of the room will not be heated unless I have the coils or radiators on the floor. How many feet of inch pipe will be required to heat the room? A. The overhead system of heating by steam is largely used in factories, and occasionally in closed rooms. In factories where the belting produces circulation, it is very desirable. We do not advise the use of this system for heating a store, where the constant opening of doors will precipitate cold air upon the floor. Coils in stacks or along vacant spaces or counter fronts, or radiators, are more suitable for stores. It will require 900 feet of 1 in. pipe or its equivalent in radiator surface to heat your store.

(295) C. J. H. writes: I saw a receipt in the SCIENTIFIC AMERICAN about a year ago for making a substitute for ivory out of potatoes. Can you give me the reference? A. See SCIENTIFIC AMERICAN, June 18, 1887, p. 392. The potatoes are washed in dilute sulphuric acid, then boiled in same until solid and dense. They are then washed free from acid and dried.

(296) R. J. L. asks: 1. Will carbons used in lighting street lamps answer instead of carbon plates in plunging battery, SCIENTIFIC AMERICAN SUPPLEMENT, No. 157? A. Yes. See SCIENTIFIC AMERICAN, October 27, 1888, p. 264. 2. How an I attach wires, handles, etc., to a galvanic battery? A. Use binding screws or wires cast in metal tops.

(297) O. S. asks how to make a good violin bow resin? A. A leading authority gives the following: "Put a quantity of Venice turpentine in a pipkin, add a little water to it, and boil for two or three hours over a slow fire. As it rises pour in small quantities of cold water to keep it from overflowing, and allow a drop now and again to cool on a plate; when it rubs clear between the fingers without sticking, it is sufficiently boiled; when thus boiled, pour it into cold water; work it well with the hands to press out the water, and break it into pieces when cold; expose to the sun and air until all the moisture is evaporated and the resin is quite transparent. Many violinists adopt a method of purifying and rendering the resin more transparent by boiling it in vinegar, and while it is warm pouring it into paper moulds, after which it is exposed some time to the sun and air."

(298) P. N. asks: 1. Is there anything a person can rub on the hands, to keep cement from burning, and making them sore, without the use of gloves? A. Use oil or tallow. 2. The best remedy to use when they get that way? A. Use oil as a remedy. 3. Is not cement supposed to set in water? A. Hydraulic cement sets in water. 4. What is the time to allow cement to get properly set? A. From a few hours to several days. 5. Is there anything that can be mixed with oil to take the stickiness from it and make it thinner, such as castor or olive oil? A. Turpentine or benzine; for castor oil, you may use alcohol. 6. What is the reason that they always put the small wheels of a wagon or carriage in front? Is it for handiness in getting around, or does it run easier? A. To facilitate turning the wagon.

(299) H. B. asks: Please tell me how to make a Bunsen battery, and how long the acid can be used before changing? A. See our SUPPLEMENT, Nos. 157, 158, and 159, for descriptions, with illustrations, of all leading forms of batteries. A solution in a Bunsen battery will last from four hours to several days, according to the demand made upon it.

(300) F. W. writes: I desire to get some information on the manufacture of wood alcohol. Will you please advise me where I can get it? A. Spons' Encyclopedia of Industrial Arts, Part L, treats of wood alcohol. We can supply it for 75 cents.

(301) J. O. B. asks: 1. What is the greatest power yet obtained in experimentation with a dry electric battery? A. Results comparable with those from good gravity batteries have been obtained with dry batteries. 2. What are the electric generating substances employed? A. Sulphuric acid or caustic soda may be used as exciting agents, with zinc as the positive plate. 3. What is the commercial value of aluminum steel, containing 1·75 per cent of aluminum? A. No particular value could be assigned it. 4. As a general rule, is blue clay rich in aluminum? A. Blue clay may or may not contain a large proportion of aluminum. There is no general rule.

(302) H. N. B. asks: 1. What are the formulæ for commercial cream tartar? A. Hydro-potassium tartrate, $KH.C_4H_4O_6$. 2. Salt of tartar. A. Purified pearlash or potassium carbonate, $(K_2Co_3)_2$ $3\,H_2O$.

(303) A. L. asks: Can paraffin be made transparent without making it liquid? A. No.

(304) For waterproofing processes we refer M. to our SUPPLEMENT, Nos. 577, 137, 373, and 410.

