

tees, and elbows. Bending and offsetting of the pipe is a matter of economy or taste with the pipe fitters. Offsets are generally bent if not too large to insert conveniently. Bends made on ends of small pipes 1/4 inch, 1/2 inch, and 3/4 inch, for terminals for chandelier and bracket connections, are properly used to prevent unscrewing of the short piece through the plastering. These bent pieces have a piece of flat iron or a strap soldered to them so as to anchor the pieces for solid support to the chandeliers and brackets. The licensing and registration of gas fitters and plumbers is a subject of municipal regulation in all large cities.

(1143) O. E. Z. asks: 1. Is not an ampere the current produced by one volt through the resistance of one ohm? If so, how can a dynamo have a capacity of 130 amperes and 100 volts? A. Yes. The capacity of a dynamo in amperes is calculated by dividing the electromotive force by the resistance. 2. What does E. M. F. indicate? A. E. M. F. stands for electromotive force. Electromotive force is the power of the current to overcome resistance. 3. Watt? A. A watt is the unit of electrical power. It is equal to a volt multiplied into an ampere; 746 watts constitute an electrical horse power.

(1144) G. B. asks (1) information on blue printing and reproduction of drawings. A. We refer you for blue printing, etc., to SCIENTIFIC AMERICAN SUPPLEMENT, No. 584. In other numbers you will find much information on this line of subjects, for which we refer you to our index of papers in SUPPLEMENT. 2. For a good recipe for waterproof, India, or drawing ink. A. For waterproof drawing ink rub up the pigment with a solution of shellac in hot borax solution. This will be nearly waterproof.

(1145) J. M. D. asks: 1. What is the best material to use for a diaphragm in non-electric or an electric telephone? A. For an acoustic telephone used a diaphragm made of wood, pasteboard, sheet iron, or strained parchment. For an electric telephone use an iron diaphragm. 2. Does the material of which a telephone box (or case) is composed have an effect on the sound? A. Probably the box acts to some extent as a resonator, but it has no great effect upon the sound. 3. If so, what is the best material for such use? A. Such wood as soundboards are made of, spruce for example.

(1146) S. J. asks for a chewing gum, having some cereal in its composition. A. Take of balsam tolu 4 ounces white resin 16 ounces, sheep's suet 1 1/2 ounces, more or less of the latter according to the season. Of this preparation take 2 ounces, soften in a water bath and mix in 1 ounce white sugar and 3 ounces oatmeal. Roll portions of proper size in sugar or flour and form in sticks to suit.

(1147) E. B. asks a good recipe for compressed yeast and the length of time it will keep. A. Vienna yeast is said to be thus made: Indian corn, barley, and rye (all sprouting) are powdered and mixed and macerated in water at a temperature from 149° to 167° Fah. Saccharification soon takes place, when the liquid is drawn off so as to be clear, and a very little yeast is added. The yeast forms a thick scum on the surface. It is removed, drained, and pressed in a hydraulic press. It may be removed several times. It will keep from 8 to 15 days.

(1148) E. N. B. asks: 1. Which city furnishes the greatest yearly output of steel rails, St. Louis or Pittsburg? A. Pittsburg. 2. What is the best authority in chess for amateur players? A. The new edition of chess, by G. H. Gossip, which we can mail for \$3. We also refer to numerous SCIENTIFIC AMERICAN SUPPLEMENTS. 3. The address of Herr Steinitz, chess monthly. A. International Chess Magazine, New York city.

(1149) L. M. P. asks (1) why several seeds, mostly beans and corn, when they are being grub eaten, become notably hot. A. Because the corn is fermenting at the same time, and the slow combustion of fermentation develops sensible heat. 2. A recipe to restore clean and transparent glassware made dim and whitish by a rather long exposure to humidity. I have tried many acids, muriatic among them, and always without success. Scraping is very troublesome. A. Nothing better than scraping or other mechanical polishing will produce the desired effect. Some polishing powders, such as flour of emery, followed by rouge rubbed on with a chamois, might be superior to scraping.

(1150) J. H. K. asks: 1. How can cloth and duck lining be made waterproof, not affecting color or original finish? A. Paraffin melted in with a hot iron is very effectual, and while somewhat changing the appearance, is on the whole about the best application. 2. What is the smallest space in which heat can be generated, not using fire? A. For very intense heat the voltaic arc, where the temperature can be further intensified by the concentration of the sun's rays thereon by a concave mirror or convex lens. The secondary spark due to opening and breaking an electric circuit is extremely small and represents a certain degree of heat.

