

Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

Sight: An Exposition of the Principles of Monocular and Binocular Vision. By Joseph Le Conte, LL.D., author of "Elements of Geology," etc. "International Scientific Series." With illustrations. 12mo. cloth. Price, \$1.50. D. Appleton & Co., Publishers, 1, 3, and 5 Bond Street, New York.

Turbine Wheels; Mill Mach'y. O. J. Bollinger, York, Pa.

The Twin Rotary Pump. See adv., p. 140.

For Mining Mach'y, see adv. of Noble & Hall, p. 172.

Carpenter's Tool Patent for sale. See adv., p. 190.

Silica Paints (not mixed); all shades. 40 Bleeker St., N. Y.

Geiser's Patent Grain Thrasher and Separator; Peerless, Portable, and Traction Engine. Geiser M'fg Co., Waynesboro, Pa.

Wanted—Steam Engine, 150 to 200 H P.; must be first-class. Address Baugh & Sons, Philadelphia.

13,000 Battery Carbons, 2½ x 4½ inches, wanted immediately. Send sample with estimate. J. Pusey, P. O. Box 2008, Philadelphia, Pa.

Van Bell's "Rye and Rock" is acknowledged to be the best remedy for lung and throat diseases.

\$600.—Entire Patent Valuable Household Art. H. Station F., Philadelphia, Pa.

A man well established in business, but having some leisure, would like to handle a specialty on commission. Address Box 6, Journal Office, Providence, R. I.

Avoid the expense and evils attending the use of compounds in your boiler. Remove the sediment contained in feed water at small cost by Hotchkiss' Mechanical Boiler Cleaner. Circulars free. 84 John St., New York.

Heavy Lathe, 7 ft. swing, 16 ft. bed.; Steam Hammer; Heavy Geared Hoisters; Double Cylinder Propeller Engine, 26 x 26; Portable Hoister; Engines, Boilers, Boiler Makers' and Machinists' Tools. 22 East, near Delancey St., New York city.

Foreman wanted for Machine Shop. A thorough mechanic, competent to manage men. Satisfactory references required. B. W. Payne & Sons, Corning, N. Y.

Wanted—Mechanical Draughtsmen. None but thoroughly practical men need apply. S. S. Hepworth & Co., 11th Ave. and 27th St., New York.

Gear Wheels for Models, etc.; brass or iron. New list free. Discount to dealers. Grant, 4 Aiden St., Boston.

Lightning Screw Plates and Labor-saving Tools, p. 125.

Fire Brick, Tile, and Clay Retorts, all shapes. Borgner & O'Brien, M'frs, 23d St., above Race, Phila., Pa.

Telephone and Call Bell, complete set, only \$3. Model Novelty Co., Boonton, N. J.

Wanted—10 or more Iron Cars, suitable for drying purposes, holding about one ton each. Address Baugh & Sons, Philadelphia.

For Machinists' Tools, see Whitcomb's adv., p. 173.

Toope's Pat Felt and Asbestos Non-conducting Removable Covering for Hot or Cold Surfaces; Toope's Pat. Grate Bar. C. Toope & Co., M'fg Agt., 353 E. 78th St., N. Y. For Light Machinists' Tools, etc., see Reed's adv., p. 156.

Large Slotter, 72" x 18" stroke. Photo on application. Machinery Exchange, 261 N. 3d St., Phila.

Buy the Buffalo Port Forge. Have no other.

The Inventors' Institute, Cooper Union, New York. Sales of patent rights negotiated and inventions exhibited and advertised for subscribers. Send for circular.

Presses, Dies, and Tools for working Sheet Metals, etc. Fruit and other "Can Tools." E. W. Bliss, successor to Bliss & Williams, Brooklyn, N. Y.

L. Martin & Co., manufacturers of Lampblack and Pulp Mortar-black, 236 Walnut St., Philadelphia, Pa.

Send to John D. Leveridge, 3 Cortlandt St., New York, for illustrated catalogue, mailed free, of all kinds of Scroll Saws and Supplies, Electric Lighters, Tyson's Steam Engines, Telephones, Novelties, etc.

Pure Oak Lea Belting. C. W. Arny & Son, Manufacturers Philadelphia. Correspondence solicited.

