

# Notes & Queries

## HINTS TO CORRESPONDENTS.

**Names and Address** must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication.

**References** to former articles or answers should give date of paper and page or number of question.

**Inquiries** not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn.

**Special Information** requests on matters of personal rather than general interest, and requests for **Prompt Answers by Letter**, should be accompanied with remittance of \$1 to \$5, according to the subject, as we cannot be expected to perform such service without remuneration.

**Scientific American Supplements** referred to may be had at the office. Price 10 cents each.

**Minerals** sent for examination should be distinctly marked or labeled.

(1) **W. S.**—It is not customary to bleach wood. The color of maple depends entirely upon the cutting of it. This operation is best performed in cold weather. The condition of the tree and numerous other details must be carefully considered and followed out, or else the wood will be dark and unsatisfactory.

(2) **W. H. T.**—It has been suggested, though we believe the matter is far from being satisfactorily settled, that exposure to light makes potatoes bitter.

(3) **T. J. D.** writes: On the hill above Canyon City are two water tanks, 10x12 feet, and 8 feet deep. These tanks are about 2½ feet apart, but are connected at the bottom by a 3 inch iron pipe. Another iron 3 inch pipe leads from one of these tanks to a hydrant 120 feet lower. There is no decrease in size of pipe at the hydrant, as it is simply a fire plug on which to fasten the hose in case of fire, thus forming a hydraulic fire extinguisher. Now, if the two tanks were full, and the supply cut off, and the water should be turned loose at the hydrant, would these tanks lower equally? If not, how much water would be in the one tank when the other was empty? A. The tank having the hydrant connection would fall the fastest, but how much, depends largely upon the size of the nozzle at the hydrant. If the full capacity of the 3 inch pipe should be used, the hydrant tank would be emptied when the other would be half full. The smaller the nozzle used the more nearly equal would the water remain in the tanks.

(4) **J. D.** asks for a bedbug poison. A. Set in the center of the room a dish containing 4 ounces of brimstone. Light it, and close the room as tight as possible, stopping the keyhole of the door with paper to keep the fumes of the brimstone in the room. Let it remain for three or four hours, then open the windows and air thoroughly. The brimstone will be found to have also bleached the paint, if it was a yellowish white. Mixtures such as equal parts of turpentine and kerosene oil are used; filling up the cracks with hard soap is an excellent remedy. Benzine and gasoline will kill bedbugs as fast as they can reach them. A weak solution of zinc chloride is also said to be an effectual banisher of these pests.

(5) **H. J. H.** asks for a formula to make a good A No. 1 shoe dressing. A. Try the following:

Gum shellac.....	½ pound.
Alcohol.....	3 quarts.
Dissolve and add:	
Camphor.....	1½ oz.
Lampblack.....	2 "

The foregoing will be found to give an excellent gloss, and is especially adapted to any leather, the surface of which is roughened by wear.

(6) **E. de F.**—For hektograph use:

Good ordinary glue.....	100 parts.
Glycerine.....	50 "
Barium sulphate finely powdered or the same amount of kaolin.....	25 "
Water.....	75 "

For ink and method of preparing the pad see answer to query 57, in the *SCIENTIFIC AMERICAN*, for February 7, 1885.

(7) **T. A. P.**—A pound of very fine steel wire to make watch springs of, is worth about \$4; this will make 17,000 springs, worth \$7,000.

(8) **J. H. D.**—The highest point reached by man was by balloon 27,000 feet. Travelers have rarely exceeded 20,000 feet, at which point the air from its rarity is very debilitating.

(9) **J. W.** asks how to cast ingots of resins so that the resin will not stick to the mould and the surfaces shall all be bright. A. Cover the contact surfaces in the mould with pure glycerine.

(10) **D. D.** asks whether it injures a shot gun, by expansion or otherwise, to clean it with boiling water. A. No; cleaning guns with hot water is a common practice.

(11) **T. F. A.** asks how ingot copper is run and what process it goes through to get the color. A. The rich color on copper ingots is obtained by sprinkling them with water as soon as the metal sets; which prevents oxidation.

(12) **C. A. P.** asks: Can you advise me concerning photography in colors. A. No way has yet been found to make photographs direct, in the camera, of natural colors, as, for instance, a landscape. Uranium photography applies to the taking of pictures on a film sensitized by uranium salts.

