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For Surface Planers, small size, and for Box Corner Grooving Machines, send to A. Davis, Lowell, Mass.

The "Scientific American" Office, New York, is fitted with the Miniature Electric Telegraph. By touching little buttons on the desks of the managers, signals are sent to persons in the various departments of the establishment. Cheap and effective. Splendid for shops, offices, dwellings. Works for any distance. Price \$5. F. C. Beach & Co., 263 Broadway, New York, Makers. Send for free illustrated Catalogue.

The most Perfect Power Hammer—Exclusive Right for sale, or built on Royalty. Particulars of Samuel Pennock, Kennett Square, Pa.

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Steploc, McFarlan & Co., No. 212 to 220 West 4d St., Cincinnati, Ohio, manufacturers of Wood-working Machinery and Machinists' Tools. Send for circulars.

Steam Boiler and Pipe Covering—Economy, Safety, and Durability. Saves from ten to twenty per cent. Chalmers Spence Company, foot East 8th St., N. Y.

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For best Presses, Dies and Fruit Can Tools, Bliss & Williams, cor. of Plymouth & Jay, Brooklyn, N. Y.

All Fruit-can Tools, Ferracute, Bridgeton, N. J.

Brown's Coal-yard Quarry & Contractor's Apparatus for hoisting and conveying materials by iron cable. W. D. Andrews & Bro., 414 Water St., New York.

For Solid Emery Wheels and Machinery, send to the Union Stone Co., Boston, Mass., for circular.

Lathes, Planers, Drills, Milling and Index Machines. Geo. S. Lincoln & Co., Hartford, Conn.

For Solid Wrought-iron Beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

Temples & Oilcans. Draper, Hopedale, Mass. Hydraulic Presses and Jacks, new and second hand. E. Lyon, 470 Grand Street, New York.

Peck's Patent Drop Press. For circulars, address Milo, Peck & Co., New Haven, Conn.

Small Tools and Gear Wheels for Models. List free. Goodnow & Wightman, 23 Cornhill, Boston, Ma.

The French Files of Limet & Co. are pronounced superior to all other brands by all who use them. Decided excellence and moderate cost have made these goods popular. Homer Foot & Co., Sole Agents for America, 20 Platt Street, New York.

Mining, Wrecking, Pumping, Drainage, or Irrigating Machinery, for sale or rent. See advertisement. Andrew's Patent, inside page.

Two 50 H. P. Tubular Boilers for Sale (Miller's patent) very low, if applied for soon. Will be sold separately or together. Complete connections and pump. Holske Machine Co., 279 Cherry Street, New York.

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A Superior Printing Telegraph Instrument (the Selden Patent), for private and short lines—awarded the First Premium (a Silver Medal) at Cincinnati Exposition, 1871, for "Best Telegraph Instrument for private use"—is offered for sale by the Merchants' Mfg and Construction Co., 50 Broad St., New York. P. O. Box 496.

Woolen and Cotton Machinery of every description for sale by Tully & Wilde, 20 Platt St., N. Y.

Dean's Steam Pumps, for all purposes; Engines, Boilers, Iron and Wood Working Machinery of all descriptions. W. L. Chase & Co., 93, 95, 97 Liberty Street, New York.

Parties needing estimates for Machinery of any kind, call on, or address, W. L. Chase & Co., 93, 95, 97 Liberty Street, New York.

Dickinson's Patent Shaped Diamond Carbon Points and adjustable holder for working Stone, dressing Emery Wheels, Grindingstones, &c., 64 Nassau st., N. Y.

Steam Fire Engines—Philadelphia Hydraulic Works, Philadelphia, Pa.

One Mills and Portable Grist Mills.—Send for Catalogue to Tully & Wilde, 20 Platt St., New York.

Waterproof Enamelled Papers—all colors—for packing Lard and other oily substances, Chloride of Lime, Soda and similar Chemicals, Cartridges, Shoe Linings, Wrapping Soaps, Smoked or Dried Meats, and Dehydrated Vegetables, Shelf Papers, and all applications where absorption is to be resisted. Samples on application. Crump's Label Press, 75 Fulton St., New York.

For descriptive circulars, and terms to Agents of new and saleable mechanical novelties, address James H. White, Newark, N. J., Manufacturer of Sheet and Cast Metal Small Wares.

Paragon Gold Quill-Pens—The best in use. C. M. Fisher & Co., 102 Fulton Street, New York.

Emerson's Patent Inserted Toothed Saws, and Saw Swage. See occasional advertisement on outside page. Send Postal Card for Circular and Price List. Emerson, Ford & Co., Beaver Falls, Pa.

