grocer.



HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our

by no attention with the part effects. This is no out information, and not for publication.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

some answers require not a little research, and, though we endeavor to reply to all, wither by letter or in this department, each must wake the turn. Special Information requests on matters of personal asther then concerned interact.

Special information requests on matters of personal rather than general interest, and requests for Frompt 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) H. C. P.-You may generate 237 cubic feet of steam from one cubic foot of water at 100 pounds pressure.

(2) J. W. H.-Any one can readily make a microphone by following instructions given in our SUPPLEMENT. We do not know that they are regularly manufactured.

(3) J. B.-Your dynamo, if made according to instructions given in SUPPLEMENT, should operate two or three small incandescent lamps

(4) A. J. H. asks how to burnish an agate. A. By polishing it with crocus. (5) G. W. S.-Two cigar boxes con-

nected by a string or wire cable cord form an acoustic : a floor already laid, is to lay a set of light beams on telephone which works very well, and is not covered by any patent.

(6) H. B. P. writes: I have an Edison incandescent lamp, 6 candle power; what kind of a battory do you think is the best? A. Use 10 or 12 cells of Bunsen.

(7) W. H. V. R.-A dipping needle is sometimes employed to search for iron, but the other metals have no effect on it. No reliable instrument for indicating the precious metals has been invented. You can purchase a dipping needle from any of the dealers in philosophical or mathematical instruments who advert' se in our columns.

(8) O. V. A.-A volt is the unit of the current, and is about equal to the current delivered from a Daniell's cell. An ampere is one volt delivered through one ohm for one second, and is the unit of work.

(9) C. T. A. writes: Our citizens are making an effort toward the establishment of manufacturing enterprises here (in Kentucky), and purpose send ing out an agent to visit some places where small manufactures are carried on. What would be good places to visit? A. It is probable that you will find more small industries within a radius of 50 miles from New York city than anywhere else in this country, and by visiting them you could get some idea of what you want. We think that a visit to some of our large dealers in wooden ware, notions, etc., would be instructive, and might lead to business. There are many small shops in Connecticut which might be visited with profit. We believe that South Bend, Ind., is noted for the manufacture of wooden articles, particularly parts of wagons and carriages. There is of course a large variety of manufacture which you might carry on profitably, provided you get the very best and most modern tools and appliance

(10) A. L. L. asks: 1. About how expensive are the various Geissler's tubes, such as are used in electrical exhibitions, and where can I procure them? A. Geissler's tubes cost from 75 cents to \$50 and upward, each; such as are ordinarily exhibited, 6 to 8 inches long, cost from \$1 to \$2 each. You can purchase them from dealers in philosophical instruments. 2. How much and what kind of battery power would be re quired to work five or six tubes? A. Two or three cells of Bunsen or the plunging bichromate battery. 3. Is it necessary to use an induction coil with the battery? If so, what size? A. Yes. One that will yield an inch spark answers very well indeed. A very small one will show one or two small tubes. 4. Where can I procure electric jewelry? A. From dealers who advertise in our columns

(11) R. W.—We think you will not be able to construct a baker's oven from the raw clay. The clay shrinks so much that the arch would be likely to break down. Better mould and burn rude bricks or slabs of clay, from which build the oven.-See SCIEN-TIFIC AMERICAN SUPPLEMENT, No. 59, for illustration of a fiexible harrow, or address makers of agricultural machinery.

(12) J. S. asks: 1. Is it practically posible to run a dynamo, produce by it an electric (and heat, fuse, and sublime metals by that electric current, all in vacu? A. Yes, in such vacua as we are familiar with. What an absolutely perfect vacuum might do we cannot say. 2. A friend of mine contends that electricity and its operations are impossible without the presence of oxygen, that oxygen is an essential developer of electricity. A. We do not think oxygen is vital to the generation or utilization of electricity.

(13) P. J. M.-Ivory is bleached by exposing to sunlight. It takes in this way from one month to six months. Exposed to sunlight under a light cover of turpentine, the bleaching may be done in three or four days.

(14) S. J. R.—The only practicable way of getting the tanning qualities of hemlock bark in a concentrated state is by grinding and leaching and then evaporating, as bark extract is regularly made. A few of the makers of bark extract take off the ross, or rough outside portion of the bark, before grinding, but three to four weeks will become liquid without the use the most or them grind and leach the whole of the bark as taken from the tree.

(15) T. N. C.-Naphtha, coal oil, and ble to gases and fluids. 2. What preparation is used to of 70° to 85° F. will produce a satisfactory cider. The petroleum have all been used on locomotives and under stationary boilers, with varying success with locomotives, but with stationary boilers; an entire success. For valuable articles on petroleum and its derivatives as fuel, see Scientific American Supplement, Nos. 331. 63, 403, 119. For equal weight, petroleum has twice the evaporative power of coal.

(16) J. F. S.-The assertion of interested parties relative to the wonderful strength of beton should be taken with several grains of allowance. Although trial tests have shown great strength, it is not reliable for arches without provision for thrust, to any greater extent than ordinary stone in a monolithic form.

