Business and Personal.

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

Notes & Queries

(1) J. M. S. asks: Have chemists ever analyzed the juice of the India rubber tree? What are its ingredients? A. Yes; the pure juice is essentially a mixture of a number of hydrocarbons isomeric and polymeric with turpentine oil (XC_5H_4). Consult Watt's "Dictionary of Chemistry."

(2) G. E. B. writes: What causes the needle of the compass to point north and south, electricity or magnetism? A. It is supposed to be caused by the circulation of electric currents around the earth in a direction about parallel with its equator, and the tendency of the needle to arrange itself at right angles to the direction of these currents. See also answer to S. B. G.

Shall I proceed in the same manner to make an electrotype of a wooden medallion as I would in taking one from a plaster one? A. Yes.

(3) J. N. L. asks (1) for a recipe to promote the growth of the human hair? A. The health and vigor of the hair depends in a great measure on the general vigor of the system. Brush the scalp well with a stiff brush daily (with care not to strain the hair) and wash it with pure water, to which a little cologne water or tincture of cantharides may be added. Avoid the use of pomatums, oils, etc. 2. Also, one that will cause it to cease growing? A. See answer to R. E. F.

(4) T. J. H. writes: How can I remove the rust off a nickel or silver plated surface, and make it appear as good as new? A. By buffing or polishing until a new surface is obtained, which must then be replated.

(5) A. V. P. writes: 1. Can I coat an ordinary glass jar with tinfoil? A. Yes. 2. How can I fasten it to the glass? A. With shellac varnish. Then, in order to drive off all moisture from the inside of the jar, it is well to heat the jar to about 212°, and keep it at that heat for about one hour; then seal the jar airtight, with sealing wax. 3. Can I make a plate machine by using thick window glass for the plate, cutting it 8 or 16-sided, putting a hole through the center and clasping it between wood disks on a wood shaft for turning it? A. Yes. 4. How thick should the glass be? A. Make it of crown glass ⅛ of an inch thick and 12 inches in diameter, 5. Would two thicknesses do best? A. Not for a small machine. 6. Can the collecting combs be connected directly with the jars? A. Yes. See SUPPLEMENT 105, p. 1669. 7. Of what is it best to make the cushions? A. Of chamois leather, and stuffed with hair?

I would like to know my best method for procuring oxygen gas, not too expensively, for trying a few ordinary experiments; using say 2 or 3 gallons at a time? A. Make a retort out of a piece of iron gas pipe 8 inches long and of about 1 inch bore; on one end of this have a gas fitter screw on a cap airtight, and on the other end a reducer, connected airtight with about 2 feet of ¼ inch gas pipe: now it would be well to place the retort in the fire, so as to burn off any oil that may be in it; then remove it from the fire, and when it is cool place in it a mixture of about equal parts of pulverized black oxide of manganese and chlorate of potash; then heat the retort gradually, and the oxygen gas will escape at the end of the ¼ inch pipe, where it may be collected over water or by simply bending the ¼ inch pipe into a glass jar, so that the oxygen gas (which is heavier than air) may settle in the glass jar. A little splinter of ignited charcoal held near the mouth of the jar will indicate (by burning brightly) when the jar is full.

(6) E. M. asks what can be put on carpets while sweeping to lay the dust, and which will not injure the carpets? A. Wet tea leaves.

(7) In answer to J. S. H., who asks for a good recipe for vinegar made by chemicals, SUPPLEMENT 86, 326, 284, 156, and 123, vol. 37, SCIENTIFIC AMERICAN.

(8) R. E. F. asks for a safe and simple method or preparation that will permanently remove from the upper lip a slight down, which being dark is unpleasantly apparent? A. Böttger recommends the following: 1 part, by weight, pure crystallized sodium sulphydrate, and 3 parts of fine purified chalk; rub well together, moisten with water, and apply a layer the thickness of a knife blade. It should be allowed to remain in contact with the flesh not more than two or three minutes. If the materials are impure the skin may be stained.

