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Notes & Queries

C. C. P. will find on p. 203, vol. 34, recipes for colored fires.—H. J. C. should line his vinegar casks with the material described on p. 11, vol. 34. —G.W. S. and other pisciculturists should address Seth Green, Esq., Rochester. N. Y.—S. H. D. will will find a recipe for removing warts on p. 97,vol. 32.—R. G. B. will find directions for bronzing iron castings on p. 283, vol. 31.—C. W., Jr., can proportion the change wheels of his compound gears by the rule given on p. 107, vol. 34.—W. B. can paste paper labels on tin if he mixes a tablespoonful of coarse sugar with a quart of flour paste.—E. F., G. M. C. & M., J. M., C. C., J. H. G., and many 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) F. M. J. says : I want to convey water 1,000 feet from a hydrant before it can be used. Which is the most practicable way, to lay 1,000 feet of pipe and connect an engine to the end, or connect the engine close to the hydrant, and the hose to the end of the pipe and play through the pipe and hose? A, The first method would be best, if you wish to throw a stream.

(2) A. S. asks: How are photographs put upon glass and made transparent, so as to be colored on the back with oil colors? A. The face of the picture is covered liberally with starch paste and laid upon clean glass. Then, with a smooth, hard edge, the paper is rubbed upon the back from the center to the edge until all of the starch is pressed out from between the picture and glass that can be. After it is dry, castor oil is applied to make it transparent.

(3) E. V. J. asks : What is the difference between sweet oil and olive oil? A. They are different names for the same thing.

(4) A. F. I. asks : How high can water be raised with an ordinary well pump by using check valves, say 10 or 12 feet apart? A. If, as we understand you, you mean to force the water up, the hight is only limited by the power applied, and the strength of the apparatus.

(5) W. L. P. asks : 1. In what proportion should the best Portland cement be mixed with clean sharp sand, for coating the outside of a stone or brick building? A. One measure of cement powder to three measures of dry sand. 2. How many square feet will a barrel of cement mixed with sand cover? A. One barrel of cement and three of sand will make 3½ barrels of mortar, which will cover about 4,000 square feet of brick wall, or about 40 squares, to a thickness of ¾ of an inch. 3. Should it be put on in one or two coats? A.Use one primary coat and a finishing coat put on immediately after it, before the first coat has set. The permanence of stucco on the exterior walls of a building depends generally more upon the stability of the surface that receives it than upon the stucco itself. The latter can absorb water and give it off without injury; but if the water finds its way through the stucco into the brick, it is apt to freeze in winter and fracture the face of the wall. To harden and fill the pores of the brick, spread a thin wash of cement over the wall and scrape it off first, before putting on the principal coat. 4. Could an ordinary house plasterer put it on satisfactorily? A. Yes, if an intelligent man.

(6) E. M. B. asks : Will a pump do work as easily with a 12 inch column as with a 5 inch, the size of water valve being the same in both cases? The lift is 150 feet. A. Other things being similar, the pump should force water more easily through the 12 inch pipe.

(7) J. V. N. asks : The following is a 2 x 4 inches engine, large enough to drive a boat 20 feet long and 40 inches beam, with a propeller? A. A somewhat larger cylinder would be advisable.

(8) R. R. H. says : I have a small iron cylinder, that will hold, compressed, 100 gallons nitrous oxide gas. I have also a regular dental gasometer that will hold a similar quantity. How can I compress this nitrous oxide gas into the iron cylinder, taking it from the gasometer? A. You will need a compressing pump. Considerable apparatus is required for producing such a high degree of compression.

(9) J. R. McC. says: 1. I saw in the SCIENTIFIC AMERICAN a recipe to make a wash of cement and oil to put on a brick wall, to keep out the moisture. Would water do as well as oil to mix with the cement, or would the brick being previously painted be a detriment to the cement adhering to the brick wall? A.A wash of cement and oil is simply a paint, and you can apply it like any other paint, with a brush; if your wall has been already painted, you should use oil and not water. 2. After the cement is applied, can I paint over the wall with any ordinary paint? A. Yes.

