Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion.

Notes & Queries

Correspondents are reminded that we cannot notice anonymous communications, and that letters signed "constant reader," "old subscriber," or mere initials come under this rule. In many instances we prefer to reply to queries, especially when they are of a personal nature, by postal card addressed directly to the inquirer, and it is obvious that we cannot do so unless the full address is given. Many correspondents whose questions are not answered will find the reason in the foregoing.

(1) J. O. asks: What is the cheapest and most effectual method of separating iron from brass, when the two metals have become fused together? A. If small quantities of the alloy are to be operated upon, perhaps the following method will best serve the purpose: Fuse the alloy with an equal quantity of sulphur (or add the sulphur after fusion) and digest the cooled mass with a sufficient quantity of oil of vitriol, mixed with three parts of water and warmed for some time. This will dissolve the iron and remaining zinc, leaving the copper as a dark powder, which may be dried, roasted, mixed with an equal quantity of sal soda and charcoal, again roasted, and finally heated to whiteness to reduce and melt the copper. If it is desired to recover the iron, boil the solution, add a sufficient quantity of caustic lime in powder, or chalk, allow to settle, decant the liquid, mix the precipitate with twice its weight of charcoal powder, dry perfectly and fuse at a strong white heat. Fusing the alloy with the proper quantity of clean quartz sand at a white heat will slag the iron, volatilize the zinc, and, if a little copper be added, separate the copper.

(2) J. A. W. says: 1. I made an electro-magnet with 25 feet of the size of the wire sent (not insulated with either silk or cotton) on each bobbin, with $\frac{3}{16}$ inch round Ulster iron for the cores; they were 1¾ inches long and would hold up 1½ lbs. I made the magneto-electric engine described on p. 201 SCIENTIFIC AMERICAN SUPPLEMENT, using the above magnet, but it would not work. What was the matter with the engine? Was the magnet long enough? How many feet and of what number of silk-insulated wire will I need to make the engine? A. Make the cores of ½ inch soft iron, about 2 inches long, and use enough of No. 28 silk-covered copper wire to make the helices an inch and a quarter in diameter. 2. Could I not make one that would work a small lathe with about 2 lbs. of wire on the magnet? A. No. 3. How would sal ammoniac do for the zinc fluid in the Bunsen or bichromate battery, with two cells of the bichromate battery? A. Dilute sulphuric acid is preferable.

(3) A. H. G. wishes to know (1) the manner of photo-engraving? A. There are several photo-engraving processes in use, generally based on the property possessed by certain compounds—as that of gelatin with chromic acid—of being insoluble when exposed in thin films to light. The films may be spread directly on the plate, slightly coated with wax or asphaltum, and after drying in the dark, exposed under the photo-negative; or on transfer tissue, and, after exposure, transferred to the plate. Treated with hot water the parts of the image unaffected by the light are dissolved, leaving in those portions the surface of the plate, or waxed surface, bare. The film may then be hardened by immersing the plate in alum water, after which the exposed surface may be etched with an acid, or acid salt (if the plate is of zinc), as sesquichloride of iron: first having removed wax or asphaltum with benzole. After etching, the image may be removed with hypochlorite of lime and boiling water, and the engraving perfected. The photograph is usually in line drawing. The name of nature-printing is applied to several processes. 2. How is nature-printing done? A. You should consult Vogel's "Chemistry of Light and Photography." 2. Can the impressions be made in gutta percha and paper, instead of wax and plaster? A. As we understand you, yes, in some cases.

(4) A. B. asks how he can have his hair restored? It has fallen out in patches all over his head. A. The following preparation for stimulating the scalp is recommended by Fox: Glycerin 3 drachms, lime water liniment 4 ozs., cantharides—tincture—3 drachms. Brush into the scalp with a stiff nail brush until irritation is set up.

(5) N. S. asks: What is the cheapest manner of making oil of salmon heads, liver, etc., and clarifying or refining same? A. The scrap may be thrown into a deep narrow cauldron filled with boiling water, and hot steam injected at the bottom for about fifteen minutes, transferred to an hydraulic press, and what oil there is expressed. The pressed scrap may be used as a fertilizer. The oil may be purified by agitation with hot water containing a few per cent of tannin, next with hot water and steam alone, and filtration through animal charcoal; or agitate with a dilute solution of blue vitriol and common salt, wash, and filter as before. Ordinarily, exposure to sunlight in shallow glass-covered trays will bleach it.

