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 This is for our information, and not for publication.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) H. C. A. writes: I want to make a 4 cell plunge battery. I have 4 carbon plates 12x6x¼. 1. How large must the zinc plates be? A. The zinc plates should be of the same size as the carbon plates. 2. Will I obtain a stronger current by having 2 carbon plates to each cell? A. The current will be somewhat stronger, and the battery will be more constant. 3. What quantity of bichromate of potash and sulphuric acid should I use to each gallon of water? A. About 4 ounces of bichromate of potash to the pint of water, and one-fifth the bulk of this solution of sulphuric acid.

(2) J. D. asks how to cut and bore holes in glassware. A. Make a drill of best steel; harden it as hard as fire and water will make it; keep it very sharp, and moisten it with turpentine.

(3) C. Z. D. asks: 1. Does a covering of sleet protect the buds of trees from excessive cold, or, in other words, does it require greater cold to destroy buds upon fruit trees when covered with sleet than when they are uncovered? If so, how much more? A. The sleet does not protect, as snow sometimes does; the ice is nearly always fatal. 2. What form of armature would give the best results for incandescent lighting, in a dynamo twice the size of the one given in SUPPLEMENT, No. 161? How many and of what power would the lights be? A. Siemens' new form or Edison's. Such a machine ought to run two 8 candle power lamps. 3. Where can I find the best form of storage batteries? A. You will find nearly all forms of storage batteries described in the SCIENTIFIC AMERICAN SUPPLEMENT.

(4) G. A. R. asks the names of such books as are necessary for one to study to post himself thoroughly in the electrical science. Also a good self-taught algebra and geometry. A. Begin with Ganot's Physics, Sprague on Electricity, and follow up these with such works as Gordon's Electricity and Magnetism, and the Electric Light by the same author. We know of no better books on algebra and geometry than the ordinary text books.

(5) A. E. C. asks (1) how to mend broken battery carbons; the fractures all fall within the liquid; the liquid is electropoin fluid. A. We know of no practical way of doing this; as the carbon plates are inexpensive, the broken ones should be replaced by whole ones. 2. How can I make ordinary glue so as to fasten oiled surfaces together, and hold them with the same tenacity as clean ones? A. We do not believe such glue can be made to hold without removing the oil. 3. Is there any method for destroying the warping propensity of wood? A. By rendering it entirely impervious to water, as by saturating it with melted paraffine. 4. Does the potassium bichromate in soluble glue remain so only while light gets at it? A. The glue remains permanently insoluble. 5. I wish to have a cheap varnish for toys; one coat must answer, no filler to be used, and yet that coat to give the bright gloss noticed on cheap German toys. If there is such a varnish as I desire, how can it be colored? A. Common rosin dissolved in turpentine will make such a varnish as you require. You can readily add any of the dry pigments used for paint.

(6) W. L. P. asks if an electrical current can be obtained by placing two telegraph instruments at a short distance, say across a small stream, with only ground wire to form circuit. If it can be done, how are the ground wires attached? A. We know of no method of doing this.

(7) C. F. asks if there is such a substance as "animated marble." A. It is simply a figurative expression for life-like sculpture.

(8) L. D. C. writes: What size battery ought I to get to light a room 40x60 feet? A. You cannot economically produce an electric light by means of batteries. You might light your room with 50 cells of Bunsen battery and an arc light.

(9) T. W. M. asks: What is the material used in making blacklead crucibles, and is it the same material that is used in making lead pencils? A. The substance is the mineral graphite mixed with clay. It is the same as that used for making lead pencils.

(10) J. M. C. asks: 1. Of what is the black varnish or coating now used on cheap grades of silver mirrors composed of? A. The article used is probably the common asphalt varnish. 2. How is it prepared? A. An excellent variety of this varnish can be prepared as follows: Take 8 ounces burnt umber, 4 ounces true asphaltum, and 1 gallon linseed oil. Grind the umber with a little of the oil, add to it the asphaltum, previously dissolved in a small quantity of the oil by heat; mix, add the remainder of the oil, boil, cool, and thin with a sufficient quantity of oil of turpentine.

