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## Notes & Queries

**C. D.** should consult a florist.—**J. W. W.** can find directions for making nitro-glycerin on p. 283, vol. 30.—**C. G.** will find full information as to grate bars in Trowbridge's "Heat and Steam Engines."—**E. J. H.** is informed that there is no rule for determining the horse power of a boiler.

**Q. R. N.** will find full information as to the rubber horse shoe on p. 166, vol. 31.—**M. M. W.** will find a recipe for baking powder on p. 123, vol. 31.—**D. L. L.** should consult a treatise on water wheels.

**T. W.** will find directions for hardening needles, etc., on p. 347, vol. 31.—**I. C. F., W. R. M.,** and many others are informed that water glass is silicate of soda, advertised regularly in our columns.—**J. L. S.** can preserve his canvas tent by using the preparation described on p. 347, vol. 31.—**B. C. S.** can scour his castings by the process given on p. 139, vol. 31.

**(1) W. H. B.** asks: Will steam destroy the temper of spring steel kept constantly in it? **A.** The springs, if properly tempered, will continue serviceable for a long time unless the steam pressure is unusually high.

**(2) F. L.** asks: How much coal and water are needed to propel a freight train of 30 cars for 100 miles at the usual speed? **A.** These elements vary greatly. We find, from an inspection of locomotive returns, that a ton of coal will move an ordinary freight train a distance varying from 35 to 62 miles.

**(3) S. F. S.** asks: Can you tell me how to file a circular saw for sawing cord wood into stove length? **A.** No. 1 is a good shaped tooth for very soft wood, the wide level being the front of the tooth.

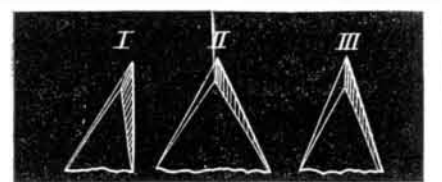
**(4) B. M. M.** and others ask: What study would be best for a machinist to take up? **A.** It would be well to begin with geometry, drawing, and natural philosophy. We can recommend Minifie's "Mechanical Drawing," Robinson's or Loomis' "Geometry," and Silliman's, Ganot's, or Deschanel's "Physics."

**(5) F. E. H.** says: I wish to make two large wooden troughs to hold a silver and copper solution, for electroplating. Please give me a recipe for varnish that will stand the cyanides. **A.** Coat it with marine glue.

**(6) F. R. G.** asks: I am engaged in constructing a reflecting telescope, which I wish to be a Gregorian. The mirror is 7 inches in diameter and of 6 feet focus. What should be the focus of the small mirror, and where along the tube should it be placed so as to give the best effect? **A.** Focus of small convex mirror, Cassegrain, 8 inches, 64 inches from speculum. A Cassegrain would be much better. The small convex mirror corrects part of the spherical aberration of the speculum. It is placed at its own negative focal length inside the focus of the large mirror.

**(7) W. L. W.** asks: Is musk such as is used for perfumery, extracted from the common musk rat? **A.** It is prepared from the musk root, *sumbal*, or *jatamansi* (a substance imported from the East). The root itself has long been used in India and Persia as a medicine, a perfume, and for incense. It has a pleasant, musk-like odor, and acts as a powerful stimulant on the nervous system.

**(8) A. W. R.** asks: Can you give me any information as to the saw here shown? The engraving shows the shape of the seam or lan-



toothed saw. **a** shows the form of tooth of full size, and **b**, the position for holding the saw. The saw is held flat on the bench, and one side is finished before the saw is turned over. No setting is needed, and the plate should be thin and of the best quality and temper. **A.** We have never used this particular shape of tooth. For very fine smooth sawing, this form of tooth would undoubtedly work well; but must be filed by an expert workman.—**J. E. E.,** of Pa.

**(9) S. M.** asks: 1. How are galvanometers made? **A.** A magnetized needle is placed in the center of a coil of insulated copper wire, the needle being suspended by a thread, or resting on a pivot. 2. I have a magneto-electric machine for medical purposes. It has always worked well until lately, and now I cannot get a hard shock though I put on all the force I can. The induction coils all right, but I can only get a very feeble current through the secondary coil, and that at very irregular intervals. It is driven by a revolving armature between the plates of a small electromagnet; the circuit is broken and connected by two small silver springs, which press upon an arrangement on the shaft of the armature. The armature revolves about 200 times per minute. **A.** Probably the coating or insulation of the wire of the secondary coil is destroyed, and thus prevents the secondary current from traversing the entire length of the wire.

