paper so that it will not be affected by either hot or cold water. A. Parchmentizing by treatment in a relatively large quantity of a mixture of 2 volumes sulphuric acid with 1 volume water is the best. This may be applied to single sheets afterward compressed into pasteboard. After immersion in acid it must be washed off with water and dilute ammonia. The requirement of resistance to hot water excludes paraffin and varnishes generally from the list of substances which might answer your requirements.

(2744) S. P. asks: What will put a gloss finish on oil cloth that won't crack when rolled up? A. We can only suggest the best quality of varnish applied in successive thin coats. Possibly celluloid varnish would answer. Japanning would be excellent if the goods would stand the heat.

(2745) O. A. R. writes: I have a meerschaum pipe which when warm I have been rubbing with white wax to make it color. I have rubbed in too much; can you tell me how to draw the wax out? A. Keep on smoking the pipe and wipe off the wax as it exudes from the pores. The trouble will thus be rectified.

(2746) C. W. C.—The best information we have places the annual consumption of borax in this country at about 2,000 tons.

(2747) W. J. R. asks: Will you kindly tell me how to make a good sticking paste for sticking stamps and labels on beer kegs. We experience a great deal of trouble in cold weather by stamps blowing off. A colorless paste would be preferred. A. If rye flour paste will not answer, try freshly made solution of gum tragacanth, or try one of the pastes given in the SCIENTIFIC AMERICAN, November 1, 1890, page 281, and October 11, 1890, page 227.

(2748) I. T. E. asks how to make a cheap flour paste, such as is used by paper bag manufacturers on machinery. A. Rye flour paste, made by boiling rye flour with water, is the best of the simple pastes, and is used by bag makers. For other formulas see SCIENTIFIC AMERICAN, as in preceding query.

(2749) C. W. H. asks (1) for a recipe for making a chemical ink eraser. A. Mix equal parts of oxalic and tartaric or citric acids in powder. When to be used, dissolve a little in water. It is poisonous. 2. A recipe for making mucilage in stick form. A. Mouth glue is what you refer to. Soak good glue in water for a day or more until softened. Pour off excess of water and melt the glue. For each part of glue used add one-half part of sugar; mix and pour into moulds.

(2750) W. H. E.: How can I make a thin skin that I have, tough and strong? A. Massage or rub the skin thoroughly with flesh brush. Bathe frequently with cold water. Once or twice daily sponge with solution of coarse salt in alcohol or water.

(2751) W. E. B. asks: What is the best material to make the covering of a balloon that will hold hydrogen without leaking? A. India rubber cloth or sheet is the only tissue that can be recommended, and it is too heavy and expensive. The gas is almost impossible to retain. For regular balloon varnish, its preparation, etc., we refer you to our SUPPLEMENT, No. 726.

(2752) G. H. W. asks for dimensions of induction coil for telephone transmitter, viz., size and amount of wire in primary and secondary coils. A. The Bell Telephone Company's coils are wound thus: Primary, ½ ohm, No. 18 to 24 wire; secondary, 80 ohms, No. 36 wire. This gives for No. 18 wire a length of 75 feet, for No. 36 wire a length of 186 feet. Other lengths can be found in electric resistance tables.

(2753) C. L. S. asks for the best polish to use on pianos and organs, etc., something easily applied, that will give a good gloss. A. Apply olive oil and water mixed on the palm of the hand. No severer treatment than this should be necessary. Rottenstone and oil may be applied with a piece of fine cloth in very bad cases, to be followed by the hand rubbing described.

(2754) J. M. F. asks for a good receipt for making a cement to put paper on iron pulleys. A. Use fresh and thick solution of gum tragacanth.

(2755) W. M. C. asks: Wishing to freeze ice for my own family use, I write to ask how I can freeze it in boxes, what kind of boxes, and how I can get it out of them? A. Water can be frozen by freezing mixtures, such as 1 part nitrate of ammonium and 2 to 3 parts water, but on a small scale it is expensive and unsatisfactory. Most of the salt can be recovered by evaporation. The freezing mixture can be applied in an ice cream freezer. The ice can be removed from the boxes by pouring hot water over them while inverted. Use tin boxes. The freezing mixture must be stirred vigorously.