(9) J. B. M. asks: At what degree of heat will green oak staves take fire in a light dry house without coming in contact with fire or a heated wall or iron? A. For a short time probably 600° Fah.

(10) S. B. G. writes: The magnetic needle is said to stand at right angles to a current of electricity parallel to the equator. Then what is the cause of the variation of the magnetic needle or the current of electricity? A. Perhaps you will understand this if you bear in mind that the magnetic equator does not coincide with the terrestrial. The former is a somewhat sinuous line, not differing much from a great circle inclined to the horizon at an angle of 12°, and cutting it on two points almost exactly opposite each other, one in the Atlantic and the other in the Pacific. These points appear to be gradually moving their position, and traveling from east to west.

(11) L. A. B. asks: Will a sun dial show correct time the year round? A. As regards solar time, yes; as regards mean time, no.

(12) E. R. G. asks if our common red clover seed is used in this or foreign countries for the purpose of coloring or making colors of any kind? A. We have never heard of their being used for such a purpose; and, judging from their chemical composition, we should say that they could not be.

(13) S. B. G. asks: Where will a body weigh the heavier by a spring balance at new moon—on the opposite side of the earth from the moon and sun, or at right angles to the center line of attraction, which would be at low tide? A. It would weigh heavier, of course, on the opposite side of the earth from the moon, where it is less influenced by the attraction of the latter, and in a downward direction.

(14) A. P. B. says: It is a well known fact that in some sections of our country water does not lie at the same depth, that is, a well may be sunk one hundred feet before finding water, while but at a very short distance water may be found quite near the surface. Is there any means by which these veins of water can be found or their depth determined? A. There can be no means of determining the matter, for the reason that the presence or absence of water, at different depths, depends wholly on the structure and inclination of the underlying strata—a point that can be settled by trial only

(15) C. W. K. says: In the publisher's prospectus of Wm. Cullen Bryant's "History of the United States," it states that "Geologists have demonstrated that this is the oldest of the continents." He seems inclined to doubt this, and asks our opinion. A. We believe that the most prominent scientists all concede America to be the old world, geologically speaking. From our own reading on the subject we cannot think otherwise.

(16) C. M. R. asks why paper immersed in water in absorbing the water swells, and why, if it had been immersed in oil, although it absorbs the oil, yet it does not swell. I refer particularly to linseed oil. A. The paper originally consisted of exceedingly fine fibers mixed with water in the form of a pulp, to which there was added a small quantity of glue. When it is soaked in water the latter disintegrates it and causes the fibers to separate and to again assume a semi-pulpy state; the paper can hardly be said to swell. Oils have not the property of causing such a disintegration any more than they have of dissolving certain things that are soluble in water.

(17) I. J. I. asks: What chemicals must I use to make a freezing compound? A. Any of the following will answer the purpose: Snow or powdered ice 2 parts, common salt 1 part; snow or powdered ice 3 parts, crystallized chloride of calcium 4 parts; or sulphate of soda 6 parts, nitrate of ammonia 5 parts, dilute nitric acid 4 parts. The parts referred to are by weight.

(18) G. W. K. asks: Is soda injurious as a tooth powder? A. Yes.

How can I make japan for small castings (yellow japan)? A. Gamboge, 2 drachms; cape aloes, 3 drachms; pale shellac, 4 ozs.; alcohol, 1 quart.

How can I melt gold dollars in a common blacksmith's forge? A. Gold coin may be readily melted in the heat of an ordinary blacksmith's forge. You will need a crucible, made either of graphite or French clay, in which to melt them.

(19) A. H. C. asks for a recipe for darkening the color of the hair, not instantly, but by gradual process? A. Apply occasionally as a wash the expressed juice of the bark of green walnuts (*Paulus ægimeta*).