(305) R. M. asks: What proportions of bromide of ammonium and cadmium are employed in formula for collodio-bromide emulsion in query 22, November 24, 1888, issue of the SCIENTIFIC AMERICAN. A. The double salts spoken of are not commonly found in this country. Use instead bromide of cadmium 44 grains, bromide of ammonium 12 grains. After drying and washing the emulsion, it is redissolved in equal parts of alcohol and ether, in the proportion of 24 grains to the ounce of these mixed solvents. See SUPPLEMENT No. 572 for full particulars on collodion emulsions for window transparencies. No preservative is required for washed emulsions. Camphor is used as a preservative for starch pastes. For enameling add 4 parts castor oil to 100 parts plain collodion. To recover gold from toning baths add to each gallon of toning solution a solution containing thirty grains of protosulphate of iron. Put the gold solution into a barrel or, better still, a special shaped vessel having the bottom pointed like a wedge, with a faucet a third of the distance up from the bottom. Let the solution stand for twelve hours. The gold will settle to the bottom, then decant off by a siphon the supernatant liquor, leaving the residue of metallic gold, together with waste liquor in the bottom, at a depth of three or four inches. This latter material is then removed and thrown on a filter of bibulous paper, washed by pouring hot water over it, and, when dry, the gold is converted into chloride of gold. The hot water should constantly be poured on it until the wash water no longer produces a precipitate with a solution of barium chloride, proving that the gold is free from the excess of sulphate of iron. The washed precipitate of gold is now dissolved in aqua regia, and the solution evaporated nearly to dryness, the latter operation being carried on slowly on a water bath, to prevent spurting. The yellow chloride of gold thus prepared should be preserved in a well stoppered bottle or in a sealed tube, as the salt is very deliquescent.

(306) W. B. asks for the composition of the small pellets used in the toy called Pharoah's serpents. A. Sulphocyanide of mercury is the basis of the ordinary preparation. We refer you to our SUPPLEMENT, No. 259, for description and illustration. As the vapors from the burning sulphocyanide of mercury are injurious, the following is recommended as a substitute:

Bichromate of potash	2 parts.
Nitrate of potash	1 "
White sugar	2 "

Pulverize each ingredient separately and mix intimately, and slightly moisten. Press into small paper cones and when perfectly dry they will be ready for use. This preparation is poisonous, but emits no injurious vapors.

(307) E. M. C. writes: 1. I have a short telegraph line which works by a battery of four Daniell cells. It has worked very well for two weeks, but lately, when I close the circuit, the current seems to grow weaker and weaker, till it stops entirely and the armature flies up. I will be very much obliged if you will tell me what is the matter? A. Your battery has run down. It probably needs more blue vitriol, possibly some of the solution should be removed and replaced by water. The zincs also may need scraping. 2. What is the most simple storage battery to make and how many does it take to run an Edison eight candle power miniature incandescent lamp? A. 17 or 18 cells. You will find many forms described in our SUPPLEMENTS. None are easy to make. It is probably better policy to buy them.

(308) S. C. T. asks (1) how to melt or dissolve rubber to use similar to varnish or paint, or process of using it preparatory to making balls of the clear article. Foot balls or syringe bulbs. A. India rubber cannot be practically treated as you describe. We refer you to our SUPPLEMENT, Nos. 249, 251, and 252, for description of the treatment and manufacture of this product. 2. Can old rubber be worked over? A. Old rubber can be mixed with new and thus made over, but the result is always inferior.

(309) J. F. D. says: I am at work on a grape basket. My difficulty lies in the breaking of the veneer. Can you give me a receipt for the bending of the veneer, by using chemicals or soaking otherwise than by steaming, as it takes them so long to dry after being formed into the basket. I mean something to make the veneer flexible, so it can be bent up in any shape without breaking. A. There is nothing but steaming that is practicable for bending basket veneers. They should be bent hot, when they will be dry enough to finish in a very short time. A warm room will finish the drying in a reasonable time. Steam or boiling water only is used by basket makers, when necessary, otherwise cold water.

(310) C. McE. asks: Can an oil stove be so constructed so that the smoke, odor, etc., can be drawn up through the chimney of a house like any other stove? A. Yes; there is no reason for mingling the gases of combustion with the air we breathe, when there is a chimney opening convenient.

(311) Milwaukee asks if anything will prevent the constant cracking and breaking of the shades and globes around gas jets. No matter how carefully shielded from draughts, they still continue to crack and break. A. The opening at the top of the shade is too small or the gas jet is too large. There is no trouble where they are properly proportioned.

(312) W. S. asks: 1. What horse power can I get from 150 inches of water, velocity 257 feet per minute, on 15 feet overshot wheel? A. The whole value of your water-flow and fall is 7½ horse power, of which you may realize, with a good overshot wheel, 5 horse power. 2. Is the pressure on inclined water pipe computed by its perpendicular only? A. The value of the pressure is due to the vertical height.

