(88) Volts required to operate an electric motor one-half the size of one described in SUPPLEMENT, No. 641. Six volts and upward, if the battery is of low resistance.

(89) Wire for Induction Coil.—Use No. 36 on secondary, No. 20 on primary. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 160 and 569. A No. 2 Grenet battery is large enough to work it, though two or three cells would be better.

(92) Silver Plating.—The battery described is large enough. For oxidizing copper and brass. For brass 4 drachms perchloride of iron to 10 oz. tersulphide of arsenic, 1 pint water. For copper, 1 drachm sulphur, 1 oz. pearlash, 1 pint water. Immerse until the color is satisfactory in depth. Quicking articles before plating is not absolutely necessary, but is to be recommended.

(125) Staining Ivory.—Treat with pyrogallic acid to make nitrate of silver stain permanent.

(127) Producing Green and Blue Stains.—The science of staining minerals has received quite extensive development of late, chalcedony and other minerals proving particularly amenable to the treatment. The mineral salts are used; the exact treatment seems hard to ascertain.

(133) Converting Carbonic Oxide (CO) into Carbonic Acid Gas (CO_2).—Pass it through a tube containing oxide of copper heated to a full red heat.

(137) Cost of Induction Coil in SUPPLEMENT, No. 161.—Copper Color of Aniline Green.—The materials for induction coil will cost from $10 to $15. Labor you must estimate for yourself. The copper color you refer to is not due to copper; the aniline contains none; it is a kind of fluorescence.

(138) Strength of Batteries.—Batteries for Various Uses.—Dynamo and Motor.—1. Disque Leclanche, E. M. F. 1·48 volts, resistance one ohm. 2. Do not know what battery you mean. 3. Fuller and Bunsen, E. M. F. 1·8 to 2·0 volts, resistance 1-10 to 1 ohm, according to size. From above you can calculate amperage, dividing E. M. F. by battery resistance, plus outer circuit resistance. The proper voltage of battery depends on the uses. No general rule can be given. Low resistance of battery is the great desideratum. Use gray iron for motor and dynamo castings. No data as to current given by motor used as dynamo.

(142) Converting Chloride of Silver into Nitrate of Silver.—Place in a flask with metallic zinc; treat with dilute sulphuric acid, adding zinc or acid as required until the chloride is completely reduced to the metallic state. Remove any zinc, wash thoroughly, first with dilute sulphuric acid and finally with hot water, and dissolve in nitric acid. Evaporate to dryness and fuse at a low heat. This gives lunar caustic or fused nitrate that can be subsequently dissolved in pure water.

(142) G. O. — Reduction of Silver Chloride.—Melt your chloride of silver with freshly burnt lime 1 part and chloride of silver 4 parts. After which dissolve the result (which will be pure silver) in nitric acid and evaporate to dryness, wash the same several times and evaporate to dryness after each washing. The result will be pure nitrate of silver.—C. H. M.

(142) To Obtain Pure Silver Nitrate from Pure Silver Chloride. — The silver chloride is first reduced to metallic state, which is best done as follows: The precipitate is dried and mixed with nearly an equal portion of a mixture of sodium and potassium carbonates, put into a crucible, a little borax added and fused. After complete fusion, pour the contents of crucible into some suitable receptacle, and when cool the silver globule is easily separated from the mass. The metallic silver is then dissolved in as small a portion as possible of nitric acid heated; diluted with an even amount of distilled water and evaporated to dryness. To the dried mass add distilled water, heat till dissolved, and set aside. Crystals of pure silver nitrate will form.—EDMUND WRIGHT, Jr., Philadelphia, Pa.

(143) Using Motor as Dynamo.—Advise you to make a regular dynamo, such as described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 600.

(144) H. W. C.—Artificial Cold Room.—One freezing mixture without ice consists of equal parts nitrate of ammonia and water; another, of equal parts nitrate of ammonia, carbonate of soda, and water. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 605, 578, 443, 314, 288, 254, 215, for illustrated descriptions of various methods of producing cold.