(6) I. C. G. asks: Why does the moon appear larger and less brilliant at the horizon than at the meridian? A. Larger because of comparison with terrestrial objects; less brilliant because of being seen through the denser or more hazy atmosphere close to the earth's surface.

Considering the difference between equatorial and polar radii of the earth, it would seem that the flow of the Mississippi river from its source to its mouth would be about 2½ miles up hill; how is it? A. If "up hill" means more or less distance from the earth's center, the Mississippi would present the paradox noted; but "up hill" is really elevation above the ocean level—which must be taken as the standard. In reality the river descends about 2 feet per mile, the elevation of the source being some 8,000 feet above the sea level.

(7) N. W. G. asks: What is the best way to bend plow handles? We have some trouble owing to their splitting. A. Cut a fine groove around the handle and bind them with copper wire.

(8) J. W. R. asks: 1. How can I make a mould for electrotyping from a wood cut, and how is it prepared? A. Use wax, melted sufficiently so as to take a fine impression of the cut. Dust the mould thickly with graphite, and suspend freely in the bath. 2. What can I do when sufficient copper has attracted the mould, to make it ready for mounting on wood blocks? A. Fill in the back of the electrotype with type metal and turn the edges neatly.

(9) F. F. W. asks: What will prevent black oil (say natural W. Va.) "Globe A" brand from working destructively on a sulphur joint under the bed plate of an engine? A. Give the joint a thick coat of equal quantities red and white lead mixed with varnish.

(10) C. D. N. asks: Does a toad throw off its skin? A. Yes, at intervals.

What position, east or west, north or south, is the best for the bed of a sleepless person? A. Beds in many hospitals are placed north and south, parallel to the magnetic meridian.

1. What will remove the effects of a wasp's sting? A. Ammonia. 2. How can we drive wasps from a house? A. You might try any insect powder, or smoke from burning coffee.

Can you give me a simple method for illustrating to a class of children the movements and phases of the moon? A ball hanging on a thread and moving round the head with a candle for the sun is simple, but is hardly satisfactory. A. We know of no simpler method than that suggested.

Has the sun any kind of a movement, and what is it? A. Three—an axial rotation, a motion about the center of gravity of the whole solar system, and a progressive motion in space toward the constellation *Hercules*.

What is the use of the dominical letter? A. For the purpose of determining when Easter falls and for other similar problems concerning the day of the week and the day of the year. It was early found convenient to place the first seven letters of the alphabet in succession against the days of the months, putting A to January 1 and repeating the seven letters as often as necessary until December 31. The letter which falls against the first Sunday in January will fall against every Sunday in the year and thus is the dominical letter for the year unless it be leap year. Finding the dominical letter enables one determine what day of the week a given date in the year is. See introduction in Episcopal Book of Common Prayer.

Does the expression W. by S. (west by south) mean west near the south? What does (S. S. W.) south-south west, mean? A. W. by S. is the first point of the compass to the southward of due west, and S. S. W. is the second point to the westward of due south. Other questions have been repeatedly answered in back numbers.

(11) W. K. R. asks: Would it be practicable to make a small steam boiler, 20 x 30 inches, of galvanized iron? If so, what thickness of iron would be required, and at what pressure would it be safe to run it? A. Such construction is very common. If the iron is ⅛ inch thick, a safe working pressure will be about 50 lbs. per square inch.

(12) Z. B. says: A. and B. are building an 18 inch pipe that is to have a fall of 60 feet. B. maintains that if the pipe is made taper, that with the same sized outlet he will have more pressure than if the pipe is 18 inches diameter the entire length. A. says not. Which of the two is right? A. We think A. is right; but the meaning of the question is not very clear as it is expressed.

(13) L. J. B. asks: Which, on a half mile curve of railroad track, is the longest rail, the inside or outside, or are they equal in length? A. The outside.