(11) G. W. B. desires information as to how old walnut and mahogany furniture is polished, and also the French method of polishing. A. In order to clean and finish old furniture, it is necessary to scrape and sandpaper the work as smooth as possible; go over every part with a brush dipped in furniture oil, and let it remain all night; have ready the powder of the finest red brick, which tie up in a cotton stocking, and sift equally over the work the next morning, and with a leaden or iron weight in a piece of carpet rub it well the way of the grain, backward and forward, till it has a good gloss. If not sufficient, or if the grain appears at all rough, repeat the process. Be careful not to put too much of the brick dust, as it should not be rubbed dry, but rather as a paste upon the cloth. When the surface is perfectly smooth, clean it off with a rubber of carpet and fine mahogany sawdust. This process will give a good gloss, and make a surface that will improve by wear. The French method of polishing is as follows: With a piece of fine pumicestone and water pass regularly over the work with the grain until the grain is down, then, with powdered tripoli and boiled linseed oil, polish the work to a bright face. This produces a very superior polish, but it requires considerable time.

(12) H. A. L. desires a recipe for liquid glue. A. Soften 100 parts best Russian glue in 100 parts warm water, and then add slowly 5¾ to 6 parts nitric acid, and finally 6 parts powdered sulphate of lead. The latter is used to impart to it a white color.

(13) J. E. A. asks for a receipt for making gold beater's skin tougher than it is when it is bought, so as not to tear so easy when used in making whistles for imitating animals, birds, etc. A. Gold-beater's skin is derived from the cæcum of the ox, which being well cleaned is doubled together, the two mucous surfaces face to face, in which state they unite firmly. The membrane is then treated with solutions of alum, isinglass, white of eggs, etc., and sometimes with creosote, and being beaten between folds of paper to expel the grease, is finally pressed and dried. The leaves thus obtained, each 5½ inches square, are made up into moulds. As the gold beater's skin is therefore somewhat complex in its manufacture, we would recommend its substitution by some other variety of skin, or possibly parchment paper might be found sufficiently tough for the purpose.

(14) J. H. S. asks (1) how to renovate old frames (gilt or bronze)? A. Gilt frames may be cleaned by simply washing with a small sponge, wet with urine, hot spirits of wine, or oil of turpentine, not too wet, but sufficiently to take off the dirt and fly marks. They should not be afterward wiped, but left to dry of themselves. To regild frames it is necessary to take a sponge and some clean water and wash the frame well, then let it dry, procure some gold size, make some thin size from dry hide or parchment, mix enough warm with the gold size to enable you to work it in the frame with a camel's hair brush, give it two coats, when dry rub it over with a piece of fine sand paper; it will then be ready for gilding. When the frame is covered, rest it on its edge to drain; when perfectly dry, dip a pencil into water, and wipe the gold over with it; it will take the particles of gold off and make it appear solid. For any parts not covered, take bits of leaf with a dry pencil, and lay on as before, then give the whole a coat of clear parchment size, brush the back edges over with ocher, and the frame is then ready. 2. Also, how to lacquer polished brass without heating it? A. Use 2 ounces gum sandarac and ½ ounce gum mastic dissolved in one pint of alcohol. When completely dissolved, add 5 drops glycerine.

(15) H. W. G. asks if there is such a word as "oxiden," and if there is, what does it mean? A. There is no such word in the English language. It is the plural in the German for "oxides."

(16) W. S. asks: What other substance is better than plaster of Paris for moulds, that is, something harder, for it is impossible for me to take more than one or two good sharp runs before it is dull or crumbles? A. Sulphur is sometimes used. Saturate the plaster mould with boiled linseed oil and let it dry. Possibly you will have to resort to type metal, which is largely used for moulds.

(17) E. H. P. asks how large an engine would it take to churn 4 gallons of milk with say 40 or 50 pounds pressure? A boy ten years old works the churn. Could I make a gas pipe boiler for such an engine? If so, what size pipe, number of feet, and construction? A. Cylinder 1 inch diameter, 2 inch stroke; 6 feet 1 inch gas pipe in a coil will be sufficient for a boiler.

