

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.

For Sale—One No. 2 second-hand Brown & Sharpe Milling machine. Used but very little. Good as new. W. P. Davis, Rochester, N. Y.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. For best hoisting engine. J. S. Mundy, Newark, N. J. Best 15 in. Shapers, \$245. Am. Tool Co., Cleveland, O. The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

"How to Keep Boilers Clean." Send your address for free 96 p. book. Jas. C. Hotchkiss, 112 Liberty St., N. Y.

Centrifugal Pumps. Capacity, 100 to 40,000 gals. per minute. All sizes in stock. Irvin Van Wie, Syracuse, N. Y.

Scale removed and prevented in boilers; for each 50 horse, 16 cents a week. Pittsburgh (Pa.) Boiler Scale Resolvent Co.

Guild & Garrison, Brooklyn, N. Y., manufacture steam pumps, vacuum pumps, vacuum apparatus, air pumps, acid blowers, filter press pumps, etc.

No. 1 Universal Miller, with arm, reduced price, \$480 f. o. b. any R.R. depot east of Mississippi. Address Garvin Machine Co., Laight and Canal Sts., N. Y.

Split Pulleys at Low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

The price of the Brown & Sharpe No. 1 Universal Milling Machine without Overhanging Arm is \$480. Price of the Machine with Overhanging Arm, \$495. Previous prices, \$550 and \$585. Brown & Sharpe Mfg. Co., Providence, R. I.

Magic Lanterns and Stereopticons of all prices. Views illustrating every subject for public exhibitions, etc. A profitable business for a man with small capital. Also lanterns for home amusement. 220 page catalogue free. McAllister, Optician, 49 Nassau St., N. Y.

Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway, New York. Free on application.

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 This is for our information and not for publication.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 and labeled.

(3601) M. S. writes: 1. I wish to run a 40r candle incandescent lamp for from five minutes to half an hour at a time, lamp to be 40 feet from battery. I have four 5x6 cells, each containing two carbons 6x1 1/2x1/4 inch and porous cup 6x2 3/4 in which is placed an amalgamated zinc rod in a little mercury. Solution of chromic acid to be used outside porous cup, acidulated water inside. How many such cells are needed to light the lamp properly? A. From 6 to 8 cells. 2. Can I use any more effective cell than this? A. We think not. 3. Is the zinc in this battery consumed while the circuit is open, or is there any local action when the battery is not in use? A. The action in the Fuller battery is very slight when the circuit is open. 4. How long will this battery light the lamp continuously, and what proportions of chromic and sulphuric acids with water are most effective? A. The battery will probably operate continuously for a week. It will require about 10 percent each of the chromic and sulphuric acids. 5. What size wire is best to connect lamp with battery? A. Use No. 16. 6. Can I use the same battery to light a gas jet without the help of a coil? If not, how small a coil can I use and light a jet 50 to 75 feet from battery? What size wire and how much by weight shall I use to make the coil, and how much and what size iron wire will I need for the core? A. A coil will be needed to light the gas. Make a spark coil by winding on a 3/4 inch bundle of soft iron wires, 8 inches long, 10 or 12 layers of No. 18 wire. Use No. 16 iron wire for the core. 7. Would the battery be too powerful for a bell at 75 feet? If so, couldn't I use German silver wire in the circuit to the bell? If the idea is practical, how much and what size should I use? A. You can use a bell having a suitably wound magnet without employing German silver wire.

(3602) E. N. A.—1. For a full description of luminous paints we refer you to our SUPPLEMENT, Nos. 229, 249, 497, and 539. 2. For parlor matches.—Dry the splints and immerse the ends in melted stearine. Then dip in following mixture and dry:

- Phosphorus (red).....3 parts.
- Gum arabic or tragacanth.....0.5 "
- Water.....3 "
- Sand (finely ground).....2 "
- Binoxide of lead.....2 "

Perfume by dipping in a solution of benzoic acid. 3. With a power blast you can melt iron or brass, but the operation can only be carried on in a small way. 4. We can supply Root's "A. B. C. of Bee Culture" for \$1.25, Cook's "Manual of the Apiary" for \$1.50, Langstroth on the "Honey Bee," \$2.

(3603) H. W. S. writes: In paper of October 10, 1891, in Notes and Queries column, No. 3446, W. E. V. asks how to straighten lance wood which is bent or crooked. Heat it in gas flame or otherwise, until about too hot to handle comfortably; then it will be soft and pliable, something like lead, and will stay flat. I have done it so.