(17) O. M. B. writes: I have an engine located 25 feet from the line shaft it drives. Will I gain or lose power by increasing the distance to 50 or 60 feet? A. 50 or 60 feet between centers is considered too long a distance for satisfactory running of a belt. The vibration gives a jerky motion to the shafting. The absolute loss of power is very little.

(18) A. D. C. asks the diameter and focal length of the objective to a Galilean telescope that shall have the same power and same field of view as an achromatic astronomical telescope whose objective is 3 inches in diameter and 48 inches focus, giving a power of 240? Also, what kind of lens is the best for the objective in a Galilean telescope ? A. The field is glass of Linches diameter, 20 feet focal length, for anapproximation to the power you mention, using a 1 inch focus eye glass. The glass should be as perfect as is required for achromatic objectives. We do not recommend this form in our advanced age.

(19) F. J. K.—The most approved way of deafening a roller skating floor, if in a building with rubber (pure gum) bearings upon the old floor and fill in with saw dust, then lay the skating floor on the light beams. In making a new floor, two sets of beams may be laid, one set a few inches higher than the other: lay roofing felt upon the upperbeams, and the floor upon that. The lower beams may be lathed and plastered or felted and ceiled with boards.

(20) A. G.-Telegraph instruments are polished and lacquered. You cannot clean the parts with acid to any advantage. The best way is to take the instrument apart and clean off old lacquer with alcohol, then polish all the parts with rotten stone and oil on leather, pine stick, string, or anything that will reach the various parts. Then thoroughly clean with a cloth wet with alcohol, and lacquer with thin shellac varnish, using a flat camel's hair brush. Remove japan by burning off, or dissolving the varnish in naphtha. We do not know of any metal that will expand and contract as you desire under the influence of an electric current.

(21) F. E. F. writes: On page 188 of Mitchell's Manual of Assaying, it says: "Niter has a very powerful action on the sulphides, and where an excess of niter is used, all the sulphur is converted into sulphuric acid." Again, in Aaron's work on Assaying (published by the Scientific Press), it says on page 32, niter is a desulphurizer in two ways: First, by giving off oxygen to burn sulphur; secondly, by the potassium combining with sulphur, as the sodium of soda does; but if enough niter be used, all the sulphur is burned. being converted into sulphuric acid. I claim that sulnever burns to ic, but always to ous, thereby phur forming sulphurous acid. and not sulphuric. A. According to Watts, anhydrous sulphuric acid (SO₃) "is formed by the direct oxidation of sulphurous oxide" (SO_2) , and therefore we see no reason for not accepting the statement of Mitchell, especially as the present edition has been revised by so careful and competent authority as Professor William Crookes.

(22) F. G. D. asks what the chemicals are, and in what proportion they are mixed, for making blue lines on white paper. Also give the receipt for Pellet's plan. A. The process desired by you is given in answer to query 45 in the SCIENTIFIC AMERICAN for January 27, 1883. In the Pellet's process the copying paper is sensitized by immersion in a bath formed of 100 parts of water, 10 of iron perchloride, and 5 of oxalic acid. The drawing, on transparent paper, is placed on a dry sheet of the copying paper, and exposed to the light under the glass. After exposure the sheet is placed in a bath of potassium ferrocyanide (15 to 18 per cent of water), which immediately colors blue all the parts where the perchloride has remained intact, but does not affect the parts where the salt has been reduced by light. Then the drawing is washed with water and passed into a bath of 8 to 10 per cent of hydrochloric acid, which removes the salt of protoxide of iron; then it is washed again and dried.

(23) H. H. U.—White lead produced by the Dutch process is said to have a higher specific hromi esquiovide c o obtain tills over from crude petroleum below 100° C. is called tive, and can be obtained by heating iron sulphate. The plaster of Paris for your crucibles must be mixed with glue or starch water to prevent cracking.

(24) W. H. D.-If you desire to become mechanical draughtsman, it will be best for you to attach yourself to some engineer's office. Or if you desire to follow art, then you should study in the studio of some artist.

(25) W. M. G. asks: 1. What kind of a glue or cement is used to fasten rubber on band saw wheels? A. Such a cement is best made by a solution of shellac in ammonia. This is prepared by soaking average temperature of which is in winter 50° Fahr. pulverized gum shellac in ten times its weight of strong ammonia, when a slimy mass is obtained, which in of the cider has turned to vinegar. How can the of hot water. This softens the rubber, and becomes, vinegar be made either in brandy or whisky barrels? A. after volatilization of the ammonia, hard and impermea-

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(26) C. M. R. asks (1) recipe for making camphor ice in small quantities for home use. A. Melt together over a water bath, white wax and spermaceti

each 1 ounce, camphor 2 ounces, in sweet almond oil 1 pound, then triturate until the mixture has become homogeneous, and allow one pound of rose water to flow in slowly during the operation. 2. Recipe for making instantaneous ink and stain extractor. A. Take of chloride of lime 1 pound thoroughly pulverized and 4 quarts soft water. The foregoing unput be thoroughly shaken when first put together. If is renat be quired to stand twenty-four hours to dissolve the chloride of lime; then strain through a cotton cloth, after which add a teaspoonful of acetic acid to every ounce of the chloride of lime water. 3. Recipe for making ink that I can use on a copy book with a press. A. See recipes given in SCIENTIFIC AMERICAN SUPPLE-MENT, No. 157. 4. Recipes for making a roof paint waterproof, for painting old tin roofs, something that will last and is good. A. You will find this informa-tion in SCIENTIFIC AMERICAN SUPPLEMENT, No. 113. 5. What city in the United States are eggs manufactured in, or if they are manufactured? A. Eggs are not manufactured at all.

