Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion. If the Notice exceeds four lines, One Dollar and a Half per line will be charged.

Notes & Queries

C. H. W. will find a description of Sir William Thomson's compass on p. 908, SCIENTIFIC AMERICAN SUPPLEMENT.—J. E. H. will find something as to the strains on threads of gas pipes on p. 1, vol. 34.—F. D. S. is informed that it is not probable that lard oil can be purified by adding extract of nutgalls.—D. W. S. will find that the speed of circular saws is given on p. 163, vol. 34. As to speeds of pulleys, see p. 138, vol. 34.—F. B. will find directions for japanning on tin on p. 132, vol. 24.—C. C. will find directions for preparing solubleacid chromate of lime on p. 123, vol. 36.—H. P. C., Jr., will find directions for exterminating cockroaches on p. 303, vol. 35.—F. C. W. will find something on deodorizing kerosene oil on p. 203, vol. 36.—J. D. K. will find articles on Professor Barff's method of preventing iron rust on p. 232, vol. 36, and on p. 1041 SCIENTIFIC AMERICAN SUPPLEMENT.—A. B. will find a description of a waterproof cement for stone on p. 138, vol. 31.—H. H. L. will find on reference that the ink described on p. 361, vol. 34, is mentioned as an indelible ink. It will do for stamping.—E. A. D. will find a description of hydraulic cement on p. 138, vol. 31.—W. J. T. will find directions for preparing xanthogenate of potassium on p. 275, vol. 36.—J. McM. will find on p. 119, vol. 30, directions for purifying rancid butter.—A. C. W. will find a description of a steam engine indicator and its use on p. 64, vol. 30.—W. J. K. will find in No. 19 of the SCIENTIFIC AMERICAN SUPPLEMENT directions for making an electric engine.—C. H. K. will find a recipe for a good cement for china on p. 379, vol. 31.—E. J. McQ. can calculate the horse power of engines by the formula on p. 33, vol. 33.—W. D. can ascertain the power of his springs only by experiment.—J. V. B. will find on p. 250, vol. 36, something as to the time used in electric telegraphing.—C. C. M., of Innsbruck, Tyrol, will find directions for making cotton cloth uninflammable on p. 103, vol. 34.—H. C. G. will find directions for kalsomining on p. 133, vol. 34.—A. H. B. will find on p. 251, vol. 31, a recipe for cement for filling millstones.—E. W. M. will find on p. 204, vol. 28, directions for preserving natural flowers. Back numbers of the SCIENTIFIC AMERICAN can be furnished if not out of print.—A. R. W. will find the recipe for cold in the head, from the *Lancet*, on p. 351, vol. 35.—S. N. O'H. will find a recipe for furniture polish on p. 315, vol. 30. A cure for corns is described on p. 202, vol. 34.—A. J. W., E. L., C. P., J. S., F. W. C., A. C., R. J. W., N. F., M. R. S., J. N. P., W. D., and others, who ask us to recommend books on industrial and scientific subjects, should address the booksellers who advertise in our columns, all of whom are trustworthy firms, for catalogues.

(1) J. P. G. says: E. B. K. can saw firebrick with a strip of sheet iron, with teeth cut in it.

(2) D. C. S. says, in reply to D. W.'s query as to the welding of the foot of a spindle to the step or plate under it: A few years ago my 4 foot burr appeared to run heavily, the foot of the spindle got very hot, and the mill was stopped. I examined it, and found the plate of steel that was under the spindle welded fast to the point. The point of spindle was about 1¼ inches in diameter, and the plate under it was ½ inch thick and 2 inches square. I took the point out, and tried to drive the plate off with a hammer, but could not. I then cut it off, and found the weld as perfect as any other part of the steel. I refitted it and started the mill again, and it ran for several weeks, and then welded as before. This time I took the point out and trimmed the corners off the plate, dressed it up true with the balance of the point, and retempered it. I have been using it ever since, and it is as solid and good as any. There was plenty of oil in the step each time, but it was of a very inferior quality; and I now keep a good supply of good oil, and it never gets warm. It is my opinion that the welding was accomplished by the parts being thoroughly ground together under pressure.

(3) A. Y. K. asks: In using the telephone, does the battery require to be stronger or weaker than that used in ordinary telegraphy? A. The battery may be comparatively light: we believe the apparatus is also made to work without any battery, simply by induced currents.

Is there an instrument for measuring the focus of spectacle lenses? If so, what is its character? A. You can determine the focus of a lens by holding it to the light before a flat surface; its distance from the surface, when external objects are clearly defined on the same, is its focal length.