(313) J. L. C. asks for a receipt for making shampoo for cleaning the scalp, also from dandruff, not to in any way damage the hair or scalp? A. Rum 1,000 parts, alcohol 120, tincture of cantharides 5, carbonate of ammonium 5, salt of tartar 10; after shampooing wash with cold water.

(314) E. R. asks for a receipt for a good stencil ink for marking boxes, barrels, etc., through a stencil. Also a paint for marking with brush, not using stencil. A. For a fine preparation use shellac 2 ounces, borax 2 ounces, water 25 ounces, gum arabic 2 ounces. Color with fine lampblack, to desired consistency. You may use turpentine and lampblack with a little linseed oil, or even glue and water with lampblack. Thin for use as a paint; use somewhat thicker for stencil.

(315) B. O. H.—The removal of superfluous hair by electrolysis is treated of in our SUPPLEMENT, Nos. 176 and 353, which we can send you by mail for ten cents. A really simple way of removing hair is not known.

(316) G. R. writes: I would like to know how to construct a plunging bichromate battery, and what size required to run a one man power motor, also a field magnet. A. For directions relative to construction we refer you to the SCIENTIFIC AMERICAN, August 20, 1887. From 100 to 150 such cells will represent one horse power, for one man power use 10 to 20. The larger number is to be preferred. For field magnet construction see our SUPPLEMENT, Nos. 160, 600, and 641, which we can send you for 10 cents each.

(317) O. F. S. writes: 1. Will you inform me how long an ordinary incandescent lamp carbon will burn in air? A. It will instantly be destroyed by access of air. 2. And if there is any liquid that will be attracted by a permanent magnet? A. No.

Enquiries to be Answered.

The following enquiries have been sent in by some of our subscribers, and doubtless others of our readers will take pleasure in answering them. The *number* of the enquiry should head the reply.

(318) E. E. P. asks how a preparation called plastic is made. It is used in decorative and fresco painting. It is applied with a brush by one man, who goes ahead and is followed by another, who stipples it with something like a broom scrub brush. And this preparation pulls out and becomes rough like a scratch coat of plaster. Designs are then scratched on this to suit tastes.

(319) W. E. asks: When will occur the next total eclipse of the sun visible in the vicinity of New York?

(320) S. L. F. asks: Will you kindly give me a rule for working out the following problem. What is the areal strain on ⅞ inch staybolts placed 6 inches apart, with one hundred pounds pressure of steam?

(321) S. H. P. says: I should like to ascertain, if possible, the diameter, area, and number of blades of a propeller, and power required, to drive a vessel having a resistance of 3,000 pounds through the water at the rate of 7 knots per hour.

Replies to Enquiries.

The following replies relate to enquiries recently published in SCIENTIFIC AMERICAN, and to the numbers therein given:

(72) K. C.—Petrifying Springs.—There are such reported springs in the Yellowstone Park, and other parts of the United States. They are not petrifying waters, but rather incrustating waters. An object placed in the water will soon be covered with a coating of carbonate of lime. This is an entirely different operation from petrifaction, which is a chemical interchange of elements, by which the wood becomes silicified entirely, though retaining its wood identity. We do not know that there is such petrifaction now taking place. It is now only known as the fossil remains of a previous geological age.

(76) F. R.—The relief valve is known, and can be obtained through the pipe trade, as a back pressure valve. 2. In piping drying kilns, the coils should be so arranged as to allow more than the full area of the exhaust pipe throughout the system to avoid back pressure. 3. Bridge wall should be from 7 to 10 inches from the boiler and may be straight or curved. Both forms have their advocates among mechanical engineers.

(79) K. & W.—Running Engine.—You fail to state the number of revolutions required, or the condition of the cut-off: 50 to 55 pounds boiler pressure should enable you to give the piston a mean pressure of 40 pounds per square inch, which, with a speed of 75 revolutions per minute, will make 30 horse power. The pipe should be placed in a box at least 10 inches square inside, and filed with sawdust if better material is not at hand. Pulverized charcoal, mineral wool, or asbestos is preferable.

(80) G. A. S.—Smoke Stack Protection.—Your smoke stack will be safe from lightning if you make a good iron or copper connection from the base to the water way in the ground. This may be done by driving an iron rod to the water level, or sinking a drive well pipe where you can be sure that you have a water connection. If you have a well, it will answer the purpose to connect with the water in it.