**(10) R. A.** asks: How can I separate silver from copper in blocks of mixed metal? **A.** Dissolve the mixed metal in aquafortis of 1:2 gravity. Precipitate the silver as chloride with solution of salt, and reduce the chloride with zinc and dilute sulphuric acid. Evaporate the remainder (containing copper) to dryness, ignite to drive off the acid, and reduce the metal in crucible, or precipitate the copper in solution by iron.

**(11) D. C. M.** asks: Where can a mineral rod be obtained? **A.** If you mean by a mineral rod a diving rod, we cannot say, because they are only sold by quacks and used by ignorant persons.

**(12) B. P. M.** asks: When did the first land plants make their appearance? **A.** In certain shales and other deposits, belonging to the Devonian formation.

1. Is the school started by Agassiz still open, and is it the best school of its class? **A.** It is still open, and is the best. For further information, address the officers. 2. Do medical colleges admit students who only take anatomy? **A.** Not as a general rule.

**(13) W. D. S.** asks: 1. What substance will dissolve in water at its natural temperature? **A.** Most of the salts of the alkalis and metals. 2. What substance will dissolve in water only when heated to 200° or 212° Fah.? What substance will dissolve in water heated (under pressure) to 500° or 700° Fah.? **A.** Substances which dissolve under these circumstances will also dissolve, although not to so great an extent, at lower temperatures. I drop a piece of copper into nitric acid; powerful analytic and synthetic action ensues, and there rises a murky, yellowish, brown vapor. What is this vapor? **A.** Hyponitric acid.

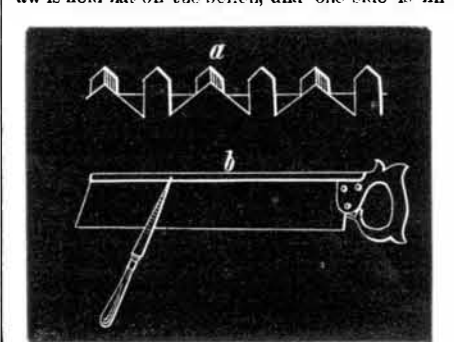
**(14) A. S.** asks: What degree of heat is required to melt nickel? **A.** Nickel has remarkable magnetic properties, which it loses on being heated to 650° Fah. The standard authorities do not state the melting point of nickel further than it is very high and near that of iron.

**(15) F. E.** asks: How can I line a tin can with lead? **A.** Tin lined lead pipes are now common, and a compound sheet of the two metals might be used for your purpose.

**(16) T. H. W.** asks: 1. How can I coat castings with copper? **A.** The article should first be rendered free from rust by rubbing with an emery cloth, or by dipping into a pickle composed of sulphuric acid 2 ozs., hydrochloric acid 1 oz., water 1 gallon. After the article has remained some time in this pickle, it should be taken out and the rust removed by a brush and some wet sand; if the oxide cannot be easily cleaned off, it must be returned to the pickle. As soon as the article is rendered bright, it is washed in a warm solution of soda or potash, for the purpose of removing all grease. Lastly it is well rinsed in hot water, and immediately placed in a concentrated solution of sulphate of copper, to which a little sulphuric acid has been added. In a short time it will be found to be coated with an even covering of metallic copper. 3. How can I blue wire cloth, such as is used for dish covers? **A.** See p. 266, vol. 30.

**(17) W. R.** asks: 1. Can you give me a recipe for a dye that will change a set of wooden white chessmen to a pretty red color? **A.** To 2 lbs. genuine Brazil dust add 4 gallons water. Place the articles, immersed in this liquid, in a suitable vessel, boil them for three hours and let them cool, then add 2 ozs. each of alum and aquafortis, and keep lukewarm until the required shade is obtained. 2. What would be the greatest distance at which a brilliant light would appear to stand over and so designate a particular house? **A.** We do not fully understand your question. The magnesium light has been distinctly seen at sea, when

25 miles distant, and the lime, "Drummond," or "calcium," light at a distance of fully 100 miles.



**(18) H. M.** asks: Can you tell me of a varnish which is perfectly transparent, for polished silver ware? **A.** We think the following recipe will answer your purpose. Take gum mastic 6 ozs., turpentine 14 ozs., place them together in a large bottle, and shake for some time without the application of heat. When dissolved, strain it through a piece of calico, and place it, in a bottle tightly corked, so that the sun may strike it for several weeks, which will cause a mucilaginous precipitate, leaving the remainder as transparent as water. It may then be decanted into another bottle, and put by for use.