(20) X. asks: What mineral or chemical substance would be best to deodorize the fumes of gasoline smoke? Could the fumes be precipitated or conducted through a chemical mixture and divested of the bad smell? If so, by what chemical substance? A. The trouble is due to the difficulty of securing complete combustion. The vapors may be condensed by passing through cold water, or thoroughly oxidized by conducting them through a column of granular potassium bichromate kept constantly moistened with strong sulphuric acid.

(21) L. A. asks how to cement a hard rubber triangle, such as draughtsmen use? A. Melt together equal parts of pitch and gutta percha, apply hot and press the parts firmly together until quite cold. If properly applied, the lines will be only very slightly out of true.

(22) R. W. S. asks: What can I use to cleanse and burnish my lamp burners to prevent their smoking? I have tried various preparations, all to no advantage, and am obliged to throw them aside and get new ones, which only last a few weeks, until they smoke as bad as the old ones just laid aside. A. To clean unlacquered brass work use a stiff brush, plenty of hot soapsuds, and a little fine sand; dip in clean water and touch up with tripoli. It may be kept clean for a time by applying a light coating of shellac in alcohol with a little dragon's blood to color. Lacquer may be removed by strong hot solution of borax.

(23) L. A. L. asks: 1. What is the price of aluminum in Europe? A. About $1.30 per ounce. 2. Can it be had in amounts suitable for manufacturers' use? A. Yes. 3. Where is the metal mostly prepared? A. In France. 4. Is any made in America? A. Not commercially. 5. What are the best sources of supply? A. The minerals or ores from which metallic aluminum may be economically extracted by methods in use at present are: Bauxite, found, in notable quantities, only in France—at Beaux and Revese, and cryolite, occurring in abundance on the western coast of Greenland and in the Ural Mountains, Russia. (See SCIENTIFIC AMERICAN SUPPLEMENT No. 62, p. 990.) Most of the commercial aluminum is obtained from bauxite: that from cryolite is usually impure. (See SCIENTIFIC AMERICAN SUPPLEMENT, pp. 798 and 1213, and SCIENTIFIC AMERICAN, vol. 37, p. 153.)

(24) J. K. S. writes: In the SCIENTIFIC AMERICAN, vol. 1, new series, p. 38, you give a rule for constructing cone pulleys. Will you please explain how to multiply by the angles? I have tried it and I cannot get the same answer as you give. A. The article referred to does not give rules, but merely contains a few illustrative examples, the method of solving which is not explained. You will find simple methods described in "Wrinkles and Recipes."

(25) N. O. P. writes: Does such an article exist as a bullet-proof jacket, or has there yet been invented a covering for a man's body capable of resisting the action of pistol balls? If so, where can one be purchased. If not, what substance, metallic or otherwise, best resists the penetration of leaden bullets? A. A great many patents for such garments were taken out during our late unpleasantness, and possibly you can obtain what you want from a dealer in weapons of offense and defense.

(26) R. H. M. writes. 1. I want to build a steamboat 50 feet long, 12 feet beam, to draw not over 16 inches, as the water is very shoal in places where I wish to run. She will be of fair model, but quite flat amidships. How large an engine will I need? A. An 8 x 10 will answer. 2. What pitch ought the screw to have? A. It will be better to use two screws, with a pitch of 4½ to 5 feet. 3. What will be the speed? A. About 5 or 6 miles an hour.

(27) G. W. writes: I have an engine 2 x 2½ inches; boiler, 9 square feet of heating surface, containing about two buckets of water, carrying 100 lbs. of steam and running 600 revolutions per minute. What power is developed? A. If the boiler is capable of furnishing steam for running the engine at this speed, you should realize about 1¼ effective horse power.

(28) W. R. B., query No. 20, January 19, asks for a method to clean sponges used at the Aquarium. I would suggest in addition to your information that good clean sand be tried. The mode of operation is to work the sand into the sponge by a kneading process, and when sufficiently worked rinse in warm (not hot) water, which loosens and removes the dirt and slime.—J. W. C.