apparent twist of liquids running from faucets is govvery small in a Galilean telescope. You will require a erned by the shape, form, or roughness of the nozzle as the calcining of bones for the preparation of animal well as the shape of the opening made by turning the charcoal or boneblack. It is only valuable as a coarse plug.

> (28) C. M. W. asks: 1. Will 2,000 cubic feet of water with a 20 foot fall be any more effective on a 40 foot breast wheel than over a 20 foot overshot wheel? A. Where there 18 no liability to back water obstruction under the wheel, we believe the overshot wheel the most effective with a limited supply of water, as there is in a well constructed overshot but little leak age, although the bottom spill indicates a small loss on the total effect. 2. The total weight of a vessel is 100 tons. What is the least number of tons of water that will float her, provided she is set into a tank of water? A. The quantity or weight of water required for floata tion depends entirely upon the perfection of fit of the inclosing case. It might take one ton or fifty.

> (29) I. B. H. writes: Supposing a steam launch engine with a cylinder 4 inches by 6 inches to make 300 revolutions per minute (filling and emptying itself 600 times per minute), with a boiler pressure of 50 pounds per square inch, whatever would be the average effective piston pressure, what amount of water would the steam used represent? Also how much water would be used (at same number of revolutions) at 100 pounds pressure? In a word, how much more water would be in the steam at 100 than at 50 pressure? Ordinary slide valve, and steam from vertical tubular boiler. A. You will probably have a mean piston pressure of 40 pounds, which will require nearly 316 pounds of water per minute. If you carry 100 pounds pressure, you may have 80 pounds mean piston pressure, which will require 51/2 pounds of water per minute.

> (30) L. M. G.—Do not try to cast brass in plaster of Paris; fine moulding sand is the proper material. To weld iron pipe, scarf the ends to be welded so that they will lap about 1% inch to 1 inch according to size. Make the scarfs so that when put together they will be somewhat larger than the diameter of the pipe, which will enable you to finish the weld the same size as the pipe. Place the scarfs together in the fire, heat to welding, tap the end of the pipe gently to give them contact, and hammer the scarfs with a light hammer in the fire, turning the pipe over as you hammer. A little sand or borax helps the weld.

> (31) F. A. M. writes: I have charge of 6 miles of track on a north and south road, and I find that 90 per cent of the iron worn out is on the west side of track. Can you assign the reason for wearing a greater per cent on west side than on the east? A. Your observation is a very curious one, and if this fact could be proved universally on north and south roads, would stand as a very pretty practical demonstration of the rotation of our earth. The wear you speak of must be due to the uneven loading of your freight cars or to the fact that the rotation of earth on its axis from west to east throws the greater weight of the cars on the west track, causing a greater wear of same. Mr. P. H. Dudley of the dynograph car, and who has examined the principal railroads in this country, informs us that he has not discovered that under normal and equal conditions the wear of west rails in north and south roads is greater than that of east rails. Further facts in this matter would be of interest.

(32) N. J. W. asks: 1. Is there any method of extracting fossils from compact rock? A. There is no way known to us for obtaining clean fossil prints, but care in splitting the rock. When a fosgravity than that produced by other methods. A de' sil is but partially exposed in the splitting, the overlyscription of this process is given in standard works on ing stone has to be carefully chipped off with a small chemistry. It is too lengthy to be reproduced here. chisel and hammer until the desired uncovering is are soft a procured. In some kinds of rock mixture of potassium dichromate with sulphur or sal sharp graver chisel in the hand is all that may be needed. | coal dry? A. There is no advantage, but a decided loss, ammoniac and lixiviating the residue. That which dis- No solvent will answer. 2. Why is dew deposited only in burning wet coal. The heat consumed in vaporizing on the tip of a blade of grass? A. The tips of the petroleum ether. The red oxide of iron is found na- blades of grass are most exposed to the effects of radiation, and become colder than the lower part. The dew gathers upon the coldest part. 3. What is the powder used to make perfumed cigars? A. This depends upon the kind of perfume desired. In cinnamon cigars the bark is pulverized and sprinkled upon the moist stock. Many essential oils are used by spraying upon the filling of the cigars.

vinegar of cider made last summer. This cider was put in stone jars and glass demijohns, and has been racked off once. It has been stored in basement, the Some of it was putin the sun for weeks, but none mother" be made to form in barrels of cider? Can The action of the atmosphere with time at a temperature AMERICAN SUPPLEMENT, No. 13.

glue or secure sand on a sand belt? A. Use strong glue above conditions will bring about the formation of the size: the sand can be procured from any druggist or mother. Some prefer to add a little true cider vinegar to the fluid, but this is not strictly nec-ssary. Dip a piece of coarse paper in molasses and place it in your vinegar barrel. It is immaterial as regards the barrels. See Scientific American Supplement, No. 392, on 'How to Clarify and Purify Vinegar."