(13) **F. B. P.** writes: I wish to make some castings of Babbitt metal for experimenting purposes. Could you tell me what to put in it, that would keep it from breaking as easy as the common Babbitt? A. You can add tin to your Babbitt metal until it is as soft as you may require. 2. Can I use anything in the place of sand for my moulds? A.

Sand is the easiest to manage for moulds. It will cast well in metallic moulds.

(14) **C. M. C.**—For coloring a skin after it has been cleaned, dip into decoctions of varying quantities of logwood and Guinea wood. For darkening a small quantity of iron sulphate is used. Or dip the skin first into a bath of catechu and then into potassium bichromate.

(15) **W. H.** asks (1) for the shortest and cheapest method of removing silver from plated ware before replating. A. Dip the article in nitric acid, this will remove the silver. 2. A formula for white metal? A. Try the following formula. It takes a fine polish:

Copper.....	69.8 parts.
Nickel.....	19.8 "
Zinc.....	5.5 "
Cadmium.....	4.7 "

3. A formula for removing grease from table ware, using caustic potash? Can anything cheaper be used? Please describe about what quantity to use with quart of water, probably it will not be too expensive. A. See *SCIENTIFIC AMERICAN SUPPLEMENT*, No. 310, for directions as to preparation of cleansing liquid for plated ware. 4. State price of white metal in New York. A. White metal is not generally sold in the New York market, and therefore we cannot give you a price on it. It is generally made direct by those who use it.

(16) **I. T. S.**—The less basic phosphate of lime is prepared by pouring a ten per cent solution of hydrochloric acid on as much ("equal weight") of bone meal burnt white as you use solution, i. e., 1 pound solution (10 per cent acid, 90 per cent water) to 1 pound burnt bone meal. Use then 50 parts of this product to make your baking powder.

(17) **C. G. P.**—The machinery used by the oil cloth makers in this country is of special construction, and made only to order from designs prepared by the individual manufacturer.

(18) **F. K.**—Printer's ink cannot be completely removed from cards. A solution of benzol or turpentine may sometimes remove small spots, but the process is not a success.

(19) **L. F.**—Soap and water make about as good a compound as can be used to give the skin a healthy clean color. See Dr. J. V. Shoemaker's article on the skin, in *SCIENTIFIC AMERICAN SUPPLEMENT*, No. 210.

(20) **C. W. T.** writes: I have an oleomargarine tank which I want to use to hold water for a boiler. How can I remove the grease? A. Use a solution of caustic potash, which will form a soap with the grease.

(21) **N. P. W.**—Tar soap is made from soap cut into shavings, 2 parts, tar 1 part; and liquor of potassa, 2 parts; the whole being intimately mixed in a mortar.

(22) **H. L.** writes: I render my lard by steam, and it has a very nice flavor, but it is not as white as it ought to be, and I would like to find out what to use to make it white. A. We understand that hydrogen peroxide is used. You will find a description of this substance given in *SCIENTIFIC AMERICAN SUPPLEMENT*, Nos. 184 and 339.

(23) **J. E. D.**—United States Government bonds are specially excepted by law from taxation, but greenbacks in hand are taxable the same as any other description of personal property.

(24) **A. P. C.** asks the weight and value of a cubic foot of solid gold or silver. A. A cubic foot of gold weighs about 19,300 ounces, and gold is worth \$20.67 per ounce. Silver is worth \$1.29 per ounce, and a cubic foot weighs 10,500 ounces. Consequently the cubic foot of gold would be worth \$398,931 and the silver \$13,545.

(25) **J. B.**—Meerschaum is the common name for the mineral serpiolite, and it is a hydrated silicate of magnesium. The word meerschaum is the German equivalent of sea foam.

(26) **J. M. M.** asks: What is meant by "microcosmic salt," used as a reagent in the analysis of metals? A. Microcosmic salt is a hydrogen sodium ammonium phosphate, having the chemical formula  $\text{NaNH}_2\text{HPO}_4$ , this is to say, it is a tribasic phosphoric acid, in which two atoms of hydrogen have been replaced, one by sodium, the other by the ammonium radical. See also Webster's Dictionary.

(27) **T. A.** asks a receipt for a substance that one can put in a pipe and wet it, and it will burn. A. Metallic sodium or potassium will do this but they must be handled with great care.

(28) **S. M. B.**—Neither alcohol nor glycerine freezes except at very low temperatures.

(29) **G. C. K.**—Do not know that gas meter leather has any special preparation as a preservative. Fine grained kid is generally used, dry.