Spools, Button Molds, and all small turned goods made by H. H. Frary, Jonesville, Vt.



T. D. W. can best adjust the pea of a scale by experiment, with a known weight.—J. G. P. will find an explanation of the wire rope and sheave mystery on p. 191, vol. 29.—J. H. will find directions for waterproofing canvas on p. 122, vol. 27. Varnish for chromos is described on p. 164, vol. 27. A solution of gum dextrin is sometimes used on postage stamps.—E. H. will find directions for galvanizing wrought iron on p. 202, vol. 30.—K. will find a recipe for fine shoe polish on p. 73, vol. 26.—W. W. P. will find that marine glue, described on p. 202, vol. 33, will answer his purpose.

A. R. B. asks: What elements are removed from the soil by the growth of cabbage? A. The outer leaves of perfectly ripe cabbage are composed of albuminous substances, 1.16 per cent, woody fiber, gum, and sugar, 5.0 per cent, ash, 2.3 per cent, water, 91.1 per cent. The heart leaves contain a little more water, and a little less of the other constituents. It removes potash, lime, phosphoric and sulphuric acids principally from the soil. These acids are in combination with the various bases which are absorbed by the growing plant.

A. L. C. asks: 1. If I take a tube of suitable length and diameter, and on one end put a double convex lens of about 6 inches focus, and in front of this end a mirror, at the other end a triangle, is there any way by which I can project that triangle on to the mirror, so that I may be able to see it from the outside? A. Not when arranged in the manner stated. 2. Can you give me any information in relation to the different species and character of the marine vegetation of the Great Banks of Newfoundland? A. See the reports of the exploring expeditions sent out by England and the United States Government. 3. What is the best theory on the physical constitution of the sun? A. The sun is supposed to consist of a central solid or liquid mass, which is surrounded by two or more shells or envelopes, which consist of the vapors of the various metallic and other bodies constituting the sun, and of gases, especially hydrogen in a state of intense ignition.

F. T. H. asks: 1. Can I prepare ammonia arsenite as a reagent? A. Ammonia arsenite, (NH₄)₂PO₃As₂O₃, is produced, according to Pasteur, when very strong aqueous ammonia is poured upon arsenious oxide. It exists only in contact with ammonia, quickly giving off ammonia in contact with the air. It forms a yellow precipitate with silver salts. 2. What degree of heat can I obtain in an evaporating dish on an oval copper water bath over a Bunsen burner? A. You cannot obtain a heat over 212° Fah. in an ordinary water bath, whatever the containing vessel and the source of heat may be. 3. What are the specific gravity, hardness, and other mineralogical properties of borate of lime? A. The specific gravity of borate of lime is between 2.84 and 2.98. It is sufficiently hard to scratch fluoride of lime, or calcium fluoride. Its color is white, shaded with gray or green, and sometimes milk white and translucent or nearly transparent. One variety is gray, white, and reddish in concentric stripes. Before the blowpipe it swells into a milk-white mass and then melts into a transparent glass, colorless, or sometimes pale rose colored. It is composed of lime, silica, boric acid, and water.

J. T. asks: 1. What will dissolve ultramarine to make writing fluid? A. Ultramarine can be suspended in a mucilaginous liquid, like ordinary mucilage, for the purpose you mention. 2. Will soluble glass dry on an iron surface exposed to friction? A. We do not advise the application of soluble glass where metallic surfaces rub together. 3. Will a long belt transmit more power than a short one? A. No.

S. B. says: 1. We have a cellar heater, with three hot air pipes heating five rooms; one of the pipes runs into a flue, which heats two rooms on the first floor and one on the second floor. There are no dampers in the hot air pipes or in the flue. When we want all the heat in the two rooms on the first floor, we close the registers on the other pipes and the upper part of the flue, which leaves a vacuum in those pipes and the flue. I think that, if we had dampers in pipes in the cellar by the heater, and one in the flue right above the register on the first floor, we should get more heat. A. It is usual to provide dampers in the hot air pipes near the furnace in the cellar; and you would save some heat by having them, namely, that portion which escapes from the pipe not used, by radiation from it, and by the register in the room not heated, which seldom or never closes tight. 2. Can you inform me what the sizing that plumbers put on the pipes, preparatory to wiping the joints, is made of? A. It is prepared with lamp-black and glue boiled in water, with sometimes a little lager beer put into it.