(34) F. H. C. asks the formula for making a solution of citrate of magnesia.

A. Carbonate of magnesium..... 200 grains. 44

Bicarbonate of potassium in crystals, 30

Water a sufficient quantity.

Dissolve the citric acid in 2,000 grains of water, and, having added the carbonate of magnesium, stir until it is dissolved. Filter the solution into a strong 12 ounce bottle, containing the sirup of citric acid. Then add enough water, previously boiled and filtered, to nearly fill the bottle, drop in the bicarbonate of potassium, and immediately close the bottle with a cork, which must he secured with a twine. Shake the mixture occasionally until the bicarbonate of potassium is dissolved.

(35) C. T. A. asks: What kind of oil can be made of bones (beef or hog), and how the oil is made? A. Boneoil, variously known as Dippel's oil and animal oil, is obtained in the dry distillation of (27) L. S. T.-The direction, curve, or animal gelatinous substance. All that is now found in commerce is recovered as a product of distillation during lubricant. The method of manufacture is described in technical works.

> (36) A. J. M. asks: Is there any preparation by which you can take a natural flower and dip it in, that will preserve it? A. Dip the flowers in melted paraffine, withdrawing them quickly. The liquid should only be just hot enough to maintain its fluidity, and the flowers should be dipped one at a time, held by the stalks, and moved about for an instant to get rid of air bubbles. Fresh cut specimens free from moisture make excellent specimens in this way.

> (37) L. M. B. writes: I have several upright oil tanks (cylinders), some having round or dished bottoms and others cone-shaped. I wish to know their exact capacity, and the difficulty I find is to get the capacity of the round and cone-shaped bottoms. Please give me a rule whereby I can measure them. And also how to find the capacity of a globe. A. Forthe volume of a cone: Multiply the area of the base by the height; one-third of the product equals the volume. For the volume of the segment of a sphere: To 3 times square of the radius of its base, add square of its height; multiply this sum by height, and product by 0'5236. For the volume of a sphere: Multiply the cube of the diameter by 0.5236.

> (38) W. H. R. writes: I want information in regard to the preserving of fruit, eggs, etc., by cold storage or in cold storage rooms, as it is called, I believe. A. Cold storage consists simply in the placing of perishable articles of food in a room artificially cooled. Generally the room is cooled by passing air over ice, and then allowing it to enter the room from above, but air can be cooled by other processes and used with equal advantage. The room is also carefully built in such a way as to prevent the entrance of hot air, the doors fit tightly, and there is generally an ante-chamber through which one enters.

> (39) F. W. B. writes: How much power would I get from a round brick structure thirty feet across. with an inner wall eight feet from the first, surmounted by an iron horizontal wheel thirty feet across similar to a windmill, and letting the heatfrom fires in the annular space between the walls strike against fans of wheel, on the principle of the smoke jack? Would this principle, modified by best forms of draught chimney, grate, etc., give any practical result? A. No. For so large an apparatus you could scarcely overcome the friction of the wheel with any natural draught that you could produce.

> (40) H. M. B. writes: During a conversation, I made the assertion that there are running engines in England to-day having no cabs on same. Is is not a fact? A. Very few of the English engines are provided with cabs, as ours are.

> (41) E. S. N.-Steam under sudden compression evolves heat the same as air and the gases. If the pressure can be carried to near 2,000 pounds without loss of heat, the steam would be condensed into water at a red heat.

> (42) W. H. J.—There are some 16 or more lead smelting works in the United States at present, the most important of which is at Newark, N. J. The duty on pig lead is 2 cents per pound, and on lead ore it is 11/2 cents per pound. Pig lead is worth from \$3.50 to \$3.70.

> (43) D. C. asks: Is any advantage gained in burning hard coal moistened or dry? Would you recommend coal constantly moistened in a self-eder coal stove? in burning wet coal. The heat consumed in vaporizing the water is lost. The vapor itself is of no value, as it only imparts the heat that it has received from the The water used to cake soft coal and its dust coal. is only a mechanical expedient to utilize what might otherwise be wasted by sifting through the grate unburned.

(44) H. T.-For polishing black marble, use oxide of tin. It does not stain. Woolen cloth or felt (an old felt hat) for the rubber.-There is no (33) H. C. G. asks how to make strong difficulty in belting fore and aft in a building 21x94. Put your engine belt wheel in the central part of the room, so that the belt wheel will be next the wall, then belt forward on to a main shaft and also backward on to a main shaft, and from each of the main shafts carry belts to the front and rear. This is a common practice here.