**(19) H. W. J.** says: I have a camera obscura, but the lenses are gone. It will take a picture about 3 inches square. What kind of lens would be best to get? **A.** Try a meniscus, 1 inch in diameter, of 5 inches focus, or buy a quarter size view tube.

**(20) E. B. I.** asks: 1. How can I make paraboloid chucks to grind glass specula by means of a common lathe? **A.** Keep the mirror spherical until polished, then polish out the center until the focus of marginal and center rays is the same when you read the SCIENTIFIC AMERICAN at 50 yards distance. 2. If cast, how are the molds constructed? **A.** Cast a pair, tap for lathe spindle, turn to template of correct radius, then grind together with emery. 3. After the speculum is ground and polished, how can it be tested for minute errors, and how can such errors be corrected? **A.** The parabolic mirror has twice the longitudinal aberration of the spherical one. That of the spherical one is equal to the square of half the aperture divided by eight times the principal focal length. The mirror is mounted on wooden cleats and viewed at the center of curvature: 1, with an eye-piece mounted on a graduated table close to an artificial star, a lamp with two pinholes in its opaque screen. If spherical, the image is sharply defined, and surrounded by interference rings. 2. By moving an opaque screen across the cone of rays in front of the pupil of the eye. If the mirror be spherical, it will resemble a plane surface.

**(21) H. Z. E.** asks: 1. Does the earth in its path round the sun always move in the same plane? **A.** No. 2. What is the shape of the earth's orbit? **A.** An ellipse. The eccentricity is  $\frac{1}{2}$ . In 24,000 years it will diminish to 0.0033 and commence to increase.

**(22) D. B. & D. H. B.** says: We have an engineer running our engine; he sometimes runs with 30 lbs. of pressure, at other times as high as 75 or 80 lbs. He contends that low pressure is as good as high pressure in regard to economy. We say that low pressure takes more fuel, more water, and more steam. Which is right? **A.** The difference is in general considerably in favor of high pressure, but not always, however. We could not give an estimate of the difference in your case without knowing more particulars.

**(23) E. O. G.** says: 1. I state that, at the depth of 1 mile in the sea, a human body will, by the pressure, be rendered unrecognizable, at 3 miles torn and pressed out of shape, and at 7 miles torn to pieces. Am I correct? **A.** We do not know. 2. At what depth is there a pressure of a thousand atmospheres? **A.** At about 34,000 feet.

**(24) N. R.** says: I have a well 80 feet deep, which is 15 feet from boiler. Can I force the water up through pipe, 90 feet high from bottom of well, with 70 lbs. steam? **A.** Yes.

**(25) P. P.** says: I read that, in warming buildings by steam pipes, each square foot of surface will heat 200 cubic feet of the surrounding air to 75°, and will require 170 cubic inches of boiler capacity for its supply. 1. Is this a good standard to go by in estimating the quantity of pipe needed to heat a building? **A.** There is no general rule for all kinds of buildings. 2. What increases and diminishes the weight of air, and what increases and diminishes the density of air? **A.** Cold or compression increases the weight of a given volume. Heat or expansion diminishes it.

**(26) J. H.** says: 1. We have a boat 16 feet long by 3 feet wide, flat-bottomed, pointed at bow and nearly so at stern. Can this boat be driven as fast by a propeller as by one pair of oars? **A.** The oars will answer best. 2. On p. 43, vol. 32, in your answer to J. H., you speak of pitch and gutta percha not being attacked by water. Would this be good for painting the outside of a boat with, to prevent the water soaking into the wood? **A.** Yes.

**(27) A. B.** asks: What is meant by the area of a piston? **A.** The number of units of square measure, such as square inches or square feet, in the cross section.

I have a rose bush that seems to be full of small reptiles resembling snakes. How can I kill them without killing the rosebush? **A.** Apply to a nurseryman.

What is meant by the frogling box of a locomotive? **A.** The term is new to us. Perhaps some of our readers can explain it.

**(28) A. L. M.** asks: What is the best plan of seasoning green dogwood or other small woods to avoid cracking? We are putting it in a tight box and turning on live steam, and intend piling it in a dry room (heated by steam) afterwards. Will this answer, and how soon will it dry? **A.** No doubt this plan will answer if it is thoroughly steamed, and it will dry in a few days.

1. What should be the size of a crank pin for a 45 horse power engine? **A.** The question is too indefinite to admit of a general answer. 2. How can I tighten a loose crank on shaft? **A.** It should be bushed and refitted.

**(29) L. A. T.** says: 1. On p. 19, vol. 32, under head of "British Naval Guns," we find the following: "The latter was proved capable of penetrating wrought iron plates 14 inches thick, as well as a backing of 18 inches of timber and a skin