Notes & Queries

R. K. will find directions for tempering rock drills on p. 202, vol. 31.—W. F. will find that greasy cotton waste is very liable to spontaneous combustion. See p. 26, vol. 33.—M. S. will find a recipe for purple ink on p. 315, vol. 33.—J. N. W. can nickel plate his iron castings on p. 235, vol. 33.—C. S. will find a recipe for preserving timber on p. 265, vol. 33.—W. F., J. R. C., W. M., J. C. W., 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) B. J. H. says: What will restore the skin to its natural color after being tanned by exposure to the sun? A. Use a paste made of precipitated chalk and glycerin, and avoid exposing the skin to the influence of strong sunlight or winds.

(2) J. B. H. asks: What will remove the tar of tar weed from woolen cloth? A. Try benzine or naphtha.

How can I make my clock run slower? A. Lengthen the pendulum.

Can you give a simple process for making potato starch? A. Convert the potatoes into a pulp by means of a scraping knife or an instrument similar to a nutmeg grater; throw the pulp upon a fine linen cloth in a large funnel, and allow pure cold water to run through the mass slowly for several hours. By this means all of the minute starch granules may be washed through the cloth; and on allowing the water to stand for some time, these will settle to the bottom, and may be removed by decanting the water and straining.

(3) A. B. asks: How can I stain basswood to imitate Spanish cedar? A. Use logwood.

(4) A. H. asks: Which is the most approved kiln for burning charcoal? I hear that, around Lake Superior, retorts resembling those for gas or pyroligneous acid are used, the object being solely production of charcoal. Is charcoal burnt in retorts equal to that burnt in kilns? A. The finer qualities of charcoal are made by distilling the wood in closed retorts such as you mention. By this method several other valuable products, such as illuminating gas, creosote, pyroligneous acid, etc., are obtained.

(5) J. S. says: I have been using cowrie copal, which dissolves readily in alcohol. I now wish to use Zanzibar copal, which will not dissolve in alcohol. Can you tell me what will dissolve it? A. Zanzibar copal is soluble in ether.

(6) H. B. M. asks: 1. Is it not a fact that carbonic acid gas under certain compression becomes heavier than sea water? A. No; liquid carbonic acid is lighter than water. 2. If a pressure of thirty-six atmospheres will liquefy it, does not that degree of pressure exist in the deeper portions of the sea? A. Yes; but the acid would speedily be dissolved by the water, and gradually escape to the surface. 3. Does pressure arrest decomposition or chemical change? A No. 4. If carbonic acid gas be generated at the bottom of the ocean under a pressure which will render it heavier than water, can that liquid rise through the water to the surface? A. Yes. 5. Should chemical action in the depths of the ocean set more gas free than the undisturbed water above can absorb, is it not possible that below a certain depth the ocean rests upon a sub-ocean of liquefied carbonic gas, and may not the fact, noticed in the deep sea soundings, "that material brought from the bottom is strongly charged with carbonic acid" be attributable to the imprisonment of the gas by the pressure of the water above it? A. This is not at all probable; when the water has been taken from great depths, it has, in some instances, been found to be heavily charged with carbonic acid. 6. If investigation should prove the existence of a large body of carbonic acid gas beneath the ocean, might not the fact of its known electrical affinity throw further light upon the action of the tides and other terrestrial phenomena? A. We do not see what possible influence this could have on the tides, etc. 7. Would affirmative proof of the above justify the conjecture that the absence of tides in the lakes might be due to the want of sufficient depth to compress the gas to a sufficient specific gravity? A. No.

(7) H. C. asks: Please give me a recipe for extracting the mildew and shop stains from fine kid gloves. A. Draw the gloves over suitable wooden hands, and treat with a little putty powder and benzole.

(8) H. & L. say: Please tell us of a cheap plastic cement that can be used as a substitute for lead in lining wooden tanks to hold sulphuric acid. A. We do not know of such a cement that can be recommended.

(9) J. E. T. asks: How can I clean tallow? A. Digest it for some hours with dilute sulphuric acid; the pure tallow will separate and rise to the surface. The application of chlorine, which you suggest, is not necessary.

(10) C. C. asks: If I make a pump by taking 4 pieces of plank 6 inches wide, 1½ inches thick, and nail them together, and leave the hole square and work a wooden rod in it, having valves at the bottom of the pipe, can I raise water 112 feet without bursting the pipe? A. If you fasten it well, with bolts or straps, it will answer.

How is the horse power of boilers rated? A. Makers generally rate the horse power of a boiler by the amount of heating surface, and consequently by the size.

(11) H. F. L. asks: Can you tell me of a solution and process, which is a cheaper substitute for $AgNO_3$ in printing from a negative, which will give as good a print as silver? A. No.

(12) P. R. says: 1. What is the highest degree of heat that water can be raised to in a boiler ⅔ full? A. With sufficient temperature in the furnace, the limit would only be reached at the melting point of the material of which the boiler was constructed, provided, of course, that the boiler was of sufficient strength. 2. Can steam be raised to a greater degree while in the same boiler, and what degree will steam attain by separating it from the water and superheating it? A. The steam can be superheated in either case, to the same limits as before. 3. Is the top or boiler head of a steam boiler ⅔ full of water any hotter with 100 lbs. pressure than with 10 lbs. pressure? A. Yes, because the temperature increases with the pressure.