(45) W. H.-For a full illustrated description of how to set a slide valve see SCIENTIFIC

vacuum from 60 pounds pressure at the rate of about left is burned. A very little of it is made into pulp 1,600 feet per second. From 60 pounds pressure into air for leather board, but it is not good for this purpose, steam flows at the rate of 795 fect per second. So that, if for which rawhide cuttings and skivings from tanthere is very little friction and the ports are large, there neries are more used, with a great proportion of hemp the face of the type. The paper is kept in contact with can be little difficulty in getting a piston speed of fifty or jute fiber. Large pieces are made into heels, and to sixty feet per second for an eight inch stroke, provided you can overcome the reaction of the crank.

(47) J. H. T. asks: About what is the momentum, in foot pounds, of a train consisting of a locomotive and six passenger cars, with their complement of passengers, traveling at the rate of thirty miles per hour? A. About 500,000,000 foot pounds,

(48) E. C. writes: Can I return condensed steam to boiler from heating pipes by gravity when using 50 or 60 pounds steam? A. Yes; provided you keep the full pressure on the pipes or coils, so that the water will return by gravity. It may require 8 or 10 feet height from bottom of coils to water line in boiler to effect a return. If steam pipe is large, it can be done with less height.

(49) Artisan asks: About how many cells of the Bunsen battery would ittake for an electric lamp equal to about four common kerosene lamps? Also what number SUPPLEMENT contains directions for constructing? A. For an arc light, from 25 to 30. For one incandescent lamp, three or four times that number of cells. For description of various batteries consult SUPPLEMENT, Nos. 157, 158, and 159.

(50) J. M. F. asks for a simple formula for the cure of kidney disease. A. Lithia water may alleviate, but we cannot recommend anything to cure.

(51) W. A. S. O.-Mechanical and elec trical skill and education are both necessary to the profession of electrical engineering. There is always room at the head of every profession or business. We can hardly advise you as to the best business for you to follow. We would say, however, that it is best to choose the one most in accord with your tastes and inclinations. We know of nothing better than a heavy wrapping of felt to keep ordinary water pipes from freezing

softened by water. An inferior quality of rubber goods is made by melting old rubber and mixing with new

(53) W. H. M. sends a sketch of a pecuhar form of magnet devised for a special purpose, having a hollow core with a valve for the armature, and asks if this construction is practical? And what power or how many pounds lifting force will such mag-net have, that is, how much force will be required to separate the armature from contact with magnet with medium battery power? What size wire should be used to form the coil, and what battery would give the best results, that is, hold the armature in contact the strongest? He wishes to use the hollow magnet as shown to pass air through, and to control the value by a current of electricity. A. You can get almost any power you wish in your magnet; but you are probably aware that the attractive power of the magnet is inversely as the square of the distance, so that when your valve leaves its seat the power of the magnet over it diminishes very rapidly. You do not say what pressure you desire to hold the valve against. A magnet made like your sketch and wound with No. 16 wire should hold the valve against a total pressure of from 100 pounds to 200 pounds, with a suitable battery. For continuous use, it is probable that a Bunsen battery of the bichromate form would be best. For a magnet of the size shown, you would require from 4 to 6 cells.

(54) L. & B. ask how to make a paste or mucilage to fasten labels on tin. A. Soften good glue in water, then boil it with strong vinegar, and thicken the liquid, during boiling, with fine wheat fiour, so that a paste results; or starch paste, with which a little Venice turpentine has been incorporated while it was warm.

(55) J. R.—Leather is usually bleached with an acetate of lead and sulphuric acid. Those who bleach leather in this way say its strength is not injured by this treatment, but we should say it was, though possibly in only a slight degree, according to the manner of treatment.

(56) W. W.—The paste used for papier mache process of stereotyping is regular flour paste, very finely divided, but some of the stereotypers add thereto something to prevent burning when one mould is used to make a great many plates, and this is considered a trade secret. We know of no book published especially on stereotyping.

(57) D. W. asks where to dispose of old shoes and old leather. A. There is no market for old shoes as far as we know. To a limited extent they are used for the preparation of animal charcoal, but in such cases they command only a very low figure.

(58) S. H.-Permanent magnets are made by the contact of tempered steel with an electro- the action of hydrochloric acid on lime or the carmagnet, or by enclosing the tempered steel in a coil, then sending a current through the coil. Ganot's Physics would be a good book for you.

(59) W. S.-See article on Induction Coil in SUPPLEMENT. No. 160. for making sparks to light gas. You will be able to make an electric motor by following directions for making a dynamo electric machine given in SUPPLEMENT, No. 161. For a motor you could make the field magnets smaller. You should also wind the armature with coarse wire, say No. 16.

(60) L. H. T.-We know nothing of the composition of the ink mentioned by you. Its not drying is due to the glycerine, from which it receives the You can obviate this difficulty by copying quality. dilution. You will find in the SCIENTIFIC AMERICAN SUPPLEMENT, No. 157, numerous receipts for the manufacture of ink, some of which may be more satisfactory than the article you are now using.

but very little unless large enough to make something from. The leather is used up so closely in some of 1 fog becomes so much diffused,

(46) W. J. S.-Steam flows into a the Eastern shoe manufactories that such refuse as is some into "pancake" leather, a very inferior, nondescript article used for innersoling in some cheap shoes

> (62) W. G.—Both the heliotrope and the blood stone are used in limited quantities by manufacturing jewelers. Write to Tiffany & Co., of New York, and they will furnish you with detailed information in regard to their value.