(4) L. N. L. asks: 1. Is there any method known by which frictional electricity, when generated, can be stored up or accumulated, and made serviceable in working telegraph lines? A. No; not as ordinarily worked. 2. In the report of the Michigan State Board of Agriculture for 1871, there is an allusion to Andrew Cross, an Englishman, who owned to having made crystals of quartz, carbonate of lime, lead, copper, and many other artificial minerals by electricity. Can you tell me where I can find a detailed account of his experiments? A. Many of Mr. Cross' experiments are described in Noad's "Manual of Electricity."

(5) T. H. S. says: I wish to produce the sensitive flame with common gas. I can make the harmonicon, but it will not emit a note unless I lower a tube to a certain point over the flame. Can I produce the sensitive flame responding to a certain tone without employing hydrogen? A. Coal gas will answer. You may use an ordinary Bunsen burner, having a large tube, with the airports closed tightly. Or take a glass tube about ½ inch in diameter and 4 inches long, stop one end of it with a perforated cork through which the gas delivery tube just enters. The aperture of the delivery tube should be about $\frac{1}{10}$ inch diameter. When the flow of gas is properly adjusted, this will give you a very sensitive flame.

(6) F. I. asks: How can I make gold and silver inks? A. These are usually prepared by grinding gold or silver leaf with a little honey until the foils are converted into an impalpable powder, which is retained by the honey. The honey is then dissolved out with warm water, and the gold or silver powder mixed with a little gum water. Bronze powders mixed with gum water are often employed by artists as a substitute for the gold or silver.

(7) T. B. asks: 1. Can xanthogenate of potassium be purchased? A. It has not yet been commercially manufactured in this country. 2. What are the quantities necessary to the gallon of carbonate-charged birch beer, to prevent it from souring? A. Unless the salt were very pure it would be liable to give a somewhat disagreeable flavor to such beer. About 5 or 10 grains to the gallon would perhaps suffice. 3. Can salicylic acid be used for the purpose? A. Yes. Use from 30 to 50 grains of it to each gallon of beer.

(8) E. F. says: In picture frame polishing, I find trouble in getting the shellac dark enough in color. We cut our gum (orange) shellac and mix with imitation shellac, using about 5 gallons per day. As a coloring, I am using Vandyke brown mixed with alcohol for the dark polish. But the trouble with it is that it settles like mud at the bottom of the can in which I mix it; and when carefully poured off, it leaves the alcohol so slightly colored that it is almost useless, unless stirred up before mixing with the shellac. Is there anything that you can recommend for coloring shellac that will be clear from sediments when ready for use? A. The trouble with your Vandyke brown is probably due to the fact that you do not grind it fine enough. If this is attended to, it will not settle. Umber is sometimes used in the varnish instead of Vandyke brown.

(9) R. S. N. asks: Can you give me a formula or recipe for making an aniline ink which will answer for printing from stencil plates with? A. These inks are prepared by dissolving ordinary aniline red, violet, etc., in warm glycerin. The colors may be ground to a fine powder, and a little at a time stirred into the glycerin until the desired shade is reached; let stand for a day or so and strain through a small piece of fine silk before using. Although the aniline colors are for the most part quite expensive, their tinctorial power is so great that a very minute quantity will ordinarily suffice. These inks can therefore be made nearly as cheaply as ordinary printing ink, as only crude glycerin need be employed.

(10) A. B.—The blue or purple dyestuff known by the different names of archil, litmus, cudbear, and tournesol, is fabricated from several species of lichens by grinding them into a paste with ammonia water, and occasionally stirring until, by the action of the air, all of the orsellic acid contained in them is converted into orcine, when the mixture assumes a bright purple color. Further exposure to the air turns it blue. Lime and plaster of Paris is then added to give bulk and consistence, and the whole is dried. This forms commercial litmus. Acids decompose the blue compound with lime or ammonia, and set free the red orcine. Acid salts also redden litmus solutions. The water you used may have contained acids, or, what is more probable, the litmus contained foreign organic bodies, which by fermentation produced the results noted. This is not uncommon.

(11) J. L. says, on the welding of a spindle to its step: We also had a similar thing happen to us. The stone was a 30 inch corn burr, and was running at a high speed, when all at once the burr stopped, the belt slipped on the pulley, and we stopped the engine to examine whether there was anything in the burr or not. We soon found there was nothing unusual in the burrs, so we took them apart, took the spindle out, and found that the spindle had welded to the steel plate. We then tried to knock the plate off the spindle, but could not. We then took it to the blacksmith, who had to cut the spindle off.