A. B. asks: What is the value of antimony, what is its use, and where is it mostly found? A. Alloys of antimony, with lead and tin, are largely used for type metal. An alloy of 90 parts of copper, 5 of zinc, and 5 of antimony is used for sockets in which the steel or iron pivots of machinery are at work. The gray antimony ore is found in the Hartz mountains in Germany, and also in Cornwall, Auvergne, Hungary, and Borneo. The oxide of antimony is found in Algeria and is smelted in France. Red antimony, which is a compound of oxide and sulphide of antimony, is found in Tuscany. The mode of working the ores is too long to be given here.

A. E. F. asks: Will you give me a recipe for making a good quick dryer for oil paint? A. Linseed oil 1 gallon, powdered litharge 1/2 lb.; simmer with frequent stirring until a pellicle begins to form, remove the scum; and when it has become cold and has settled, decant the clear portion. This is used by house painters.

E. L. D. asks: How can I remove enamel from gold without heating? The enamel is the blue kind used for ornamenting jewelry. A. The enamel to which you refer, being a species of glass, can be removed without heat by the action of hydrofluoric acid. This is most easily applied by wetting the enamel with sulphuric acid and then sprinkling over it some finely pulverized fluor spar (calcium fluoride), by which means hydrofluoric acid is set free and attacks the glass, the gold not being affected by either acid. The sulphuric acid should be slightly warm, and care taken to avoid the fumes and getting the acids on the hands, as hydrofluoric acid is very corrosive to the skin. Several applications may be necessary. Wash off and dry after each application.

P. H. W. says: To heat water I placed a copper tube in a coal stove; the tube is 13 inches deep, 5 1/2 inches diameter, with a ball made on the circle of same diameter. It was filled nearly full; and while boiling rapidly, I attempted to take it out, but the steam was rising so fast that I could not place my hand near to it. I then poured a little cold water into it, which checked the steam entirely, so that there was no visible steam arising from it. I took it out and set it on a cold plate of iron, where it stood 6 or 8 minutes, then took it by the ball again, holding it two minutes. There was no sign of steam arising from the water, but as soon as I attempted to pour it out, the steam burst forth in such volume that it was only with the greatest effort that I succeeded in keeping it from scalding my hand. Did the cold water remain on the top, and at a lower temperature, condensing the steam, until poured off? A. The explosion was caused by the power which water in a gaseous state has of retaining a large amount of steam, and setting it free when shaken or suddenly agitated.

F. M. B. says: 1. While on the roof of my house, watching the chimney burning out, I noticed a stream of electrical fire or light passing on to the point of the platinum arrow or weather vane attached to the lightning rod and passing off from the opposite end. I touched the point of the arrow with my hand and the light ceased; on removing my hand, the electrical current was again established. I reversed the arrow in direction, putting the point opposite to the wind; again the light ceased. On letting go of the arrow, the point turned toward the wind and the electrical light was resumed again. At the time the wind was blowing from southeast, rain and sleet were falling, and the barometer was low. The following questions arise: Does electricity go with the wind? A. Atmospheric electricity is caused by the advancing clouds. 2. No lightning being seen, was this voltaic electricity? And if so why did not the current pass from the arrow to the lightning rod, and thence pass to the ground instead of passing off from the reverse end of the arrow? All the connections of the copper rod are good and the lower end is nine feet in the ground, which is moist. The rod near to and below the arrow is coated with soot from the chimney: would this prevent the flow of electricity to the earth? A. It was not voltaic electricity.

J. D. S. says: I am informed that there is a method by which tracings made on tracing muslin can be reproduced on prepared white paper. I believe a negative is prepared directly from the tracing, and afterwards printed on the prepared paper by exposure to the sun. What solution is used, or how is the negative obtained? A. The drawings properly mounted in front of the camera, and a photograph is taken in the usual manner. This negative is then employed for solar printing by direct contact with sensitized paper.

W. says: In Dr. Hayes' "Open Polar Sea," he states that he procured sufficient fresh water for the crew of his schooner by boiling sea water in a common tea kettle, using a cask as a condenser. Is it so easy a process to purify sea water? If so, what is the use of the expensive apparatus sold in Europe for this purpose? We hear of the crews of vessels perishing of thirst. Surely, if there is a simple process of purifying sea water, it should be made widely known. A. There is no difficulty in procuring water free from saline matter in the manner described. But water, so distilled, differs from natural water by containing no air and being free from certain small amounts of mineral matter, which make spring water lively and palatable. The aeration and filtration of distilled water complicate the apparatus and render it expensive.

G. W. asks: Can wood be petrified, and how is it done? A. One method is: After the tree is felled, place the root end in a solution of sulphate of copper and acetate of iron. After remaining for a few days, the wood is completely saturated. Another method is to place the wood in a vessel from which the air is exhausted; sulphate of iron or alum solution is then let in and pressure applied. The wood is then partially dried, and afterwards it is treated with a solution of chloride of calcium in the same manner. Or the wood can be impregnated with water glass, and then treated with an acid.