(1151) F. D. M. asks how to clean out the rust from an iron water pipe. My pipe is 800 feet long, three-quarter inch, and is so filled up with rust that the water barely runs through it. A. The pipe cannot be cleaned out without taking it apart and cleaning each piece with a rod. It is not profitable to lay small wrought iron pipe that is not galvanized. It soon rusts and stops up. Galvanized pipe does not rust, and if the water is kept running all the time, it will be safe and free from contamination from the zinc coating.

(1152) G. E. H. asks the best method of soldering automatic sprinklers, the solder being applied to brass or phosphor bronze, and the desire being to make a joint that will not weaken with age and that will only be affected by such a degree of heat as indicates the proximity of fire. A. A solder made 1 part each of tin and lead and 2 parts bismuth, melting at 200° Fah., is usually used for sprinklers. Use soft or white resin or Venice turpentine for flux in soldering. A blow pipe is better than a copper, as the copper is slightly absorbed by the solder, which may change its melting point.

(1153) T. S.—For a description of the new government cruiser Baltimore, see SCIENTIFIC AMERICAN, July 20, 1889. For the theory of the compound engine, see SCIENTIFIC AMERICAN SUPPLEMENT, No. 204.

(1154) R. writes: The purpose of the chip inclosed is to color small articles and especially Easter eggs. It is used by stirring the chip in a cup of hot water until the color is extracted from chip. Then the article is allowed to remain in this water for a few moments. I have seen the following colors prepared in this way: Red, purple, blue, and yellow. How is this composition prepared? A. Dissolve aniline colors of the desired tint in alcohol and mix with a hot solution of gelatine. Dip the chips into this and allow them to dry. You may, while they are still moist, dip them in the dry colors so as to cause some to adhere. You may also substitute gum arabic for gelatine.

(1155) J. H. P. asks: What paper gives full account of comets? A. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 284, 260, 323, 330, 331, 343, 172, 173, 313.

(1156) F. N. asks the price of tin per pound, also if there are any mines in the United States producing tin. A. It is about 20 cents per pound. It has been found in Dakota, in the Black Hills, but as yet in comparatively small quantities.

(1157) C. H. G. writes: 1. What is a madstone? Are there any well authenticated cases where hydrophobia has been prevented by applying a madstone to the wound caused by the bite of a mad dog? A. The madstone is a porous stone that acts by capillary attraction to withdraw the venom from a newly made wound. It is doubtless of some effect in such cases. A carbonized deer's horn has been recommended for the purpose.

(1158) L. L. P. asks how sulphur acts to free tin from zinc when sprinkled on the melted alloy? A. The sulphur combines with the zinc, forming sulphide of zinc, which separates from and tends to float upon the melted tin.

(1159) J. K. asks a formula for erasing the white stains that occur in some of the bricks in newly constructed buildings? A. Wash with dilute muriatic acid.

(1160) H. A. Z. asks: Can cast iron be made stronger, and suitable for a small cannon, by the addition of aluminum in ladle, and what proportion would be best? Also, could copper, aluminum, and iron be used for the above? A. One-tenth of one per cent of aluminum mixed with cast iron by placing the required quantity in the ladle before tapping largely increases its strength and solidity; 5 to 10 per cent aluminum with copper makes aluminum bronze, which is nearly as strong as steel. One-tenth of one per cent of tin in cast iron also increases its strength and solidity. Copper is of doubtful effect when mixed with cast iron.

(1161) C. F. R. asks: How many feet fall of water is necessary to obtain a pressure of 25 pounds per square inch? A. 57 1/2 feet is the hydrostatic column of water equal to 25 pounds pressure.

(1162) Amateur writes: Is there any formula or recipe for a mixture into which cardboard, used for outdoor signs, can be immersed, and made superficially, or better still thoroughly, waterproof? A. Heat the cardboard in melted paraffin, as hot as the paper will stand.

(1163) M. R. asks: 1. What does the word feathering mean as applied to the wheels of the new steamer Puritan? A. A feathering wheel has its buckets pivoted to be movable by an arm and connected with an eccentric, so that the buckets dip and leave the water vertically. 2. Is the Redeman-Tilford steel process used in the manufacture of steel plates for steamboat boilers, and if so, where? A. We have no information as to the localities of steel works using the Redeman-Tilford process. Steel plate for boilers is known in the market as Bessemer or open hearth steel. Its individual quality is quoted under certain stamps or the makers' names. 3. Does the United States marine law confine steamboat builders to certain established forms of steam boilers, and so forbid or make impossible novelties or improvements? A. United States marine inspectors have not established special forms for boilers. The regulations relate to quality and strength of material. The inspection of boilers covers also the elements of safety in form. 4. I want to build an arch in a furnace; fire brick and fire clay mortar will not withstand the heat for any time. What material must I use? A. Fire brick and fire clay are used in our hottest furnaces. Use only No. 1 extra brick and fire mortar made with the same kind of brick pulverized mixed with best fire clay. There is great difference in the quality of fire brick on the market.