(12) C. B. says: I have about 100 lbs. of a compound composed of about 2 parts lead, 2 tin, and 1 antimony. Is there any method by which I can separate them entirely, or, if not entirely, one from the other two? A. The metals may be separated, but not so as to repay you for the trouble and expense incurred in so doing.

(13) W. V. asks: 1. What chemical will prevent the decomposition of glue used in moulds for plaster of Paris castings? A. Alum water, lime, and chloride of zinc are occasionally used for this purpose. 2. Is there anything that will prevent shrinkage of the moulds? A. The shrinkage is due to the loss of water. Glycerin will prevent this; it may be mixed in with the glue, or applied to the surface of the mould. The former is the better way.

Is there any chemical that will prevent water containing certain animal substances from becoming stagnant? A. Salt, creosote, salicylic acid, and other antiseptics will retard or prevent putrefaction. The addition of a few crystals of permanganate of potassa to such water will purify it by oxidizing the organic matter which it contains.

(14) E. C. H. asks: How can I pour a solid box of Babbitt metal in a boss around a shaft, and afterwards get the shaft loose? I have tried putting paper around the journal, but fail very frequently to get the shaft loose without breaking the casting. The journal is 1¼ x 2½ inches. A. We know of no better plan than oiling the shaft and putting a piece of paper around it.

Do you use oil in tapping brass? A. Yes.

(15) J. M. says: 1. I have 5 gallons of fish oil for hardening springs which has lost its tempering property. How can I restore it? A. Add to your fish oil a piece of cyanide of potash about the size of a walnut, crushed to a fine powder, and ½ lb. tallow. 2. Can I use the same oil for hardening surgical instruments? A. Yes.

(16) A. H. B. asks: 1. How fast can I run a worm in a 12 inch worm gear with good results? A. About 200 revolutions per minute. 2. At what speed should a 4½ inch screw run to get the best results in screwing brass? A. About 150 feet per minute.

Is bone dust as good after using once, if it is not put into water? A. For polishing, yes.

(17) W. G. asks: Is there any way of polishing brass penholders, etc., better than buffing on a wheel? A. No.

(18) L. R. F. asks: What metal or combination of metals can I use, that will be harder than or as hard as cast iron, and that will not shrink in cooling? A. We know of none.

(19) J. J. H. says: I am building a small foot lathe. How can I harden the spindle that goes in the cone wheel without putting it in the fire? A. You cannot harden it without heating it.

(20) J. W. H. asks: Is there any tool made to file hand saws and set them at the same time? A. We know of no such device.

(21) A. S. T. asks: Is there a practical work on electric phenomena and the laws governing the same in regard to lightning rods? A. We are not aware of any work devoted especially to the subject of lightning rods, but the principles are to be found in almost any of the treatises on electricity. The principal points to be attended to are good conductors and earth connections; as a general thing, almost all of the rods offered for sale are reasonably good, but in the majority of cases they are put up without much regard to the earth connections. The rod should be fastened to the building directly, and not insulated.

(22) D. F. H. asks: Can an engine be made on the hydraulic principle, so that a large power can be had from a small power steam engine? A. No.

What kind of oil is used in tempering carriage springs? A. Fish oil.

Were the wires of the East River bridge put up before or after the wood work was fastened to them? A. Before.

(23) F. R. says: A friend of mine told me that I could not make a cast steel T square that would always remain true. I hold that if the steel be properly annealed, and is once true, it will always remain so, provided that it receives no rough usage. A. A cast steel square will remain true under equal conditions longer than a square made of any other metal.

(24) W. P. asks: 1. Is a plate of steel 5x10 feet, and ¼ inch thick, less or more likely to be perfect throughout than one of iron the same size $\frac{1}{16}$ inch thicker? A. There is no practical difference. 2. Which would make the best upright tubular boiler, 30x60 inches, the heads, tubes, and firebox being iron in both cases? A. The ¼ inch thick one.

(25) J. E. H. asks: How is brass spring-tempered? A. By cold rolling or hammering.

(26) H. O. T. asks: How can I clean copper tea kettles, water tanks, etc.? A. Use salt and sand, with water.

(27) X. Y. B. asks: Can tin or copper be manufactured in tubes, the joint being seamless and smooth? A. No; but solid drawn brass tubing is made of certain sizes.

