Notes & Queries

M. W. K. will find directions for preparing oxygen gas on p. 299, vol. 33.—C. E. K. Jr. can produce satin finish on gold or silver ware by the use of the sand blast. Nickel plating is described on p. 171, vol. 30.—J. P. A. can make pasteboard fireproof by the process given on p. 171, vol. 33.—G. G. can mold rubber by the process described on p. 283, vol. 29.—F. G. W. will find a description of tests for impurities in water on p. 155, vol. 33.—W. J. S. will find that the proportions of safety valves are described on p. 390, vol. 32.—C. W. L. can cement pieces of iron together by using the preparation described on p. 251, vol. 28.—L. L. L. can gild picture frames by the method detailed on p. 90, vol. 30.—E. should French polish his walnut panels; see p. 11, vol. 32.—J. M. A. will find directions for silvering mirrors on p. 234, vol. 30.—G. H. O. can solder brass to copper by the process described on p. 251, vol. 28.—H. J. E. will find a recipe for pickle for castings on p. 139, vol. 31.—H. E. S. will find a recipe for black ink on p. 203, vol. 29.—A. V. can purify rancid butter by following the directions on p. 119, vol. 30.—J. L. will find directions for making hard soap on pp. 331, 379, vol. 31.—W. H. M. will find a recipe for blackboard composition on p. 91, vol. 30.—O. C. T. will find directions for staining wood in imitation of black walnut on p. 90, vol. 32.—W. H. J. will find directions for proportioning screw-cutting gears on p. 187, vol. 29.—E. B. W. can dissolve india rubber by following the directions on p. 283, vol. 29.—J. H. O. K. will find a recipe for browning gun barrels on p. 11, vol. 32.—G. A. McL. should decline to listen to superstitious nonsense as to the influence of the moon's phases.—W. P. should read the SCIENTIFIC AMERICAN, and he would not then waste his time on the circle-squaring problem.—W. H. McC. can protect polished steel from rust by the method described on p. 283, vol. 31.—J. D. F. will find a recipe for a cement for china and glass on p. 346, vol. 24.—F. W. S. can make a paper canoe by following the directions on p. 163, vol. 27.—J. S. W. can test his safety valve by the process described on p. 273, vol. 31.—E. H. B. will find directions for bronzing iron castings on p. 283, vol. 31.—H. H. D. will find a description of the stereotype process on p. 363, vol. 30.—C. E. will find a recipe for hair stimulant on pp. 267, 363, vol. 31.—W. H. M. and C. P. N. can cement glass to brass by the process given to p. 298, vol. 30.—J. H. D. and S. F. B. will find a recipe for liquid bronze on p, 130, vol. 32.

(1) C. C. says: I am making a boiler of tin, 15 inches long and 5 inches in diameter. What pressure will it stand per inch? A. The safe pressure is about 25 lbs. per square inch.

(2) A. A. H. says: I have a spring of water which I have brought to a barn through ¾ inch lead pipe. I wish to let the trough fill to within 3 inches of the top, and then to carry the water down a fall of 5 feet. Last winter I had trouble with air filling in the pipe running from the trough to the yard. How can I arrange it so as to have no trouble with the air or the frost? A. To prevent the accumulation of air, lay the pipe with a continuous fall, free from abrupt bends; and cover it well to prevent freezing.

(3) J. B. P. says: I have a hand and foot sawing machine in which the power is taken from balance wheel to saw arbor by means of gear. I wish to get more speed, and propose using a 36 inch balance wheel and a 3 inch pulley on saw arbor to be driven by friction. Is it practicable to drive a 3 inch pulley by a 36 inch one? A. It will probably be best to use a V-shaped gearing, of cast iron.

(4) W. E. W. asks: A substance accumulates in my boiler. It mainly floats on the top of the water, causing inconvenience at the gage cocks. The water used is from an artesian well 118 feet deep. But little sediment or scale is formed. After blowing off and cleaning out the boiler, I have lately been using tallow, putting a few pounds into the boiler; and until I did so this substance never was troublesome. Lately it comes over with the steam; and in the vicinity of even small leaks, the iron of the engines, steam pipes, etc., is covered with a white coat of this impalpable powder. What will precipitate it (magnesia?) before it enters the boiler? A. Stop using tallow or any lubricant in the boiler, and let us know the result.

(5) A. F. E. asks: What are vernier callipers? A. We shall shortly publish an illustrated description of these instruments.

(6) J. H. asks: What is the best method of gumming postage stamps? A. Make a clear white solution of gum arabic, and add a little powdered sugar. The sugar prevents the paper from curling up when dry.

(7) M. T. asks: How can I clean a white ostrich feather? A. Put 1 oz. Castile soap in 1 pint water. Wash the feather in this, and rinse in pure water.

(8) L. S. asks: What is the best method of reducing buffalo skins to a uniform thickness? A. This is best done by perching them, that is, scraping them on the flesh side with a semi circular knife.

