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Notes & Queries

P. M. will find directions for bronzing spring steel on p. 283, vol. 31. -L. W. R. should use a saturated solution of alum in making the hard cement with plaster of Paris. Door knobs are usually screwed into doors.—F. McN. can use paraffin varnish to preserve his tools from rust. See p. 283, vol. 31. -G. M. R. is informed that nitric acid is commonly used for etching on steel. For directions for cleaning marble, see p. 330, vol. 32.—S. R will find a recipe for brown soap on p. 331, vol. 31. T. T. B. and M. can make emery belts for sand-papering spokes by following the directions on p. 394, vol. 33.—O. S. will find a recipe for paste that will adhere to tin on p. 26, vol. 34.—W. F. B.'s queries should be referred to a physician.—A. J. E. will find a recipe for plumber's solder on p. 58, vol. 30. It melts at 380° Fah.—J. K. W. will find a recipe for a blackboard composition on p. 91, vol. 30.—J. K. N. will find a description of the Stevens battery on p. 87, vol. 31.—F. O. X. will find simple directions for electroplating on p. 133, vol. 30.—T. B. G. is informed that we do not work out schoolboys' problems, and political questions are not in our line.—G. W. B. will find a simple process for nickel plating on pp. 155, 235, vol. 33.—A. B. D. will find directions for polishing woodwork on p. 315, vol. 30.—C. S. B. will find good recipes for rendering glass opaque on p. 264, vol. 30. The process for blackening gun barrels is described on p. 208, vol. 26. Files can be renewed by the process described on p. 361, vol. 31, which is a good one.—R. W. K. will find directions for a black finish on wood on p. 299, vol. 30.—C. J. M. can cut his glass jars by using the process described on p. 49, vol. 33.—L. S. will find directions for making plaster casts look like marble on p. 68, vol. 29.—G. E. R. will find directions for bronzing iron castings on p. 283, vol. 31. This also answers J. L. T.—J. L. T. will find a description of the Chutaux battery on p. 27, vol. 34, and one of the Grenet, on p. 219, vol. 32.—J. C. T. will find directions for waterproofing paper on p. 146, vol. 31.—J. N. will find a recipe for fish glue on p. 408, vol. 24.—W. C. will find a recipe for mica varnish on p. 241, vol. 32.—A. J. will find directions for grinding a parabolic mirror on p. 276, vol. 30.—N. J. will find, on reference, that the proportions of a flywheel are described on p. 288, vol. 28.—P. R. will find a description of the hydraulic ram on p. 269, vol. 31. For an improved arrangement of flouring burrs, see another page of this issue.—J. P. can make battery carbons by the method described on p. 35, vol. 33.—W. C. E. will find that the lap and lead on a steam engine are fully described on p. 101, vol. 32.—D. P. will find directions for preserving wood from decay on p. 319, vol. 31.—M. J. will find directions for making an induction coil on p. 219, vol. 32.—F. C. will find a description of the process of obtaining albumen from blood on p. 344, vol. 31.—J. W. can waterproof his leather boots by the process described on p. 155, vol. 26.—N. K. will find a recipe for fulminate of silver on p. 90, vol. 31.—J. C. K. can fireproof his shingles by the process described on p. 280, vol. 28.—F. J. will find a description of the moon's variations on p. 251, vol. 31.—F. C. can harden tallow by the method described on p. 201, vol. 24.—F. N. will find a description of M. Coignet's artificial stone on p. 124, vol. 22.—J. Q. will find directions for making a hydrogen lamp on p. 242, vol. 31.—J. T. can tan skins with the fur on by the process described on p. 233, vol. 26.—F. J. will find a recipe for solder for gun barrels on p. 353, vol. 27.—J. K. will find directions for stuffing and mounting animals on p. 250, vol. 30.—J. W. is informed that water glass is silicate of soda, frequently advertised in our columns. This also answers J. S.—C. T. will find a recipe for a black enamel on iron on p. 208, vol. 26.—J. W. C. will find a recipe for an indelible ink on p. 129, vol. 28, and for a black, on p. 112, vol. 27.—R. K. will find a recipe for marine glue on p. 43, vol. 32. Muriate of ammonia is prepared for inhalation by the process described on p. 315, vol. 31.—R. Y. will find a description of a pantagraph on pp. 99, 179, vol. 28.—W. C. will find the dimensions of the Great Eastern on p. 346, vol. 32. The proportions of safety valves are given on p. 363, vol. 29.—J. W. T. will find a description of salicylic acid on p. 324, vol. 32.—F. J. will find a description of the madstone (the virtues of which are believed in only by the ignorant) on p. 266, vol. 26.—W. C. T. can produce a black finish on German silver by the process detailed on p. 283, vol. 31.—N. T. will find directions for making gelatin relief plates on p. 272, vol. 32.—W. T. S. will find a description of the process of lithography on p. 298, vol. 31.—W. F. can harden his screw-cutting plates by the process detailed on p. 75, vol. 28.—N. P. can repair his millstones by using the cement described on p. 251, vol. 31.—M. W. will find directions for making a sun dial on p. 409, vol. 29.—C. J. will find that a method of wire rope transportation is described on p. 370, vol. 31.