Within the last ten years greater improvements have been made in mowing machines than any other agricultural implement. It is universally acknowledged that the Eureka Mower Co., of Towanda, Pa., are making the best mower now in use, and every farmer should write to the manufacturers for catalogue, with prices.

Jenkins' Patent Valves and Packing "The Standard." Jenkins Bros., Proprietors, 11 Dey St., New York.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. Wood-Working Machinery of Improved Design and Workmanship. Cordesman, Egan & Co., Cincinnati, O.

The "1880" Lace Cutter by mail for 50 cts.; discount to the trade. Sterling Elliott, 262 Dover St., Boston, Mass.

Experts in Patent Causes and Mechanical Councils. Park Benjamin & Bro., 50 Astor House, New York.

Peck's Patent Drop Press. See adv., page 174.

Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

Burgess' Portable Mechan. Blowpipe. See adv., p. 140. Malleable and Gray Iron Castings, all descriptions, by Erie Malleable Iron Company, limited, Erie, Pa.

Power, Foot, and Hand Presses for Metal Workers. Lowest prices. Peerless Punch & Shear Co., 52 Dey St., N. Y. National Steel Tube Cleaner for boiler tubes. Adjustable, durable. Chalmers-Spence Co., 40 John St., N. Y.

Wren's Patent Grate Bar. See adv. page 173.

Corrugated Wrought Iron for Tires on Traction Engines, etc. Sole mfrs., H. Lloyd, Son & Co., Pittsburg, Pa.

Eclipse Portable Engine. See illustrated adv., p. 158. Best Oak Tanned Leather Belting. Wm. F. Forpaugh, Jr., & Bros., 381 Jefferson St., Philadelphia, Pa.

Stave, Barrel, Keg and Hoghead Machinery a specialty, by E. & B. Holmes, Buffalo, N. Y.

4 to 40 H. P. Steam Engines. See adv. p. 158.

Rollstone Mac. Co.'s Wood Working Mach'y ad. p. 158.

Apply to J. H. Blaisdell for all kinds of Wood and Iron Working Machinery. 107 Liberty St., New York. Send for illustrated catalogue.

Machinists' Tools and Special Mach'y. See adv., p. 173.

Wright's Patent Steam Engine, with automatic cut off. The best engine made. For prices, address William Wright, Manufacturer, Newburgh, N. Y.

The Brown Automatic Cut-off Engine; unexcelled for workmanship, economy, and durability. Write for information. C. H. Brown & Co., Fitchburg, Mass.

Brass & Copper in sheets, wire & blanks. See ad. p. 173.

National Institute of Steam and Mechanical Engineering, Bridgeport, Conn. Blast Furnace Construction and Management. The metallurgy of iron and steel. Practical Instruction in Steam Engineering, and a good situation when competent. Send for pamphlet.

Saunders' Pipe Cutting Threading Mach. See p. 173.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, importers Vienna lime, crocus, etc. Condit, Hanson & Van Winkle, Newark, N. J., and 92 and 94 Liberty St., New York.

Saw Mill Machinery. Stearns Mfg. Co. See p. 141.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 142.

Moulding Machines for Foundry Use. 33 per cent saved in labor. See adv. of Reynolds & Co., page 141.

The Sweetland Chuck. See illus. adv., p. 141.

Machine Knives for Wood-working Machinery, Book Binders, and Paper Mills. Also manufacturers of Solomon's Parallel Vise, Taylor, Stiles & Co., Riegelsville, N. J. Eagle Anvils, 10 cents per pound. Fully warranted.

The Chester Steel Castings Co., office 407 Library St., Philadelphia, Pa., can prove by 15,000 Crank Shafts, and 10,000 Gear Wheels, now in use, the superiority of their Castings over all others. Circular and price list free.

Diamond Planers. J. Dickinson, 64 Nassau St., N. Y.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

For best Indirect Radiators, see adv., page 173.

Steam Cylinders bored from 3 to 110 inches. L. B. Flanders Machine Works, Philadelphia, Pa.

Houston's Four-Sided Moulder. See adv., page 173.

The Student's Illustrated Guide to Practical Draughting. By T. P. Pemberton. Sent on receipt of price, \$1. Address T. P. Pemberton, 5 Dey St., Room 13, New York.

New Economizer Portable Engine. See illus. adv. p. 173. For Mill Mach'y & Mill Furnishing, see illus. adv. p. 172.