(30) **J. W.**—We think that if you will use heavy moulds of metal brightly polished and keep them at a low temperature, that is, do not allow them to get warm, you can in this way cast ingots of resin. It is not necessary to use any lubricators.

(31) **J. L. S.**—The imperial gallon is 277.27 cubic inches. United States standard gallon is 231 cubic inches. See Webster's Dictionary.

(32) **J. B. C.** writes: I have an inch pipe running from the steam drum of my boiler (with a globe valve near the boiler) into the lint room of my gin house, with the purpose of emptying the boiler of steam therein, in case of fire. There is a doubt in my mind as to whether the pipe would be more serviceable as it is, or if it led from near the bottom of the boiler. Would like to hear your opinion on the subject. A. Your steam fire connection is right where it is, which is the usual arrangement for steam fire apparatus. If you connect with the water space in the boiler you will gain nothing and endanger the boiler also, in case of fire in the gin house. The end of the steam pipe should terminate near the point of greatest danger.

(33) **A. C. D.** writes: I am using a rotary pump which takes cider through a spiral hose. The wire, which is probably brass, troubles me by corroding. How will I obviate this difficulty? What will remove the oxide, or what will coat over the wire and prevent corrosion? A. You should not use a hose lined with brass wire. It is a source of poison. You can have suction hoses made with rubber lining so that the spiral wire will be covered on the inside with rubber, by any rubber company.

(34) **W. S.**—Babbitt metal is not suitable for small castings that are not intended for journal bearings. It does not run freely; put a little tin with the Babbitt metal, or use type metal for such work.

(35) **E. H. H.**—Later editions of Haswell have been improved and enlarged, with many of the formulas corrected. A velocity exceeding 8 inches per second will remove silt and clay. Exceeding 15 inches per second, will remove river sand and small gravel. Exceeding 33½ feet per second, will remove shingle or coarse gravel.

(36) **S. R. G.** writes: Suppose a cannon ball and a rifle bullet be fired at the same instant toward each other and on the same line, so that they collide, then when the bullet strikes the cannon ball and is carried along with it does the bullet stop before taking the course of the ball? A. The shape of the bullet will be destroyed by the contact, but every particle will stop before reversal, although we may not be able to comprehend the shortness of time.

(37) **J. C. C. P.**—It is claimed that a train may safely be stopped at 500 feet. Steam is always shut off for ordinary stoppages before putting on brakes. The Westinghouse brakes are now very popular on our railroads, and are considered the most perfect.

(38) **C. J.**—The outside rail is always made the highest on purpose to counteract the tendency to run off, for the same reason that when you ride your horse around a small circle you both lean toward the center in order that the horse may keep the track and you keep on his back.

(39) **W. C. G.**—Kalamein is not a metal, but only a name for a tinning process on iron, the alloy of which is composed of tin and lead like the common tin that is called Terne plate.

(40) **C. M.**—The relative size of a shaft of great length depends entirely upon the points at which it receives and gives out its power. If the power is received on one end and distributed along the shaft it is more economical to have it reduced in size at one or more points, but if the whole power may at any time be required at the farthest end, then it should be full size its whole length.—The price of an assay for gold and silver is not less than \$5, and may be considerably more.

(41) **S. L. P.** asks: What is the best way to reduce tin dross made in tinning wire? I use tallow as a flux, is there no better way? Can't the oxide be reduced so as to save all the tin? A. It does not pay to attempt to recover the tin from the dross in tinning operations. The large operators in tinning sell the dross to the color makers or chemical manufacturers, who make it into tin salts used in dyeing. The tin dross contains a little iron absorbed from the wire which could not be removed by merely reducing the oxide.

(42) **C. H. L.** writes: Supposing the paddle wheels of a side wheel steamboat, whose speed is about 12 miles an hour, could be driven at the rate of 3,000 or 5,000 revolutions a minute, would it increase or decrease the speed of the boat? I claim the latter, but a large number of my friends claim it would largely increase the speed. Which is right? A. So great speed of side wheels will not only decrease speed from the rate named, but would prevent the water entering between the buckets. In which case there could be little or no power for propulsion. You are right.

(43) **J. D. B.** asks: Has any correct geometrical solution of the "trisection of an angle" ever been published? If so, when, and where? A. We know of nothing later on the trisection of an angle than its demonstration in Leslie's Geometrical Analysis. We understand that it cannot be effected by plane geometry, but may be accomplished by means of the conic sections.