(9) A. S. asks: How are purple, red, and violet inks made? A. For purple, use a strong decoction of logwood, to which a little alum or chloride of tin has been added. For red, take Brazil wood 1 oz., white vinegar 1 pint; macerate for 4 or 5 days; boil down to one half; add roche alum 4½ ozs., gum arabic 5 ozs.; bottle for use. For violet, proceed as for purple, but make the ink thinner.

(10) J. I. R. and many others ask: How can I make an æolian harp, to be strung with fine violin strings? A. Make a box of very thin cedar, pine, or other soft wood, 5 or 6 inches deep, 7 or 8 inches wide, and of a length just equal to the width of the window in which it is to be placed. Across the top, near each end, glue a strip of wood half an inch high and a quarter of an inch thick, for bridges. Into the ends of the box insert wooden pins, like those of a violin, to wind the strings around; put two pins in each end. Make a round hole in the middle of the top, and string the box with small catgut or first (E) fiddle strings. Fastening one end of each string to a metallic pin in one end of the box, and carrying it over the bridges, wind it around the tuning pin in the opposite end of the box. The ends of the box should be increased in thickness where the wooden pins enter, by a piece of wood glued upon the inside. Tune the strings in unison, and place the box in the window. It is better to have four strings as described, but a harp with a single string produces an exceedingly sweet melody, of tones which vary with the force of the wind.

(11) H. C. S. asks: Are any scales formed on the inside of a boiler above the water line? A. Generally, no.

Will hard rubber, either red or black, soften under a pressure of 200 lbs. to the square inch on the inside of the boiler? A. We think so.

(12) G. T. S. asks: To whom is due the credit of the revolving or repeating fire arm? A. It was first practically introduced by Colonel Samuel Scott, his first patent being dated in 1835. There is, however, in the Tower of London, a matchlock gun, used four centuries ago, having a revolving breech made on a principle somewhat similar to that employed in the Colt's revolver. There is a pistol similarly constructed at Warwick Castle, England.

(13) H. B. asks: Which of the two link motions, Stephenson's or Gooch's, was invented first? A. The two were invented at almost the same time. What is commonly known as the Stephenson link was applied by the inventor, Mr. Howe, in 1843.

(14) C. C. says: My steam gage indicates 5 lbs. when everything is cold. I called the attention of my employer to it, but without success. Is it safe to continue the use of it in its present condition? A. It should be tested immediately.

I have a dog that is pestered with fleas. What will exterminate them? A. Carbolic soap.

(15) A. L. C. asks: Please give me a process for galvanizing small wrought iron rods. A. Clean the iron, cover it with a solution of sal ammoniac and hydrochlorate of zinc, and dip it into molten zinc.

(16) J. F. asks: What have I to learn in order to pass an examination as railroad or steamboat engineer? A. You must be able to answer questions about the construction, management, and repairs of engines and boilers, and must present evidence of your former experience with steam machinery.

(17) S. C. asks: How many tuns of hay are contained in a stack whose circumference is 67 feet and hight 205 feet, a tun measuring 512 cubic feet? A. About 143.

(18) J. H. C. asks: On what principle does the air railroad brake work? A. Under each car there is a cylinder with piston. The latter is connected with the levers of the brakes. Pipes lead from the cylinder to an air chamber on the locomotive. The chamber is charged with air at a high pressure by means of a small steam air pump on the locomotive. To operate the brakes, the engineer opens a cock by which the compressed air is allowed to act on the brake pistons under the cars, thus instantly working all the brakes at once.

(19) E. asks: Is there any particle of a car wheel in a moving train perfectly still? It is said by some that that atom of matter directly under the center of the wheel, touching the rail, is perfectly still for an infinitely short space of time; that if such was not the case, the wheel would slide on the rail. It is said to have been discussed at a meeting of railroad engineers and decided affirmatively; but I cannot believe it without the SCIENTIFIC AMERICAN decides that such is the case, and even then I am afraid that I cannot understand it. A. The answer to this question depends upon what is meant by "perfectly still." The facts of the case are as follows: If the car wheel is revolving at a uniform rate, every point in the circumference is moving at the same rate of speed in a circle; but each point in the circumference is moving away from a fixed station, say a post by the side of the track, at a different rate of speed; and any point in the circumference, when it touches the rail, is at rest momentarily, with respect to the fixed station.

(20) J. B. asks: Will an overshot water wheel, 20 feet in diameter and 3 feet wide, run a 50 inch circular saw, with proper gearing? A. Yes, if there is plenty of water.

(21) B. F. F. asks: What quantity of water will be forced through a pipe 1 inch in diameter, under a pressure of 62 lbs. per inch? A. Mr. R. H. Buel gives the following formulas, which give average results: L=length of pipe in feet. D=diameter of pipe in feet. A=area of pipe in square feet. V=velocity of water, in feet per second. H=head of water, in feet, to give the required velocity. h=theoretical head required for same velocity. F=head, in feet, required to overcome friction. P=pressure per square inch equivalent to a given head. Q=number of cubic feet of water delivered by pipe per second. $H=\frac{0{\cdot}000625\times L\times V^2}{D}$. $h=\frac{V^2}{64{\cdot}4}$. $F=H-h$. $P=H\times 0{\cdot}433$. $H=P\times 2{\cdot}308$. $V=\frac{Q}{A}$.