(145) Running Coffee Mill.—It needs about 1-16 horse power. A ⅛ horse power battery with motor should run it. The belt is large enough.

(146) F. McD. — Ebony Finish on Counter.—We doubt the possibility of your being able to make a satisfactory ebony finish on a Georgia pine counter. The sap pores would take a dye by absorption, but the resin veins would not take a permanent color and would show the resin streak through the varnish.

(147) F. D.—Stamping Powder.—Use pulverized steatite, or French chalk.

(148) W. L. W.—The diaphragm should be placed between the lenses, so as to revolve, with holes of various sizes to suit the requirements of sensitiveness in the plates, as shown in the exterior view of the camera. 2. It is doubtful if a 75 cent reading glass would give you satisfaction as an enlarging lens.

(149) J. I.—Horse Tread Power.—The circular horse power, if well constructed, will have less friction than the common treadmill. The treadmill is, on the other hand, easiest on the horse, as the walk is on a straight line.

(150) J. E. E.—Old Boilers.—There are a few boilers of the cylindrical type that have been in use more than 34 years. We do not recommend the use of a locomotive boiler of great age. The day of reckoning may come too soon.

(151) J. A. W.—Varnish for Canvas Boats.—Use a varnish made by dissolving pure rubber gum in naphtha. Paraffin applied hot to the perfectly dry boat is also excellent.

(152) P. F. B.—Crude Oil for Stoves.—Experiments have been made in the direction of using crude petroleum for household heating and cooking, without satisfactory results. The odor and its volatile constituents seem to be a drawback There is a wide field of invention yet left in this line.

(153) J. A.—Salt in Cement Mortar.—See SCIENTIFIC AMERICAN, January 7, 1888.

(154) W. H. W.—Cleaning Castings, etc.—Immerse the castings in a bath of hot water 10 parts, sulphuric acid 1 part, from one to two hours, and wash in hot water to remove acid, or smear the castings with a stronger solution 1 part sulphuric acid and 4 parts water, after three or four hours wash in hot water. 2. There is no fear of the steel ball valve sticking by magnetism enough to affect its work. Otherwise we know of nothing better than hard bronze for the ball, say 4 oz. tin to 1 pound of copper. 3. Make the moulding trough of 2 inch plank and bind it with iron.

(155) W. W. Y.—Circular Saws.—It is possible to use three saws in cutting large logs. Mills with three circular saws are in use in California and Washington Territory. Band saws are superseding the double circulars to a large extent, as there is less friction and less heat for the amount of work done.

(156) G. A. C.—Acoustics of a Hall.—Your question is too indefinite for special answer. Consult Sallzer's "Treatise on Acoustics."

(157) W. McV.—Boilers and Engine.—The boiler with 3 inch tubes is the best for wood fuel, and otherwise the most durable. The difference in favor of the automatic cut-off over the throttle valve regulation may amount to 10 or 12 per cent.

(169) F. W. M.—Blue Checked Cotton.—The dye probably had not been fixed by a mordant, or the check may not have been properly printed and dressed to fix the printing. If not, this may also be the cause of so much shrinkage.

(170) O. I. F.—How to Cut and Polish Stones; Dynamo.—You will need a thin copper disk about 6 in. diameter made to revolve rapidly on a spindle. With No. 90 to 100 emery and water liberally fed to the wheel, you will be able to slab any specimens of rocks or minerals of ordinary hardness. You will also need a grindstone to flatten the surfaces for polishing. A lap of lead is used with fine emery, and another of wood faced with leather or felt fed with a cream of rouge and water. The laps should run at a speed of 150 and may be 10 or 12 in. diameter, the specimens being held on their face with the hand. For a less expensive arrangement for surfacing only a good grindstone and a piece of sole leather nailed to a board, with the whole manipulation made by hand, will make satisfactory work with amteurs. For a more detailed description of lapidary work, see a work by Byrne, "Artisan, Mechanic and Engineer," $5, which we can mail. 2. It depends on the voltage desired. Use wire to give the same number of turns on the armature, and use two numbers larger on the field.