(18) J. P. C. asks: 1. What amount of power can be had from a six foot turbine fed by a three inch pipe falling 150 feet? A. You give the height and diameter only, but should send the length of the pipe also, and the exact form of turbine. The value of your discharge may be from 25 horse power for vertical pipes to anything less, according to length of pipe. 2. What is the rule to find horse power from different size of pipe, fall, and turbine? A. The formulas for power from the flow of pipes under pressure are rather complex, when considered under the different conditions found in practice. From the formula in "Haswell,"

$$2{,}356\sqrt{\frac{h}{l}}\times d^5 = \text{volume in cubic ft.}$$

per minute—where h is height, l is length of pipe, and d^5 is the 5th power of the diameter of the pipe in feet or decimal parts of a foot. For the initial power of the discharge, $62{\cdot}5 \times V \times h$ = power of the discharge—where the flow pipe is large and the nozzle small enough to disregard the friction; or, in other words, the discharge from the turbine is so small as not to effect the pressure due to height. For the coefficient of an open pipe of equal bore throughout:

$$\left(0{\cdot}0144 + \frac{0{\cdot}01746}{\sqrt{V}}\right) = \text{coefficient; V} =$$

velocity of flow. Then $62{\cdot}5 \times V \times h \times C$ = power. For the effect through turbine, you may expect from 75 to 85 per cent effective work.

(19) G. W. L. asks how to bleach horns so as to make them nearly transparent. What I wish them for is to finish and mount for ornaments. A. Besides hydrogen peroxide, the method of using which is fully described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 339, you can bleach the horns by immersing for a short time in water slightly mixed with sulphuric acid, chloride of lime, or chlorine, or they may be exposed in the moist state to the fumes of burning sulphur, largely diluted with air.

(20) J. X. D. asks how the colors on a sample of goods sent are made and applied to different kinds of cloth. A. The colors are various shades of the aniline colors. They are applied to the fabric, which is probably mordanted, by means of so-called block printing. Each shade has a different block, and the various gradations of tint are brought about by one or more applications of the block.

(21) E. A. S. asks how to dye cotton yarn black with aniline, so the color will be fast; also which is the best to use in dyeing with aniline, the powder or the liquid. A. The wool is first dipped into a solution of aniline salt (aniline hydrochlorate), then plunged into a bath of potassium chlorate containing one per cent of copper sulphate. The fabric is then removed from the bath, dried in a warm room, and washed with soap. During the drying process the color is developed. Aniline black of itself is insoluble, and is formed in the fabric during the process of development.

(22) D. S. M. Co. asks for a recipe for a white stamping powder suitable for dark goods? A. By mixing white lead to the consistence of paint with a rather thin mucilage of acacia, we think a satisfactory white marking ink can be made. A more successful process is by dusting over the stencil the white lead mixed in powder with a little resin, fixing the pattern by covering with a piece of paper and ironing with a hot iron. When the cloth can be turned (as between boards or book covers) without scattering the powder, it may be preferable to apply the heat directly to the back of the fabric.

(23) T. H. asks for a recipe for removing stains from a marble hearth, caused by burning of note or letter paper (I suppose sized) on the same. A. Take 2 parts of common soda, 1 part of pumice stone, and 1 part of finely powdered chalk; sift it through a fine sieve, and mix it with water; then rub it well all over the marble, and the stains will be removed; then wash the marble all over with soap and water, and it will be as clean as it was at first.

(24) P. D. wishes a receipt for a transparent lacquer for covering a highly polished brass, which does not deaden the finish, and will keep it from tarnishing, such as the eastern chandelier manufacturers use. A. Dissolve 2 ounces gum sandarac, and half an ounce gum mastic in one pint alcohol. When dissolved add 5 drops glycerine.

(25) C. E. M. wishes a receipt for making a cement which will fasten glass and white metal together. A. The following are receipts for cap cements: 1. Resin, 5 lb.; beeswax and dried Venetian red, of each, 1 lb.; melted together. 2. Equal parts of red lead and white lead, sometimes a mixture of white lead and glycerine, is used.

(26) J. T. W. Bromine has a specific gravity of 3·1872; iodide of methylene, 3·342; and mercury, 13·55.

(27) C. H. J.—An alloy consisting of 4 volumes of cadmium with 5 volumes each tin, lead, and bismuth is quite liquid at 150° F. The alloy given by you is known as Wood's patent fusible alloy, and melts between 150° and 160° F. We are not familiar with the composition used on the fire extinguishers, and hence cannot say as to their melting point. Nor do we know of any alloy that is liquid at 120° F. An amalgam is an alloy containing mercury.