C. E. Y. asks: Can metallic zinc be obtained from the muriate of zinc, or can a coating of zinc be deposited on iron or other metal from the muriate of zinc? A. The muriate of zinc has been employed, but is said to possess no peculiar advantage.

G. C. H. says, in reply to J. N. W.'s query as to the excrescence on the plank: The board was recently brought to Utica and shown to the scientific men of the place, among others to Mr. S. W. Chubbuck. He immediately said that it was the result of compression; and to convince the others, he selected a piece of clear pine, laid it upon a block of iron, and struck it one blow with a hammer. It was then placed in a vise and sawn down through the edge; immediately the compressed wood bulged out and assumed the shape it now has. I enclose you the piece. I think that the original one can be accounted for in the same manner. The tree either struck a stone or other substance in falling, and was thus indented at that spot, or the board has been prepared for a joke. A. Mr. Chubbuck has certainly succeeded in producing an appearance similar to that of J. N. W.'s board, and his explanation is correct.

S. asks: How thick is the earth's surface or crust? At what depth in the earth will it be hot enough to fuse all known substances? A. It is ascertained that at a depth of a very small proportion of the earth's diameter, all known substances would be in a state of fusion. Experiments made at Creuzot, France, led the observers to believe that, at a depth of 50 miles, the heat would reach 4,600° Fah, more than sufficient to melt platinum. As to artesian wells, see p. 241, vol. 30.

E. E. asks: What can I use to make a joint steam tight? A. Use equal parts of white lead and red lead, and add as much boiled linseed oil as is required to make a putty.

G. N.—Animal vaccine virus can be obtained at all times and in any quantity from Frank P. Foster, M.D., Director of Vaccine Department, New York Dispensary, 187 Center Street, New York City. It is furnished in three ways: On slips of quill, costing each 25 cents; in capillary tubes, costing \$2 each; and in entire crusts, costing \$2 each. The first is the most handy to use. The method of using it is so simple that it is within the power of every one to vaccinate: Bare the arm to be vaccinated to the shoulder, and, taking a large needle, scratch the skin two inches below the shoulder in cross lines until a place the size of a three cent piece looks watery; then dip the quill into warm water for a second, and rub the smaller end upon this spot for a few seconds. Allow the arm to remain bare for some minutes until the spot seems dry. Each quill is sufficient for one person; but the capillary tube contains sufficient virus, in a liquid form, to vaccinate ten or twelve persons. It is necessary to blow the lymph out of the tube upon a knife blade in minute quantities at a time, and rub the knife blade upon the spot prepared as before described. The crust may be macerated in water and then applied. Virus is prepared for use in this way: When the pustule upon the cow is full of matter, the small quills are dipped into it, allowed to dry, and rolled in tin foil. The capillary tube is simply a very fine glass tube, one end of which is dipped into the matter; the matter will nearly fill the tube, by what is called capillary action of the tube. Then the portion of the tube not filled with matter is broken off, the two ends sealed up with sealing wax, and the tube is now ready for transportation. Vaccine virus from the cow is the purest and most efficient known, first, because young and healthy heifers are the only animals from which the virus is taken, and secondly, because it can always be obtained fresh from the physician above mentioned. A letter, addressed to him enclosing 25 cents or \$2, will be answered by return post by a letter containing the quill or tube.—S. H. C., M.D.

W. H. J. asks: Will a siphon draw water 100 feet high, if it had 150 feet fall? A. No. The rise of water would be less than 34 feet.

M. C. asks: Is there any machinery for utilizing the power of water, as it is ordinarily laid on in dwelling houses? A. Yes. Water engines and small turbine wheels, for driving sewing machines and other purposes, are in the market.

E. L. S. asks: 1. Is it possible for gas to escape from a burner when lighted, unconsumed? A. No. 2. Is it the revolution of our earth which produces the atmosphere? A. It does not produce the atmosphere, but causes certain great movements in the atmosphere, such as the trade winds.

D. C. S. asks: Has heating with hot water been adopted in this country? A. There are several firms in this city who make heating by hot water a specialty, as also some in the other principal seaboard cities, and who have put their apparatus in a great many buildings, both public and private. The expense, however, of heating by this method is fully as great as that of steam.