(10) J. T. C. asks : A and B. have an argument about names of floors in a building two or more stories high. A. says the floor on a level with the street is the ground floor, and not the first floor, but the floor up one flight of stairs from this ground floor is the first floor, and up two flights the second. B. contends that the floor level with street is the first floor, and may also be called the ground floor, but the floor up one flight is the second floor, and so on. Which is right? A. B. is right, according to the practice followed in this country; but A. would be right in Europe. The ground floor in London and the *rez de chaussée* in Paris correspond to our first floor; and the first story in London and *premier étage* in Paris are equivalent to our second floor. In London they sometimes say " up one pair," that is, one pair of stairs, and in Paris *au premier,* which means the same thing.

(11) J. J. asks : A. says that glue can be dissolved in alcohol without applying heat, providing the spirit be of the proper strength? B. says it cannot be done with alcohol alone. A. B. is right.

(12) G. H. W. asks : Is carbonic acid beneficial to the stomach? A. In many cases it is.

(13) C. E. R. says : I have seen articles made from some composition pressed in molds, to represent carved wood, and intended for ornamentation on furniture. Can you tell me how they are made? A. The composition you mention is probably that made from sawdust and glue.

You state that paper pulp can be hardened by treatment with chloride of zinc. Can you give me fuller directions? A. We believe the anhydrous chloride of zinc is employed, together with the alumina salt, in the sizing.

(14) J. H. S. asks : How much zinc, used as a preventive of scale, is required for a 30 horse power boiler? A. A piece weighing 2 or 3 lbs. will be sufficient to experiment with.

(15) C. W. N. asks: Why is it that gunners are afraid to depress their guns below a certain angle in firing from a hight? A. For fear that the gun may become unmanageable, and more disastrous to friend than to foe.

(16) A. A. H. asks : How is the material used by dentists for filling teeth prepared? A. Gold leaf is principally employed for this purpose, also other foils. An amalgam of copper and mercury has also been used with good results. You should have stated more explicitly what particular variety of cement you had reference to. Plaster of Paris is not used for this purpose.

(17) T. P. H. asks : Can marsh grass be utilized in the manufacture of paper? A. The material, we believe, has been used for this purpose before. If it can be economically harvested, dried, and freighted, and occurs in sufficiently large quantities, it might prove of some value.

(18) C. W. J. asks : The statement that, in the case of mill rocks, the upper stone may be more easily raised when in motion than at rest (the upper stone being the runner) by the regulating screw, is not credited. Can you explain? A. A simple test could be made by attaching a spring balance to the wheel or lever by which the stone is raised.

Of what material must a barometer be made in order to be entirely reliable? A. Mercury barometers are regarded as the most accurate.

The circumference and area being given, how do you find the diameter of a ring? A. Divide 4 times the area by the circumference.

(19) W. M. says : I have a gummy fluid which contains by the test considerable iron in solution. The density is about 15° Baumé. Can I get rid of the iron so as to avoid the color it gives? A. Iron in solution may be precipitated by heating it with nitric acid, and then adding ammonia.

(20) L. H. E. asks : How can I make a dressing that will keep a leather buggy top soft and pliable? A. A good mixture for making and keeping leather flexible consists of 1 pint boiled linseed oil, 2 ozs. beeswax, 1 oz. Burgundy pitch, and 2 ozs. turpentine, melted together over a slow fire.

(21) R. C. S. asks : How can I make gold size? A. For use on oil colors, take boiled oil and thicken with calcined red ocher, and reduce to the utmost smoothness by grinding. Thin with oil of turpentine. On water color or distemper work, use isinglass size, mixed with finely ground yellow ocher.

(22) H. B. asks : If a bottle be partly filled with water and an air pump applied to the top (the pump not reaching the water), can the water be pumped out, leaving a perfect vacuum in the bottle? It is understood that the bottle shall be closed air-tight. A. No

(23) C. S. says : When I drop a large stone into a stream of water, it will sink to the bottom: but if I break that stone into small particles and drop it into the current, it will move down the stream. My friend says it is because the particles are lighter. I say it is because the particles have a larger surface in proportion to their weight, to be acted upon by the water. Which is right? A. You are.