(28) P. D. asks: 1. What is the chemical formula of protoplasm, of grape sugar, and of linseed oil? A. The chemical composition of protoplasm cannot be satisfactorily expressed by a formula. Grape sugar has the formula $C_6H_{12}O_6$. Linseed oil has approximately the formula $C_{15}H_{28}O_2$. 2. The specific gravity of lithium, cobalt, and manganese? A. The specific gravity of cobalt is 8·9: of lithium, 0·6; of manganese, 8.

(29) W. L. E. asks: Is there any method of depriving crude petroleum of its disagreeable odor? A. Twenty pounds of petroleum are placed in a suitable vessel, and by means of a long necked funnel two ounces each of concentrated sulphuric acid and nitric acid are poured into the receptacle; finally 1 pound of alcohol is carefully poured on top of the oil. The latter gradually sinks to the bottom. As soon as it comes in contact with the acids it develops heat and causes slight effervescence from boiling. A small quantity of nitric ether is formed. This and similar products of the reaction produce an agreeable odor which is imparted to the petroleum. The latter assumes a yellowish color, and, after having stood in contact with the acids and alcohol for about one hour, is gently agitated with water, and after about 10 hours decanted. The lower layer may be used for deodorizing the heavier petroleum oils by agitating them for twenty minutes with the mixture, decanting after twelve hours, and then washing with milk of lime to remove all traces of acid.

(30) A. L. K. writes: I see in my SCIENTIFIC AMERICAN, vol. lii. and No. 1, a list of nineteen fine metals, whose value respectively is above $1,000 per pound. Has not one been overlooked, viz., indium? I notice zirconium quoted at $7,200 per pound. What is the metal itself used for? How are its oxides, chlorides, etc., etc., manufactured? And for what purpose used? Where bought and sold, and at what prices, etc.? A. Indium is an exceedingly rare metal. According to a table prepared by Dr. Bolton and published in 1875, the price of indium per pound was $1,522.08, this being at the rate of $3.36 per gramme. In 1880 it was quoted at $4.83 per gramme. Zirconium has no practical applications, unless it be in connection with the electric light. The various salts are prepared by chemical means from the silicate or mineral zircons. It is only bought and sold as a chemical curiosity at fancy prices, from dealers in pure chemicals and chemical apparatus.

(31) E. W.—The Martini-Henry rifles used in the British army are made at the Government works, Enfield, near London. They combine the Martini breech action with the Henry barrel.

(32) M. H. C.—Certain of the lower forms of life are capable of existing and even growing in ice without having their vitality destroyed.

(33) J. M. L. writes: I have a Laurent polariscope out of which I am unable to get good results because the alcohol sodium flame is not bright enough. Even with the clearest sugar solution the shadow is very dark and the line unsensitive. Can I do anything to increase the brilliance of the light without destroying the monochromatic character of the flame? Gas, which might be better, I cannot obtain. A. Use a lamp burning coal oil.

(34) J. P. G.—1. In reference to gelatine sensitive paper you can obtain an improved kind from Messrs. E. & H. T. Anthony & Co., 591 Broadway, N. Y., which is thin and has a toothed surface for taking a crayon or pencil, well adapted for enlargements. The pure whites are obtained by thorough fixing, and, after a careful washing, by running the paper through very dilute solution of water and sulphuric acid:

Water	80 oz.
Sulphuric acid	1 oz.

The bluish prints you speak of are made on paper sensitized on a nitrate of silver bath; the paper is then dried, and put in a solar camera and exposed to the sun. The paper is not like that used in the blue process of copying drawings. The solar camera is an expensive, cumbersome apparatus, and requires special skill to operate it. It is not possible to make solar prints with the apparatus described on page 86, vol. l., of the SCIENTIFIC AMERICAN, as the ordinary silver paper is too insensitive. 2. The focus of your marine glass is too short for an astronomical telescope.

(35) W. S. asks: Is there any fluid other than water that can be converted into a gas, as water is into steam, that will assume its natural order, as does steam into water? A. The common hydrocarbons, which are volatile at ordinary temperatures, form gases without decomposition, such as, for instance, alcohol, ether, or chloroform.