(2756) J. I. C. asks: Of what is the red material on the edge of tablets composed? A. Glue 50 parts, glycerine 9 parts, water enough. Color to suit with aniline or cochineal. Soak glue in water alone, then dissolve, and finally add glycerin.

(2757) A. C. W. writes: To settle a dispute, and one which is liable to bankrupt somebody unless nipped in the bud, I would ask, as I agreed to foot it, if ice forms underneath or on top, *i. e.*, after say 3 inches is formed, does it continue to form underneath or does it form on the top? A. It forms underneath, sometimes snow and slush add to its thickness by freezing on its surface after becoming solidified by rain or thawing.

(2758) W. H. M. writes: I am troubled with an over production of fatty matter from the sebaceous glands, and my nose keeps shiny and greasy all the time. Can you kindly suggest something to dry these glands up? A. It would not be advisable to dry the glands up, but the secretion may be diminished and the unpleasantness removed by the use of Castile or ivory (toilet) soap applied thoroughly with nail brush about three times a week, or oftener. Sponge the nose gently with ether on the alternate days. Or you may use a saturated solution of boric acid and alcohol applied with soft linen rag three or four times a day.

(2759) C. O. D. asks: Will you be kind enough to tell me, if you can, how to reduce paraffine wax, so that it can be worked with the hands? I wish to make plaster of Paris moulds in wax for confectionery uses. I have used glycerine, also lard, but have had no success yet. I know it can be reduced and worked in that manner, but don't know how to do it. A. Mix the paraffin with olive oil, melting all together.

(2760) J. R. H. asks: 1. What is the pressure per square inch at a depth of 1,000 feet below the surface of the water, and what is the rule for finding the same? Also is it true that a weight that will sink a man to a depth of 50 feet will sink him to any depth. If the pressure on the inside of a cannon at the time it is fired is 60,000 pounds per square inch, what is the pressure at the time the ball leaves the cannon or gun, say it is 60 feet long, as, for instance, a pneumatic gun now in use? Could you please give me the rule for finding the pressure of powder or dynamite when it is exploded? A. Multiply the feet in depth by 0·433 for the pressure, which at 1,000 feet is 433 pounds per square inch. Any body that will sink 50 feet will go to the bottom at any depth. The pressure in a gun is relieved at the instant that the ball passes the mouth. It is the relief that makes the report. The pressure in a pneumatic gun varies from 100 to 700 pounds per square inch as the charge moves along. The pressure in the best ordnance is from 40,000 to 50,000 pounds per square inch. The rule is derived from the power of the powder or dynamite, of which the expansive test is the principal factor. See article "Projectiles," in Chambers' Mathematics, $1.50 mailed.

(2761) H. T. B. asks: Will you please give a formula for magnesium powder, such as is used on the stage? A.

Chlorate of potash.....3 parts.
Perchlorate of potash.....3 "
Magnesium powder.....4 "

(2762) W. S. F. asks how to make a shoe dressing for ladies' shoes. A. We can supply you with "Workshop Receipts," 4th series, $2, which contains numerous receipts for blackings. Also consult query No. 1704.

(2763) G. V. A. asks: 1. Does heat applied to a casting with a hole in it increase or diminish the size of the hole? For instance: I saw an engineer undertake to remove a crank pin from a large cast crank by heating the whole to almost a red heat and then cool off the iron about the pin before undertaking to remove it. His philosophy was that the cooling contracted the iron away from the pin, thus loosening it. A. The expansion or contraction of a hole in a mass of iron depends very much upon the relative thickness of the iron in proportion to the size of the hole. If uniformly heated, the hole and metal expand together by heat, while in a large mass of metal heated, the hole will enlarge by cooling the metal immediately around it while the outside remains hot. This is on the principle that the metal is somewhat elastic and yields to the expansion strain of the heated outer mass. In the case that you state it was of course necessary to cool the crank pin as much as possible. 2. When a boiler is worked with a high pressure and shut down for the night, everything being tight, what sort of a vacuum will be produced in the cooling down? Can it in any way become dangerous? Will the water in the boiler show its natural or true level while there is a vacuum? A. The cooling of boilers that are tight often produces a partial vacuum, which is of no harm, as a perfect vacuum is never over 15 pounds to a square inch, and the vacuum in boilers seldom reaches 10 pounds, for which they are amply strong. The case is different in the copper boilers of our kitchens, which are very thin and have been known to collapse by vacuum. The vacuum does not affect the water gauge.

