# 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 This is for our information, and not for publication.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.

(1) J. J. M.—The angle at the circumference of a windmill varies much for the power and velocity required. For high speed and light work the extreme angle may be from 7° to 10° with the plane of the mill. Where high winds prevail, 10° to 20° may be desirable. The angle should increase toward the center; at half distance between periphery and center the angle should be double the peripheral angle. For a full and illustrated description of mills and their power, see a work on "The Windmill as a Prime Mover," by Wolff, which we can furnish for $3. A six foot mill will run a churn or grindstone.

(2) D. L. T. asks the number of pounds required to lift bodily from ordinary soil a green oak stump 12 inches diameter, also pine stump 12 inches diameter and 24 inches diameter. A. From 4 to 8 tons, according to kind and condition of soil.

(3) J. G. asks: 1. What is the freezing and boiling point of hydric cyanide? A. Boils at 80° Fah. Freezes at —0·4° Fah. 2. Are ferric disulphide and sulphide of iron the same? A. Both are identical.

(4) J. K. B. asks: What material is used in the manufacture of binder twine, such as used on harvesting machines? Does it require expensive machinery? A. Jute, Sisal hemp, and waste products of flax mills. Machinery for that purpose alone is not very expensive. Could be home made if you are familiar with the manufacture.

(5) "Louisville."—The footprints in the limestone found in Washington Co., Ohio, were probably made during the Carboniferous or coal-producing period. It is impossible to state the amount of denudation that this indicates. Where the geological sequence is complete, the Carboniferous is overlain by the Mesozoic, Tertiary, and Quaternary formations, but we do not know whether the series was complete at this point. It is probable that many thousand feet of sediment have been removed in order to expose this formation. Having no measure of the thickness of these more recent formations, the time required for their deposition and subsequent removal is similarly unknown.

(6) J. C. M. asks a recipe for sticky fly paper. A. Melt together one pound of resin and add two fluid drachms of linseed oil. While the mixture is warm, dip a spatula into it, and spread what adheres to the blade on foolscap paper. Different samples of resin require varying proportions of oil to make the composition spread properly.

(7) T. McM. asks: 1. What is the process of preparing salmon for canning? A. See "Canned Food," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 499. 2. Would the mullet make a good canning fish under same process as the salmon? A. Such samples of canned mullet as have been put in the market have not been well received. 3. A cheap receipt for deodorizing kerosene oil. A. Mix it with chloride of lime in the proportion of three ounces to each gallon of liquid to be purified. The mixture is then introduced into a cask, some muriatic acid is added, and the whole well agitated. It is then passed into another vessel, containing slaked lime, which absorbs the free chlorine and leaves the oil sufficiently deodorized.

(8) C. L. asks: Can air after having been pumped out of a glass vessel be kept out? A. An exhausted glass vessel may be sealed so as to preserve a vacuum indefinitely by fusing the glass tube connecting the vessel with the air pump.

(9) L. H. H. asks: 1. Are there any mica mines now worked in Virginia, and what is the quality of the product? A. There are mica mines in Amherst, Bedford, Hanover, and Amelia Counties, which have yielded an excellent product, but are little worked now on account of the superior deposits in North Carolina. The southern portion of the State is believed to offer a promising field for prospecting. 2. Where are the largest and best deposits of mica found, to what extent are they worked, and what rank do the mines of North or South Carolina hold? A. The best deposits of mica so far discovered have been in Western North Carolina and in Custer and Pennington Counties, Dakota. The annual product of the latter locality amounts to $70,000. The total product of the United States amounts to about $370,000. The mica regions of South Carolina have not as yet been thoroughly explored. 3. What books would you recommend on mica mining, mineralogy, and geology? A. "Elements of Geology," by Joseph Le Conte (price $4.00), and "Manual of Geology," by J. D. Dana (price $5.00), are both excellent. "Descriptive Mineralogy," by J. D. Dana (price $10.00), is the standard work on the subject, but his smaller book, "A Manual of Mineralogy and Lithology" (price $2.00), would probably serve your purpose. We will send these books postpaid on receipt of price. For information concerning mica mining we would recommend "Mineral Resources of the U. S.," published by the Government, and the North Carolina Geological Reports.

(10) H. M. P. asks: 1. How do scientific men observe the process of development of man from the fructifying of the egg to the birth of the child, or the process of ontogeny? A. By direct examination of the embryo or fœtus during the several stages of development. The recent remarkable progress in embryology is largely due to the perfection of the mechanical means for making these examinations, and to the chemical reagents used to prepare the subject for extended study. By hardening, clearing, and tinting the fœtus with chromic acid, and then making the finest possible microscopic sections, it is practicable to represent the entire process of development; and by providing for the suitable preservation of the specimens, to secure the opportunity of similar study to other investigators. 2. Has the supposed organism *Bathybius Haeckelii*, discovered by Huxley, been confirmed? A. It is doubtful. Several scientists believe that the evidences of organic life which Huxley discovered were due to the alcohol in which the specimens were preserved. Recently, however, the Arctic navigator Bessels has reported the discovery of a free homogeneous protoplasm in Smith Sound, to which he gave the name protobathybius. 3. Has spontaneous generation been produced artificially? A. No.