(28) A. P. T. says: I have frequently observed when using a new 14 inch crosscut coarse file upon wrought iron, particularly upon sheet iron, that the very first stroke causes its destruction. The file, as it comes from the cutler's, is evidently too hard for immediate use. I am acquainted with the process of drawing the temper in the case of ordinary tools, but cannot see how it is applicable to the case of a file. At the same time, I feel confident that there must be a remedy for the evil in question. A. A new file should not be used upon a narrow surface, as the grip of the teeth is in that case so great as to break the points of the teeth off. A file cannot be made too hard. The most economical usage of a file is to use it on brass or cast iron at first, and upon as broad surfaces as possible.

(29) C. G. L. asks: If the cast iron master wheel in a horse power is banded with a wrought iron band from ½ to 1 inch thick, shrunk on, will it strengthen or prevent the cast iron wheel from breaking when it is strained or subjected to a sudden jar during work? I claim that the cast and wrought iron are of different textures; and that when extra strain is put on the cast iron cogs or rim, it would break before the shrunk wrought iron band gets a chance to bear any strain or to assist it. A. A wrought iron band would strengthen the rim of the cast iron wheel.

(30) F. S. J. asks: 1. What is it in a locomotive that occasions a terrible roar? It is heard only occasionally, and makes everything tremble for a distance around. A. It is the steam escaping from the safety valve. 2. Will a locomotive go faster with the reversing lever, hooked up, or slower, and why? A. It depends upon the lap and travel of the slide valves. As a rule, the engine will go faster when hooked up.

(31) C. M. G. asks: What can be used as a convenient and inexpensive substitute for gas in an amateur mechanic's workshop, for hardening and tempering small drills, taps, etc., and for small jobs of soldering? Can petroleum or gasoline be utilized for that purpose? If so, how? A. Special lamps are made to burn kerosene for the purposes mentioned.

(32) K. B. asks: How can I find the correct shape of the teeth of wheels, also the length and thickness of the teeth, when pitch is given? A. The subject of drawing teeth for wheels is too extensive for these columns. Consult Willis on the "Teeth of Wheels."

How can a keg which contained dry American vermilion or other lead paint be cleansed so that it will be pure from the poison? A. Let a strong stream of cold water run into it.

(33) B. & Co. say: We have a 4 horse power caloric engine which we would like to run with oil instead of hard coal. Which would be the best method to feed and distribute the oil in the furnace? A. The burning of petroleum in a furnace is a difficult problem, at present engaging the attention of engineers.

(34) F. B. M. says: How can I drill copper? A. Keep your drill thin at the point, grind it keen, and use oil.

(35) J. E. F. says: 1. I am building a lathe for foot power. I have a large iron wheel about 6 feet in diameter, weighing about 150 lbs. Would it be any advantage to mount it on a countershaft, and use it as a balance wheel? If so, would it not be better to hang it in centers? A. It would be of no advantage. Either of the forms of treadle which you suggest will do. 2. What size of drive wheel will do? A. About 26 to 28 inches in diameter. 3. Would it not be better to have both it and the pulleys of iron? A. Yes.

(36) H. R. H. says: 1. I have a small circular saw, which I run by foot power. The large wheel is 36 inches and the pulley on the mandrel 3 inches in diameter. Are these proportions correct? A. Yes. 2. What is the best motor by which I can run it, to saw 1 inch pine wood? A. A small steam engine will answer your purpose best.

(37) W. H. R. asks: How can German steel be hardened? I have repaired some parts of machines that needed hardening, and what I supposed was steel would not harden. Upon inquiry I was informed that it was German steel. A. Your steel may be case-hardened as follows: Powder prussiate of potash very fine, heat the steel to cherry red, rub on the potash until it fuses and runs over the steel, put the latter in the fire again, reheat to cherry red, and quench in cold water.

How can I make pieces of wire 2 feet long perfectly straight? A. Straighten your wire as nearly as possible with a hammer and a level block, then beat it and roll it between two flat iron plates.

(38) G. E. Y. asks: 1. In reference to Professor Bell's telephone, what size wire and how much is wrapped on the ends of the horseshoe magnet, and is it wrapped in the same way as an electro-magnet? A. For short circuits an ordinary telegraph sounder coil will do. 2. Of what thickness is the steel plate, and how is it fastened to the sounding box? A. It should be very thin for weak currents. The system is explained in Prescott's "Electricity and the Electric Telegraph."

(39) T. M. P. says: 1. In Professor Bell's telephone, what is the thickness of the plate, and is it of a uniform thickness? A. For the transmitters, the plates should be thin to get the best effect; the instruments, however, are made of various forms. 2. Does Professor Bell use a return wire or the ground both ends, and does the instrument used for sending the sound do the receiving? A. No return wire is required.