For Shafts, Pulleys, or Hangers, call and see stock kept at 79 Liberty St., N. Y. Wm. Sellers & Co.

The I. B. Davis Patent Feed Pump. See adv., p. 141. Wm. Sellers & Co., Phila., have introduced a new injector, worked by a single motion of a lever.

Skinner & Wood, Erie, Pa., Portable and Stationary Engines, are full of orders, and withdraw their illustrated advertisement. Send for their new circulars.

Use Vacuum Oil Co.'s Cylinder Oil, Rochester, N. Y.

Don't buy a Steam Pump until you have written Valley Machine Co., Easthampton, Mass.

Send ten cents for Vick's Floral Guide. See adv., page 140. James Vick, Rochester, N. Y.

Clark Rubber Wheels adv. See page 172.



HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from \$1 to \$5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

(1) J. S. M. writes: In the last SCIENTIFIC AMERICAN in answer to J. S. M., in regard to re boring the cylinder, or grinding with segment of lead and sand or emery, I will ask if it is not possible to wear the cylinder smooth by constant use, keeping the packing set slack and keeping it well lubricated with good oil mixed with good plumbago, the cylinder being quite soft? I know of one case where a cylinder became cut quite bad on opposite sides by the piston rod being bent on account of one of the follower bolts working out. This cylinder became smooth in about four months of running twelve hours each day, without any special care on account of its being cut. This case makes me think that a cylinder that has become cut in one or two places might, with extra good care, be made to wear smooth. What is your opinion in the case? You have told me already that the only safe way was to re bore the cylinder, and I think it is; but if it is possible to wear it out I would like to do so. The diameter is 22 inches, being cut in one place about 5 inches wide, whole length of stroke 20 inches. A. We think that with care it might be accomplished in the way you propose, but the process must necessarily be slow, as all other parts of the cylinder must be worn or abraded to a diameter sufficiently large to remove the metal to the depth of the cuts.

(2) W. L. asks: How much stiffer would a wrought iron pipe, 4 inches in diameter and ¼ inch thick, be, than a pine stick 8 inches in diameter, both to be 10 feet long? A. The pipe would be about 3½ times stiffer than the wood.

(3) O. P. S. asks: 1. What is the best preparation that I can use to ebonize or blacken parts of a light-colored ash wood, used for furniture, the preparation to be applied with a brush? A. See page 91, (18), vol. xl, SCIENTIFIC AMERICAN. 2. Will a simple rotary fan blower, 6 inches in diameter, with the wings 2½ inches across, be sufficient to run a sand blast, and what would be the greatest speed to get the strongest blast? A. Such a fan will do. It should run at from 2,500 to 3,000 revolutions per minute.

(4) H. F. W. writes: 1. In the description of Elisha Gray's electro-harmonic telegraph, in No. 27, vol. xlii., it says that the steel reeds are operated by electro-magnets, and "the current, operating one reed when passed over a line, will set in motion at the farther end a reed exactly corresponding to the first," etc. Why is not one reed set in motion by the current as much as another? A. A reed will answer only to electrical impulses corresponding in rapidity with its period of vibration. 2. Has any motor been invented to use simply the power of a permanent magnet? A. No.

(5) J. P. F. asks: 1. Where can I procure a good cylinder air pump? A. From any good metal pump maker. See our advertising columns. 2. What would be the weight of one square foot of steam, at a density of 140 lb. to the square inch? A. One cubic foot, 155 lb., total pressure=0.00348 lb.

(6) H. A. M. writes: A maintains that white is a color. B says that white is not a color. Is white a color considered in the same sense as green or yellow, etc.? A. White is popularly considered as a color, but in reality it is the union of all colors.

(7) J. L. K. writes: 1. I want to bring water to a turbine wheel, a distance of 800 feet, fall 60 feet, size of pipe about 15 inches. I propose using 500 feet of pipe and 300 feet open race. Can I make a substantial pipe of 3 inch plank, and how should I construct it? A. Yes; make the pipe with staves, hooped with wrought iron band. The lower end must of course be hooped closer than the upper end. 2. What power do I require to drive a two-block shingle machine, self-feeding saw, making 1500 revolutions per minute, and cutting half an inch each revolution? A. About six horse power.