(3604) A. C. asks if it would be dangerous to connect the exhaust pipe of a gas motor with the sewer. A. Yes, it would be dangerous, as gas sometimes passes through into the sewer and causes explosion. Connection with chimney also results sometimes in explosions.

(3605) G. W. S. writes: 1. I wish to make an induction coil like that described in "Experimental Science." Would it not be better to use insulated wire for the secondary coil instead of the bare wire as given? A. You could use cotton-covered wire for the secondary instead of bare wire. It is easier wound, although it is a little more expensive. 2. How much double cotton-covered wire should be wound on the secondary coil to make the machine as effective as possible? A. Use about one-third more wire than the amount mentioned in the article referred to. 3. Why is it necessary to leave a space of one-eighth inch near the heads, and would it still be required if insulated wire was used? A. The space near the heads is left to avoid the possibility of the bare wire slipping down between the heads and the paper used to separate the coils. 4. In figuring the tin foil surface, are both sides considered? A. Yes.

(3606) H. W. L. asks the best way to protect nickel plating on a bicycle, put away for the winter, from rusting. Are the preparations like anti-rust, etc., good for this purpose without tarnishing the surface after removal in the spring? By answering you will have the gratitude of all wheelmen, as this question now presents itself to them. A. In putting away a bicycle for the winter, every part should be thoroughly cleaned from dirt, the running parts duly oiled and the bright parts wiped with a mixture of vaseline and paraffine, 2 parts vaseline, 1/2 part paraffine, to which add a half part of finely ground quicklime by heating and stirring. Apply warm by wiping all the nickel parts, and wrapping them in paper which has been coated on one side by the mixture, very thin, which will keep off dust and dampness. The japanned parts and saddle should also be nicely covered with wrapping paper to keep off dust, which injures the japan by long contact.

(3607) W. V. L. asks (1) how to make type metal or the composition of same. A. Type metal consists of lead 3 parts, antimony 1 part, melted together. You can readily procure old type from any printer at a low price, thus saving the trouble of making the alloy. 2. If it is advisable to use the same for making the cylinder or drum on the phonograph described in SUPPLEMENT, No. 133, in place of the plaster one? A. Type metal will do very well for the phonograph cylinder referred to. 3. How many 6 by 8 cells of gravity battery are required to run the Gramme motor described in SCIENTIFIC AMERICAN, No. 783? Or please recommend some cheap battery to run the above motor for about 10 hours continually. A. The gravity battery is not adapted to running the motor. Use 6 or 8 cells of large plunging or bichromate battery.

(3608) G. A. H. asks: 1. Would you kindly inform me the best style of galvanometer to use for field work in the open air with rough usage for measuring small currents accurately? A. We think a Thompson marine galvanometer would answer your purpose. 2. Can the resistance of the earth to the passage of small currents be measured the same as a wire conductor, as for instance the return circuit of a telegraph line using the earth as a return? A. You can measure the resistance of the earth by establishing a circuit with the earth as return, afterward deducting the resistance of the metallic conductor used. 3. Would there be any measurable difference between say 100 feet and 200 feet distance of such return? A. With proper ground connections we think the resistance will be found to be practically nothing. 4. Suppose a current to be generated in the earth by an underground stream of water flowing swiftly, would such a current be continuous or alternating? A. It will undoubtedly be continuous. 5. Is it necessary in order to transform a current to a higher or lower potential that it be an alternating current instead of a continuous current? A. Yes, unless it is done by means of a motor dynamo, that is to say, the primary current being used to drive the motor, the secondary current being taken from the dynamo.

(3609) F. A. M. asks how to clean sea and similar shells and make them look nice. A. Dark colored organic matter on the outer surface is first removed by making a thick mixture of one part bleaching powder to two parts water and soaking the shell therein. On removing wash and scrub it. Thick incrustations of lime must be picked off with a sharp edged hammer or some similar tool, and then the shell must be dipped in boiling dilute muriatic acid. For strong heavy shells use 1 acid to 3 of water; for delicate shells use 1 part acid to 10 of water. Dip the shell for a second only, wash and examine; if not enough, give it a second dip. Hold it in wooden forceps or attach it to a stick in any way to serve as its handle. The important point is not to let the acid stay long on the shell. For local spots it may be applied with a brush.

