

(9) D. F. L.—There is no patent process for welding copper. It is easily welded with a mixture of soda and ammonia phosphate, also with soda phosphate and borax. With a little care and experience.

(10) N. W.—There is no difficulty in laying the rails. You have only to allow for the expansion from the temperature at which they are laid and the heat of the rail under the sun on a hot summer's day, say 120°. You may easily measure the amount on any railway in your city. The rails require no slotting.

(11) W. C. writes: When the flame has passed under the boiler to back end, and returned through four inch tubes to front end, is there anything gained by still conveying the heat over the top of boiler to back end, when the chimney is at front? A. There is nothing gained unless the top of the boiler is kept perfectly clean. It has been demonstrated that the ashes that accumulate on the shell of the boiler are so light and porous that they only operate as a felting to keep the heat from descending to the shell. If the top can be kept clean, a slight superheating of the steam may be effected. The inconvenience of the arrangement is often more than the gain.

(12) E. L. M.—SUPPLEMENT No. 472 has a great number of receipts and formulas for perfumes. Your engine will run boat only about five miles, instead of fourteen miles, per hour.

(13) F. C.—For antique green: Dip in bath of 10 parts each sea salt, cream of tartar, and acetate of copper, 30 parts carbonate of soda, and 200 parts vinegar, until the required shade is obtained.

(14) R. O. D.—Rule for obtaining elevations by boiling water: Multiply 520 by the difference of the boiling point and 212°; to this sum add the square of the difference. For the correction for temperature add the temperature of the upper to the temperature of the lower station. For every 10° this sum is above 64°, add $\frac{1}{100}$ of the sum obtained above.

100° Fah.—0.942 lb. per sq. ft.
175° " =6.708 lb. per " " " " " "

You will find this tabulated on page 700, Haswell's Pocket Book, last edition.

(15) M. E. M.—The winter fogs are caused by a saturated surface stratum of the atmosphere under a falling temperature. They are of the same nature as clouds, and formed under similar conditions. In winter a cold wind or stratum of cold air settling over a stream on the land after a thaw or rain condenses the saturated moisture of the air on the surface, producing fog that lasts as long as the proper conditions continue.

(16) R. W. J. writes: 1. I have a frozen fire hydrant. How can I thaw it out without interfering with the valve or packing? Would alcohol thaw the ice? A. Salt is much used to liquefy ice, but there is nothing better in our opinion than a portable steam apparatus, a small upright boiler on legs or on wheels arranged to easily fill from a bucket through a funnel, with cock to close, and a connection for a small hose with a cock to check the steam, and also a small spring safety valve. This simple apparatus may be kept in the engine house ready to carry on wheel to any hydrant that may be frozen. It may be filled full of water, and a fire started before leaving the engine house. A boiler that will hold 4 pails of water should generate enough steam at 0 to 5 pounds pressure to thaw out any hydrant. To operate, pass the hose into the nozzle of the hydrant, and follow the thawed cavity down the pipe, or if possible pass the hose down the box outside the hydrant. Your style of hydrant will suggest the best way. These appliances are used here to good effect. 2. Is there a plumbers school in New York, and where could I get information relative to it? A. Yes, the New York "Trade Schools," First Avenue, 67th and 68th Streets, New York. 3. Are there any books published treating on the plumbing business? A. We know of no work on shop details in plumbing. On sanitary engineering there are many works.

(17) J. C. G.—The musical vibrations perceived are, for E above the G clef 640, D 576, C 512, B 480, A 420, G 384, F 340, E below, 320. The whistling of the wind from a picket fence is caused by vibrations in the air, produced by interrupting its even flow, whether by pickets, trees, or telegraph wires. The Greely expedition reached farther north than Captain Nares did, Lieut. Lockwood attaining a latitude of 83° 24'. For article on the basin of the Gulf of Mexico see SCIENTIFIC AMERICAN SUPPLEMENT, No. 289; on the source of the Gulf Stream, see SCIENTIFIC AMERICAN SUPPLEMENT, No. 95.

(18) M. J. W.—We do not know of any regular matrix paper for stereotype moulds except such as the stereotypers themselves build up with several sheets of tissue paper and flour paste. Some of the stereotypers on the New York morning papers use something besides paste to protect the moulds from burning, so that many plates can be taken from the same impression, and in this the workmen in the several offices each claim to have something a little better than their neighbors.

(19) S. L. G. writes: A kerosene lamp is broken on the floor, saturating the carpet and floor with oil. How can it best be removed? A. If the oil has recently been spilled, put on plenty of wheat flour or whiting to absorb the oil as much as possible. If the spot is near a seam, it is well to open the carpet and place the whiting underneath as well. Next day sweep up the flour above and beneath the carpet with a stiff brush, and put on plenty of fresh flour. If spots persist in remaining after this treatment, they can be removed by rubbing with rags dipped in spirits of turpentine or benzine. Others use a preparation made by mixing a little soap into a gallon of soft, warm water, and then adding half an ounce of borax. Wash the part well with a clean cloth, and the spot will soon disappear.

(20) J. B. S. asks: 1. What is the pressure of one atmosphere per square inch? A. Generally taken as fifteen pounds. 2. What apparatus would you describe as the best one for proving that the greatest density of water is at 4° Centigrade? A. See description of apparatus given in Ganot's Physics. 3. What

chemicals must a person use to freeze water by solution? A. See list of freezing mixtures given in answer to query 4 in SCIENTIFIC AMERICAN for June 21, 1884. 4. Can I make a Bunsen burner by cutting a hole in the gas pipe near the flame? A. Yes, if the other conditions are perfect. It is necessary to obtain the proper mixture of air with the gas to produce the burner.

(21) C. W. A. asks: 1. What power will be required to run the dynamo described in SUPPLEMENT, No. 161? A. One-quarter horse power. 2. How many Edison lights will it run? A. Two or three small ones. 3. If in order to get an intense current I wind the armature with very fine wire, will I have to change the wire on the field magnet? A. No. 4. Will cast iron do for the armature? A. Yes, if very soft.

(22) W. S. asks for one of the latest receipts for staining cherry a mahogany color. A. For dark mahogany: Introduce into a bottle 15 grains of alkanet root, 30 grains aloes, 30 grains powdered dragon's blood, and 500 grains 95 per cent alcohol, closing the mouth of the bottle with a piece of bladder, keeping it in a warm place for three or four days, with occasional shaking, then filtering the liquid. The wood is first mordanted with nitric acid, and when dry washed with the stain once or oftener, according to the desired shade; then the wood, being dried, is oiled and polished. For light mahogany: Same as dark mahogany, but the stain should be applied once. The veins of true mahogany may be imitated by the use of iron acetate skillfully applied.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined with the results stated.

B. B.—The specimen consists of chlorite with quartz; there is no evidence of gold on the specimen sent.

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