(24) U. H. asks: 1. Would an engine with two oscillating cylinders, ⅝ inch in diameter and of 1¼ inch stroke, be powerful enough to run a scroll sawing machine to saw pine 1 inch thick? A. The engine will answer. 2. Of what size should the boiler be, to run with spirit lamp, and at what pressure should I run it? A. You might use a boiler 10 or 12 inches in diameter, and 18 or 20 inches high. You will find alcohol a very expensive form of fuel, even if you succeed in using it at all.

(25) C. J. L. asks: Is it possible for a gas meter to register more gas than really goes through it? A. It would be very easy to make a meter that would do this.

(26) F. C. R. Jr. asks: 1. If a ball is thrown into the air vertically, will it, on coming down, strike the hand with the same force that it left it with? A. No. 2. Why not? A. On account of the resistance of the air.

(27) S. G. asks : How many feet of water per second is required when passing over an overshot water wheel 24 feet in diameter, utilizing 70 per cent of its effective force, to produce 100 horse power? A. Find how many horse power would be developed, if there were no losses, multiply this by 550, and divide the product by the product of the velocity of the water in feet per second multiplied by the weight of a cubic foot in lbs.

(28) F. O. R. says : I have steel springs from No. 18 to No. 0 in thickness in a vessel containing steam, sometimes up to 100 lbs. pressure. For what length of time do you think the springs will maintain their elasticity? Do you think that the heat of the steam will injure the temper? Will it corrode them? A. If the springs are kept bright, they will prove quite durable. To prevent their corrosion,they might be plated with nickel or silver.

(29) J. W. N. asks: Which wheel, of a pair of ordinary carriage wheels, would lift from the ground in rounding a curve, with nothing on the axle, the wheels being drawn rapidly? A. We are not sure that either would. if the ground were level.

(30) J. J. asks: 1 What power is gained on every additional inch on the face of an 18 inches diameter pulley, say from 6 inches to 7, 8, etc.? A. As we understand your question, if you double the face, you can expect to transmit about double the power. 2. What is the best thing to put on a rubber belt to keep it from slipping? A. If it is tightly stretched, it would be advisable to use a wider belt. 3. Is a six ply belt as liable to slip as a four ply? A. Yes, other things being the same.

(31) D. P. A. asks : What weight will a 2 inch jack screw raise and sustain? The screw has 2 threads to the inch, single thread, and length of nut is 4 inches. A. If you do not take friction into account, the weight raised will be to the pressure applied, as the distance passed over in a given time by the point of application of the pressure is to the distance passed over in the same time by the point of application of the weight. Practically, this result will be considerably modified by friction : how much can best be ascertained by experiment.

(32) O. R. M. asks : What power would be required to run a fan with 30 blades, each 5 feet long x 1 foot wide, set at an angle of 30°, at a speed of 500 per minute? A. So much depends on form and construction of fan blowers that it is safer to answer such questions by experiment.

Have you ever published any articles on flying machines? A. We think that everything of importance in reference to the subject has at least been noticed in our columns, and on p. 112, vol. 32, you will find a pretty thorough review of the question.

(33) H. M. W. says: I see it stated that anticipating a crowd at a new church, they tested the strength thereof (by piling pig iron on it) to 50 lbs. to the square inch. To what bight would they have to pile to accomplish it? A. About 16 feet. We think, however, that you did not read the statement rightly. At all events, we are confident that no such test was applied in the case mentioned.

(34) C. T. V. asks : I have a ram for forcing water to my barn, and it will not run. It has always performed its duty well until this spring. The pipe into flume is tight, and no part broken. The valves are in good order; the shut-off comes up and will not go back. Can you tell what will start it? A. You should endeavor to find out why the waste valve will not shut. It must be obvious that a thorough examination would be more valuable than our opinion.