(8) J. W. H. asks: 1. How much power is required to run a 24-inch saw to cut or split hardwood plank from 3 to 4 inches thick? A. T. power does not depend upon the size of the saw, but upon the amount of work to be done; and, as you do not state this, we can give you only a general reply. With a kerf of one-eighth inch, 1 horse power will saw 2.66 square feet per minute. 2. Which is the best steam engine, one with large cylinder and short stroke, or a smaller cylinder and longer stroke, both to be of the same horse power? A. For high speed short stroke, and for slow speed long stroke. 3. Which is the best, the upright or the horizontal—the engines not to exceed 15 horse power? A. There is very little choice; the upright occupies the least room.

(9) C. N. F. asks: 1. How can water be kept in casks for fire purposes in mills, in winter, without freezing? A. I have used salt, but it don't seem to be a sure preventive. A. Salt will answer very well if you use enough of it.

(10) J. W. B. writes: I want to plate table cutlery with Banca tin, by melting the tin in a crucible, and dipping the articles to be plated. How shall I prepare the solutions to be used before and after the dipping, so that no polishing will be necessary? A. Cleanse by dipping in a mixture of equal parts muriatic acid and water, and scouring with a brush and fine sand or pumice stone; rinse quickly in running water, and put into a bath of hot melted tallow for half an hour, then for an hour in the molten tin at about 435° Fah. On removal dip in very hot tin, and remove all superfluous metal with a brush of hemp. Dip again in a very hot bath of purest tin, and transfer at once to a bath of hot oil, where excess of the metal drains off. On removing dip the edges in the hot tin to take off the thick border. Finally rub with dry bran until the oil is removed and the work presents a silvery gloss.

(11) W. S. asks (1) how to obtain a pure or nearly pure carbon gas. A. We do not know what you mean by carbon gas. 2. Can a vessel containing said gas be heated to redness without danger? A. Illuminating or similar hydrocarbon gas, or vapor of petroleum oils, et., if unmixed with air, may be passed through red hot iron tubes without danger. Owing to the expansion caused by heat it would not be safe to heat such a gas in sealed vessels. 3. Can carbon be made a non-conductor of electricity, and if so, will it retain its infusible properties? A. The diamond (pure crystallized carbon) is practically a non-conductor of electricity, and infusible; the other forms afford a passage to the current. The conversion of these latter into the crystalline form has not yet been accomplished in a practical way. 4. Will kaolin withstand the heat of incandescent carbon of ordinary lamps (say Edison's)? If not, is there any substance, a non-conductor, that will? A. Not very well; you might try pure caustic lime or magnesia.

(12) G. G. asks: Is there any way to prepare India ink so that it will not gum or harden? If so, please inform me how to do it. A. Dilute Cooper's liquid glue with about six parts of water, mix into a perfectly smooth thick paste, with the finest purified vegetable lampblack: mould and dry slowly.

(13) G. G. P. writes: I am at a loss for a mordant for dyeing pearl buttons either blue or red. Can you assist me? A. Use a strong alcoholic solution of aniline blue or red; dry, and rub down with cork moistened with oil of vitriol.

(14) C. C. asks: 1. Can I soften celluloid so I can press it into a plaster cast of a wood engraving and then print from it as from a stereo or electrotype? A. Yes, by steam and pressure; also by means of a hot oil bath. 2. Where can celluloid be bought, and cost per sheet or lb.? A. See our advertising columns and Hints to Correspondents. 3. Where can bisulphide of carbon be obtained in small quantities, say 1, 2, or 3, oz., and cost per oz.? It cannot be had here or in Den-

ver. A. Your druggist can doubtless procure it for you; costs about 40 cents a pound. 4. Can electro-types be produced with the dynamo electrical machine? A. Yes. 5. Can you explain how engravings on wood are made to look similar to pencil drawings and lithographs, as seen in Scribner, St. Nicholas, Wide Awake, and the Jersey Bull, in this week's SCIENTIFIC AMERICAN (February 5); show shape of tools? A. The plates are prepared by the photo-engraving process. See printing by photography, SUPPLEMENTS, Nos. 143 and 146. 6. Where can the tools be bought? A. See answer No. 2. 7. Give parts of hydrofluoric acid and parts of water for etching on glass. A. Use ordinary strong hydrofluoric acid, or powdered fluorspar, made into a paste with strong sulphuric acid slightly warmed.