E. M. B. asks: 1. What are the most powerfully explosive substances or compounds known, that can be obtained in large or inexhaustible quantities? A. Gun cotton, nitro-glycerin, dynamite, and dextrin. One part by weight of gun cotton is equal in projectile power to 5 parts of gunpowder; 1 part of nitro-glycerin to 8 parts of gunpowder. 2. Which of said explosives are the cheapest per unit of explosive power? A. Nitro-glycerin. 3. Which of said explosives burns or explodes with the least smoke or ashes? A. Gun cotton should leave no residue. 4. Is there any treatise upon explosives that will give me all the known properties of the principal explosives? A. See our advertising columns for booksellers' addresses.

G. S. R., H. B. G., and others question the accuracy of our answer to W. L. N., in which we stated that it is not a fact that all matters that form scale in a boiler float on the water as scum. A. Compounds of lime are precipitated from solution in water as the temperature increases, and the carbonate of lime, being light, rises to the surface of the water, if there is a good circulation in the boiler. The sulphate of lime, which is heavier, sinks almost immediately after precipitation. Both of these substances can be most readily removed by a surface blow, since they are formed more rapidly as the temperature of the water increases. When the boiler is not in use, the particles of carbonate of lime no longer rise to the surface, but settle down upon different parts of the boiler.

C. P. H. asks: How many pounds of nitrate of ammonia would be required to freeze a gallon of water? A. Theoretically, nearly 4 lbs. when the temperature of the water is 68° Fah., but in practice a larger quantity, owing to the absorption of heat from the containing vessels.

J. G. H. asks: 1. Can sugar be kept liquid by any chemical process? A. No. 2. How can copying ink be made from common writing ink? A. By the addition of a little sugar. 3. Can water colors be made to copy, the same as copying ink? A. This can be easily tried.

L. says: I want to make a heat governor for a hot air furnace. If I enclose, in a tube exposed to the heat, quicksilver, or simply the air in the tube, from which can I get the most expansion or pressure to act on the damper? A. Quicksilver expands the 0.01543 times its volume on being heated from the freezing to the boiling point, and air 0.3665 times, so that the expansion of air is much greater. 2. Can you suggest a way by which this pressure may best act on a lever? Pure rubber would answer the purpose if perfectly airtight. A. By means of an airtight piston.

M. asks: Is the mineral found with lead ore and known to miners as mundic the same as iron pyrites? A. Mundic is the name of copper pyrites among English miners.

C.H.S. asks: Had eighteen hundred and seventy-four full years of the Christian era passed on January 1, 1874? A. Not exactly. The years as reckoned by the calendar do not agree perfectly with those calculated on astronomical data.

F. C. C. asks: What can I apply to the back of sheet copper to prevent gold adhering, while I am electro-gilding the face? It must not come off into or injure the solution. A. Use a thin coating of varnish.

E. S. asks: What is the proper temper for a magnet, and how much of it should be tempered? A. It should be tempered at as high a degree of heat as possible, and the temper should be drawn to a violet-straw color.

S. S. S. asks: 1. Would a silver rod used for an anode (as in the illustration in your issue of January 31) be as good for plating a dozen forks or spoons as an anode of sheet silver? A. Some electroplaters use anodes of pieces or rods of silver. The general practice is to employ sheet silver; and while the former plan answers, the latter is on some accounts to be preferred. 2. How much silver by weight is calculated to be deposited upon a dozen forks, for single, double, and triple plate? A. Tablespoons are single plated when they are plated with 4 ozs. of silver to the gross, double plated with 8 ozs., and triple plated with 12 ozs. Forks in proportion, according to size. 3. What book do you recommend for traveling electroplaters? A. Roseleur's "Galvanoplastic Manipulations" is a standard authority.

G. P. L. asks: Is there any chemical or other way to remove hair from any part of the face without marring the face or leaving any injurious marks on it? A. Hydrosulphate of sodium can be used, but care must be taken, lest the skin be attacked. See Science Record for 1874, p. 20.

N. A. M. asks: Can you give me a recipe for making nitro-glycerin? A. To prepare nitro-glycerin, very strong nitric acid, density 49° to 90° Baumé, is mixed with twice its weight of concentrated sulphuric acid: 6 lbs. of this mixture, thoroughly cooled, are poured into a glazed earthenware jar, placed in a pan of cold water, and there is next added gradually 1 lb. of concentrated and purified glycerin, having a density of at least 30° to 31° Baumé, care being taken to stir constantly. The mixture is left to stand for some time, and afterwards poured into five or six times its bulk of very cold water to which a rotary motion has been imparted. The nitro-glycerin sinks to the bottom as an oily liquid.