(29) E. K. asks: What will take a stain of coal oil, about six feet in diameter, out of a dark Brussels carpet? A. Try heating the spot very hot before a fire for some time, to drive out the oil by evaporation. If that fails, probably wetting with purified benzine will effect the object.

(30) R. C. asks: What is the latest estimate of the zero of temperature, and upon what considerations is that estimate based? A. Assume a cylindrical tube, closed below and open above. Further assume the air in the tube is confined by a piston which has no weight and moves without friction. As the temperature rises or falls, of course our assumed piston would rise or fall in the tube, following the expanding or contracting of the confined air. Mark the point at which the piston falls at the temperature of freezing water, 0°, and the point to which it rises at the temperature of boiling water, 100°. Lastly, divide this piston into 100 equal parts, and continue the division of the same size above 100° and below 0°. It will be found that almost exactly 273 such divisions can be made before reaching the closed bottom of the tube. These divisions correspond to centigrade degrees, so that the absolute zero is 273° below the freezing point centigrade, or 459° below that of Fahrenheit.

(31) L. A. W. asks for the number of power looms in the United States and Europe? A. According to the compendium of the ninth census of the United States, issued at the Government printing office in Washington, D. C., there are in the United States 157,310 power looms used in the manufacture of cotton goods, and 1,451 in the manufacture of carpets.

(32) R. W. asks: Can an ice boat sail faster than the wind which blows it along? A. Yes. See SCIENTIFIC AMERICAN SUPPLEMENT Nos. 54 and 61, for full particulars.

(33) With regard to destroying lice on cattle and not injure them, G. B. says: Take 1 pint fish oil, pour it on the animal gradually, from the back of the horns to the root of the tail. To cure the cow itch or scratches: Paint the pastern joint well with white lead and oil; any kind of vegetable or animal oil will answer. Keep the cow haltered so she cannot lick her feet or go into water for one week. One application of each remedy is sufficient. On using the oil for lice, I have seen a cow in seven days' time shed her coat, and in 14 days' time a new beautiful coat of hair in its place; took on fat so very fast that in 30 days' time she was ready to kill for beef, and good beef at that. This in all was 30 days from the time she had been served with the dose of oil on her back. She had the prettiest coat of hair I ever saw on an animal's back. We keep our dogs well greased with tanner's oil, to kill fleas, and keep off flies in summer.

(34) A. E. K. asks: What is the salary of a first class engraver, capable of doing work similar and the same as banknote, vignette and script lettering equal to banknote work, which is got up at present in the States and Canada? A. The compensation received by first class banknote engravers varies a great deal, according to their abilities. You must apply to an engraving company, with specimens of your work, if you wish to obtain definite information.

(35) F. C. writes for directions for making a small magnetic engine, either upright or horizontal? A. You will find a fully illustrated description on p. 301, SUPPLEMENT No. 19.

(36) F. D. H. asks (1) if there is such an article as gunpowder that makes no noise when exploded in an ordinary gun? A. No. 2. In the forcible discharge of a missile from a gun barrel, will not the sound waves be produced in a greater or less degree, no matter what the explosive employed? A. Yes.

(37) S. S. B. asks: How can I make and apply ink as used on ribbons of dating stamps, etc., either purple or some other color? A. The inks are made by dissolving the soluble aniline or other coal tar dyes in hot glycerin diluted with about ⅔ its weight of water. For red, "rubine" extra or aurin with a few drops of ammonia; for blue, water blue BR, 5B, or 2B; for green, methyl green; for violet, methyl violet 5B, Hoffmann's violet 3B, or gentiana-violet B; for black, nigrosin.

(38) A. K. asks: How can I detect the presence of sulphate of soda in a solution of hyposulphite of soda? A. Heat the hyposulphite solution for some time with excess of dilute hydrochloric acid, free from chlorine, filter, add to the warm filtrate slight excess of solution of barium chloride, and after standing a short time filter. The precipitate, if any, consists of barium sulphate; 100 parts by weight (washed with hot water and dried) equal about 78 parts sulphate of soda in hyposulphite solution,