lathe the pulleys on the head spindle are 3 inches, 4½ inches, and 6 inches in diameter respectively, and the largest driving pulley is 2 feet in diameter; what should be the sizes of the other two driving pulleys? A. The form of the plate would be approximately parabolic, but would be worthless for a telescope mirror. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 581, 582, 583, for making refracting and reflecting telescopes. The formulas for matched cone pulleys are somewhat complex. You will find them complete in Cromwell's book on belts and pulleys, $2 mailed.

(3647) L. B. asks for a good polish for furniture, pianos, and woodwork and that would dry quick. A. Raw linseed oil 10 ounces, shellac varnish and wood alcohol 5 ounces of each. Mix by shaking before use. For pianos rub with nothing but a mixture of olive oil and water made on the palm of the hand and rubbed on with the hand alone.

(3648) W. H. B. asks (1) for a description of the battery used with electric light for necktie pin. A. The battery generally used is formed of carbon and amalgamated zinc, one rod of each to each cell. The bichromate solution is used. A small storage battery is undoubtedly preferable to the bichromate. 2. How many batteries will it need to run a four-candle light of ten volts? A. It will require at least six cells to run a lamp of this size. Much smaller lamps are used for the purpose, say ½ to 1 candle power, requiring 1 to 2 cells of battery.

(3649) T. M.—You will find the method of laying out curved sectional elbows in Butt's "Tinman's Manual." Price $1.25 mailed.

(3650) C. G. C.—For freezing mixtures see our SUPPLEMENT, Nos. 89, 352, 551, 608, and 646.

(3651) F. C. B. asks if it is injurious to health to have plants in a bed room. A. It has been said that the soil of potted plants breeds malaria. We cannot vouch for the truth of the statement.

(3652) T. M. D. asks: 1. Can white dextrine be held in mucilage form? If so, how? In all the experiments I have tried it goes back to a chalk white paste. A. It can. It should remain in solution in water. Try the following mixture. Dextrine, 2 parts; acetic acid, 1 part; water, 5 parts; alcohol, 2 parts. 2. What, except gum arabic, will make a light colored mucilage that will dry quickly and not be very costly? A. The above formula answers your requirements. 3. What dyeing material will make a jet black in liquid shoe dressing where shellac is the material used to give a polish? Is there anything that can be added to nigrosine, diamond slate dye, or any of the coloring matters that give a bluish or purplish appearance when applied to paper, that will give a jet black appearance after drying on soiled leather? A. Try to destroy the blue shade by addition of some brown dye. One formula recommends for shellac blacking, 21 parts blue aniline to 31 parts Bismarck brown aniline. 4. Please give formula for a good black ink (writing fluid) that will not be very expensive. A. The formulæ are very numerous. The following is typical: Dissolve as far as possible 18 parts pulverized gall nuts in 100 parts of water; filter through a cloth and dissolve in the filtrate 7 parts gum arabic; then add a solution of 7 parts of copperas in 50 parts of water.

(3653) B. R. W. asks: Will you please give formula and directions for making the prisms similar to those used in the Gonda form of Leclanche cell? Can the old prisms be revived and made nearly as good as new, and how can this be done? A. An old battery prism is of no value whatever; it should be replaced by a new one. The composition of the prism is as follows: granulated black oxide of manganese, 40 parts; granulated carbon, 52 parts; gum shellac, 5 parts; potassium bisulphate, 3 parts. These ingredients are mixed, heated to 212° Fah., and pressed in moulds under a pressure of two tons.

(3654) C. U. B. writes: 1. I send a sample of what we call carbon, which collects in furnaces from natural gas. What I want to know is, can this be used for a carbon battery? If it can be used, please tell me how. A. Yes. Grind to a powder, mix with enough sugar solution (thick sirup) to give it the consistency of clay, and heat to redness in an iron mould. After ignition and thorough cooling without exposure to the air they may be dipped again and ignited as before. It is well to boil in the sirup the second time. The last operations may be repeated until sufficient density is obtained. See "Experimental Science," or consult the SCIENTIFIC AMERICAN, vol. 60, No. 20. 2. Give me a receipt for cutting down plate glass and polishing it for making a telescope lens. A. See, for full and practical instructions, "Experimental Science," $4; or our SUPPLEMENT, No. 318. 3. What would be a good hook on electricity for an amateur? A. "Experimental Science" contains much that is useful. Thompson's "Elementary Lessons in Electricity and Magnetism," price $1.25. Prof. Ayrton's "Practical Electricity," price $2.50.

(3655) H. K. S. asks (1) for the composition of Ashberry metal. A. Ashberry metal is composed of 78 to 82 parts of tin, 16 to 20 parts of antimony, and 2 or 3 parts of copper. 2. The composition of packfong. A. Packfong is made from 45 parts of copper, 21 parts of zinc, and 33 parts of nickel. From "Scientific American Cyclopedia of Receipts, Notes and Queries." In press.

(3656) L. J. F. asks for a ginger beer powder. A. Ginger, bruised, ½ oz.; cream of tartar, ¾ oz.; essence of lemon, 4 drops. Mix. Some sugar may be added if it be thought desirable to make the packet look bigger. For use this powder is to be added to a gallon of boiling water, in which dissolve 1 lb. of lump sugar, and when the mixture is nearly cool, two or three tablespoonfuls of yeast are to be added. The mixture should be set aside to work for four days, when it may be strained and bottled.

(3657) G. W. W. asks: What is the general method of working amber? A. Amber in the rough is first split and cut rudely into the shape required by a leaden wheel worked with emery powder, or by a bow saw having a wire for the blade; tripoli