(15) W. P. D. asks: What is the best mixture to apply to iron shaft and castings to protect them from dilute acids? A. Clear lard, 1 lb.; camphor, ¼ oz.; melt together and mix with enough blacklead to color. Clean the parts and coat thoroughly with this.

(16) O. C. asks: Can you inform me of any process by which eggs can be prevented from spoiling and kept in a reasonably fresh state, say from April to January? I have tried some pickling process but not with success. A. One of the best means of preserving eggs is the following: Select good fresh eggs and pack endwise in a mixture of equal parts of fine dry charcoal and salt (cold). Keep in a cool dry place, until required for use. A thin coating of gum or a trace of oil will prevent loss of moisture through the shell.

(17) A. E. N. asks: How is the sensitive paper used for taking blue prints (photographic) prepared? A. Ferricyanide, 1 oz.; ammonio-citrate of iron, 1 oz.; water (distilled), 10 oz. Both the ferricyanide and citrate must be chemically pure. Dissolve the former in six ounces of the water and the latter in the remainder. Mix the solutions together, put into a shallow porcelain dish. Float the sheets of paper on the surface of the liquid, raising the corners alternately to drive out air bubbles. Hang up by one corner in a dark place to dry. After exposing to sunlight behind the design or drawing, wash immediately and thoroughly in running water to remove all unchanged chemicals.

(18) C. E. S. asks for a process for tinning malleable cast iron. The acid used to tin wrought iron will not do for malleable iron. I have tried it without success. A. Do not leave in the acid or bran too long; scour thoroughly with fine sand (and a wire brush where it can be used), and pass through the following solution before entering to the grease pot: Ammonia alum, 11 oz.; fused protochloride of tin, ½ oz.; water, 4½ gallons; heat to boiling.

(19) T. H. C. asks: What kind of a machine is used for emerying those iron or steel ramrods used in the army guns? A. We believe an emery belt is commonly used for this purpose.

(20) R. J. W. writes: I have several boilers in this section of the country receiving their water from driven wells. The water is perfectly clear, is good to drink; but when used in a boiler to make steam it forms a froth or scum on top of water. How can I get rid of it? It will not sink so that I can blow it out of mud drum. Will a surface blow-off answer, by putting the pipe from top of boiler down to water line? A. Use a surface blow-off valve with a scum pipe inside the boiler.

(21) F. M. W. asks: Please explain how I can make gas bags in some cheap way, that will hold enough oxygen and hydrogen gas to run a magic lantern for two or three hours without filling again? A. Gum caoutchouc, 1 part; benzole, 20. Warm the latter over hot sand (out of doors), and gradually add the former, cut in fine shreds. Let it stand, with occasional stirring, until solution is complete. Give fine cotton ducking two coats of this (on one side), letting the first become nearly dry before laying on the second. Place two of these pieces, cemented faces together; go over the double piece (both sides) with a hot iron, and expose to the air for a week, to dry. Having prepared enough of this double cloth, stitch together with strong linen thread to form a wedge-shaped bag; give the seams several coats of the cement, thinned somewhat with benzole, and seal in the stop cock with the same. With an ordinary oxyhydrogen jet and quarter lb. pressure per inch you will require at least 15 feet of oxygen gas and about twice as much hydrogen (pure hydrogen). A "wedge" bag, 4½ x 4 x 3 feet, will hold sufficient oxygen.

(22) S. C. asks for the process of making chloride of lime in small quantity. A. Paint with asphaltum dissolved in oil of turpentine the inside of a long shallow box, all the cracks of which have been previously stopped with putty. When this is dry sprinkle the bottom of the box with slaked lime just moist, to a depth of half an inch. At one end place a stoneware jar half filled with a mixture of 6 parts black oxide of manganese, 8 parts salt, mixed with 20 parts of water. Then stir in 13 parts of oil of vitriol (which will heat the water nearly to boiling). Set on the cover tightly at once and let it alone for twelve hours. The lime will be found sufficiently chlorinated for use. The box should be kept out of doors. Avoid inhaling the chlorine gas. Usually it is very much cheaper to purchase than to make small quantities of bleaching powder.