(44) **W. C.** asks: What are the ingredients and proportions of the chemicals used to dip the ends of parlor matches? A. Either of the following will answer: 1. ¼ part by weight phosphorus, 4 potassium chlorate, 2 glue, 4 finely powdered glass, 11 water. 2. 2 parts by weight of phosphorus, 5 potassium chlorate, 3 glue, 1½ red lead, 12 water. See article on "Friction Matches," page 1332, *SCIENTIFIC AMERICAN SUPPLEMENT*, No. 84.

(45) **R. W.** writes: I have a rubber coat, and the rubber has got worn off and is not waterproof. Can you give a receipt for it? A. We do not think that you can improve the coat in any way. Possibly by coating it with a solution of rubber in carbon disulphide and allowing it dry you might somewhat improve it. See the article on how waterproof goods are made in *SCIENTIFIC AMERICAN SUPPLEMENT*, No. 251.

(46) **G. H. B.**—A male catamount, or cougar, has a body 4 to 4½ feet long, the female being somewhat smaller. It is also known as the puma, American lion, and catamount, and is as much larger than the wild cat as the latter is stronger and fiercer than the domestic cat.

(47) **F. F. M.** asks: 1. How can I construct a rain gauge? A. See *SCIENTIFIC AMERICAN SUPPLEMENT*, No. 419. 2. How, and what of, will I build a small kiln to reduce oyster shells to lime? A. See *SCIENTIFIC AMERICAN SUPPLEMENT*, No. 360. 3. A short description of diamond drills and their cost? A. For diamond drills and their cost, address manufacturers who advertise in the *SCIENTIFIC AMERICAN*. 4. I want to season some inch sections of native woods, averaging four inches diameter. I've tried kerosene, also oven drying, in longer and shorter sections, but wood would crack and bark peel off. Outdoor seasoning is too slow; I

want to preserve the color of wood. A. There is no other way than slow drying; pack in a box, and exclude air for six months. 5. On a tree, if a limb is cut off flush with the bark, will the balance of limb left in the tree decay and be crowded out, and the vacancy be filled with woody fiber; will the bark grow over again? A. The wood grows over cut limbs. 6. A growing tree marked with a blaze or hacks; will such marks always remain at the same level, or tend to rise with the growth of the tree? A. Remain at same level. 7. What causes shaking asp leaves to be always in a quiver? A. The wind or vibration of the air only causes the quiver of the aspen leaf. 8. What is used to measure cold below 35° Fah., as mercury or alcohol is irregular? A. Metallic thermometers are used to measure lowest temperatures, alcohol being quite irregular. 9. Is the top surface of ice on a pond, the amount of water let in and out being the same day by day, on a level with the water surface or above it? A. Ice is slightly elastic, and when fast to the shore the central portion rises and falls with slight variations in water level, the proportion above and below water level being as is the weight of ice to the weight of water it displaces. 10. Of the two waters, hard and soft, which freezes the quicker, and in ice which saves the best in like packing? A. Soft water freezes the quickest and keeps the best. 11. Will slush ice save better than block ice? A. If you mean by block ice clear ice, it keeps the best. 12. Will boiled water freeze quicker than before boiling? Or steam water quicker than either the others? A. Yes. 13. Does water in freezing purify itself? A. Clears itself from chemicals; does not clear itself from mechanical mixtures as mud and clay. 14. Why is the inclined plane not used by any canal in the world but the Morris canal, running from Jersey city to Phillipsburg? A. Inclined planes on canals are only used as necessities; possibly because other canals do not need an inclined plane. 15. I've heard the statement made that Roebing, Niagara Bridge engineer, selected for the iron in his cables ore mined at Andover, N. J., after tests made of various foreign and home ores; is this so? A. Very probably so. 16. In cutting ice with a cross cut saw, does it ruin it for a timber saw; if so, why? A. It does not ruin the saw. 17. How do engineers classify masonry as first class, second class, etc., in piers and abutments? A. First and second class are terms for quality of material and workmanship. 18. Is kerosene oil magnetic? A. No, unless combined with iron. 19. Why is it that so many chestnut trees are struck by lightning? Is it not altogether on account of their standing alone, because they are struck in the woods? A. We do not know that an undue proportion of chestnut trees are struck, considering the isolated and irregular way they generally grow. 20. Will setting a compass near or under them affect the needle? A. We see no reason why it should.