(11) S. W. S. asks: Will you please inform me whether there is any coating that can be applied to the inside of a water lime-plastered cistern which will prevent the water from becoming "hard"? If there is such an article, please state what it is and how to apply it. A. Our best recommendation is to wash it over several times with a wash of hydraulic lime and water. Asphalt would stop it, but would tend to give the water a taste, and would require an absolutely dry surface for application.

(12) J. F. writes: Will you please give me a process for magnetizing knitting needles? A. Prepare a coil of wire, No. 15 to 20, as long as the needle and of five to ten layers. Place the needles within it, and pass a strong current through it. Or by rubbing with a strong permanent magnet from pole to pole, always in the same direction, you can do it. Or simply place the ends against the field pieces of a strong dynamo while running.

(13) H. E. S. asks: Can you let me know of a cement that can be used on a tin roof that is old and leaky, that will stand heat and cold weather? A. Old paint skins, such as may be procured from painters, are much used.

(14) W. W. S. writes: Reading your articles on films, as represented by the sieve and the floating needle, why is it that the needle floated on water in a basin will point north and south? Is it through the influence of the magnetic current? A. If it points north and south, it is because it possesses enough magnetism to be affected by the polarity of the earth. 2. If a ball rolling on a double inclined plane is operated at each end of its track by a spring of sufficient power to overcome the influence of gravitation and friction when the ball is put in motion, would it not continue to move from spring to spring until either the springs become weakened or the wearing of some parts increased the friction sufficiently to bring the ball to a rest? A. The springs would have to be worked by some other power than the impulse of the ball. 3. Such an instrument could not be termed perpetual motion, could it? A. It would not constitute perpetual motion.

(15) O. S. P. writes: I made a magic lantern, but cannot get satisfactory results from it. In my lantern I use 2 plano-convex condensing lenses 4½ inches diameter for a condenser (the focal distance from the lamps is 4½ inches, and the two lenses are placed 2½ inches apart in the condenser). For an object glass I use a Darlot photographic lens 3 inches diameter. This lantern, when placed about 8 feet from the screen, only gives a picture of 2 feet diameter (with a 60 candle power oil lamp). Where do you think the fault lies? A. Your Darlot objective is of too long focus. You can only remedy the trouble by placing your lantern far back from the screen. Why do you not place your condenser lenses closer together, and shorten up the whole apparatus?

(16) W. S. W. asks: 1. Will sal ammoniac cells work an electric lamp? If so, how many Leclanche Gonda cells will be required for a 4 candle power incandescent lamp? A. Leclanche cells are quite unadapted for steady work. 2. What are the relative proportions of zincs and carbons, and sizes required, to retain a 19 platinum wire at white heat constantly for ¼ hour; the exciting fluid to be sul. acid and bichromate potash? A. It depends on the length of wire. Anywhere from eight cells upward.

(17) D. S. S. asks: 1. How many cells of Disque Leclanche battery will it take to operate a telephone line 1 mile in length of No. 16 galvanized wire, insulated at pole with glass, and ground connection? A. Two to four cells. 2. Would connection to iron pump pipe in well 70 to 90 feet deep answer for ground connection? A. Such connection would be excellent, as long as the well contained water enough to cover end of pipe. 3. Would additional cells be necessary if magneto bell be used? A. Four cells should do everything. 4. Would it be necessary to insulate wire through side of building with rubber tubing, or would silk-covered office wire answer? A. Insulate by rubber tubing. 5. Would a horse shoe magnet telephone, as described in SUPPLEMENT, No. 142, make a good serviceable instrument for every day use, and how long would it remain so, using six inch magnets? A. It would be perfectly serviceable, and would last for many years.

(18) E. B. R. asks: 1. What resistance would a straight electro magnet have to be to repel a 5 inch horseshoe permanent magnet to work as a motor situated between its poles, when provided with suitable commutator? A. Very slight resistance would be required. The electro magnet should have a thick core—½ inch round iron. 2. How can a permanent magnet be spread apart so that the top is as wide as the bottom, without damaging it? A. You could not spread apart the limbs of a horseshoe magnet without heating and consequently demagnetizing it.

(19) S. F. M. writes: I built a cherry sideboard. It was first gone over with Wheeler wood filler, sandpapered, and then shellac varnish rubbed in. It has a smooth, hard finish, but is dead in appearance. How should I treat it now to give it a bright, polished look? A. Make a mixture of rather thick alcoholic shellac varnish and boiled linseed oil, equal parts. Shake it well before using. Apply in small quantities with a cotton cloth, rubbing the work briskly until the desired polish is secured.

(20) J. W. asks: 1. How many cells of the Bennett battery, of the size indicated in SCIENTIFIC AMERICAN, April 11, 1885, will it take to charge the field magnet of a dynamo constructed after the model and proportions of the dynamo in SUPPLEMENT, No. 161? A. About six such cells would be enough. 2. Would well seasoned hard wood answer for a commutator if well coated with shellac and the set screw is bedded in the wood, so that the head can be thickly covered with shellac? A. It would answer, though ebonite is far preferable.