(22) C. M. B. asks: How can I cement a hair bracelet into a gold clasp? A. Melt together equal parts of clear resin and pure gum rubber. Apply hot.

(23) M. F. asks: What are gold pens pointed with? A. Gold pens are now almost universally tipped with the native ore of the metals iridium and osmium. Diamonds and rubies were formerly employed for this purpose.

(24) Q. Q. Q. asks: What preparation, when written with on blue paper, produces a white mark by discharging the color from the paper? A. Use a dilute solution of oxalic acid in water.

(25) W. B. H. says: You speak of water conducted through galvanized iron pipe tending to dangerous results. I have a reservoir holding 50 gallons, made of galvanized iron. The water comes in lead pipe into the bottom of the reservoir, and discharges through lead pipe near the top, leaving the reservoir to stand nearly full of soft water. Is this water injurious? If so, what paint or other substance can I apply to the inner surface, that will prevent the poisonous effect of the zinc, without injury to the water? A. The question as to whether the water is rendered unwholesome by its passage through the pipes and reservoir depends upon the character of the water itself. Waters containing a small quantity of certain mineral substances in solution are not affected by these metals, while, on the contrary, but a small quantity of other mineral salts may have a very deleterious action upon the quality of the water when in contact with the same metals. You should have a chemical examination made of your water.

(26) W. H. H. M. and others, who ask as to the qualities of certain waters: We are not able to give you decisive answers without first having given the waters a chemical examination.

(27) G. W. W. says: Please tell me how to prepare lime for the oxyhydrogen light. A. Select a piece of good, thoroughly and newly burnt lime, as free from sand as possible; and by means of a saw and knife, cut out a piece about 2 inches long and ¾ inch in diameter. Trim this down to the form of a cylinder, and it is ready for use. These limes, when not in use, should be kept in small, dry, airtight bottles.

(28) C. H. asks: What substance is used on the cushions of hard rubber plate frictional electric machines? It is a powder very much like coarse gold bronze. A. Take zinc and grain tin, each 1 oz.; melt in an iron ladle, and add mercury (hot) 8 ozs.; stir with an iron rod, pour into a well chalked wooden box, and agitate until cold; or stir till cold, and then powder. Keep in a well corked glass bottle.

(29) K. L. asks: 1. What is the best and most convenient article for covering steam pipes, running to radiators for heating public or private buildings? A. Felt bound in canvas. 2. When laid in a box under ground, what is the best filling? A. Plaster of Paris. 3. Would you paint the pipes with coal tar before covering or filling? A. Give them a coat of red lead paint. 4. Is coal tar a conductor of heat? A. Yes.

(30) J. C. B. asks: At what season of the year is it best to trim trees and bushes, and why? A. Timber trees are usually felled in the winter, when the trunks and bark are free from sap. Fruit trees are trimmed in the spring, that the vigor of the tree may be expended in the fruit instead of on the growth of the tree.

(31) M. W. asks: How is the metal calcium obtained? A. By igniting the iodide of calcium with an equivalent quantity of sodium in an iron crucible, having its lid screwed down.

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

E. D. E.—Both specimens consist, chemically speaking, of silex and silicates of lime, alumina, and iron, with some carbonate of lime and iron. They are valuable only for polishing purposes.—D. H.—Your box, which came to hand some time before your letter, contained (if we remember rightly) particles of decomposed mica.—J. F. B.—It is iron pyrites imbedded in talcose schist. No further results are given by analysis.—B. F. B.—No. 1 contains a very minute percentage of silver. It is galena. No. 2, no silver detected.—C. H.—One is a piece of water-worn coral. The other is part of a tibia of some animal.—E. C. M.—We will require the root of the unknown plant, with the leaves, stem, and blossom, before we can classify it.—D. W. S.—It is sulphuret of iron.—D. K.—No. 1 does not contain nickel. No. 2 does not contain silver—F. A. W.—It has a very slight trace of tin.—H. N. L.—It is not gold.—D. M. S.—They are very nice specimens of sulphuret of lead or galena.—R. H. C.—It is mica in quartz.—A box of specimens forwarded by S. D. M. contained many pieces of bituminous coal, marked with the curious disks referred to in the SCIENTIFIC AMERICAN of June 12. In opposition to the explanation there given, S. D. M. says: "While the material forming the coal was in a semi-fluid state, the bitumen in part composing it contained an oil of some kind not chemically mixed with it, which, when the enormous pressure took place on the stratum forming the coal, attempted to escape, and, finding space to spread, did so in the very slight openings left by the cool crystals. These, becoming dry as it were, formed those pellicles or films, which in turn protected the spots from being oxidized by