(13) W. H R. asks: What is the best way to mix paint for the red staff to staff millstones with, water or oil? A. We think oil is generally preferable.

(14) N. W. J. says: 1. I am using a force pump located over a well, with 24 feet of suction, and force the water 25 feet up into large tubs. The suction pipe is 2½ inches in diameter, the discharge pipe 3 inches, running on a level with the pump 70 feet, then up through the bottom of the tub, without a check in the pipe. The pump has a 12 inch valve. When running, the valves and piston thump heavily. How can I remedy it? A. Air vessels should be employed. 2. Does a pump in working form a vacuum? A. Yes, if it lifts water.

Will ice transmit the rays of the sun, so as to affect the thermometer? A. Yes.

(15) C. A. D says: I want to build a boat, with flat bottom, to be propelled with a wheel behind, with a one horse power engine. Of what size should the boat be? A. You can use a boat 15 feet long and of 3½ or 4 feet beam; but the engine is rather too small.

(16) W. R. P. asks: How can I wind up a line 60 inches long with a uniform tension of, say, 1 oz., without interposing a fusee? A. You can do it by means of clockwork actuated by a weight: or if you wish to use a spring, it should be quite long, and the clockwork should have an escapement with a pendulum or balance wheel. In other wards, the problem that you have proposed is precisely the same as occurs in the manufacture of clocks and watches.

(17) A. L. B. asks: What is the hight of the tallest mast of a sea-going vessel? A. The Three Brothers, said to be the largest sailing vessel in the world, has a mainmast 99 feet 10 inches high. If there are vessels with higher masts, probably some of our readers will be kind enough to send particulars.

(18) W. A. P. says: 1. I have a small engine with two oscillating cylinders 3½ inches long and 2 in diameter, with a 3 inch stroke. I wish to put it in a small side wheel steamer. Please give me the dimensions of which to make the boat and the paddle wheels. A. Boat 18 to 20 feet long; wheels, 2 feet in diameter. 2. I want to make a boiler for the above. Of what dimensions should it be to furnish steam enough? A. Make it 2 feet in diameter and 3½ or 4 feet high. 3. What would such a boat cost without the engine? A. From $20 to $50, according to character.

In "Wrinkles and Recipes" you give a recipe for coating iron with mercury to prevent rust. My engine is all polished. Would it do to coat it accordingly? A. It might answer very well.

(19) L. D. B. says: I have a well that affords about three fourths enough water for my boiler. Can I turn my escape pipe into the well and condense the steam by means of a pipe to run water from my reservoir into the well over the end of the escape pipe, shooting it out in fine spray? A. The plan does not seem very promising, as it requires several times as much water, as a given volume of steam was formed from, to condense that steam.

(20) J. O. H. Jr. says: 1. I have an engine and boiler. Size of engine cylinder is 4½ x 8 inches; the boiler is a double flue, 6 feet 4 inches long and 2 feet 4 inches in diameter. What size of flat-bottomed boat could I run with such an engine, running the engine 5 revolutions to 1 of the wheel? A. Boat 30 feet long and 6 to 7 feet beam. 2. Of what size should I make the wheel? A. Propeller 20 inches diameter, 3½ to 4 feet pitch. 3. What speed would the boat make against a current of 4½ miles per hour? A. You might realize 3 miles an hour.

(21) A. T. asks: What is the best metal for lining the sides of a box in which the plunge of a tile mill works, in order to wear the least? A. We think you will get very good results by using Bessemer steel.

(22) L. B. asks: 1. Is there any danger of an explosion in making soldering fluid, that is, by throwing pieces of scrap zinc into a glass jar containing muriatic acid? The jar sometimes gets heated to 120° Fah. A. There is no danger provided the gas (hydrogen) which is evolved is allowed to escape into the air without contact with flame. 2. Is it very injurious to health to inhale the fumes of the acid, while boiling? A. The acid vapors are poisonous. 3. Can you inform me as to a safe and proper way of making it? A. The operation should be conducted in the open air, in a large wide-mouthed porcelain or stoneware jar. To avoid the first violent action it is better to dilute the acid with thrice its volume of water.

(23) F. E. J. says: I want a cement that will resist dilute sulphuric acid and carbonic acid gas. I need something equal in strength to plaster of Paris or sealing wax, sufficiently strong to hold a light vessel in place. Can you aid me? A. Try paraffin, plaster of Paris soaked in melted paraffin, or solution of caoutchouc.

(24) D. C. D. says: You give a description of a baroscope, made by placing a glass tube in a bottle partly filled with water, and blowing a column of water up the tube, when the hight of the column of water will vary with the pressure of the atmosphere. What cement can I put around the cork to make it airtight and hold up the column of water? A. A rubber stopper is best for this purpose; it should be well greased with a little cerate, and forced in as tightly a possible. Where it is not possible to obtain a suitable rubber stopper, choose a good cork one, immerse it for a short time in melted paraffin, and, when the pores are well filled, force it into the neck of the bottle tightly and hold it in position until perfectly cool.