C. S. D. asks: 1. Where is the largest reflecting telescope in the world, and what is the size of its object lens? A. At the National Observatory, Washington, D. C.; diameter of lens, 26 inches. 2. I wish to connect another boy's home with mine by a telegraph wire, and (as it is not convenient to have it suspended from the one house to the other) I want to know if I tar copper wire and put it under the sidewalk (fastened by staples), if the tarred wire will answer the same purpose as insulated wire? And if not, what can I put on the wire that will? A. Use an ordinary insulated gutta percha telegraph wire. 3. I have a blackboard on which it is difficult to leave any mark. What substance shall I put on it to remove that difficulty? A. Put on the blackboard liquid sold by most stationers.

R. E. W. asks: Is there any way of making oxygen gas, cheaper than the common method of using potash and manganese? Nitrate of soda is much cheaper; cannot its oxygen be driven off? A. Nitrate of soda is readily decomposed at a red heat, and yields oxygen, which at first is tolerably pure, but becomes contaminated with increasing quantities of nitrogen.

A. B. asks: Is the white soft matter in the center of a corn kernel pure starch? A. It consists of more than 50 per cent of starch. The remainder is water, fat, cellulose, and nitrogenous substances.

K. K. K. asks: By what means can nitrogen be prepared in large quantities, cheaply, rapidly, and with simple apparatus, similar to a hydrogen generator, so as to be instantly ready? A. By heating nitrite of ammonia.

F. H. M. asks: Is there any sure way of ridding an old house of bedbugs, cockroaches, etc.? A. As to bedbugs, if you can locate their dwelling places, use strong mercurial ointment, soft soap, and oil of turpentine, in equal parts, triturated together. If they are secreted in the timbers, fumigation by burning sulphur is the best method. For cockroaches, make poison wafers of flour, red lead, and sugar, rubbed up with a little mullage; spread out thin to dry.

W. S. X. asks: 1. How can I make lard oil in small quantities? A. Lard oil is chiefly obtained as a secondary product in the manufacture of stearin. It is purified first by agitation with sulphuric acid, and afterwards by steaming it or washing it by water. 2. Is there a polish that will adhere to such articles as a tin lantern of which the tin is worn off? If so, how is it made? A. See p. 315, vol. 29.

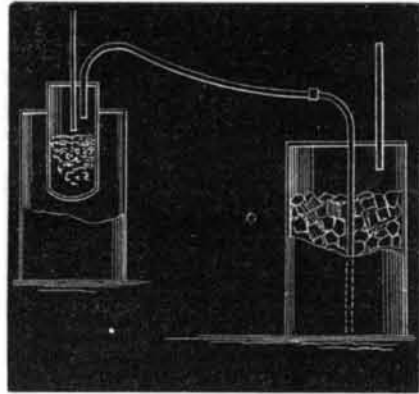
G. W. W. asks: How can canvas be prepared for oil painting? A. The canvas must be strained on a frame of thoroughly seasoned wood, so as not to shrink, and a thin oil filling must be put on till the texture of the canvas is completely hidden. All seams and projections must be avoided.

J. A. M. asks: How can I smooth and polish a piece of rough marble? A. Use (1) wet sandstone, (2) a piece of unglazed pottery (also wet), (3) pumice-stone, (4) lead filings and linae, (5) a little powder of calcined tin, rubbed on with a linen rag.

Z. P. B. asks: 1. What is the best substance with which to clean common and undressed kid and dogskin gloves with, and how is it applied? A. Damp them slightly, stretch them gently over wooden hands, and clean them with a sponge dipped in benzole. As soon as they are dry, withdraw the hands, and suspend in the air till the smell has passed off. 2. What is the best to clean ivory with? A. Ivory can be bleached by exposing it to the fumes of burning sulphur or to chlorine gas. In answer to your other question, consult a cyclopaedia of manufactures.

C. W. H. Jr. asks: How can cloth or velvet be made to stick to cast iron? A. Try painting the iron with oil paint, letting it dry, and then attaching the cloth with glue.

A. A. W. asks: How can I make bisulphide of carbon? A. You can probably buy bisulphide of carbon more cheaply than you can make it, as it is now manufactured on the large scale. The following apparatus, however, may be sufficiently simple and cheap for your purpose: Bore two holes in the top of an iron bottle, such as mercury is imported in, and into these holes fix two copper pipes, one straight, as on the figure



and the other bent. The bent tube is connected with another tube leading to the bottom of a bottle filled with ice. The iron bottle is fitted into the top of a furnace, so that about two thirds is exposed to the action of the flame. The furnace should have a hole in its top so that the bottle may fit snugly into it, and the top be protected from the fire. The bottle is filled two thirds full of pieces of fresh charcoal; and when hot, a few fragments of sulphur dropped at intervals into the straight tube, which is immediately closed with a plug. The bisulphide of carbon is condensed in the bottom of the ice bottle, and sinks to the bottom of the water. It should afterwards be rectified by carefully distilling in a hot water bath, in contact with chloride of calcium, and condensed as before. Bisulphide of carbon is very volatile and inflammable, so that care must be used in making and handling.

