Notes & Queries

W. F. M. will find directions for making cement for mending rubber garments on p. 203, vol. 30.—L. F. P. will find a recipe for lard oil on p. 283, vol. 30. Furniture polish is described on p. 315, vol. 30. Cutting glass is detailed on p. 331, vol. 30.—C. W. will find a recipe for wood filling on p. 347, vol. 31.—J. W. will find recipes for black and red ink on pp. 203, vol. 29, and 200, vol. 30.—S. S. can make a polishing starch by the recipe given on p. 203, vol. 31.—T. H. D. S. can make a T square by following the directions on p. 165, vol. 30.

(1) J. A. McI. asks: How can I make Britannia metal? A. Melt together 8 ozs. shruff or dross brass, 2 lbs. regulus of antimony, and 10 lbs. tin.

(2) C. A. D. asks: What is wire-drawn steam? A. Steam which has its pressure reduced by the resistance of passages.

(3) D. W. G. asks: What can I use to coat the inside of a small brass tube with, that will effectually resist the action of vinegar and spirituous liquors? A. We have seen it recommended in similar cases to use tannate of gelatin.

(4) N. H. V. asks: Does the volatile fluid sulphide of carbon contain carbon in solution? A. From 1 oz. bisulphide of carbon, 404·21 grains sulphur and 75·79 grains carbon may be obtained; yet the carbon cannot be said to be in solution, but in chemical combination with the sulphur. So also with all the compounds containing carbon. Carbon, in its free state, is insoluble in acids or alkalies.

(5) S. E. A. asks: 1. At what temperature does platinum fuse? A. Experiments made by Dr. Deville give the fusing point of platinum to be between 2660° Fah. and 2696° Fah. 2. At what temperature will a compound of silver with one third platinum fuse? A. Direct experiment is your only resource to find the melting point of your alloy.

(6) J. H. A. asks: 1. Will oil in which steel is hardened lose its hardening property? A. Yes. It must be kept up by a supply of melted resin stirred into the oil when warm. 2. Which is the best oil for steel? A. Pure Straits whale or sperm oil. Be sure that it is free from any mixture of mineral oils.—J. E. E., of Pa.

(7) W. W. says: I separated some fine powder from hard coal ashes which are wasted. Is it useful for anything? A. Such ashes have been used for cleaning tin ware for a long time with satisfaction, still it is doubtful whether ashes could be used in this way at present with pecuniary profit as a commercial undertaking.

(8) C. E. P. asks: What process does carbon undergo in order to form it into crucibles? A. Black lead crucibles are made of two parts of graphite and one of fire clay, mixed with water into a paste, pressed in molds, and well dried. Graphite or plumbago is an allotropic form of carbon. It is also used in the manufacture of lead pencils.

(9) A. E. S. asks: 1. How can I fix lard so that it will remain in a soft or liquid state in cold weather? A. Try mixing the lard with a small quantity of kerosene oil, which may be deodorized by digesting for a short time on chloride of lime. 2. Would it be safe to mix it with alcohol for burning in a lamp? A. We would not recommend alcohol as a solvent in this case.

(10) F. F. V. says: On p. 304, vol. 31, is a paragraph on the crystallization of tin. Could this be so arranged as to do away with the platinum capsule? A. Any metallic vessel not attacked by the solution, or one made of carbon, will answer the purpose as well.

What impurities does sheet zinc commonly contain, and how may they be removed, so as to leave it comparatively pure? A. Commercial zinc contains a small quantity of lead, iron, and of a peculiar carbonaceous matter, besides (occasionally) traces of arsenic and of copper. The best method of obtaining the metal in a state of purity consists in transmitting sulphuretted hydrogen gas through a slightly acidulated solution of sulphate of zinc, filtering from any precipitate that may be found, (and after boiling the solution, in order to expel the sulphuretted hydrogen) precipitating the zinc in the form of carbonate by the addition of carbonate of soda. The carbonate when ignited is converted into the oxide of zinc, which must be distilled in a porcelain retort with charcoal prepared from loaf sugar.

What is block tin, and how may it be reduced to pure tin? A. Block tin is a name given to the metal to distinguish it from tin plate (sheet iron superficially covered with tin). The tin which is imported from Banca and several other places is almost chemically pure. English tin usually contains small quantities of arsenic, iron, copper, and lead, and often traces of gold. When required in a state of perfect purity, the metal may be obtained by means of voltaic action. For this purpose a concentrated solution of tin in hydrochloric acid is placed in a beaker, and water is cautiously poured in without disturbing the dense solution below. If a bar of tin be plunged into the liquid, beautiful prismatic crystals of pure tin are gradually deposited upon the bar, at the point of junction between the metallic solution and the water.