(171) T. H. F. — Walnut Stain. — Mix equal parts of solution of extract of logwood and solution of saffron, dilute with spirit of wine, add some solution of tin in hydrochloric acid. For a variety of acid, water sulphide and gallate of iron stains, see "Techno-Chemical Receipt Book," $2, which we can mail.

(173) J. A. B.—Hydraulic Pump Gaskets.—Make hydraulic pump gaskets of sole leather only. They should be cupped in a mould made to size of pump. For speeding machinery or other computations, see Mechanics', Millwrights', and Engineers' Pocket Book, by Templeton.

(174) Steam Boiler.—1. Divide the area of heating surface, in square feet, by 16, and the quotient will be the horse power required. 2. Feed pipes should not burst quicker in front of a boiler than behind. They are, however, more liable to burst, or "give out," when exposed to the fire than when not so exposed.—W. J. B.

(179) C. L. S. inquires how to make a porous brick to use as a fire kindler. Take three fifths fire clay, one-fifth coarse ground brick, pea size, and one-fifth sawdust. Bake in a kiln and the sawdust will burn away, leaving a porous brick.—D. Y. M.

(185) Hot Air Furnace.—Your rooms are evidently not properly ventilated. Each room, to heat economically, should have, near the floor, on the side of the room opposite the register, a ventilator, connected with suitable flue for carrying off cold air which settles to the bottom of the room. Make hot air pipes as short as possible, and run them on as sharp an incline as possible. Cold air should be taken direct from outside, and from the windward side of the house, so that if any wind is blowing it will force the warm air into the rooms. Care should be taken to arrange the cold air inlet so that the wind will not blow by it, forming a partial vacuum and causing back draught.—W. J. B.

(185) C. H. S.—Hot Air Furnace.—There may be several causes for the deficiency of your furnace: 1. The doors and windows of the rooms may permit the wind to blow through. If so, the draught will prevent the rising of warm air unless it is pretty well forced. 2. The pipes may not have rise enough from the furnace to the outlets, and last, but not least, the air box may not be large enough to supply the furnace, or may not be in the right place. The air box must have three-fourths the capacity of the hot air pipes, and should face north or west. The end of the box should be protected from any wind that may draw air from the furnace instead of supplying it (an atomizer will illustrate what I mean), for without a sufficient cold air supply you cannot get warm air. If C. H. S. will send an addressed envelope to A. H. Woodruff, 478 Mulberry Street, Newark, N. J., I will send a diagram of a simple means of automatically preventing the siphoning of the furnace through the air box.—A. H. W.

(189) Magnetized Watch. — Means of putting in order a watch that has been magnetized by a dynamo are described in vol. lv., No. 14, of the SCIENTIFIC AMERICAN, under the heading of "The Demagnetization of Watches." No solution is known which will have the desired effect.—W. J. B.

☞ Books or other publications referred to above can, in most cases, be promptly obtained through the SCIENTIFIC AMERICAN office, Munn & Co., 361 Broadway, New York.

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This book gives practical directions for photo-engraving in line, in half tone, and on copper, photo-lithography in line and in half tone, and also of the collotype and heliotype processes. The two authors show a familiarity in detail with most of the experiments which have had a modicum of success during the past twenty years, during which so much effort has been made to supersede the old methods of engraving by the use of photography, and the book cannot fail to be of use to all who do such work, while to a beginner it will be almost invaluable.

CHEMICAL LECTURE NOTES. Lectures of Professor C. O. Curtman. By Prof. H. M. Whelpley. St. Louis, Mo.: Published by the author. Pp. 211.

This is the second edition, revised and enlarged, the notes being made from lectures delivered at the St. Louis College of Pharmacy. The publication is designed more particularly to meet the wants of students of pharmaceutical and medical colleges.

THE PRACTICE OF MEDICINE MADE PLAIN. By Dr. C. D. Bobo. Oakland, Cal.: Pacific Press Publishing House. Pp. 148.

This is a work devoid of technicalities and scientific phrases, in which the author endeavors to set forth, in concise form, the results of his own practice, and his methods of treating a wide variety of cases, during an experience of forty-five years.

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