(1) T. W. D. asks: Will putty made of linseed oil and Spanish whiting stand the weather? A. Yes.

(2) J. L. McM. says: 1. I wish to engage in the manufacture of potash on a small scale. Will you please give me the details of the process? A. The substance known in chemistry as potassic carbonate is generally termed potash, because it was formerly obtained from wood ash, which, after lixiviation with water, was evaporated to dryness in cast iron pots. You give no intimation in regard to your source of supply; we can give no method, therefore, until we know from what material you expect to derive your potash. Below we give the sources whence potassa is industrially obtained: The inorganic sources of potassa.—1. The salt minerals of Stassfurt. 2. Felspar. 3. Sea water. 4. Saltpeter. The organic sources of potassa: 5. Ashes of plants. 6. The residue of the molasses of beet root sugar after distillation. 7. Seaweeds, as a by-product of the manufacture of iodine. 8. The suint of the crude wool of sheep.

(3) W. R. T. of Manchester, England, says: How can I make iodine green, used by calico printers? A. Iodine green is obtained by the following process: One part acetate of rosaniline, 2 iodide of methyl, and 2 methylic alcohol are heated together for several hours under a high pressure, or (on a small scale) in a sealed tube. When the operation is finished, the result is a mixture of violet and green pigments dissolved in methylic alcohol. The volatile substances having been driven off by distillation, the mixture of pigments is put into boiling water, wherein the green is completely dissolved, while the violet remains insoluble; the former is precipitated by a cold saturated solution of picric acid in water; the ensuing precipitate—picrate of iodine green—is collected on a filter, rapidly washed with the smallest possible quantity of water, and, after having been partly dried, brought into commerce as a paste. The crystalline iodine green, free from picric acid, has the formula $C_{25}\ H_{33}\ N_3\ OI_2$.

(4) M. M. G. says: I find in use in Delaware the leaves of a small bush that grows in the swamps and on the borders of lakes and ponds. It possesses the peculiar property of diminishing or preventing the accumulation of fat in persons disposed to obesity. I have been unable to find that it is known to the medical profession, and I do not know what its proper name is; it is called here the swamp shrub. It is a beautiful bush, growing to the hight of 2½ or 3 feet, and bears a beautiful purple flower. It blooms in July and August, and is quite ornamental in comparison to the surrounding rubbish among which it grows. My attention was called to it by several corpulent individuals, who stated that they could diminish their proportions at leisure at the rate of 5 or 6 lbs. per week. Being quite lusty, I was induced to try it, with the following result: In five weeks I diminished my weight from 210 lbs. to 190 lbs., when my clothes commenced to feel uncomfortably large, and then I stopped. I took a dose of the infusion when convenient. When my fat accumulates, I take to drinking it; and in a short time the oppressiveness of flesh diminishes. If there is anything in medicine that will do this, I am not aware of it. What is the botanical or medical name of the shrub? A. Your description is insufficient to enable us to determine the plant. Send specimen of shrub and its root, and, if possible, full description of its flower.

(5) G. W. D. asks: Can you give me a convenient and inexpensive process for removing the moisture from common air, without the use of heat? A. Force the air through vessels containing quicklime. The surface of exposure containing the quicklime should be large.