What cement will cement hard rubber and glass together and resist the action of ordinary writing inks? A. Melt together in an iron pot equal parts of pitch and gutta percha. This may be kept liquid under water.

Will nickel resist the action of ordinary writing inks as well as silver? A. No.

(25) H. C. N. asks: What will dissolve tin, bismuth, and lead (both severally and together), without acting upon copper or silver? A. We do not know of such a reagent.

(26) O. O. W. asks: How can I compute the amount of heat generated in an air pump at, say, 100 lbs. pressure, with thermometer at 60° Fah.? A. By using the following formula: T=absolute temperature of air before compression; t=absolute temperature of air after compression; V=volume of air before compression; v=volume of air after compression; P=pressure of air before compression; p=pressure of air after compression. Then $\frac{t}{T}=\left(\frac{V}{v}\right)^{0.408}=\left(\frac{p}{P}\right)^{0.29}$. This equation can be most readily solved by the use of logarithms, thus: $\log.\left(\frac{t}{T}\right)=0.408\times\log.\left(\frac{V}{v}\right)=0.29\times\log.\left(\frac{p}{P}\right)$.

(27) J. H. P. says: 1. I wish to prepare a plaster of Paris mold for making bee comb foundations. How can I harden the mold so that it will not break or crumble under pressure? A. Mix the dry plaster with a solution of alum in water in place of pure water. 2. Beeswax in thin sheets is very frail and breaks easily when cold. What can I add to it to toughen it? A. Try fusing the wax with a little resin.

(28) W. C. T. asks: Is there any material, of which soft, pliable gloves can be made, that will stand hot water and be durable? A. Gloves of leather and of Macintosh cloth (cloth filled with caoutchouc solutions), etc., have been used for this purpose, but were soon discarded. We do not know of anything that would be an improvement upon these.

(29) J. E. A. asks: How can I remove kerosene oil stains from a marble slab? A. A paste made of soda, pumicestone, and chalk is recommended, after the application of which the marble is to be washed with soap and water.

Can steel or chilled iron balls be turned perfectly spherical? A. It is better to grind them.

How are what are called rephotographs produced? The photographs seem to be first transferred to glass by some method, and then touched up on the back with oil paints. Will you give me a description of the *modus operandi*? A. See p. 359, vol. 31.

(30) C. W. T. says: J. C. J. can lower the tone of his tuning fork by filing the tines thinner close to the handle.

(31) A. H. & S. G. ask. 1. What is the best rail for railroad purposes, namely, for strength and safety, irrespective of cost? What should be its length, size, and weight? A. A committee of the American Society of Civil Engineers recommend a steel rail weighing from 52 to 56 lbs. per yard; hight from 4 to 4½ inches: head 2⅜ inches wide, 1¼ inches deep: top of head curved to a radius of 12 inches; thickness of stem $\frac{7}{16}$ to ½ inch; width of base 4 to 4½ inches; thickness of base at edge $\frac{3}{16}$ inch, rising at an angle of 14°. 2. What is the effect of cold on the best rail? A. The committee think that rails break in winter because they are weaker, and the road bed is less elastic. Other prominent engineers do not think that the rails are weaker in cold weather, and believe that good rails are no more liable to break in winter than at any other season. 3. What is the nature of the strain upon a rail by the passing over it of a train of cars? Is it tension or impact? A. A rail is subjected to tension or compression because it acts as a beam between supports. It also has to resist blows or impact, and the imposed weight tends to crush it, in addition Besides this, its section is reduced by wear.

(32) C. C. asks: In a first class condensing engine, cutting off at one sixth, what is the pressure in cylinder at the end of stroke, supposing that in the boiler to be 60 lbs.? A. About ⅙ of the pressure at point of cut-off.

(33) H. P. says: There is a spring, affording water enough to fill a 6 inch pipe, 400 rods from and 70 feet above the village. To bring water from this spring to the village with force enough to throw to the tops of buildings, what size of pipe will be necessary? A. Unless you use a very large main, the head will be so much cut down that the hight of discharge will be quite small. It would probably be cheaper to use a smaller main, and have a pump and standpipe in the town.

(34) J. M. says: I make a fluid from galls, sulphate of iron, and sulphate of indigo; when I neutralize the sulphate of indigo with marble dust, there is a violet-bluish film on top of the ink; filtering does not remedy it, as the film soon collects again. What is it, and how can I get rid of it? A. Your solution after filtration is probably too concentrated. Add a little more water.

(35) L. L. T. asks: How can I color russet leather red and white? A. For red, use an alcoholic solution of aniline red, not too strong. We do not know of any method of coloring the leather white, except it be by the superficial application of some light-colored pigment, such as zinc white (oxide of zinc) and finely ground barytes (sulphate of baryta), rolled in with gum arabic solution.