Notes & Queries

R. J. will find a description of a steam lithographic press on p. 15, vol. 24.—N. F. S. will find directions for gilding carriage work on p. 288, vol. 24.—J. R. N. will find details of the two-battery spectroscope on p. 355, vol. 24.—K. N. will find a description of fish glue on p. 408, vol. 24.—E. P. will find some interesting particulars as to the Australian blue gum tree on p. 165, vol. 30.—J. F. will find directions for building cement walls on p. 218, vol. 30.

(1) F. H. W. asks: 1. How should animal charcoal be used for filtering sirup? A. The bone black is placed in the form of small lumps on sieves in a tall cylindrical vessel, having at the top a large reservoir in which a constant level of the liquid is maintained by means of an automatic valve. The juice is allowed to gradually percolate through the mass of carbon, and is received at the bottom in large tubs or other vessels. 2. Could I burn the bones in a common cook stove, or would they have to be burnt in an oven made especially for the purpose? A. No. It would be necessary to first exhaust them of all fat and grease, by immersion in bisulphide of carbon. They must then be broken up, placed in iron retorts, and subjected to destructive distillation.

(2) E. F. K. asks: How can I make a cheap barometer that will indicate the changes with tolerable accuracy? A. Obtain a straight fine glass tube about 33 inches long, and as nearly cylindrical as possible, sealed at one end, and having an even uniform bore of about 2½ lines diameter. The mercury to be used should be perfectly pure and free from all air and moisture. This latter requisite may be assured by heating the mercury in a porcelain dish to nearly the boiling point, previous to using it. The tube is then held securely with the open end uppermost, and carefully filled with the liquid metal. The open end of the tube is then securely covered with the finger, the tube inverted, and the end covered by the finger plunged below the surface of a little mercury placed in a small vessel to receive it. The finger is then removed, when the mercury in the tube will immediately fall to a level of about 30 inches above the surface of that in the small reservoir below. In order to attach the scale correctly, it will be necessary to compare the indications with those of some good instrument.

(3) J. B. S. says: In a recent issue you say, in answer to inquiry for a freezing mixture, that 8 parts sulphate of soda and 5 parts hydrochloric acid will reduce the temperature from 50° to 0°. I have tried it, placing one tin can inside another, with about ½ inch between, and I filled the inside can with cool water. I could not see that filling the space with the salt, and saturating with the acid, made any perceptible difference with the temperature of the water. What is the trouble? A. It will be necessary for you to use either thin glass, silver, or other metallic vessels not attacked by the acid used, as any such action interferes seriously with the success of the experiment. If the chemicals used are not worthless, and the proper proportions are used, failure is impossible. You should use a thermometer in the experiments, as the finger is hardly sufficiently sensitive. It should also be borne in mind that the low degree of temperature mentioned in the recipe, as attainable by the solution of this salt, is the temperature indicated by the solution itself; and it cannot be hoped that any large body of liquid contained in a separate vessel and immersed in the solution will immediately, or even ultimately, assume the precise degree of temperature of the other liquid.

(4) S. S. J. asks: 1. What is the philosophy of spontaneous combustion? A. At the ordinary temperature of the atmosphere, oxygen frequently enters (slowly) into combination, without any perceptible disengagement of heat, as when a bar of iron is gradually rusting in the air. In other instances, where the process is more rapid, the heat accumulates, and sometimes it rises high enough to cause the materials to burst into flame, producing what is called a case of spontaneous combustion. This phenomenon is often exhibited in large piles of cotton waste saturated with machinery oil for a long time, moist hay placed in stacks, etc. These bodies expose large surfaces to the atmospheric oxygen; and considerable heat accompanies the rapid oxidation or fermentation that ensues. These bodies being very poor conductors of heat, the result is simply an accumulation of energy with a corresponding rise in the temperature, and this rise in temperature reacts to accelerate the rate of combustion, until a point is reached where the temperature is sufficient to decompose and inflame the gaseous products of the decomposition. The point of inflammation of various substances is, of course, determined by widely different degrees of temperature; phosphorus will sometimes become inflamed at the ordinary summer temperature, while bodies at the other extreme would require, perhaps, thousands of degrees for their ignition. 2. It is said that spontaneous combustion sometimes occurs in the human body. Has there ever been such a case? A. Liebig has demonstrated the impossibility of the living body ever taking fire and being more or less completely consumed through the agency of spontaneous combustion. He affirms that no amount of fat, alcohol, or phosphorus, which the living body could possibly contain, would render it combustible. Upon investigation, the alleged instances of spontaneous combustion were found in no case entitled to credence.