(85) A. J. C.—Damp Walls.—Paint the outside of your rough-cast walls with raw linseed oil. When this has become set or dry, paint again with any desirable color, mixed with boiled linseed oil. The dampness inside may also arise from the faulty method of plastering upon the wall, instead of furring and lathing. If the dampness is at the bottom or next to the base board, it may be derived from the ground by absorption through the brickwork. In such cases, clearing away the soil to two feet below the floor beams and plastering with asphalt, or painting the wall with two coats coal tar, will remedy the dampness.

(126) B. L. A.—Heating Room. — You are right. Fresh air must enter to take the place of air ejected by ventilation. If cold, it will fall to the floor unless arrangement is made for its contact with heating pipes in room. 2. It can if air is provided by special inlet to supply combustion within the stove. 3. Yes; Heat is transmitted by radiation, and also imparted by convection or contact with a conveying medium, as air or other gases and fluids.

(128) O. S.—Violin Bow Resin.—Select the best clear brown resin, melt it in a clean basin, to nearly a boil, which will clear it of turpentine or other volatile oils. Pour in paper moulds.

(130) P. C. W.—Old Gold Braid.—The old and soiled gold braid cannot be restored. Replace it with new.

(131) S. B.—Work of Pulleys.—The set screw power, as you call it, or resistance, depends upon the product of the leverage or semi-diameter of the pulley multiplied by the tension of the belt in each case; the difference in the diameter of the respective shafts being also a factor.

(132) W. H. M.—Razors.—Razors are hardened and tempered in the rough with the cutting edge thick, to avoid cracking, and then ground thin. You cannot harden your razor. Try a new one.

(134) C.—Engine and Boiler.—For your 20 H. P. engine, a 30 H. P. boiler is the cheapest in the fuel account.

(135) A. A.—Electro-Plating.—You will find the subject fully treated in a work on "Electro-Deposition," by Watt, $3.50, which we can mail.

(136) C. B. S.—Thrashing Machine and Engineering.—If the tumbling rod connection is properly made and free running, you should lose less than 10 per cent of the power. 2. Study electrical works in the special line that you wish to pursue. (See our catalogue for valuable works which we can furnish.) 3. As a profession, electrical engineering is progressive, and compares very favorably with civil and other branches of engineering.

(139) A. G. D.—Cold Box in Ice House.—You must have ice packed around and above the cold box. The tendency of cold air from the ice is always downward.

(140) F. W. E.—Poisonous Cookery.—There is nothing made better than the porcelain lined kettles for cooking fruit. We fear that you will find the trouble somewhere else. Systematic search may reward you with the information requested.

(141) H. B.—High Explosives.—A work on "Modern High Explosives," by Eissler, treats of the chemistry, manufacture, and use of the best high explosives used in the United States. The names that you mention are mostly foreign explosives that have been experimented with by U. S. naval officers. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 674, for an account of them.

☞ Books or other publications referred to above can, in most cases, be promptly obtained through the SCIENTIFIC AMERICAN office, Munn & Co., 361 Broadway, New York.

NEW BOOKS AND PUBLICATIONS.

TOWN AND COUNTRY SCHOOL BUILDINGS. A collection of designs for schools of various sizes, graded and ungraded, with descriptions of construction of sanitary arrangements, light, heat, and ventilation. By E. C. Gardner. E. L. Kellogg & Co., New York and Chicago. 1888. Price $2.50.

In this work the whole operation of building country schools, from the preparation of the ground to the development of the best sanitary appliances, is treated. The book begins with a description of a log building of one room for pioneers. It then gradually develops the subject until the large brick building for graded work is reached. Alterations, ventilation, out of door surroundings, and detached suggestions are also treated of. The designs for buildings, accompanied by their plans, are numerous and tasteful, the author departing radically from the idea that the school house must be plain and ugly. The cuts number 124.

GORED MAPS OF THE NORTHERN AND SOUTHERN HEMISPHERES. Chicago: E. Hollenshade.

These gored maps are printed on two sides of a sheet 28×30 inches in size, one side representing the southern and the other the northern hemisphere, with their respective poles in the center. They are each designed to represent the true surface of a hemisphere, so that if folded over a spherical mould, the gores, or unprinted portions, would be found to be surplus, and the printed or pictorial portions of the surface present the precise relations that different and widely separated divisions of the earth bear to each other latitudinally and longitudinally.

Messrs. Styles & Cash, the well known New York printers and stationers, get out an unusually large and handsome calendar this year, and, in addition to the dial for marking the days as on the face of a clock, there are fine surrounding views of the homes and haunts of Washington, especially appropriate for this centennial year of Washington's inauguration.

☞ Any of the above books may be purchased through this office. Send for new book catalogue just published.

Address MUNN & Co., 361 Broadway, New York.

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