(14) F. E. C. asks: Is the point of cut-off equalized in the stationary engine? If so, how? A. It can be equalized by allowing a variation in the steam lead at the two ends of the stroke.

(15) H. M. A. says: I think of running a 1 inch pipe from my 30 horse power boiler into and up a 70 feet brick chimney, and attaching a whistle thereto. Would the apparatus be safe as a lightning conductor? A. Certainly not. Such attachments should terminate in the ground; never in the structure they are designed to protect.

(16) J. E. C. ask: Will I have to pay a government license to run a small skiff with a small engine on the Chemung river, which is not navigable or used for any commercial purpose? A. The steamers coming under the provision of the law are those "navigating any waters of the United States which are common highways of commerce, or open to general or competitive navigation," and "all coastwise sea-going vessels, and vessels navigating the great lakes" (extracts from sections 4400 and 4401 of the Revised Statutes of the United States).

(17) J. E. L. asks for a simple and easy way to set a safety valve on a steam boiler, or how to go to work to find where to hang the pea? A. Take off the lever, balance it on a knife edge, and observe how far the point at which it balances is from its fulcrum. Lay off this distance from the center of a bar of uniform section. Place the center of this bar on a knife edge, lay off from the center, on the opposite side, a distance equal to the distance from the center of the valve stem to the fulcrum. At this point attach the valve and a weight equal to the pressure acting on the valve when it is to open. Attach the lever at the first point marked, and move the pea along the bar until it is balanced. See also question (9), p. 236.

(18) W. H. C. asks (1) how to take the tubes out of a locomotive boiler when the tubes are badly covered with scale, produced from lime water, without injuring the tube sheets? A. The tubes must be cut loose from the sheets, and then they can be drawn out by inserting rods in them, each rod having a washer at one end, and a thread at the other, passing through a crowfoot placed against the sheet. 2. Is there a scale extractor that will remove the scale from the tubes by using it in the boiler before undertaking to take the tubes out? A. The scale may be softened by filling the boiler with fresh water, heating it and then allowing it to cool slowly. If there is much scale, it may be very difficult to remove the first tube, but after that is out, a tool can be introduced to clean the second tube.

(19) A. H. asks how many feet the earth varies from a straight line per minute in its orbit? A. Considering the earth's orbit as a circle of average radius 91,500,000 miles, the variation would be roughly 700 miles, or 3,696,000 feet per minute. 2. Also how many foot lbs. of velocity it is supposed to have? A. About 35 thousand million trillions of foot tons per minute.

(20) W. P. R. asks how shoemaker's wax is prepared? A. Beeswax, 8 ozs.; tallow, 1 oz.; melt and add powdered gum arabic, 1 oz., and lampblack to color. We know of no special uses.

(21) N. A. W. asks for combination colors, not aniline, for wool goods, for green, blue, red, black, and yellow? A. *Black* for 50 lbs.—Prepare with 2¼ lbs. of chrome; boil ½ hour and wash in two waters. Dye with 20 lbs. logwood and 2 lbs. fustic. Boil ½ hour: 1 water, then a slight sour moderately warm; 1 cold water and finish out of a warm one softened with a little urine. *Yellow* for 40 lbs.—2½ lbs. bark, 2 lbs. tartar, 2 quarts muriate of tin. Enter at 150° Fah.; boil 30 minutes. *Grass green* for 50 lbs.—Boil 20 lbs. fustic, 7 lbs. extract of indigo, 1½ lb. tartar, 3 gills sulphuric acid. *Scarlet* for 50 lbs.—Boil 4 lbs. cochineal and 1¾ lbs. of bark. Add 3 lbs. tartar, 2 quarts scarlet spirits. Enter at 200° Fah.; boil 1 hour, wash well. Sour before dyeing either cold or warm. *Blue* for 50 lbs.—1 gill sulphuric acid, 3 ozs. extract of indigo, 1 lb. alum. Enter cold with one half of the extract; give the other half when the boiler warms. Bring to the spring.

(22) C. E. S. asks; What chemicals may be used for writing on colored paper which will take the color out, leaving a white line where the ink touches? A. 1 part muriatic acid and 20 parts starch water. Very dilute oxalic acid may also be used. Write with a stee pen.