N. H. F. says that J. P., who asked how to prevent a wooden screw from checking, should boil it in water with a little salt in it. It will then never check or crack.

H. G. B. says, to M. B. C., who asked how to increase the rapidity of the drying in his lumber kiln: You need no air at all, and consequently have too much already. Air is good for respiration, but was not made for a drying agent, although it is well adapted to prevent too rapid desiccation. And air-dried lumber has a crust of dried wood on the outside, which retards the internal drying and prevents the thorough shrinking of the wood, leaving it liable to swell or shrink with every change of the weather. Again, air cannot season lumber, which operation is a chemical change of its albumen, preventing its future shrinkage, swelling, and decay. Even eggcases can be so coagulated as to keep for 10 years, and I have some, thus prepared, which are thus old, as perfect as ever they were as far as decay is concerned. It was (and still is) thought that the best way of preserving lumber was to extract the albumen, by soaking the lumber in water for 6 or 12 months, or by boiling or steaming. These processes kill the lumber for good work and good finish. The albumen should be coagulated and retained in the pores of the wood, and it will keep out water or damp air as well as if the pores were filled with shellac or other gum, evidently fitting the wood for a very superior finish. This operation is readily accomplished by the well known means of dry steam, requiring fewer days for its completion than the soaking and subsequent drying does months. In fact, it pays well to subject all lumber, no matter by what process it has been seasoned, to dry steam, by the use of which a black walnut tree may be cut in the forest on Monday morning, and worked into furniture by Saturday night, and be better fortified against any tendency to shrink, swell, warp, or decay, and it will show a better finish.

H. P. says: If W. D. B., who asked as to flow of oil from a wick, will lower the wick, when not lighted, below the top of the wick tube, the oil will not spread over the outside of the lamp, which is the case with some, if not all, oils when the wicks protrude out of the tubes.

J. E. D. says, in reply to several correspondents who ask how to gly on glass: First I see that the glass is free from dirt and grease; then with my tongue, I lick the place where I desire the figure or letter to be, and then press the dampened surface upon a piece of gold leaf of sufficient size, taking care to have it smooth and unbroken. After it has dried (which is indicated by its assuming a polished appearance), I place it over a marked board, and with a sharp instrument and ruler scratch lines for the top and bottom of the letters, and then (with quickly drying material) paint the letters, taking care to reverse them so that they will show right from the other side. When the paint is dry, I rub off the superfluous leaf and the job is done. If the work is to be done on large glass-like store windows, it is better to paint the letters first on the outside, as they are to appear, and this will show where to apply the leaf, and also how to paint on the inside, as the paint will show plainly through the leaf. When the job is done, the outside letters can be easily cleaned off. It will help most persons to ink the letters backwards, to mark them with pen and ink on paper, and, after oiling the paper, look at them from the other side.

P. H. B. says, in answer to W. E. S., who asked how a 20 horse power engine can be started and stopped by telegraph: If it be a single engine, it would have to be seen that the crank was in a position to start and the steam pipe and the steam chest would have to be well provided with drip exits; and the throttle valve must be easily worked and well balanced. The throttle lever could be actuated by a magnet, or by weights and mechanism similar to that employed to trip the hammer in apparatus for striking the fire alarm telegraph bells in cities. A double engine could be so arranged as to be stopped or started, at any time, by the same arrangement.

K. L. H. says, in reply to J. J. G., who asks if there is any compound that will make the beard grow faster than it naturally would: The following recipe is perfectly harmless, and will make the beard grow like mushrooms in a hotbed: Cologne 2 ozs., liquid hartshorn 1 dram, tincture of cantharides 2 drams, oil of rosemary 12 drops, oil of nutmeg 12 drops, lavender 12 drops. Apply to the face daily and wait for the result.

T. A. C. says, in an answer to J. P., whose query about seasoning wooden screws is answered on p. 219, vol. 30: Bore a hole longitudinally through the center of the screw; it will not be apt to crack so badly in seasoning, because then the air can get to the center of the wood, the sap escapes therefrom, the center of the wood contracts, and the strain on the outside is lessened. Of course, the larger the hole, the better for the seasoning process; but it should not, and need not, be large enough to materially weaken the screw. If in addition, you can boil the screw in water, the job will be bettered; if boiled in oil, it will be complete.

J. H. P. says: Tell G. C. B. that cracks and holes in cast iron kettles can frequently be filled by cement composed of glycerin and litharge made into a stiff putty. It requires 3 or 4 days to harden. I have filled holes in kettles an inch or more in diameter with this cement, and used the kettles for years afterwards.