(5) W. T. C. asks: How can I reduce wood to a pulp? A. The fibers of the wood are first separated by passing between large rollers plentifully supplied with water. The excess of water is then removed by pressure, and the fibers are cut into small pieces by revolving cylinders. These pieces are placed in a stamping mill or beating machine with water, in which they are reduced to the consistence of pulp. After this the mass is transferred to another machine, and bleached by a solution of chloride of lime, chlorine water, chlorine gas, or other bleaching agent. To remove all trace of hydrochloric acid, the pulp is washed in solutions of potash, soda, or antichlore, and then in water. In spite of careful chemical bleaching, it is found necessary to add bluing matter in sufficient quantity to neutralize the yellow cast of the pulp.

Will crude petroleum oil injure the skin? A. No.

What is meant by an atmosphere? A. The atmosphere (used as a degree of pressure) is equal to the weight of a column of air reaching from the earth's surface to the limits of the atmosphere, a distance of about forty-five miles. It corresponds to a barometrical column of mercury 30 inches high, and exerts a pressure of about 15 lbs. per square inch.

(6) B. B. asks: I am engaged in the manufacture of glue, and at times am troubled that the glue does not set quickly enough. Can you recommend something which I can use as a dryer? A. Your trouble is probably due to insufficient cleansing of the materials at the beginning of the operation, and imperfect drying of the product at the last.

(7) J. T. asks: What are the proper proportions of salt, manganese oxide, and sulphuric acid, to make chlorine? A. Chlorine may be easily prepared from a mixture of 7 parts by weight of oil of vitriol, previously diluted with 7 parts water, and allowed to cool, and 4 parts powdered salt, mixed intimately with 3 parts finely powdered black oxide of manganese. The gas comes off slowly in the cold, but freely on the application of a gentle heat. The small quantity of hydrochloric acid that comes over with the gas may be easily removed by passing it through a wash bottle containing a little water. 2. How is lime impregnated with the chloride to form chloride of lime? A. The slaked lime is placed in layers several inches in depth upon perforated shelves in airtight leaden chambers, and exposed to the action of chlorine. The gas must be admitted gradually, in order to prevent a rapid rise of temperature, consequent upon its quick absorption by the lime. 3. How much gas will 1 lb. slaked lime absorb? A. Good lime will absorb about one half its weight of chlorine gas.

(8) F. H. W. asks: 1. In manufacturing rubber stamps, do they oil the type before making the plaster of Paris cast? A. Yes. 2. How do they prevent air bubbles from forming? A. The type is first covered with a film of plaster of the consistence of cream. This is worked into all the cavities and around the lines with a camel's hair brush, thus excluding all bubbles of air. Immediately afterwards the thicker plaster paste is poured in, and the whole allowed to set.

(9) G. F. says: I have some silver-plated buckles to my harness, and the plating is all worn off. How can I silver them again without taking them from the harness? A. We think the metal work in question could not be satisfactorily replated without removing it from the harness. 2. How can I japan them black without taking them off? A. A good japan varnish may be made by mixing together 1 oz. of asphalt, 2½ ozs. umber, and 1 pint boiled linseed oil. Thin with oil of turpentine until of the desired consistence.

(10) R. K. W. asks: What is meant by the radiation of steam cylinders? A. The term refers to the heat lost by radiation.

(11) G. B. says: There is a church basement floor which is very moist in winter. It is 70 by 120 feet. Which is the best cement to coat it with? A. Lay a concrete floor, 3 inches thick, of Rosendale cement, clean sharp sand, gravel, and small stone chips. It will take some time to set, but will ultimately become hard and dry.

(12) L. S. asks: 1. Is it better to paint wood work, inside and outside of dwelling houses, with paint mixed with raw linseed oil instead of boiled? A. Raw oil is usually used with a dryer added, but boiled oil requires no dryer. The work has a more shining surface with boiled oil than with raw. 2. How should inside shutters and front doors, which are exposed to the hot rays of an afternoon sun, be painted, in order to prevent blistering? A. Give them a good coat of oil before painting, and give plenty of time for one coat of paint to dry before putting on another.

(13) A. F. A. M. asks: What is the composition of Babbitt metal? Why is it put in journal bearings, and from what did it derive its name? A. It was invented by Isaac Babbitt, of Boston, and is used because it makes a good bearing without any fitting. Its composition, by weight, is: Tin 50 parts, antimony 5 parts, copper 1 part. There are numerous other recipes for Babbitt metal of different grades, but this forms a good composition for general use.