(6) L. C. asks: How can I reduce the black or brown oxide of mercury to a metallic state? I have a quantity, which I have pounded in an iron mortar with water, and a portion of it has been reduced; afterwards I distilled it at a high heat, and but little came over. The remainder is a fine brown powder. Can I reduce it by any means except by the wet process, and how? A. Take equal parts of powdered charcoal and dry carbonate of soda, and heat with the oxide until decomposition ensues. Metallic mercury will separate.

(7) S. R. B. asks: 1. Have fishes an auditory apparatus? Do they hear distinctly? A. "The ear of the fish (almost always entirely within the cranium, on the sides of the brain) consists essentially of a vestibule and 3 semi-circular canals, which receive the vibrations of the integuments and cranial walls; there is rarely anything that can be called an external ear, drum, or tympanic cavity; loud, sudden, and strange sounds frighten fish; in ancient, and even in modern times, they have been taught to come and receive food at the tinkle of a bell, or the pronunciation of pet names."—*American Cyclopædia*, vol. 7, p. 533.

(8) H. D. M. asks: Will you mention a good cheap way to powder copper (sheet or ingot) so that I can obtain the pure powder? A. There are four methods: 1. Granulate the copper by allowing the molten metal to fall through a sieve into cold water. 2. By dissolving up the copper in sulphuric acid, and adding scraps of iron, the copper will be precipitated in the metallic state. 3. By bringing the acid solution in the galvanic current in such a manner that spongy metallic copper will be precipitated at the negative pole. 4. By heating oxide of copper in a stream of hydrogen gas.

(9) C. F. T. asks: How can I dye powdered chalk or tripoli to a dark pink or carmine, so that vinegar or alcohol will not change the color? A. Use rouge.

(10) A. asks: Can cider be pressed from the fruit, boiled down to one half, then stored away, so as to keep any length of time, and then be diluted and fermented, and distilled into a good article of apple brandy? A. We see no objection to the process, provided that, during storage, air be excluded and the other usual precautions taken.

Is the manufacture of oxalic acid from sawdust, in a country where sawdust is cheap, practicable? A. If the sawdust be mixed with a solution of caustic potassa, and exposed to a heat considerably above 212° Fah., it will be partially decomposed and converted into oxalic acid, which will be found in combination with the alkali. Much of the oxalic acid of commerce is made in this way.

(11) L. R. asks: Is there an instrument that will indicate the degree of moisture in the earth? A. There is no instrument for this purpose? The moisture may be determined as follows: Weigh out ½ lb. of the earth immediately after taking it from the ground; transfer to an oven where the temperature is maintained at 212° Fah. until the earth is completely dried. After cooling, weigh; the difference in the two weights gives the amount of moisture.

(12) J. W. N. says: Open coal fires are certainly desirable things; but as they are not very common, I infer that, for some reason, open coal grates have not yet been made successful. Please inform me wherein they fail. A. The coal grate fire is very common here. No failure.

(13) S. A. F. says: I am building a boat 28 feet over all, and 25 feet 6 inches on the keel: she is 5 feet 10 inches wide, and draws 14 inches forward and 30 inches aft. Her engine is 4½x5 inches, with a surface condenser and a boiler 30 inches diameter by 54 inches high, with 40 two inch tubes. She has a 30 inch propeller. Please tell me what speed I can get out of her. I carry 100 lbs. pressure. A. That question can best be answered after the boat is done. We will hazard a guess, however, that, if the boiler steams well, the speed of the boat will be about 6½ miles an hour in still water. Let us hear from you after you have made a run.

(14) H. J. S. says: A. claims that if 100 tuns pressure compresses 2 bales cotton to half their thickness, when placed side by side, about half the pressure or same force will equally compress said cotton if the bales are placed one on top of the other. I claim that it will not. Please decide. A. We incline to A.'s opinion.

(15) W. S. says: 1. I propose to build a cylindrical copper boiler, the shell to be made with a butt joint, a strip of copper being placed on the inside over the seam and riveted. Will this joint be as strong as a double-riveted lap joint? A. Yes, if properly proportioned. 2. What is the greatest strain per square inch of section that should be placed upon copper, when used in a boiler? A. With a double-riveted joint, 3,200 lbs. 3. Can you give me a formula for calculating the strength of copper boilers, similar to the formulæ in use for iron boilers? A. Use the constant for working strength of copper, as above, in the formula for iron boilers. You will find rules given at length in "Wrinkles and Recipes."