(23) F. M. J. asks: 1. Cannot a small electric lamp for an ordinary room be furnished with light from a battery run by clockwork, similar to Edison's, but on a small scale, that would be an improvement on the ordinary kerosene lamp, the lamp to be stationary or otherwise. A. A one light machine could doubtless be constructed, but the clock work motor would hardly prove practicable. Small dynamo machines are not as economical as large ones. 2. Please explain the *modus operandi* of clarifying the crude oil kerosene as we receive it at 150 test. A. Agitate with about 3 per cent of oil of vitriol, then with plenty of water, and finally with water containing a trace of soda. 3. I find "aluminum gold" jewelry advertised—warranted to keep color and not distinguishable from gold, even by experts. Is the metal what it is represented to be? A. Aluminum bronze can be made to closely resemble gold in appearance. Experts can easily distinguish the alloy from gold.

(24) W. T. asks how to make asphalt pavements or walks. Are they expensive? Where can the material be obtained? Is it durable? What is the best mixture for walks that will stand hard usage? A. Ordinarily gravel screened to various sizes is stirred up with asphaltum liquefied by heat until the pebbles become well coated with the material. The road bed having been excavated to a depth of 6 or 7 inches and walled at the sides with inch planks, a layer of the coarser gravel is laid down and compacted by heavily rolling. Other layers of tarred gravel grading to fine sand at the surface are then put down in a similar manner. These walks are much cheaper than flagging, but they do not stand the weather in this climate very well. Good hydraulic cement mixed with about twice its weight of very fine sharp quartz sand and one one-hundredth part of silicate of soda dissolved in water makes a good walk when properly hardened. For materials see our advertising columns.

(25) T. H. S. asks: Can you inform me if there is any paint or other material which can be depended upon to make a wooden cistern watertight? If cement is used will it adhere better to brickwork than to wood? A. Try the following: 1. Boiled linseed oil, 3 parts; asphaltum, 4 parts; rosin, 12 parts. Melt and stir together over a gentle fire for an hour. Try a sample by cooling under water; if not sufficiently firm add more asphaltum and resin. Apply to the dry wood hot (not too hot). 2. Litharge, plaster of Paris, and dry white sand, each 10 parts by measure powdered; 1 part finely powdered resin. Mix into a stiff paste with warm boiled oil. Use at once and give three days to harden before wetting.

(26) J. M. A. writes: The front glass of my aquarium, one-sixteenth inch thick, 12x28, has cracked across the narrow part. There is no support for the top of the glass, but a strip is laid on. How can it be made secure without trouble of replacing the glass? The fracture is very neat, so that it scarcely leaks. A. Clean the glass with a little soda, and cut a piece of thin glass an inch wide and as long as the crack. Smear both glasses with the following warm solution: Fine isinglass and gelatine, each 1 dram; bichromate of ammonia, 12 grains; water, 2 ounces; filter. Slide one glass upon another so as to carry off all but a film of the cement, which exposure to light soon renders perfectly insoluble in water.

(27) J. A. B. asks: What is the process for making the article called pumpkin flour? A. The cleaned and pulped fruit is dried by exposure to currents of warm dry air, then ground in a mill.

(28) G. B. asks for directions for embossing designs on glass ware, that is, goblets and shade globes. We understand the work is printed on by impressions taken off brass plates, then transferred to paper and from that to the glass, and then the glass is put in a bath containing white acid. A. Print from engraved plates on soft paper and immediately place the printed papers smoothly on the glass to dry. Moisten the back of the paper with a sponge, when it will come off, leaving the design on the glass. Then dip the surface in hydrofluoric acid until properly etched, rinse in water, and take off the fatty design by soaking in benzole.

(29) T. C. asks: What is the composition of the charges used for charging small fire extinguishers? A. The vessel is partially filled with a saturated aqueous solution of bicarbonate of soda. Over the liquid, near the top of the vessel, is suspended a lead bottle of oil of vitriol, in such a manner that when its stopper is withdrawn by pulling up the rod at top the bottle inverts and the acid is thrown into the bicarbonate solution.

(30) H. S. C. asks how to make and apply self-luminous or calcium sulphide paint. A. Boil together for an hour 2 1/2 oz. caustic lime, recently prepared by calcining clean white shells at a strong red heat, with 1 oz. of pure sulphur (floured) and a quart of soft water. Set aside in a covered vessel for a few days, then pour off the liquid, collect the clear orange colored crystals which have deposited, and let them drain and dry on bibulous paper. Place the dried sulphide in a clean black lead crucible provided with cover. Heat for half an hour at a temperature just short of redness, then quickly for about 15 minutes at a white heat. Remove cover, and pack in clay until perfectly cold. The addition of a small quantity of pure calcium fluoride to the sulphide before heating it is made. It may be mixed with alcoholic copal varnish.