What is the fine and penalty for using a United States postage stamp a second time? A. The penalty is a fine of $50.

(14) T. G. J. asks: What is the best method of filling the pores of cement put on the outside surface of wooden buildings? We propose to first lath and plaster in the usual way, and then cement over that in imitation of brown stone. A. A coat of linseed oil is sometimes put upon brickwork for the purpose of closing the pores of the brick and preventing the absorption of water; and this might also serve the same purpose upon a cement surface. We have very little faith, however, in the permanency of lath and plaster on the exterior of buildings.

(15) J. J. N. asks: I am having built an experimental canal boat, length 21 feet, beam 5 feet. What size of engine, boiler, and grate surface will be necessary? Would you use a long cylinder with small diameter, and an upright boiler? A. We should prefer an upright boiler and a vertical engine. We could not give you dimensions without knowing more particulars; but as your boat is an experimental one, you will doubtless find the best proportions most readily by experiment.

(16) N. A. V. says: The hydraulic tyre press, illustrated in your issue of June 12, has given a little interest to an old question: Is water compressible? If a perfectly tight vessel is full of water, at a pressure of 15 lbs. per square inch, can any more water be forced in? A. Water is slightly compressible. The efficiency of the hydraulic press depends upon the fact that a pressure applied to water is transmitted equally in every direction.

(17) W. P. B. says: 1. I have a small boat, 15 feet long and 1 foot wide, in which I use a double paddle. I would like to run it by steam, and want to know how large an engine I must have. Would an engine of 2 inches bore by 4 inches stroke be large enough to move her, using side wheels? A. Yes. 2. How large a boiler would it need? A. Put in one with from 8 to 10 square feet of efficient heating surface. 3. Would wood do for fuel? A. Yes.

A friend says that he or any one else can tell by the looks of the new moon whether the following month is to be dry or wet. I hold that he cannot. Which is right? A. You are.

(18) H. P. says: I have an engine which was cleaned to a very bright surface; and I was told that, if I whitewashed it, it would keep its polish. I did it, and now it is rusted very badly. How can I remove the rust, and get it bright again? A. Use fine emery and oil.

(19) A. S. says: I have a 60 horse power engine, and run it with 100 lbs. steam, making 60 revolutions a minute, for running a mill. I want to change the cog wheels, making the driving wheel on the upright shaft larger, and the cog wheel on the engine shaft smaller, and to increase the number of revolutions per minute to about 70. How could I best do this? A. Change the governor pulleys so that the governor will have the same speed as at present, when the engine is making 70 revolutions, and adjust the valve, if necessary, so as to give more opening. These directions suppose that you are using a governor adjusted to a certain number of revolutions per minute.

I have tried different experiments to manufacture varnish as used by the larger gun manufactories to varnish guns and revolvers, but without success. It does not last, and has not the same bluish color. How can I prepare it? A. The coloring is generally effected by the use of acids, or by heating the metal. See p. 10, vol. 25.

Is there any invention which will save vessels at sea from sinking? If so, please state it. I have a plan which would answer very well, it being cheap, easily adjustable to the vessel, and sure to perform its duty. A. We think you have the market to yourself at present.

(20) E. D. D. says: Suppose a large steam generator be placed in each square of a city, would it not be profitable to connect the steam so as to warm the houses and extinguish any fire that may take place, particularly inside the houses, leaving the engines to play upon the outside? A. The idea is a very good one and has often been proposed. Nearly all modern steamships have steam pipes leading into the holds for extinguishing fire.

(21) P. S. F. asks: In plastering, how much lime, sand, and hair should be used to make a good solid material? A. Use 1 measure of quicklime to 5 measures of sand for brickwork; and 1 measure of quicklime to 4 measures of sand, and one third of a measure of bullock or horse hair, for plastering mortar. Put on the first or scratch coat ½ an inch thick, the second, or brown coat, ¼ inch thick. The third, or finishing coat, ⅛ inch thick, contains no hair, and is made of 1 measure of lime to 2 of sand, and the purest sand is used; this is called stucco. Hard finish requires 1 measure of ground plaster of Paris to about 2 of quicklime, without sand.

(22) M. C. B. asks: What will remove white paint from all woolen brown goods? A. Try a mixture of equal parts of alcohol and chloroform.