(35) J. W. C. asks : In No. 13 of the SCIENTIFIC AMERICAN SUPPLEMENT, first page, you give an illustration of the steam yacht Black Hawk, and say that salt water is now substituted to avoid carrying the weight of the fresh water. How is this done, and foaming prevented? A. In changing from fresh to salt water, and *vice versa,* foaming is apt to take place; and until the water in the boiler is changed, it is well to throttle the steam and check combustion somewhat.

(36) A. H. S. asks : What size of boiler will I need for a 1½ x 3 inches engine? What should be the thickness of iron? With such a boiler, what horse power could I develope, running at a high speed? A. Your questions are rather indefinite, as the size of boiler and thickness of iron will depend upon the number of revolutions, the pressure of steam, and the design and construction of the engine. We have published some general rules on pp. 33, 225, vol. 33.

(37) J. F. S. says : I wish to make a small propeller to draw a small boat to carry 10 persons, on flat water about 1¼ feet deep. How can I build it best? A. Build it on the model of a good rowboat that has the required capacity and draft.

(38) F. M. says : I want to make a cast iron gun of 3½ inches bore and 4 feet long. How much metal must I have around the bore at the breech? A. Make the thickness at breech about 4 inches. Make the diameter of vent ¼ inch, and bore it so as to enter breech about 1 inch from the bottom. But you will be safer if you buy a gun ready made.

(39) C. W. M. says: In your reply to E. L., you say that if, from a point without the ellipse, lines be drawn to the foci, the line bisecting the angle thus formed will be normal to the curve. So it will if the point is on the line of the major or of the minor axis, but not otherwise. In what treatise on the conic sections can be found the method of constructing the normal from a point not on the curve, in the case of either the ellipse, the parabola, or the hyperbola? A. We are obliged to our correspondent for calling attention to this matter. By an oversight, we gave the directions for drawing a normal on the assumption that the given point was on the curve. We have never seen a graphical solution of the problem for a point outside the curve. Nearly all treatises on conic sections, however, give methods by which the equation of the required normal can be obtained, and perhaps some of our mathematical readers will be interested in working out a simple graphical solution.

(40) J. H. H. asks: 1. What is the greatest depth from which a siphon can draw water, from an inclined shaft or a straight shaft, or is there any difference? A. In an inclined shaft, the pipe being longer, there would be more friction in the pipe, and the discharge would not be so great. You will reach the practical limit at a hight of 28 or 30 feet. 2. How much longer should the external end be than the internal end? A. A slight difference of level between the two ends will insure working, provided the discharge is the lower, but of course, in practice, it is well to have a considerable difference, if possible.

(41) J. W. B. says: In regard to thickness of iron for a boiler of 14 inches diameter, 30 inches long, you say that iron will stand 35 lbs. to the square inch safely. I have a cylinder of 18 gage, 16 inches in diameter and 30 inches long, that I have had tested to 270 lbs. pressure. A. In our answers to correspondents in relation to the pressure a boiler will stand, we generally give working pressure, with a large factor of safety. In practice, it is usual to find boilers carrying much higher pressures than would be allowed by our proportions ; but we think it best to give values which are sanctioned by the highest engineering authorities in this country and Europe.

(42) C. W. J. says: It is contended by some that to clear the foliage from muck beds, so that the sunlight and heat may have free access thereto, the fertilizing properties of the muck are lost by evaporation and absorption of nitrates from the muck. But to allow the shade to remain over the muck, and to haul therefrom as required, is better, and, in fact, the only salvation of the muck bed as a fertilizer; and it is contended that the evaporation and absorption goes on after the muck is deposited on the required lands, and that the plants designed to be improved thereby have to grab, so to speak, for their share, entering into direct conflict or contest with the sun. It is also contended that rain is a deposit of nitrates, previously taken up as vapor, and, therefore, after a shower, the nitrates are then taken up as rapidly as the plant can do it ; and up on the reappearance of sunshine and heat, they are reabsorbed