(48) **S. E. S.**—The best mode of curing, tanning, and dressing skins, such as beaver, musk rat, fox, etc., with the fur or hair on, so as to be soft and durable for cloaks, trimmings, and fancy articles, forms a rather intricate trade, in which there are but few experts. The latest book on this subject is Davis on the Manufacture of Leather. As to the best method for stuffing, or curing and stuffing, the skins for mounting purposes, Maynard's Manual of Taxidermy will be most useful.

(49) **J. E. K.** writes: Two cog wheels of equal diameter, one stationary, the other loose. How many times does the loose wheel revolve on its axis in making one complete circuit of the stationary wheel? If more than once, why? A. It will revolve twice, a problem easily proved by trial, and often answered in this journal. The device is old, was used by James Watt, and called the sun and planet gear. It matters not which wheel is stationary, their relative revolutions are governed by the formulas for geared wheels as pertaining to this class. For various proportional wheels, divide the sum of the peripheries of the two wheels by the periphery of the rolling wheel, for the number of revolutions.

(50) **T. W. D. & Co.**—To keep your show windows free from frost and steam you will have to close them out from the rest of the store, which can be done by glass doors. Then ventilate each window from outside by a small hole at top and bottom. Keep the doors in the partition closed so as to keep the warm moist air of the store from coming in contact with the front windows, and you will not be troubled with frost and moisture on the glass.

(51) **H. L. K.** asks, 1, how to digest different substances, how long it takes, and, if all is not digested, how to tell when the liquid is done digesting? A. Digesting generally signifies a gradual solution by heat or a bringing into a homogeneous fluid mass by heat. Experience, when the time is not specified, is the best guide. 2. How to displace gases in order to catch other gases, as water absorbs and mercury decomposes them? A. This question is too vague. 3. A good mucilage or glue for putting labels on acid bottles, so that the acid has no effect on the composition. A. Use the following directly on the glass: First dissolve 200 parts shellac by heat in 3,000 parts water with 300 parts borax; strain while still warm. Then add a solution of 80 parts of nigrosine, 3 parts tannin, 1 part picric acid, in 150 parts spirit of hartshorn, and 70 parts water. Keep in well corked bottles. 4. A compound that will remove freckles, but does not injure the skin. A. Use sulpho balate of zinc 2 parts, distilled glycerine 25 parts, rose water 25 parts, scented alcohol 5 parts. To be applied twice daily for from half an hour to an hour, and then washed off with cold water. 5. What does O. N. T. stand for seen on spools of cotton? A. Our new thread.

(52) **J. A. O.** writes: I have a square cistern, 8 by 12, and 14 feet deep, arched over. The cistern is in a wet place, and I have made, first, a rough 18 inch stone wall with cement mortar, and inside this an 8 inch brick wall with cement mortar, and then had the whole cistern well plastered all round with cement. Now, I cannot keep the water from coming in through all this, and at the same time the water has a bad taste, like cement. A. We fear that you have used poor cement, and laid the walls too loosely. For the brick wall nothing but the best Portland cement should be used. Flush the brick well, so as to have every crevice solid.

Build the brick lining an inch clear from the stone wall, and ram the space with equal parts coarse sand and Portland cement as you build the courses, so that you will have a solid and uniform portion of Portland cement concrete. The bottom should also have a continuous partition of the concrete under the brick floor.

(53) F. L. B. writes (1) for a solution that will make either leather or India rubber adhere to goloshes. I have tried hyposulphide of carbon and gutta percha, but this won't act. A. Dissolve a quantity of gutta percha in chloroform in quantity to make a fluid of honey-like consistence. When spread, it will dry in a few minutes. Heat the surfaces at a fire or gas flame until softened, and apply them together. Small patches of leather can thus be cemented on boots, etc., so as to almost defy detection. It is waterproof, and will answer almost anywhere unless exposed to heat, which will soften it.—Your other questions should be answered by some physician.

(54) H. M. R. asks how to remove ink stains from linen. A. Wet the finger in water, then dip into a powder consisting of one part of finely powdered oxalic acid mixed with four parts of cream tartar, and rub it on the spot gently, keeping it rather moist, and the stain will disappear without injuring the fabric. After the stain disappears, wash the linen in pure water.

(55) G. B. B.—A fireproof whitewash can be readily made by adding one part silicate of soda (or potash) to every five parts of whitewash. The addition of a solution of alum to whitewash is recommended as a means to prevent the rubbing off of the wash. A coating of a good glue size made by dissolving half a pound of glue in a gallon of water is employed when the wall is to be papered.