(31) E. I. asks: 1. How can I make a lacquer for polished brass, etc. Can it be purchased? How is it applied? A. Seedlac, dragon's blood, annatto, and gamboge, each 4 oz.; saffron, 1 oz.; spirits of wine, 10 pints. Put all together in a covered vessel and stand the vessel in hot water and stir the contents occasionally until dissolved. Such lacquers are purchasable. Lacquering is done in two ways, called hot and cold lacquering. In the latter the lacquer is laid on evenly with a camel's hair brush, and the work is then placed in an oven or on a hot stove for a few minutes to set the lacquer. If heated too strongly the lacquer is discolored; if not enough it does not set properly. By the first method the metal is heated to the temperature of a flat iron as used by the laundress, and the lacquer is quickly brushed over it in this state, the work being subjected to the heat of an oven after or not, according to the judgment of the lacquerer. The article, if very small, will require this, because it will have parted with much of its heat in laying on the lacquer. If heavy, it will retain sufficient to perfect the process. A knowledge of the exact degree of heat required can only be attained by experience. 2. What is the best article to polish small tin articles about the size of a button? We have a good many of these to do. A. Use a small circular scratch brush attached to a lathe. 3. How can we get cheaply? A. See article on electro-gilding, page 116, current volume.

(32) N. P. H. asks: What will make a glue that will be strong and yet be thin? A. Heat the solution for some time in a Papin's digester at 300° Fah.

(33) W. P. M. asks for the best method of coating sheet iron pans to keep them from rusting. I want some cheap varnish. A. Asphaltum, 5 parts;

fine black lead (graphite), 1 part. Dissolve the asphaltum in oil of turpentine and stir in the graphite.

(34) E. E. W. asks (1) if the telephone, in SUPPLEMENT 142, will work five miles on No. 12 wire. A. If well made it would probably work through that distance, but the sound would necessarily be weak. Better results are obtained by using some form of transmitter. 2. How are the insulators attached to the bracket, or, in other words, what is the composition used to fasten or glue them on? A. The insulators are generally screwed on the brackets, an internal thread being formed in the insulator for that purpose.

(35) A. J. K. asks: What can be added to fluid ink made of gall and iron to make it jet black at first writing? Having night work I cannot see the writing until next day, when it then turns black. Does it injure the writing by any addition, and will it be as thin as before the addition is made? A. Try the addition of a small quantity of fine logwood extract dissolved in a little hot water.

(36) W. H. S. asks: 1. When do water pipes burst, when freezing or when thawing? A. In freezing. 2. Does water when forming into ice contract or expand? A. It expands. See Tyndall's "Heat a Mode of Motion."

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

S. W.—It is a light fine silicious sandstone. Useful for some polishing purposes.—A. L. C.—The sediment is composed chiefly of a fine micaceous clay and sulphate of lime. Not specially injurious to cattle or steam boilers.—T. B. T.—A good marl—useful for fertilizing purposes. Its marketable value can only be determined by an analysis.—L. H. D.—Hornblende.—W. B.—The metal is iron and iron protosulphide. The shale contains much carboniferous matter, but no graphite.—A. U. G.—It is hornblende-schist—of little value.—T. E. T.—Mica schist—of no commercial value.—E. M. B., Jr.—1. Copper glance—sulphide of copper and iron pyrites—sulphide of iron. 2. Pyrrhotine—magnetic iron pyrites—may contain a little nickel. 3. Impure limonite—brown hematite iron ore.

COMMUNICATIONS RECEIVED.

- On a Lunar Halo. By L. B. O.
On a Parhelion. By D. H. D.
On a Lunar Halo. By J. D. H.

[OFFICIAL.]

INDEX OF INVENTIONS FOR WHICH Letters Patent of the United States were Granted in the Week Ending February 15, 1881, AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866, will be furnished from this office for one dollar. In ordering please state the number and date of the patent desired and remit to Munn & Co., 37 Park Row, New York city. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications not being printed, must be copied by hand.

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