(36) E. F. S. asks how large chunks of coal are made into ornaments, such as match safes and inkstands—what tools are used to cut it, and how it is polished. A. There are no special tools used, and the polishing process is similar to that adopted with any mineral. They can be polished by rubbing with sandpaper of a coarse character, and finally finishing with a finer paper or a little chalk.

(37) C. R. F. asks for a good receipt for tinning malleable iron. Also a receipt for making a good gold solution. A. For tinning malleable iron: Clean the work of grease or oil by boiling in caustic soda water, then rinse in clean hot water. Then thoroughly clean from scale in a bath of muriatic acid one part, water four parts. Then dip in a solution of muriate of zinc and sal ammoniac, made by saturating muriatic acid with metallic zinc and adding ten per cent by weight of sal ammoniac. Then dry on a hot plate or otherwise, and dip in the melted tin bath. Gold solution: Dissolve fine gold in a mixture of two parts hydrochloric acid, one part nitric acid, to saturation. Gently heat the mixture over a sand bath until the acid is evaporated, leaving a dark red mass, which is soluble in distilled water, with which you may make the solution of the required strength. Also see SCIENTIFIC AMERICAN SUPPLEMENT, No. 160, on electro gilding and the solution.

(38) W. W.—There is no way of hardening brass that has been annealed, except by compression. Such a process would be worth millions.

(39) E. N. N.—The difference shown by the almanac represents the equation of time, or difference between the mean or clock time and the solar or sun time, the solar time not being an equable division during the year, caused by the nodes not corresponding with either axis of the earth's orbit. The length of the solar day varies with the latitude, and the mean clock indications should correspond.

(40) W. McP., Jr., asks: What will make white paper transparent, so that when a bright color is placed on the back it will show through distinctly? A. Dissolve a piece of white beeswax, about the size of a walnut, in half a pint spirits of turpentine; then having procured some very fine white woven tissue paper, lay it on a clean board, and with a soft brush dipped in this liquid go over one side and then turn it over and apply it to the other; hang it up in a place free from dust to dry. It will be ready for use in a few days. Some add a quantity of resin, or use resin instead of wax. Perhaps simply brushing sheets of paper over with boiled oil will prove satisfactory for your purposes.

(41) G. C. W. asks for the best way to prepare a tin churn for churning, so as to keep the milk and butter from sticking to the churn. A. The addition of a little water as the operation proceeds will doubtless help you. A certain amount of experience is also essential.

(42) J. A. F. asks for a receipt for a good paste that will not draw engravings when pasted down on paper. A. For this purpose we would recommend the use of a thin paste. A mixture of gum tragacanth and gum arabic forms with water a thinner mucilage than either of these two gums alone. Rice flour is said to make an excellent paste for fine paper work. A solution of 2½ ounces gum arabic in 2 quarts of warm water is thickened to a paste with wheat flour; to this is added a solution of alum and sugar of lead 1½ ounces each in water; the mixture is heated and stirred about to boil, and is then cooled. It may be thinned with a gum solution.

(43) F. W. G.—A boiler for a one horse power engine should have eighteen square feet heating surface for effective power. A common cooking stove will not be suitable for such a boiler.

(44) B. G. M.—Large window plates may bulge from compression in their setting or by contraction from extreme cold. If the plates are thin, it is possible that their own weight may contribute to the excessive bulge at the bottom. If the putty or whatever holds the glass in place is bulged as you have sketched, it indicates edge thrust, which may be relieved by resetting or cutting away the bearing at the proper place.

(45) H. O. T.—All vessels propelled by steam are required to have a United States license; by a recent order, launches and yachts of 5 tons and under only require a fee of $5.00 for the license.

(46) J. J. B.—We know of no surface indications for coal save the strictly geological character of the rocks associated with coal bearing strata. See

SCIENTIFIC AMERICAN SUPPLEMENT, No. 241, for geology of the coal region of Pennsylvania, also No. 173, geology of coal; also an interesting article by Prof. Newberry, in No. 383; also Dana's Geology. The humming of a locomotive is caused by the vibration of the spring safety valve, which produces a synchronous resonance of both air and earth through the medium of the escaping steam.