> (63) J. O. P. desires for experimental purposes a substance of consistency and nature of paraffine or beeswax, which is transparent in pices say one-sixteenth or one thirty-second inch in thickness. Must be insoluble in water. Can you tell me how to make a composition which can be readily melted, of the fiber and toughness of beeswax? Or can paraffine made transparent in plates one -sixteenth inch in thickness? A. If you are unable to procure paraffine of the desired nature, we would recommend trial with the sheet wax used for the manufacture of wax flowers. This comes in thin sheets, and can be procured from any dealer in artists' materials.

(64) D. J. C. desires a receipt for making blue-black writing ink (it looks blue in the bottle but turns black after writing). A. Take 1 pound bruised galls, 1 gallon boiling water, 53 oz. ferrous sulphate (green vitriol) in solution, 3 ounces gum arabic, previously dissolved, and a few drops of an antiseptic, such as carbolic acid. Macerate the galls for twenty four hours, strain the infusion, and add the other ingredients. When this is completed, mix it with a strong solution of fine Prussian blue in distilled water. Numerous other formulæ are given on page 2498 of SCIENTIFIC AMERICAN SUPPLEMENT, No. 157. We are not familiar stir in the powder by degrees. Stir until cold, lest the AND EACH BEARING THAT DATE. with the exact composition of the ink in question, but the foregoing will yield an excellent article

(65) E. H. asks: Will you please give me receipt for making liquid polish for ladies' kid shoes (52) D. H. M.-Rubber is not soluble or or leather bags, that will not injure the leather and that will give it jet black polish on any colored leather? A. Use the following: Digest 12 parts shellac, white turpentine 5, gum sandarac 2, lampblack 1, with 4 parts spirits of turpentine and 96 of alcohol, or use linseed oil in which a drier such as litharge has been boiled, with sufficient lampblack for coloring. The latter is used for making enameled leather.

(66) C. C. C. desires a receipt for making the composition used in the hektograph. Also a receipt for the certain kind of black ink to be used. A. For the hektograph, take 4 ounces of good carpenter's glue, soften it in very cold water by soaking it for an hour or two, remove when entirely soft, then heat four ounces by weight of glycerin till vapor arises from it then add the glue to the hot glycerin, and stir till dissolved: then keep the vessel in a water bath for everal hours till the excess of water is evaporated. The black ink to be used consists of a strong aqueous solution of soluble aniline black (nigrosine) in the proportion of about one to five or seven of water. It must be a saturated solution, and rather thick.

(67) C. V. C. desires a formula for transferring printed pictures from the paper on to wood or glass. A. Take a saturated alcoholic solution of potash, pour the solution on the printed picture and immediately remove all the superfluous liquid by means of blotting paper. Lay the picture while damp upon the wood or other material to which it is to be transferred, and place it in a press (a copper plate press is best). The transfer will be made immediately. The picture must be immersed in clear cold water after removal from the potash bath and before putting it in the press.

(68) H. B. B.—Use as cherry stain: rain preserving the head of a fish, we would refer you to some taxidermist. To polish a pair of steer's horns, first scrape, then rub with emery cloth, and treat with pumice stone and a little oil, and finally polish with Vienna lime.

(69) Acmon asks: 1. How can paper be made waterproof, and yet left free from any oil, etc., which will soil or taint any article which may be wrapped in it? A. See SCIENTIFIC AMERICAN for July 12, and August 16, 1884, for receipts for waterproofing paper. 2. How may chloride of lime be solidified and moulded in stick or crayon form, and still retain its virtue and individuality, so far as its action is concerned, when used? A. Chloride of lime or bleaching powder does not come solidified, but as a powder. Chloride of calcium, the chemical salt, may be obtained by evaporating a solution of calcium chloride (made by bonate) and heating to 200° C., when the hydrated the aniline colors. 2. What are the ingredients of chloride parts with all of its water, leaving the anhy- soapine and pearline? A. We presume that they condrous chloride in the form of a white porous mass.

(70) R. von L. desires a receipt to give a belt a nice, dark, shining appearance. A. We would recommend you to try the following: Put a half pound shellac broken up in small pieces into a quart bottle or the shelf in a warm place; shake it well several times a day, then add a piece of camphor as large as a hen's egg, shake it well, and in a few hours shake it again and add one ounce lampblack. If the alcohol is good, it will all be dissolved in two days; then shake and use. If the materials were of the proper kind, the polish correctly prepared, it will dry in about five minutes, giving a gloss equal to patent leather.—We are not ac-quainted with the composition of the "Militair Lack." (71) N. W. asks how far an ordinary

steamboat electric light can be seen in an ordinary fog. A. The distance varies very much with the character of found equal to a good oil light, as the electric light in a

Scientific American.

(72) W. P. M.—The papier mache matrices for stereotyping are made by moistening several sheets of rather stout tissue paper with very thin size, and then beating or pressing these sheets down upon the face of the type under pressure while the matrix is dried on a steam heated table.