(23) O. B. M. asks: What is the best and cheapest way to make lampblack? A. A conical funnel of tin plate, furnished with a small pipe to convey the fumes from the apartment, is suspended over a lamp fed with oil, tallow, coal tar or crude naphtha, the wick being large and so arranged as to burn with a full smoky flame. Large, spongy, mushroom-like concretions of carbonaceous matter form at the summit of the cone, and must be collected from time to time. The funnel should be united to the smoke pipe by means of wire, and no solder should be used for the joints of either.

(24) F. D. asks for a recipe that will remove rust, grease, and dirt from a gun barrel? A. Try turpentine. 2. Also a recipe to prevent the barrel from rusting when exposed to the weather? A. See reply to L. S. W., this issue.

(25) J. M. asks: What is rubber cement, and how to soften clothes wringer rolls, so that in putting them on they will not fit so tight as to rub all the cement off the spindle? A. Rubber cement is gutta percha dissolved in bisulphide of carbon. Try dipping the rolls in hot water.

(26) A. M. C. asks for a recipe for polishing shells, such as tortoise and sea shells? A. Marine shells are cleaned by rubbing with a rag dipped in hydrochloric acid till the dull outer skin is removed, washing in warm water, drying in hot sawdust and polishing with chamois leather. Those shells which have no natural polished surface may either be varnished or rubbed with a little tripoli powder and turpentine on wash leather, then fine tripoli alone, and lastly with a little fine olive oil, bringing up the surface with chamois as before.

(27) C. E. H. asks: What is the best article to use in connection with sal soda in the manufacture of washing crystal? A. The alkaline matter is reduced to a coarse powder and stirred up with liquid size, or with a decoction of linseed, Irish moss or British gum. It is then dried and crushed.

(28) Several correspondents inquire what relations parts specified in a recipe bear to the weights of the ingredients. We have repeatedly explained that parts mean "parts by weight." Thus a cement for cracked wood is composed of 1 part slacked lime paste and 2 parts rye meal—that is, any given weight of the paste and twice that weight in rye meal.

(29) L. S. W. asks for a formula for practical use, to prevent small articles of iron or steel from rusting? A. Warm the iron or steel and rub it with clean white wax. Heat again until wax is absorbed—then rub over with a piece of serge.

(30) F. G. asks: What kind of varnish is used, and how prepared, to varnish chromos, etc.? A. Any good picture varnish will answer for chromos. A coat of clear size is usually first applied.

(31) I. M. H. asks: What will preserve rope, on flag pole, from rotting, and at same time be flexible? A. Tar the rope or oil it with whale oil. Paint the pole with white lead.

(32) T. P. G. asks for a cement that will resist the action of vitriol to coat pickle troughs? A. Use a concentrated solution of water glass.

(33) W. H. N. asks: What causes the different shades of gold jewelry, some being deep and others pale yellow? A. The different alloys used affect the color. Thus where silver alone is used with gold a green tinge results; copper alone produces a red tinge; but the copper and silver are more commonly mixed in one alloy, according to the taste of the jeweller. There are various mixtures for heightening the color of gold. For red gold use 4 ozs. melted yellow wax, and add in fine powder 1½ ozs. of red ocher, 1½ ozs. verdigris calcined till it yields no fumes, and ½ oz. of calcined borax. Mix well together, dissolve in water, and use as required. Etruscan gold coloring is obtained from a mixture of alum, 1 oz.; table salt, 1 oz.; saltpeter, powdered, 2 ozs.; and hot water sufficient to make the solution when dissolved about the consistence of thick ale; then add sufficient muriatic acid to produce the color desired. The article to be colored should be from 14 to 18 carats fine of pure gold and copper only, and free from coatings of tin or silver solder.

(34) J. W. S. asks for a cement for uniting leather and cloth nearly or quite waterproof? A. Dissolve gutta percha in bisulphide of carbon to thickness of molasses. Press the parts well together.

(35) D. R. E. asks for a glossy paint that will not taste in water pails? A. Use paint prepared with water glass.