(47) N. asks: 1. Would an ordinary Babcock fire extinguisher, 10 x 24 in., with a guarantee of a 220-pound water test, be safe for a steam pressure of say 100 pounds? It is brazed, not riveted. How as to its capacity to supply a cylinder of say 1½ x 1½ in. by casing it in a fire box for ⅔ its surface? A. The extinguisher is large enough for the engine as stated. We would not recommend you to risk more than 50 pounds pressure. 2. Is there a flexible tubing is the market, rubber or otherwise, that would be suitable for steam at 75 to 100 pounds pressure, say ¼ in. inside? A. The flexible tubing or "steam hose" is made by large rubber houses for this use.

(48) P. C. asks: The safe transmitting horse power of a 14 in. double leather belt. Pulley on engine crank shaft, 5 ft. diameter; 80 revolutions; pulley on main shaft, 3 ft. diameter; distance between centers of crank shaft and main shaft, 25 ft. Elevation of main shaft above crank shaft, 15 ft. Sag or droop of belt on top line of belt; also the rule of size for belt for given horse power. A. Your belt will transmit from 18 to 20 horse power. The size of belt for given horse power is very variable, according to strain, speed, and size of pulleys, and also the lap on the pulleys. You will find interesting articles and tables of belts and their power in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 39, 331, and 236.

(49) G. W. S. writes: I have an engine, the cylinder of which is 3 in. diameter, having a stroke of 5 in., and running at from 250 to 300 revolutions per minute, which I wish to furnish with steam by pumping hot water into a coil of copper tubing after it has been heated. How much tubing would be required, and what size would be best? I wish to take up as little room as possible. With such a coil for a boiler are water gauges, steam gauges, or safety valves required? A. With 50 pounds pressure your engine will develop about 2½ horse power, and will require about 35 square feet of heating surface in the boiler. If made of 1¼ copper tubing outside diameter, you will require 100 ft. in length. For a serviceable boiler, this amount of pipe should be made into several coils terminating in headers at top and bottom, with an outside connection for water gauge, gauge cocks, and safety valve. We do not recommend this form of boiler to the inexperienced.

(50) W. J., Jr., writes: I am very anxious to learn to play the violin, but there is no teacher here that I know of. Could such music be taught by mail? And if so, will you give the address of some one that teaches it? A. It is doubtful whether playing on the violin can be taught by mail. However, if you correspond with either the New York Conservatory of Music or else the College of Music, full information will be given you.

(51) Reader.—The finest wool is said to be that from Silesia, a province of the German Empire near Austria. The wool obtained from the Angora *goat*, not *sheep*, is the whitest wool known, but we do not think that it equals that obtained from the Australian merino sheep in fineness. See the article on Wool in Appleton's American Encyclopedia.

(52) J. Z.—Powdered charcoal is the best filling for a refrigerator, as its antiseptic properties are very essential. Mineral wool is also good, and better if mixed with charcoal. Ashes are too dense, and will not prevent mustiness.

(53) J. D. W.—Iron is strongest at about 500° temperature. A boiler is probably a little stronger with 200 pounds steam pressure than with 200 pounds water pressure.

(54) H. S. B. asks the reason for so many oil paintings cracking—often those by the best artists, who, it is to be supposed, would use only the best materials. A. The cracking of paints is due to the oxidation of the oils, etc., with which the paints are mixed, causing the canvas to shrink and ultimately to crack. The only remedy is varnishing, which must be performed from time to time by those who desire to preserve their pictures.

(55) W. F. W.—An analysis of French bottle glass gave the following results: Silica 53·55, potash 5·48, lime 29·22, alumina 6·01, oxide of iron 5·74, parts in 100.

(56) C. E. M. asks: Can you tell us what will toughen stearine? It is too brittle for small candles. Beeswax we have tried, and it will not work. A. Paraffine is used to stiffen candles.

(57) A Subscriber asks a reliable recipe for canning asparagus in self-sealing glass jars. A. The asparagus is generally cooked in the jars, and then sealed when deemed sufficiently cooked. The manipulation is one that can only be acquired by experience, and it is therefore impossible to give you any receipt, by following which successful results will ensue.