(56) W. J. D. asks how to make a small portable "filter," to be used on a faucet for filtering hydrant water. A. The essential feature of the ordinary portable filters is a layer or stratum of sand and coarsely powdered charcoal; the water, however, first passes through a sponge, in order to remove the coarser portion of the impurities. This is inclosed in a brass tube fitting by means of a thread on to the faucet, and also its capable of being opened at the center, so that from time to time the filtering substances can be renewed.

(57) W. H. C.—A red ink for marking clothes, which is not attacked by soap alkalies or acids, can be prepared as follows: Enough finely pulverized cinnabar to form a moderately thick liquid is very intimately mixed with egg albumen previously diluted with an equal bulk of water, and beaten to a froth and filtered through fine linen. Marks are formed on cloth with this liquid by means of a quill, and are fixed after they have become dry by pressing the cloth on the other side with a hot iron.

(58) F. G. T.—It is wrong to paint the drums of meters; they should be of good enough material to stand without it unless the gas is very bad. As for the cases, if they are heavily tinned they should not need painting. If, however, you desire a coating, the ordinary asphalt varnish will be found quite serviceable, or perhaps better still a mixture of red lead with linseed oil will be found to answer your wants.

(59) J. G. H.—The so-called jeweler's chamois to which you refer are also obtained from abroad, and as far as we have been able to ascertain, no one has ever been successful in impregnating the skin with the polishing powder in this country. It is presumed that this operation is accomplished at some intermediate stage during the process of preparing the skin for the market, and cannot be done after the skin is prepared.

(60) W. B. S. asks for information in regard to dissolving platinum. A. Dissolve the platinum in a boiling solution of aqua regia; this reagent consists of 1 part nitric and 2 of hydrochloric acid by measure. The operation must be continued until no nitric acid remains, thereby forming the platinum chloride. The fumes from this operation are very offensive and corrosive, so it may be found more satisfactory to purchase the platinum chloride rather than to attempt to make it.

(61) E. F. S. asks: Has a rate of speed equal to 90 miles an hour, ever been attained by railroad locomotive? Do the Grant Locomotive Works make such an engine? A. It is extremely doubtful if any locomotive ever made so high a speed. A mile in 48 seconds is the shortest time we have heard of. A rate of 70 to 75 miles per hour has been made on a spur, on good straight track. The Grant Locomotive Works could make such an engine. A. Is not 60 miles an hour considered remarkable time for trains on railroads to make, or is it something that is done frequently and by ordinary engines? A. 60 miles an hour for a train is considered a very high rate of speed, and is seldom attained in practice for more than a short run.

(62) E. G. writes: I desire to operate an electromagnet under water; what effect will the water have on the magnetic power? A. None, provided the coils are insulated. 2. What is the best way to insulate the magnet from the surrounding water? A. A coating of paraffine or shellac will do it. 3. What is the best way to make a magnet lever so as to prevent rust in the journals, being operated under water? A. Make it of brass; or bronze, nickel, or copper the exposed iron parts.

(63) P. J. O'M.—Boilers should be tested when new at twice the pressure they are intended to be used. A majority of stationary boilers in New York are tested at 150 pounds. The New York sanitary test is about 50 per cent higher than the certificate of pressure allowed. Cold water pressure is usual. You may obtain a pump from \$10 to \$30. Any pump that will make the pressure will do, and there is a great variety of makes.

(64) W. B. asks: 1. Will a two inch pipe with one inch faucet give more water than a one inch pipe with one inch faucet, both pipes leading from the bottom of the same tank, leaving friction out of consideration? A. The friction cannot be left out of the question. The 2 inch pipe will give the greatest flow. 2. Why do miners begin with a large inlet in hydraulic mining? A. Taper nozzles are found to give the best results, or quickest flow for a given head.

(65) C. T. writes: I want to make a wire solder to be applied without a soldering iron. Can you give me the preparation of lead and tin and the method of preparing it? Does it require any acid or rosin mixed with it? I saw it sold on the street in New York seven years ago. A. Mix 2 parts tin, 1 part lead by melting. Stir well together and pour slowly into a little sheet iron pan with small holes perforated along the bottom edge, at the same time draw the pan along a plate of iron or a smooth stone. The solder will run through the holes, forming little parallel strips. A little practice will make you perfect.