(1164) W. M. L. asks how much of a resistance coil would be required to reduce a 500 volt current (of the Thomson-Houston) to the right strength for simple electric motor. A. No general rule can be given; try it on a shunt circuit from main line. House connections often act as resistance coils. If the current is of the alternating type, the motor will not work. 2. Would an amalgamated zinc interfere with the current, if a solution of rock salt be used as a solution, with copper as the other pole? A. It will by its resistance, and according to the order of the plates will increase or decrease the electromotive force. 3. Has lightning ever been measured with regard to volts and amperes? A. Not accurately. It is of many thousand volts potential. We do not understand your fourth query.

(1165) J. M. asks (1) how to make the cakes of paint, black and colors, used in stenciling. A. See answer to query No. 1006. 2. How to make a plaster cast of a hand or foot. A. Oil the hand. Provide a soft pillow, and cover it with a towel, and over that a newspaper. The hand is pressed down into this until partly embedded, and the plaster mixed with alum water is poured over it and backed up by a stiffer portion. The hand must be kept perfectly still, of course; in a few minutes the plaster will have set. It is now removed from the hand, the faces smoothed and rubbed with lard, the hand replaced, and a second cast-

ing taken of the other side. Owing to the use of the lard, the two will easily separate and will form a complete mould for casting an image in. Oil the mould before using it. It may be made in several pieces. If a man's hand with hair upon it is the object, it should first be shaved. Instead of a pillow, sand may be used for the embedding material. Care must be taken to avoid "undercutting." The foot is an easier object, but little embedding being required for the first casting.

(1166) E. B. writes: 1. I want to dissolve or disintegrate a composition in nature like glass or porcelain which is subjected when fused to great heat—white heat at least; can it be done? A. This can be done by fusing the finely powdered material with carbonate of soda, or more simply by treatment with hydrofluoric acid in a platinum dish. 2. Is there any acid which will attack glass or porcelain? A. Hydrofluoric acid. 3. Can feldspar, after being fused as described, be dissolved? A. By the fusion method or treatment with hydrofluoric acid. 4. What acids will destroy platinum? A. It dissolves in the presence of chlorine. A mixture of 3 parts hydrochloric and 1 part nitric acids is often used for its solution.

(1167) C. E. G. asks: 1. What acid will dissolve platinum? A. See answer to preceding query. 2. What acid will separate platinum from lead? A. To neutral solution of platinum add sulphuric acid, which will precipitate the lead as sulphate, leaving the platinum in solution.

(1168) Courier.—The plant sent for identification is the common plantain, *Plantago major*, L., one of the commonest of weeds.

(1169) R. J. P. asks: At what height do the clouds generally float? A. The height varies from the level of the ground, when they constitute fog or mist, to several miles. As a mean, 1,300 to 1,500 yards in winter and 3,300 to 4,000 yards in summer are given. Gay-Lussac observed clouds over 7,650 yards above the earth.

(1170) M. O. K. asks: What process is best to extract the strength from sage leaf to get it strong and preserve it? A. Distill off the oil by boiling with water and collecting the distillate, separating by decantation the oil from the water.

(1171) J. W. asks for a good receipt for cementing rubber to earthenware or chinaware so that it will stand ordinary rinsing or washing in tepid water. A. Soak strong shellac in ten times its weight of strong ammonia for three or four weeks. This makes a liquid cement, which, however, will not stand much heat. Or try a mixture of 1 part gutta percha with 10 parts asphalt melted together.

(1172) D. L. B. asks for a good formula for aromatic toilet vinegar. A. A number of formulas are given, such as the following:

- a. Cologne extract.....2 oz.
  - Alcohol.....3 pt.
  - Acetic acid.....1/2 "
  - Orange flower water.....1/2 "
  - b. Extract of cassia.....1/2 pt.
  - " violet.....1/2 "
  - " rose.....1/2 "
  - Tincture of orris.....1/2 "
  - White wine vinegar.....2 "
- Digest for ten days and filter.

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