(11) H. K. G. asks: I have on hand 15 or 20 barrels cider, which I wish to make vinegar of. It is nearly 3 years old, but will not become sour, though it is no longer sweet. How can I make this sour? A. Try the following plan: Put some of the cider in a clean cask and add to it some vinegar containing abundance of mother of vinegar; after some days, if the acetic fermentation has taken place and the souring is going on, add another portion of the cider, and at similar intervals a third and a fourth. When the whole has become vinegar, take out as much as is equal to the vinegar first put in, and replace by fresh cider, and so proceed. The casks should never be but partly full; good exposure to air is necessary, and the temperature should be kept up to 86° Fah.

(12) B. says: I have made a glass prism, to contain bisulphide of carbon. What kind of cement will do for the joints, that will not injure the transparency of the fluid? A. Obtain a quantity of pure white shellac, which dissolve in alcohol. Evaporate until of the consistence of a thick paste. Moderately heat the ends of the glass plates to be joined, and immediately apply the shellac paste, and allow to set until perfectly hard. By this means a joint is obtained, which perfectly resists the action of the liquid, and, if ordinary care be taken of it, will remain perfectly tight for a very long time. This recipe is kindly furnished by Wale & Co., instrument makers to the Stevens Institute.

(13) A. B. C. asks: 1. There has been a controversy between us as to whether the use of bituminous coal as fuel in dwelling houses is attended with any injurious effects to the interior decorations, gilded work, etc. Is this so? A. When the coals contain sulphur compounds, the liberation of sulphurous gases has a still more injurious effect than the deposit of soot mentioned below. But it must be remembered that these pernicious consequences are dependent upon the escape of the products of combustion; and if bituminous coals are used, this escape should be properly guarded against. 2. What relation does English cannel coal bear to the bituminous coals of this country? A. The striking difference between the cannel and the bituminous coal is that the former contains a very much larger amount of volatile combustible matter. The English cannel coal has 66 per cent of this volatile matter, the Breckenridge from 56 to 72 per cent, the Pittsburgh bituminous has but 33 per cent. In burning there is a corresponding formation of thick sooty flame, and a likelihood, in cases where this combustion of the gases and soot is not perfect, of a deposit of soot.

(14) A. J. H. asks: 1. Will cast iron stills do for distilling spirits? A, Such stills have not been used for this purpose. Some more heat would be required for a cast iron than a copper still, and the iron would rust to some extent. But it would be safe to try such a still. 2. Will a lead worm do? A. It would be better to use a tin-lined lead pipe for the worm, since liquids running through lead pipes sometimes form lead salts which are poisonous. In fact worms of block tin are used in chemical laboratories, where it is desired to distil with the greatest freedom from impurities. There would be a tendency in the tin-lined lead pipe worm to sag with the heat, on account of the metal not being as stiff as copper; but this can be prevented by properly supporting the different parts of the worm.

(15) G. McI. asks: How is chlorate of potash made? A. Chlorate of potash may be economically obtained by exposing to a current of chlorine gas a mixture, in a slightly damp state, of 69 parts carbonate of potash, and 168 parts of caustic lime, previously reduced to the state of hydrate; chlorate of potash, carbonate of lime, and chloride of calcium are formed; boiling water dissolves both the chloride of calcium and chlorate of potash. The two salts are easily separated by crystallization, as the chlorate requires 16 parts of cold water for its solution, and the chloride is soluble to almost any extent. We would not recommend one, destitute of experience in such matters, to undertake its manufacture.

1. In making the calcium light, what kind of lime is used? A. The best results may be obtained with quicklime, freshly burned, free from sand, and perfectly dry. 2. How often can the same piece of lime be used, the piece being 2 inches by ¾ of an inch thick? A. It cannot be used for more than a few hours, for the reason that, from the intense heat that it is subjected to, it becomes disintegrated and partially vaporized.

(16) J. S. S. asks: 1. Is there any mode of constructing a bearing so as to dispense with brasses, when the journal or pivot has a travel back and forth of about 90°, the work or pressure being constant, and from 1,000 to 3,000 lbs., according to the size of machine? A. You can use such a box as you suggest, if you make it with ample bearing surface, and provide it with sufficient means of lubrication, Secure the thimble in position. 2. Are friction and wear greater where the journal makes an entire turn than where the travel is back and forth? A. The power required to overcome friction is ordinarily greater in the latter case, on account of the constant stopping and starting incident to the reciprocating motion. 3. I want to use a toggle lever attached to the connecting rod of an engine (revolutions 200 per minute). There is a journal or pivot at each end of toggle lever, and brasses will not work well. Can I, for 3,000 lbs. pressure, use a 2 inch steel pivot working in a case hardened iron thimble fitted in each end of toggle lever? Should the thimble be free in its hole in end of lever, or should it be shrunk in while the lever is hot?

(17) C. S. M. asks: I want to raise water by a hydraulic ram from the foot of the hill, on which my house stands, to the cistern in the attic, a vertical distance of 90 feet. I have a steady but small spring with a fall of 20 feet. How many gallons must be discharged from the spring through the best approved ram to raise one gallon into the cistern? A. See article on hydraulic rams, p. 259, vol. 31.