C. D. S. says that R. H. F. can test squares with the dividers by drawing two circles one within the other, from the same center, of 16 and 12 inches diameter respectively; then set the dividers to 10 inches, insert on point in any part of the outer circle, and mark the point exactly where a circle (drawn with the dividers in this position) would intersect the inner circle; now draw a straight line through the center of the circles and through the point marked in the inner circle; and through the outer one, another line starting from the point where the dividers were inserted in the outer circle through the center of the circles until the outer circle is reached. If this is done exactly, the points where those lines intersect the outer circle will form the corners of a perfect square whose side is 11-8187+ inches. If the square is correct, it will fit the square thus formed and also the lines in the center, which divide the circle into 4 equal parts, and the angles must be 90 degrees. This is based on the rule for finding the hypotenuse of a right angled triangle, thus: 6²=36 and 8²=64, sum 100, the square root of which is 10. This is some times called the 6, 8, and 10 rule for squaring buildings.

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

D. H. E.—This mineral is compact soapstone. D. B.—The mineral resembling gold, which is inclosed in the quartz, is iron pyrites. J. K.—The crystal is garnet; it is a silicate of alumina and iron. The red stone is quartz rock, colored by a little oxide of iron. The gray one is siliceous. E. L. F.—Your specimen consists of cubical crystals of iron pyrites, inclosed in gray quartz rock. B. B. S.—Crystals of iron pyrites, inclosed in talcose schist. H. S. B.—Your specimen consists of a solid mineral portion, and of volatile substances, the latter amounting to 17.76 per cent. Gives off water and oils on heating. The residue left after heating consists of siliceous grains, colored with oxide of iron. Contains a small amount of soda but no potash. We do not know of any use for it other than that of soap, and we can assign no value to it.

O. K.—Your sample of safety powder for use in petroleum oils consists of salts, mostly common salt, which have been dyed yellow, blue, and red in order to disguise their true nature. It is worse than valueless. It does not diminish the explosive nature of the oils, and should be exposed as a fraud calculated to do great injury.

R. S. asks: How can I remove the inside bark of the cocoa-nut, otherwise than by shaving it off?—V. V. V. asks: What must I use to paint show cards with? The oil in ordinary paint discolors the card around the letters. I want something that paints very black, also white and light tints for dark grounds?—G. S. asks: What is the process of ferrotyping?—M. B. A. asks: What is the best way of removing tallow and white lead that has been applied to polished parts of machinery to prevent rust?—W. H. D. asks: Does powder of a coarse grain shoot more strongly than one of a fine grain?—M. F. B. asks: 1. Which will shoot the greater distance, a breech or a muzzle loading shot gun? 2. Is 30 inches long enough for a gun of 10 gauge? 3. What are the different strengths of the materials used for gun barrels? 4. Is Damascus twist as good as laminated steel for gun barrels?—P. J. F. asks: 1. What is the proper charge of powder for a No. 12 caliber shot gun? 2. How much powder will the same caliber consume without waste?

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

- On Kepler's Third Law. By A. L.
On the Elasticity and Slipping of Belts. By J. T. H.
On a Scientific Toy. By E. L.
On Ascertaining the Width of Streams. By J. C.
On the Manufacture of Leather. By D. S.
On Car Building. By N. E.
On Light. By T. H. C.
On the Attraction of the Sun and the Earth. By H. K.
On Ventilation. By E. H. S.
On the Canal Problem. By J. H.
On Foaming in Boilers. By G. C. P.
On Shellac as a Dressing for Wounds. By W. W.
On Squares. By M. T. C.
On Spiders' Webs. By C. T.

Also enquiries and answers from the following: P. T. F.—F. H.—J. R. P.—W. H. C.—T. H. F.—J. W.—T. C. H.—E. W. H.—P. S.—J. L.—F. H. E.

Correspondents in different parts of the country ask: Who sells a machine for testing the strength of the arm by striking a flat surface? Who makes jig saws for cutting out ship timbers? Makers of the above articles will probably promote their interests by advertising, in reply, in the SCIENTIFIC AMERICAN. Several correspondents request us to publish replies to their enquiries about the patentability of their inventions, etc. Such enquiries will only be answered by letter, and the parties should give their addresses.

Correspondents who write to ask the address of certain manufacturers, or where specified articles are to be had also those having goods for sale, or who want to find partners, should send with their communications an amount sufficient to cover the cost of publication under the head of "Business and Personal," which is specially devoted to such enquiries.

[OFFICIAL.]
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