(2764) G. A. K. asks whether fluor spar is found in ore, or not, and the color of the same. I have found a certain ore which I have reason to believe contains something of that mineral. A. Fluor spar is found as a natural deposit in great quantities and in various colors. It may be transparent and crystalline or massive and opaque.

(2765) M. McI. asks: What is the simplest method of making rubber stamps? A. By pressing a sheet of mixed rubber against a plaster matrix while heated to about the temperature of boiling water. A small press is used. By increasing the heat, the rubber being still in press, the curing is effected. The matrix may be made from plaster of Paris by casting it upon the face of oiled type. We also refer you to query 2696.

(2766) J. W. F. asks (1) how to dissolve crude or virgin rubber. What I want is to soften the rubber so I can work it into a round ball and remain pliable to collect waste gold around the finisher's bench. A. Chloroform, turpentine or benzol are recommended as solvents. You can soften the gum by low heat, about that of boiling water, and press it into shape. Coat your mould, etc., with talc powder. The best substance of all for this purpose is what is known as "burned rubber," sold for artists' use in removing crayon marks. For full particulars of manipulation of India rubber, burned rubber, etc., we refer you to "Rubber Hand Stamps and the Manipulation of Rubber," which when published we will supply by mail for $1. 2. Also how to water silk. A. Silk is watered by hot calendering between engraved surfaces.

(2767) W. H. G. writes: I had an argument the other day with a friend of mine, and he said if you could dig a hole through the center of the earth to the antipodes, and then drop a stone down from the top, it would hang in the middle with nothing to hold it there; another one put in on the other side would come up to meet it, and both would hang there without anything to hold them up. Will you please give me your opinion on this subject? A. The stone would naturally seek the sides of the hole. If it remained effectively equidistant, it would act as your friend describes, after oscillating up and down for a while. The second stone under the same conditions would act as described.

(2768) J. W. B. asks: 1. Has muriatic or sulphuric acid greater effect in dissolving wrought iron? A. There is little or no difference between them. 2. Will sirup of 24° Baume density fall over a vertical row of horizontal tubes as rapidly as water in 160° heat and 21 inches vacuum? A. It will not, as it will continually thicken and concentrate in its descent. 3. Can you give any preparation with which to paint wrought iron, which will withstand 220° heat and muriatic acid? A. Nothing reliable can be given. 4. Can you also name a preparation which will prevent iron from rusting and which will run off when heated to 190°? A. Try paraffine wax, made more fusible if necessary by olive oil.

(2769) J. B. S. writes: Would you have the kindness to give me a simple rule, and an illustration of the following: How many superficial feet are there in a marble slab ⅞ inch thick and 18 by 18 inches? A. The superficial feet in one face are given by multiplying the width and length together, both expressed in inches or in feet. If in inches, the product is divided by 144 to reduce to superficial feet. If to be reduced to feet one inch thick, multiply by seven and divide by eight. Thus 18 by 18 = 2¼ superficial feet. This reduces to 1$\frac{1}{32}$ superficial feet one inch thick. If the entire superficies, both sides and edges, is meant, we must take double the area of a single face to give both sides and add the product of ⅞ by 72 inches (the perimeter) = 63 square inches or $\frac{7}{16}$ superficial foot. The total therefore is 2¼ + 2¼ + $\frac{7}{16}$ = 4$\frac{11}{16}$ superficial feet.