(73) F. E. R. asks how many cells of the Bunsen battery would produce an electric light equal to 4 or 5 ordinary kerosene lamps, and if it would be practicable. A. Probably 16 or 18 cells would do it. The battery would be troublesome, and the light would cost more than kerosene if produced in that way

(74) K. B.-You may japan small articles by dipping in japan thinned with turpentine, and baking in an oven at 250° to 270° Fah. Air drying japan is very poor in quality and hardness. You can make a black varnish with shellac, alcohol, and lampblack that will dry quickly in the air, but it will not be bright like japan.

(75) J. M. W.-We do not see how any one can protest against the use of glycerine in any form whatever, for roller composition. The formula you ask of a well known manufacturer is a secret known to them years? A. To clean marble, mix quicklime with strong only, and as far as we can judge the following will be lye, so as to form a mixture having the consistency of roller for winter: 1 pound of glue "Cooper," 2 pounds i composition be allowed to remain for a day or two and of best glycerine (white), 1/2 to 1 pound sugar, and 5 be then washed off with soap and water, the marble ounces castor oil.

(76) C. E. M. asks for a cement to stick white metal tops on glass bottles. A. One of the best cap cements consists of:

Beeswax.....1 oz. Red ocher or Venetian red in powder.... 1 oz.

Dry the earth thoroughly on a stove at a temperature above 212° Fah. Meltthe wax and resin together, and earthy matter settle to the bottom.

(77) E. H. asks: Would a powerful jet of water directed to right or left of stern have any per ceptible effect in steering the Alaska or any other ship which has lost its rudder? A. Vessels have been steered by this method, but it is not economically available.

(78) C. D. writes: I am attempting to make a tubular boiler to furnish steam for a small engine which is intended to supply power for a jeweler's lathe. 1. How many half inch tubes would be needed? A. 30 1/6 inch tubes, or 12 1 inch tubes. 2. In what manner can the tubes be fastened in the top and bottom of the boiler, so that 1t will be steam tight? A. Expand them in the same manner as in larger boilers. There are no tubes made of iron that are suitable for expanding. You can obtain 1 inch tabes that are lap welded, that will stand expanding. 3. What pressure would a boiler of the above mentioned description, made of copper plates one-sixteenth inch thickness, safely bear? A. If you make the boiler of one-sixteenth copper, the tubes should also be of one-sixteenth copper, and brazed as well as expanded in heads one-eighth thick; rivets should be three-quarter inch apart, and seam brazed. If the whole is thoroughly brazed, the boiler will be safe at 40 pounds pressure. 4. I should like to use kerosene for fuel; in what way could it be used? A. For the methods of burning kerosene or petroleum under boilers, see SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 3 and 403. Kerosene as ordinarily used we do not recommend; it is dangerous unless arranged with great care to prevent overheating.

(79) W. G. F.-All solid substances like metals that are heavier than water sink immediately to I the bottom of the sea. Other materials become water : B logged, and sink to considerable depths, when they may not go directly to the bottom. For description of various sounding apparatus, see SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 398, 433, 103, 239.

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(80) F. S. asks: 1. Which will be the water 3 quar s, annatto 4 ounces, boil in a copper kettle most durable—a flat spring 15 inches long, 2 inches wide, till the annatto is dissolved, then put in a piece of pot- 14 inch thick, fastened at one end with two bolts; the ash the size of a walnut; keep it on the fire about half other end to move 21/2 inches, or a spiral spring No. 8 an hour longer, and it is ready for use. In regard to wire 114 diameter, 8 inches long, coils 14 inch apart, to C close 21/2 inch bolt, springs to be under pressure 8 or 10 hours at a time. A. The spiral spring will be the most durable and elastic. 2. We have an upright tubular boiler, about 6 horse power, which is fed by a force pump with cold water; when the water gets low with a steam pressure of 60 or 70 pounds, and the pump is C started, it will keep the same pressure until you stop the pump, then it will drop 10 or 15 pounds in 5 minutes. What is the cause of it? A. It may take several minutes for the cold water to get into circulation so as to affect the upper portion where the steam is being liberated. It is very common for boilers to drop the pressure after the pump has been run with cold water feed. The cold water at first hangs to the bottom of the boiler, and does not at once begin to circulate to cool the steam generat ing surface.

(81) W. asks: 1. What are diamond dyes and paints made of? A. Probably solutions of sist of partly effloresced sal soda mixed with half its weight of soda ash. Some makers add a little yellow soap, coarsely powdered, to disguise the appearance, and others a little carbonate of ammonium or borax. 3. Recipe for a good condition powder. A. Ground ginjug, cover it with alcohol, cork it tight, and put it on ger1 pound, antimony sulphide 1 pound, powdered sulphur 1 pound, saltpeter. Mix altogether and administer in a mash, in such quantities as may be required. 4. Recipe to make violet ink. A. Ordinary aniline Cl violet soluble in water, with a little alcohol and glycerine, C makes an excellent ink. 5. Recipe to make good shaving soap. A. Either 66 pounds tallow and 34 pounds cocoanut oil, or 38 pounds of tables and the same quantity of palm oil and 34 pounds cocoa nut oil, treated by the cold process with 120 pounds caustic soda lye of 27° Baume, will make 214 pounds of shaving soap.