(3610) J. H. D. asks what will make a paste to hold gold braid to silk ribbon. A. The following, one of the most economical, convenient, and extensively used cements for cloth, is the gutta percha tissue cement. It consists of a thin leaf or sheet of gutta percha, which may be purchased at small cost of any dealer in tailors' supplies. When two pieces of cloth are to be joined, the gutta percha tissue is placed between the parts and a hot flat iron is then applied to the exterior of the cloth. The heat melts the gutta percha and the weight of the iron presses the parts together. On cooling, the cloths will be found strongly cemented together. For attaching together edge linings, fillings and all kinds of parts, this method is excellent. For covering, joining and patching of garments it is unequalled. It saves the drudgery of sewing, and in the matter of mending often enables the housewife to accomplish in a superior manner, in five minutes, work that would require as many hours by the needle.

(3611) C. T. H. writes: I am using a one-sixth horse power Edison slow-speed, series-wound motor to run my polishing and turning lathe. The

lathe sits on a table; the motor is in a compartment underneath; the speed is one right for polishing, but very much too high for turning. I have a resistance in the circuit, but it only cuts down the power, reducing the speed very little. I have thought of a brake, also of countershafting, but am unable to plan anything to suit the case. Can you kindly help me out of my difficulty, so that I can run my lathe fast or slow at pleasure? A. We think your best way of regulating the motor is by means of a countershaft and cone pulleys, or by means of plain cones and a shifting belt.

(3612) J. B. R. asks what size to make a balloon that would lift about three hundred pounds. A. It depends on the material and equipment. Make it of 40,000 to 60,000 cubic feet capacity. 2. How many cubic feet of gas a cylinder ten feet long and four feet in diameter will contain. A. 125 1/2 cubic feet.

(3613) P. C. E. asks the elements and solution which when used as an ink will disappear after a certain length of time (about a day). A. Use dilute tincture of iodine. 2. Also an invisible ink which will appear when warmed. A. Solution of chloride of cobalt, dilute sulphuric acid, lemon or onion juice, and many other substances. 3. A way of making letters on a coin by means of an acid. A. Coat with wax, cut the letters through the wax so as to expose the metal and drop on nitric acid. This will act on all ordinary coins except gold ones. For the latter mix three parts hydrochloric with one part nitric acid. 4. Describe the contents of the long cylinder on the platform of an electric car. A. We presume you allude to the resistance box, for controlling the power of the motor, which box contains heavy resistance coils.

(3614) J. A. asks: 1. How can poison be detected in mushrooms? A. There is no way of doing this. Actual trial or identification of the species is the only certain way. 2. How is a cylinder on an Edison phonograph constructed? Does sound register on a cylinder of wax the same as on tinfoil? A. For construction of the Edison phonograph we refer you to our SUPPLEMENT, Nos. 632 and 706. The composition cylinder is indented like the tinfoil on the original instrument. One cylinder can repeat a tune or words a great number of times.

(3615) B. F. W. asks: How much does iron shrink to the foot? Does the size change the amount of shrinkage? That is, will a 2 inch round bar shrink more or less than an inch round bar? What per cent does iron waste or lose in working? What amount of carbon does machine steel contain? What book would you recommend to read on this subject? A. Iron castings shrink about 1/8 inch to 1 foot, which is the usual allowance for plain work. Cylinders, from one-tenth to one-twelfth inch to 1 foot, according to size. There is very little difference in the shrinkage of a 1 inch and 2 inch bar. The wastage in foundry work is from 2 to 5 per cent. Machinery steel contains from 1/2 to 1 percent carbon. See our book catalogue for books on these subjects.

(3616) L. C. M. says: 1. Will you please inform a much interested reader of your valuable paper (through its columns or otherwise) what quantity of water will flow through 3,000 feet of one inch pipe, with a 6 foot head, there being no sharp curve or angle in the line? Also, how is an electric wire insulated where it passes to the interior of a gas engine? A. Your 1 inch pipe 3,000 feet long with 6 feet head will deliver 1 1/2 gallons per minute. Electric wires for gas engines may be insulated by inclosing in porcelain or glass thimbles to be held in place by a stuffing box packed with asbestos. 2. A Chinaman says: In China, when a man of high degree dies, his body is embalmed by packing it in tea, after which the tea is again boxed and a private mark placed upon the box, and by this mark Chinamen understand that the tea has been used for embalming the dead and that it is only fit for export. Is there any means of substantiating such testimony? A. Shall be glad to hear testimony as to the Chinese custom.