(16) L. H. P. asks: Where can I find a rule for the proper number, size, and arrangement of tubes for a modern tubular boiler? A. You will find some useful hints in Forney's "Catechism of the Locomotive."

(17) C. W. C. says: I have a composition steam cylinder which I use for an hydraulic engine to blow an organ; but I have not pressure enough to give the required speed, which is 20 strokes per minute under 20 lbs. per inch pressure. I propose to use carbonic acid gas as a substitute for water, and to use a cylinder 2 feet by 4 feet filled to 200 lbs. per square inch pressure. Is the following calculation correctly based? Capacity of cylinder 24×48=21714·72 cubic inches; capacity of engine 3×3=21·204 cubic inches=1014·6 half strokes+2=507·3 whole strokes. 507·3×200 (lbs. pressure of cylinder)+20 (lbs. pressure of engine)=5073+20 strokes per minute+60 minutes per hour=4 hours 13 minutes+. A. The calculation is correct: on the assumption that the pressure of the gas is inversely as the volume. You can scarcely expect to realize the performance as given by this calculation, which does not take into account some practical considerations. 2. Would the gas corrode the engine? A. We think not.

(18) H. S. M. says: I am about to build a small boat. I have 2 engines, connected on one shaft at quarter centers, of 3 inches bore and 6 inches stroke, cutting off at ¾ stroke. The boiler is large enough to make all the steam they can use; it is of an upright tubular form. Will these engines do for a boat that will carry the necessary machinery and about 15 persons? If so, please tell me the proper dimensions of the boat and wheel. A. Make a boat 30 feet long, and of 8 feet beam. Use a propeller 30 inches in diameter and of 42 inches pitch.

(19) L. S. C. says: 1. In the sugar-growing portion of Louisiana we use our boilers only two months in the year. During the other ten months we find that much injury, resulting from our damp climate, is sure to ensue. The under side, flues, and portions where the brickwork touches cannot well be painted. What can you recommend to protect such boilers? A. It might be well to remove the brickwork (a portion at a time, if more convenient) and clean and paint the whole boiler. Then, in replacing the brickwork, set it with hydraulic cement, taking care to make a tight joint. 2. As between two boilers, each of suitable size to furnish 15 horse power, one being two flue, the other a plain cylinder, about what percentage more fuel would the latter require than the former, steam being used at 80 lbs., and fuel required to raise cold water to 80 lbs. not being counted? A. The difference would be trifling, if each boiler was acting in an efficient manner.

(20) R. C. T. asks: How much friction is there between iron and ice, as in skating? How do you calculate it? A. It can only be determined by experiment. If any of our readers have any data bearing on the subject, we would be glad to hear from them.

(21) A W. says: I have had experience in running stationary and locomotive engines, and I would like to qualify myself for the position of master mechanic. How shall I proceed? A. There are schools in this vicinity and elsewhere, in one of which it might be well for you to spend a year or two; and after that it would be advisable to go into a shop or drawing room. We think the expenses at one of these schools, including board, tuition, books, etc., would be at least $400 a year.

(22) W. A. asks: How large a boat can be driven with a pair of cylinders 4x6 inches, at the speed of 10 miles an hour, pressure of steam being 80 to 100 lbs.? What size of propeller wheel will be suitable for the boat and engines? A. You can use a boat 30 feet in length, and a propeller 32 inches in diameter. We think it doubtful, however, whether you will realize the speed named.

(23) C. M. B. asks: Will a float, with just sufficient buoyancy to support 10 lbs. in cold water when not confined, support more weight if placed on the water in a steam boiler, with a pressure of steam of 200 lbs. to the inch? A. It will not support quite as much, because water expands when heated, and has less weight for a given volume.

(24) A. M. asks: In grinding rolls by means of an emery wheel, what should be the travel of the roll and of the wheel? A. It depends on the size of the rolls and the size of the emery wheel employed, and is easily discovered by experiment.