(82) W. W. P. asks: 1. What size upright boiler would freely furnish steam at 100 pounds (61) W. H.-Leather scraps are worth the fog; but we believe the electric light has not been pressure to two equalizing cylinders 2 inches by 4 inches? A. Boller 20 inches diameter 40 inches high, 25 tubes 11/2 inches. Use petroleum. 2. What is the lightest, steel Co

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or copper boiler? And how much oil and water would it take to run with this power 25 miles over any ordinary road? A. Steel is the lightest. About 25 gallons water, 3 to 4 gallons petroleum.

(83) A. E. M. writes: I am anxious to mould some small ornamental objects in nickel and copper. I can make a splendid mould of plaster of Paris, but the great heat of the melted copper next the article seems to completely rot or decompose the plaster mould, and is not satisfactory. Can I use plumbago, or what would be best? A. A plaster mould stands better if some coal ashes are mixed with the plaster. We hardly think, however, that it will answer for an alloy that melts at so high a temperature, Graphite is made into leads for pencils and into crucibles by mixing it with clay and baking it. It probably will not answer your purpose. It is possible that a dry sand mould, made of suitable proportions of clay and loam, might answer.

(84) W. H. S. asks(1) how much the photo exposure should be decreased on a clear day, with fresh fall of snow on the ground. A. About one-third. 2. What will remove discoloration from a marble mantel due from hard coal smoke gathering on it for several near to it, or will at all events make a good glycerine cream, and apply it immediately with a brush. If this will appear as though it were new.

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an filling machine, W. H. H. Stevenson ans, screw cap for metal, A. F. Cooper anale machine, G. Roth andy machine, W. E. Henry anon, pneumatic, D. M. Mefford anvas and other fabrics, machine for testing, J. F. O'Connor ar brake, J. R. Barker ar brake, J. R. Barker ar brake, I. H. Congdon ar coupling, C. M. Bennett ar coupling, A. W. Van Dorston ar coupling, A. W. Van Dorston ar storling, J. T. Herschell ar starter, F. Sr., & F. Dawson, Jr. ar starter, N. J. Roberts	314,352 314,227 314,347 314,328 314,427 314,428 314,417 314,422 314,422 314,425 314,425 314,426 314,245 314,245 314,245 314,245 314,245 314,245
an filling machine, W. H. H. Stevenson ans, screw cap for metal, A. F. Cooper anale machine, G. Roth. andy machine, W. E. Henry annon, pneumatic, D. M. Mefford anvas and other fabrics, machine for testing, J. F. O'Connor ar brake, J. R. Barker ar brake, I. Brauer ar brake, I. Brauer ar oupling, C. M. Bennett ar coupling, H. W. Tilton	314,352 314,227 314,347 314,529 314,298 314,425 314,425 314,425 314,425 314,425 314,425 314,425 314,425 314,425 314,425 314,426 314,246 314,240 314,248 314,248 314,238 314,238 314,238 314,238 314,238 314,309 314,309 314,309 314,309 314,322 314,366 314,443 314,534 314,534 314,538
an filling machine, W. H. H. Stevenson ans, screw cap for metal, A. F. Cooper anale machine, G. Roth. andy machine, W. E. Henry anon, pneumatic, D. M. Mefford anvas and other fabrics, machine for testing, J. F. O'Connor	314,352 314,227 314,347 314,529 314,298 314,425 314,425 314,425 314,425 314,425 314,425 314,425 314,425 314,425 314,425 314,426 314,246 314,240 314,248 314,248 314,238 314,238 314,238 314,238 314,238 314,309 314,309 314,309 314,309 314,322 314,366 314,443 314,534 314,534 314,538
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an filling machine, W. H. H. Stevenson ans, screw cap for metal, A. F. Cooper	314,352 314,227 314,347 314,347 314,529 314,298 314,428 314,425 314,425 314,421 314,422 314,421 314,426 314,408 314,408 314,245 314,245 314,242 314,248 314,254 314,226 314,226 314,226 314,228 314,309 314,309 314,309 314,309 314,309 314,322 314,436 314,433 314,534 314,534 314,534 314,534 314,535 314,536 314,556 314,556 314,556 314,556 314,556 314,556 314,556 314,556 314,556 314,556 314,556 314,56
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an filling machine, W. H. H. Stevenson ans, screw cap for metal, A. F. Cooper	314,352 314,227 314,347 314,328 314,228 314,417 314,422 314,427 314,427 314,427 314,427 314,427 314,426 314,246 314,246 314,246 314,248 314,248 314,238 314,309 314,300 314,328 314,328 314,330 314,54 314,433 314,534 314,434 314,534 314,534 314,534 314,406 314,406 314,428 314,438 314,451 314,451 314,451 314,451 314,451 314,451 314,451 314,451 314,453 314,451 314,451 314,455 314,555 314,