(3617) D. D. W. asks for a receipt for making cotton, etc., waterproof, by putting it in a solution of alum and lead acetate. A. Dissolve 2 1/2 pounds alum in 10 gallons of water and 2 1/2 pounds lead in 10 gallons of water. Heat may be applied to accelerate the solution; mix the two solutions and soak the cloth therein; or first soak the goods in one, and then in the other. In the latter process use half the quantity of lead acetate and immerse in the alum first, wringing out before putting it into the lead solution.

(3618) C. M. E.—1. The mould on the leaves sent is mycelium of a fungus belonging to the order Perisporiacei. We have seen recommended the spraying of the leaves with a solution of sulphate of copper to destroy the fungus. 2. Dust your rose bushes with insect powder (Pyrethrum).

(3619) S. J. S. writes: I wish to connect a bell with my telephone so as to get the calls in another room. Have made a relay that works perfectly with one Leclanche cell, but when introduced into the circuit of the telephone it shows no sign of magnetism. Have tried winding with 22 and 16 wire. Connections are good and no current can get to the telephone without passing through the relay. Is not a telephone current strong enough, or can you suggest the reason for its not working? A. You should use a polarized relay, or insert a magneto bell. The alternating current of the telephone call does not work well with an ordinary relay.

(3620) H. T. C. asks: 1. In a medium sized induction coil, what should be the ratio between the sizes of the wires in the primary and secondary coils, and what kind of a core should it have? A. The ratio of the primary and secondary in an induction coil depends upon the kind of current you desire to have. For the construction of coils we refer you to our SUPPLEMENT, Nos. 160 and 569. 2. It is stated in an elementary chemistry that if a current of oxygen be passed through a solution of ammonia gas, NH3, the resulting mixture will burn. Please give the chemical reaction. A. The idea is that enough ammoniacal (NH3) vapor will be carried off to make a combustible mixture, the hydrogen burning to water and the nitrogen going off free, thus: 2 NH3 + 3 O = 3 H2O + 2 N. 3. Is there any

paint insoluble in alcohol? If so, what kind? A. The majority of paints are insoluble in alcohol. Such as are made with a shellac vehicle are attacked by it. Common white lead with linseed oil is insoluble in alcohol.

(3621) S. A. D. asks if there is any acid that will act on lead or stereotype, and which will not touch beeswax. A. Nitric acid and water equal parts readily attacks lead. Nitric and hydrochloric acids equal parts diluted with an equal part of water attacks stereotype metal. Beeswax, paraffine or asphalt is a protection against these acids.

(3622) T. L. asks for any substance that will remove the sheet gutta percha from cloth without disfiguring the colors. A. Sponge with bisulphide of carbon or chloroform. The danger will be that the gutta percha will, as it dissolves, be soaked up by the cloth and produce a spot. Never use bisulphide of carbon near a light, as it is highly inflammable. Its odor is also very objectionable.

(3623) L. R. C. writes: I have a large carbon battery plate (6x10) which is broken; can you tell me a method by which the pieces may be united, and used in a bichromate plunge battery? A. You can repair your broken carbon plate by using a cement made of flour and molasses. After the cement is applied, the parts should be clamped together and the whole should be subjected to a red heat, the carbon being embedded in powdered carbon in an air tight box. We think you will find it less expensive to purchase a new plate than to repair the old one.

(3624) F. W. B.—The powder sent is potassium nitrate. Mixed with sulphuric acid for a depolarizer in a battery, it has the disadvantage of giving off fumes. We can supply Carhart on "Primary Batteries" for \$1.50.

(3625) G. I. H. asks if there is a rule for finding the radius of a circle when the arc and its chord, with distance (at greatest width) from arc to chord (versed sine), are given. A. The square of the chord of half the arc is found by the rule of the "square of the hypotenuse," by adding the squares of the versed sine and of half the chord together. The radius is equal to the square of the chord of half the arc divided by twice the versed sine.

TO INVENTORS.

An experience of forty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequalled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN, 361 Broadway, New York.

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October 27, 1891,

AND EACH BEARING THAT DATE.

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