(21) F. S. D. desires a practical recipe for making a first class quick rising dry yeast. A We would recommend you to strain brewer's yeast until a moist mass is obtained. Place this in hair bags, and press out till the mass is nearly dry. Then sew up in linen bags, and it is ready for transportation. It will keep for a long time, and is much used by bakers in the manufacture of the so-called Vienna bread.

(22) A. S. asks: 1. What volume of air is necessary for the complete combustion of a given volume of ordinary illuminating gas? A. From 7 to 10 vols. 2. Is there any flavoring added to pear phosphates, or is it the natural taste? A. It is made as follows: Take Bartlett or other good pears, cut or chop very fine, press, allow to settle; pour off supernatant liquid; mix one pint of this pear juice with one pint acid phosphate and one pound of sugar, or enough to sweeten.

(23) A. P. and H. A. M.—The first regular passenger railroad in America worked by steam locomotives was the Charleston and Hamburg, of South Carolina, chartered in 1827 On a part of this road the locomotive "Best Friend" was operated in the latter part of 1830. The first trial of a locomotive in America was in 1829, on a road built by the Delaware and Hudson Canal Company, to connect their mines at Carbondale with the town of Honesdale.

(24) J. L. P. asks: 1. The largest craft afloat? A. The Great Eastern. 2. The weight of the heaviest gun? A. 110 tons. 3. How many cubic feet of air are required for the practical combustion or consumption of one pound coal? A. 140 to 152 cubic feet for perfect combustion, according to the percentage of combustible in the coal. 4. By what rule do we determine the proper area or dimensions of chimney or smoke stack, to be in proportion with grate surface? A. A common practice is to make the chimney equal to two-tenths the area of the grate. The proper formula is:

$$\frac{15c}{\sqrt{h}}=\text{area},$$

$c$ being lb. of coal burned per hour, $h$ height of chimney. 5. A good work on the last question, and price? A. Nystrom's Mechanics (revised edition) is good on this and all subjects appertaining to steam engineering and mechanical subjects. We can mail it you for $3.50.

(25) A. S. writes: For home made ginger pop: Add about one gallon of boiling water to two ounces of best ground ginger. Stir in whites of one or two eggs and let settle over night. In the morning pour off as much clear liquor as possible, add enough water to make two gallons, and stir in three pounds granulated sugar. Now add 1 ounce cream tartar, the strained juice of three lemons, and two tablespoonfuls of home made yeast. It should be perfectly clear. Stir well and bottle. It will take about two days to ripen in a warm place, as a mantel piece over the kitchen range, or a week in a cool place, as the cellar. It should never be kept more than two weeks, or you may lose the bottles. The bottles should be laid on their sides, to keep the corks wet and tight.

(26) W. K. B. desires (1) simple method of removing strawberry stains from white marble—will ammonia? A. Mix up a quantity of the strongest soap-lees with quicklime, to the consistency of milk, and lay it on the stone for twenty-four hours; clean it afterward, and it will appear as new. 2. Best method of restoring nickel bicycle which has become slightly rusty? A. If the plating has not been worn off, the rust can be removed by polishing with rouge.

(27) J. L. H. asks: 1. What causes the leaves of the sensitive plant to fold up when touched? A. Because the petiole, which unites the limb or blade of the leaf to the stem, has an articulation, or a construction with a tendency to disunion, shown in a swelling formed of cellular tissue, irritation of the cells of which induces a depression of the whole bipinnate leaf; a similar property exists in the struma at the base of the leaflets which fold upward. 2. What is the most suitable material for foundation of a heavy engine? How much lower should the back end of a 14 foot return tubular boiler be set than the front end? How thick should the brick walls for boilers of this size be, also distance of bridge wall from bottom of boiler, to burn wood? A. For engine foundations, stone or hard brick laid in Portland cement, with or without dressed capstone, to suit style of bed plate or engine bearings. For a 14 foot boiler, 1½ inches inclination in its length to rear end. Walls 12 inches with 1 inch air space, and 4 inch wall outside tied in with headers enough to stay it, and solid at places opposite back stays. Bridge wall to be 8 inches clear from boiler shell.

(28) I. D. F., of Mass.—To etch your name on steel tools, proceed as follows: Clean thoroughly of grease, and then spread a thin coat of beeswax or paraffine on it at the place where the name is to be. This must be as thin as possible. Then, with a sharp needle point, write through the wax to the steel. Paint this over with a mixture of nitric and muriatic acid, in the proportion of six to one respectively, and when bubbles cease to rise, the work is done. Wash in strong soda water.

**TO INVENTORS.**

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# INDEX OF INVENTIONS

**For which Letters Patent of the United States were Granted,**

**July 20, 1886,**

**AND EACH BEARING THAT DATE.**

[See note at end of list about copies of these patents.]

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