(66) A. S. asks how to make melted brass stick to wrought iron. Should the iron be hot, and how is it best to proceed? A. The iron should be at a full red heat. It should be clean, and covered with borax. The brass should be poured very hot, and in quantity so as to run over, that the surface of the iron may be brought up to the brazing temperature.

(67) A. V. W. asks why it is that on the ceiling of a lath and plastered room one can see every joist and lath, the space where the joist and lath are being alike. A. Plastered ceilings are porous, allowing air to circulate through them. The air carries dust and smoke with it, which lodge on the surface, the ceiling acting as a filter. Where beams and lath back the plaster, the circulation is impeded or entirely stopped, which prevents the lodgment of smoke and dust.

(68) J. T. R. asks whether one could detect any free oxygen in a jar of nitrogen by means of a lighted candle. A. If the quantity of oxygen was slight, we do not think it could be detected. The fact that nitrogen does not support combustion would sustain the probability of oxygen being present in the mixture if a candle burned in the jar. We should suggest the use of pyrogallic acid as being a more satisfactory test. This compound absorbs oxygen very readily, turning black.

(69) A. N. D. asks for a receipt for a cement which will stick sheepskin firmly to white or sheet iron, and which will stand an occasional wetting. A. Spread over the metal a thin hot solution of good glue; soak the leather with a warm solution of gall nuts before placing on the metal, and leave to dry under pressure. If fastened in this manner, it is impossible to separate the leather from the metal without tearing it. See also receipts given in SCIENTIFIC AMERICAN SUPPLEMENT, No. 158.

(70) M. C. asks: 1. How is the silver currency of the United States made? A. See article entitled "United States Mint, Philadelphia, Pa.," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 117. 2. I have had occasion to use quicksilver and white of egg on furniture. Would it be safe to use hot soap suds therewith. Some say the quicksilver coming in contact with the hot water would salivate the person working with it, or any one in the room. A. We fail to see any reason why hot soap suds should not be used. The action of hot water on mercury would be so slight that probably no injurious effects would follow. Quicksilver itself is not poisonous, except in state of vapor or when finely divided. The salts, however, are injurious. If carefully handled, no danger should follow the use of hot water on mercury.

(71) D. asks for a prepared chalk that could be used to mark patterns, before sending to foundry, that would not be rubbed off in handling, but that could be erased when desired. A. French chalk or colored chalks might be used. Ordinary colored pencils would make a mark quite permanent, and yet one which could easily be removed. The artists' pencils could likewise be used.

(72) J. A. L.—Coil springs have been made of considerable power, say up to one or two horse, but it has been very expensive to make such springs, and it requires more power to wind them up than can be got from them. They are used to a limited extent for sewing machines and some other light machinery, mechanical toys, and clocks. The practical working of large springs has not as yet been a success, and they are liable to breakage, but for small powers are frequently available. Our advertising columns give names of manufacturers.

(73) J. D. A. desires a recipe for making printers' inks—black and red. A. For black ink: Take of balsam of copaiba (pure) 9 ounces, lamp black 3 ounces, indigo and Prussian blue of each half an ounce, Indian red ¼ ounce, yellow soap (dry) 3 ounces; grind the mixture to an impalpable smoothness by means of a stone and muller. Canada balsam may be substituted for balsam of copaiba where the smell of the latter is objectionable, but the ink then dries very quickly. The red inks are similarly made by using such pigments as carmine, lakes, vermilion, chrome yellow, red lead, orange red, Indian red, and Venetian red.

(74) F. A. asks how the insides of telescopes, microscopes, and laryngoscopes are blackened. A. Lampblack mixed with turpentine answers well for this purpose. Lampblack mixed with alcohol having a very slight trace of shellac in it also answers very well indeed.

(75) A. H. asks: 1. What will produce a high polish on bleached cotton cloth? Must be colorless and applied with a brush, must wash off with ordinary soap and water, must be cheap. A. Try cold starch with one-quarter its weight of isinglass. Dissolve the isinglass in warm water, and stir in the starch. 2. What is the most nourishing steam bath that can be applied to a person who is unable to sweat, and can take but little food in the stomach? A. Produce the sweating by burning alcohol under a chair in which the person sits, with blanket covering to hold the heat. Use caution and but little alcohol. Fire it in a shallow iron pan or old saucer. 3. Where can I procure a steam boiler that will stand from 10 to 25 pounds pressure, the dimensions are say 2 feet in diameter by 3 feet high, with firebox under it, and at about what cost? A. From any boilermaker in cities nearest. Cost about \$125. 4. Supposing I have a deed, the original writing on the body of which is claimed to have been eliminated and rewritten, while the acknowledgment of same at the bottom of deed is claimed as the original acknowledgment. By what means can I detect this either chemi-

cally or with microscope? The ink used being an aniline or ordinary ink, such as is put on the market. A. You should consult an expert, who can only advise after examination of the document in question.