(18) G. W. S. asks: What is the difference between the Griffiths and the Hirsch propellers? A. The blades of the two screws are differently shaped, and in the Hirsch propeller the pitch expands from hub to periphery as well as in the direction of the axis.

(19) C. W. S. asks: We have a cross cut saw hanging up in the shop. On some days the strokes of the hammer will create a greater effect upon the saw than usual. It sounds as if some person had struck it a light blow with a mallet, the sound being clear and distinct. The quicker the strokes while driving a nail, the greater the effect. Has the purity of the atmosphere anything to do with this? A. We think not.

(20) F. C. S. says: 1. We are somewhat bothered in sawing frozen pine logs with a 56 inch circular saw. She will run all right in any other kind of wood. What is the reason of this? A. What is known as sapling pine, when frozen, is about as difficult timber to saw as can be found. The extreme points of the teeth must be wider than the plate of the saw, and very sharp, with the under side wider than the upper part of the tooth, so as to present a very sharp cutting edge to the timber. 2. Does it take a different kind of saw for sawing frozen pine? A. When timber is frozen, it generally requires less set in the saw than when it is not frozen.

(21) T. C. W. says: I melted 1 lb. each resin and pitch together in an iron vessel; then, while hot, I poured the contents of the vessel into a wooden mold in the shape of a brick; but I found, after the mixture got cold and hard, that I could not get it out of the mold; it adhered to the wood. Please to tell me how to construct a mold so that the substance will readily come out when cold. A. Try covering the surface of the mold with a thick coating of plumbago.

(22) A. V. P. says: There was in December, for some days, a very bright star visible in the east just before sunrise, very nearly over the sun, I think, rising a few minutes after six, or about one hour and twenty minutes before the sun, and visible until a few minutes after the sun rose to the naked eye. This morning it looked four times as large as a star of the first magnitude, owing possibly to the fine condition of the air. What star is it? A. Venus. 2. About two weeks ago we were astonished at the unusual brightness of a star rising in the E., or a little S. of E., just before 9 P. M. It rivalled Venus at her brightest, and its light flashed in our field glass, fairly lighting it up. After getting up into the heavens, it lost much of its brightness, and since then it has not been half so conspicuous. What is it? A. Sirius.

(23) C. N. G. asks: 1. What is the size of the largest telescopic lens now in use? A. There are now completed two similar Clark equatorials, 26½ inches clear aperture, and 26 feet focus. The crown lens is double convex, of equal curvature on each side, 13 feet radius. The flint lens is 12 feet 8 inches radius on the concave side, nearly flat on the other. 2. What is its value? A. $50,000. 3. Can lenses be made any size? A. The largest disks now obtainable are 30 inches in diameter, price $10,000 per pair. Two 30 inch achromatics and a silvered glass reflector of 6 feet 6 inches aperture are now being made in Europe. 4. Can large ones be made as rapidly in proportion to their size as small ones? A. No.

(24) J. C. says: 1. We learn that the moon by her attraction produces the tides, and that attraction is in inverse proportion to distance (less distance, more force). When the tide is 72 feet high, moon's attraction is increased and earth's attraction decreased. Why does not the water continue to rise and go to the moon? A. Because the earth is nearest. 2. Why does the earth turn on its axis? A. Because the primeval nebula rotated as it condensed.

(25) C. M. asks: 1. In your issue of November 7, in answer to A. H., who asks how to prepare the glass for a camera, you say that lead-faced chucks are cast of the proper curvature, and the lever is held upon the chuck by a wooden handle attached with pitch, while sand and water are applied. Would not hard-tempered steel answer the same purpose as lead chucks? A. No; brass or iron grinders follow the roughing out. 2. Are microscopic objectives ground in the same manner, that is, with lead-faced chucks? A. Microscope lenses are roughed out on a lathe with a steel tool dipped in turpentine, or a diamond pinched into a copper rod, then ground in one of a pair of brass chucks alternately with the chuck of opposite curvature.

(26) W. P. & Co. ask: Is it practicable to discharge water from a centrifugal pump eight feet below the surface of the water? The discharge pipe is 22 inches diameter, the pump making 220 revolutions per minute. The lift of the suction pipe is from 4 to 6 feet, and the pipe is 22 inches in diameter also. A. It can readily be done with a good pump.

(27) J. W. asks: What boiler, engine, and wheel are required to propel, at 12 miles per hour, a boat of 36 feet keel, 10 feet beam, 3 feet draft, and sharp bows? She was built for sails. A. Cylinder 7x9 inches, boiler 4 feet diameter, 6 feet high; propeller from 32 to 36 inches diameter with 4 feet pitch.

(28) G. H. B. asks: What would be the effect on the cables of the new Brooklyn bridge (when completed) of a fire under that part of it extending over the tops of buildings? A. It