(2770) G. A. G. writes: We had a call for some extract of smoke to put on meat instead of smoking it. Do you know of any such extract? A. Crude pyroligneous acid comes the nearest to your requirements. Nothing can supplant the smoking process for real efficacy.

(2771) J. H. M. asks: What chemical change, if any, takes place in the atmosphere of a closed room heated by a red hot stove? A. It is believed that carbon monoxide gas, which is poisonous, can pass through red hot iron. There is some doubt, however, as to how far the action may go, and as to whether it may be enough to be injurious or not.

(2772) P. B. writes: I find that a plunge battery, or rather a chromic acid battery, of very large current can be constructed with the carbon cup of the Laclede battery, using for zinc a zinc of the Bunsen battery, pint size. The zinc is to be bent out so as to set in the end of the jar, and a channel cut into the carbon cup to allow the zinc connection to pass out without touching. The bending must be done before amalgamation. I do not know the amperage of a cell thus constructed, but it is quite large, for one cell will heat a short piece of platinum wire, such as goes in lamps, almost white hot. It has a very good life, and with small zincs will, I think, maintain its initial current for five or six hours, which is doing very well, considering that each cell holds only a quart of solution. I have been experimenting by using iron in place of zinc in plunge batteries. It appears to give almost as good an electromotive force as zinc, and I believe can be used with much stronger solutions, and does not heat like zinc when unamalgamated. It is certainly much cheaper. The iron I found best adapted to that use, of any I used, was the largest size of iron wire nails, or wire rods. Should any of your correspondents experiment in this direction or find out the amperage of the cell mentioned, I, and I am sure others, would be glad to hear from them. I desire to ask you how the white surface caused by dilute sulphuric acid falling on colored marble can be removed. A. By repolishing by means of powdered pumice stone followed by putty powder.

NEW BOOKS AND PUBLICATIONS.

THE LIFE OF JOHN ERICSSON. By William Conant Church. Illustrated. 2 vols. New York: Charles Scribner's Sons. Pp. xii, 303; x, 357. Price $6.

In these two books the complete biography of Ericsson is given by one selected by the great engineer as his biographer. Whatever popular renown has been attained by the more public achievements of his busy life, many of the most interesting and characteristic features of John Ericsson are unknown to the public. He was so particular in his work, and so mindful of his reputation, that he hesitated to divulge much that he did which was in itself of the highest merit. All through the two volumes instances of his skill and ingenuity in engineering are met with. It is refreshing to read of his way of meeting the conservatism of old-time prejudices which so often sought to thwart him. It is an excellent lesson for the inventor of to-day when told that he is striving after the unattainable. But the moral effect of the lifework of Ericsson and some few others has been felt in this direction, and people have learned to be more cautious than hitherto in pronouncing things to be impossible of execution. We have already in our columns given *resumes* of the work of Ericsson. We are exceedingly glad to find his full biography so handsomely and adequately presented to the public in book form. His views on mathematics are sometimes evidenced strikingly. He held that the ordinary mathematician had no reasoning power, or he would not be driven to the use of symbols unintelligible to others. He wrote a letter giving a short method for determining the thickness of iron plates, ending with the note, "A great mathematician would cover half a dozen sheets with figures to solve the above problem." His absolute reliance on his drawings appears when he rejected the use of measurements of partially completed engines having keyways cut and all arranged by the drawing only. The account of the caloric steamship Ericsson, with her giant cylinders 14 feet in diameter, of her stormy voyage to Washington, of the perfection of the machinery, which proved unable to impart the necessary speed, of her sinking off Sandy Hook, with a view of the vessel at sea, reads like a novel. The plan was abandoned, to Ericsson's most bitter disappointment. Column after column could be filled with the accounts of the inventor and of his work. The book itself must be recurred to by those interested in one of the most picturesque lives of the present day,

A handsome calendar for 1891 has been issued by Messrs. Styles & Cash, printers and stationers, No. 77 Eighth Avenue, New York. It has attractive views in colors of the old colonial days in New York, and a large plain dial, with prominent figures and pointer, for each month.

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January 13, 1891,

AND EACH BEARING THAT DATE.

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