(76) B. W. D. asks for a receipt for coloring meerschaum pipes without smoking. A. The meerschaum is steeped or heated in linseed oil which has been suitably colored by means of dragon's blood and gamboge; or else the same effect may be produced by boiling in wax to which dragon's blood has been added as coloring material. The meerschaum to be treated must be dry and free from any previous application of oil or wax. The manipulation is one requiring skill and experience.

(77) J. P. K.—For the manufacture of vinegar, the essentials are the oxidation of liquids containing alcohol by exposing such solutions to the action of the air at a temperature between 75° and 85° Fah. The details of the process depend upon the quantity you desire to make. Some expose the liquor in vats, others in barrels. The manufacture of vinegar by means of bacteria is described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 247, to which we refer you.

(78) T. B. J. asks the proportions of oleic acid, glycerine, and water necessary to produce the bubbles alluded to in No. 2, vol. III. A. Dissolve Castile soap in strong alcohol, let it settle or filter, and take the clear solution, from which evaporate the alcohol. The solid residue is oleate of soda. To this add half its weight of glycerine and sufficient water to give the proper consistency. Another method consists in shaking fine shavings of palm oil soap in a large bottle with distilled water, until a concentrated solution of the soap is obtained; this is filtered through gray filtering paper, and then mixed with about one-third its weight of pure glycerine. The fluid is to be well shaken before using.

(79) J. W. P. writes: Can you give me a receipt for a cement or glue that will hold emery on a felt wheel for polishing iron or castings? Common glue will not hold, as the heat caused by the friction warms the glue and loosens the emery so that it rubs off. A. The felt wheel is first filled with oil, then the emery powder is poured on, and mixing with the oil forms the polishing material. No glue is to be used.

(80) J. M. G. asks (1) how a crust of whitewash can be removed from the ceilings of rooms? A. Whitewash can readily be removed by scraping the ceiling or else by washing it off with water. 2. What system of shorthand would you advise a young man to learn? A. Either Graham's or Munson's system is good. Both are extensively used.

(81) G. C. H. writes: I have a vat 12 feet wide and 10 feet high, holding about 7,000 gallons, which I use for storing vinegar in. It is constructed of American pitch pine (new wood). When the vinegar has stood in it a short while, it acquires an unpleasant smell and taste from the resin or turpentine of the timber. I have tried to cure this by coating the inside with paraffine, but I have not succeeded. What can I do to effectually overcome the evil? A. Your tank should have been constructed of white pine or else of white oak—the latter is the better; then lined with paraffine. If the latter be thickly applied, we fail to understand how any odor can penetrate it. Before the process of paraffining became prevalent, a thick coat of whitewash used to be employed, and sometimes shellac was used to form the lining of the tank, but paraffine has at present replaced these substances.

(82) R. G. H.—Ordinary powdered glass is used with the varnish. A Bunsen burner is one which burns with a non-luminous flame, in consequence of the introduction of a current of air near the base of the burner. They may be readily obtained from any dealer in chemists' or druggists' outfits.

(83) J. D. W. asks: Which is the most durable, iron or brass, for thin wire stretched on a fence and exposed to the sun and weather? A. Both wires being naked, and with no tension, the brass wire would last longest. With tension the iron wire will not break, while the brass wire becomes brittle, and soon breaks. Galvanized iron wire is the best.

(84) M. asks how to make a steam whistle at small cost that will act with amount of pressure used to run a fair sized toy engine. A. Make or buy a toy whistle of tin of the same pattern as the boys make of willow twigs, and solder a small pipe to the mouth.

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

A. & H.—The sample appears to be a limestone rock containing small shiny particles of mica. An assay to determine the pressure of either gold or silver would cost \$5.—J. B.—The specimen is clay and of no probable value in New York city on account of the nearness of the deposits in New Jersey.—C. S. C.—The button is composed essentially of silver; it contains some copper, and probably iron.

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