(58) C. P. M., Jr., asks how many mints there are, and where, in the United States. A. Under the coinage act of 1873, the following mints and assay offices are in operation: The mints of Philadelphia, Pa., San Francisco, Cal., Carson City, Nev., and Denver, Col.; and the assay offices of New York, N. Y., Charlotte, N. C., and Boise City, Idaho.

(59) C. F. M. asks how to make a silent gunpowder, to shoot birds for stuffing. A. We do not know of any silent gunpowder. A light charge with small shot or else an air gun can be used to kill birds so as not to injure their skins.

(60) C. F.—To enlarge a card photo without a camera for photo crayon work, first soak the photograph in warm water until the albumen paper separates from the card mount. Now dry the albumen print and lay it in a printing frame, picture side up, and then put in on top, film side down, an ordinary gelatine dry plate. This should be done by a red light. Make the exposure to white light for one or two seconds, and develop the image in the ordinary way. When fixed, you have a clear negative of the card photograph. By placing the negative in an enlarging apparatus, as described in the SCIENTIFIC AMERICAN of February 9, 1884, and using sensitive gelatine silver paper, any size enlarged image can be obtained. A positive may be made from the glass negative by contact, and enlarged up by means of a camera. Sketches can be easily made while it is thrown up.

(61) M. C. G.—To make photo developing trays water tight, whether made of wood or metal, coat them three or four times, after each application is dry, with a diluted solution of Syrian asphaltum dissolved in oil of turpentine. Pasteboard used for the same purpose should first be coated with linseed oil varnish.

(62) H. K.—There is no better way to put a high gloss upon the canvas enlargement than by the method of wax and turpentine; we think the proportions you have used were too strong; instead of equal parts of wax and turpentine, try the following formula:

White wax in shreds ..... 1 oz.
Oil of turpentine. ..... 5 oz.

On page 626, October 3, 1884, issue of the *Photographic News*, you will find useful information on this subject. The usual sizing given to cotton cloth is imparted to the thread before it is woven; the glaze is made by passing the cloth through heated calender rolls under pressure.

(63) I. A. W. asks how to prepare a rapid photo printing paper which shall exceed in rapidity the ordinary blue process, and be capable of being affected by light passing through an ordinary 3 ply sheet of Bristol board. A. By means of gelatino-bromide of silver emulsions, rapid printing paper can be successfully made, but its manufacture is attended with considerable bother; and as it will keep well, it is advisable for the beginner to purchase it ready prepared from dealers in photographic materials. One method of preparing the paper is, first, to make a sensitive emulsion as given by Henderson on page 293 of the November 8, 1884, issue of the SCIENTIFIC AMERICAN, and then to coat a sheet of plain Saxe paper with it, by laying the moistened sheet upon a level plate of glass, and bending the edges up by strips of wood, to form a paper dish. The emulsion while warm is now poured on the center of the sheet until a pool is formed large enough to permit it to be spread equally over the sheet by a glass rod. It is then allowed to cool, and when sufficiently set the sheet of paper is hung up to dry. It may now be exposed, film side away from the face of the thick card board drawing, in an ordinary printing frame for two or three seconds to diffused daylight, or for a minute and a half to the light from a large kerosene lamp. The image is then developed by immersing the exposed sheet in a solution of ferrous oxalate of potash composed of saturated solution of neutral oxalate potash acidified with a solution of oxalic acid sufficient to turn blue litmus paper red, 6 ounces, saturated solution of sulphate of iron, 1 ounce. The iron must be poured into the oxalate. Half a dozen exposed sheets may be developed one after the other, in the same solution. The sheet is next washed by soaking in a pan of water for four or five minutes, removed, and immersed in a solution of

Hyposulphite soda..... 1 oz.
Water..... 6 oz.

for eight minutes, which fixes the print; the latter must now be washed for two or three hours in several changes of cold water, when it may be hung up to dry, which it must do spontaneously, as the application of heat will melt the gelatine film. Examination of the print will show the lines and figures non-reversed as in the original drawing, because the sensitive sheet was laid on film side away from the drawing. The operation of preparing and developing the paper must be carried on in a dark room lighted only by a deep ruby red non-actinic lamp.

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