

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.

Walrus Leather, Nickel Anodes, Turkey Emery, Pumice Stone and Composition. Greene, Tweed & Co., N. Y.

Straight Line Engine Co., Syracuse, N. Y. See p. 252.

Catalogues free.—Scientific Books, 100 pages; Electrical Books, 14 pages. E. & F. N. Spon, 44 Murray St., N. Y.

Owners of patents desiring to sell the same, or have the articles made on royalty, can address as below. Send full particulars. Cuts or papers returned if desired. Would be pleased to communicate with parties desiring bronze or brass castings. Lock Box 35, West Troy, N. Y.

New list Machinists' Tools now ready. Address E. West, Lockport, N. Y.

Storage of Electricity, \$1; by N. Y. Agent College Electrical Engineering. Latest and best book on this subject.

Loud Speaking Telephones, \$5 a pair. Illus. circular for stamp. Agents wanted. W. R. Brooks, Phelps, N. Y.

Improved Skinner Portable Engines. Erie, Pa. American Fruit Drier. Free Pamphlet. See ad., p. 254.

Am. Twist Drill Co., Meredith, N. H., make Pat. Chuck Jaws, Emery Wheels, Grinders, automatic Knife Grinders.

Drop Forgings. Billings & Spencer Co. See adv., p. 253.

Brass & Copper in sheets, wire & blanks. See ad. p. 252.

The Chester Steel Castings Co., office 407 Library St., Philadelphia, Pa., can prove by 20,000 Crank Shafts and 15,000 Gear Wheels, now in use, the superiority of their Castings over all others. Circular and price list free.

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

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

Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 254.

Gear Wheels for Models (list free); Experimental Work, etc. D. Gilbert & Son, 212 Chester St., Phila., Pa.

Combined Concentric and Eccentric Universal and Independent Jaw Chucks. The Pratt & Whitney Co., Hartford, Conn.

Catechism of the Locomotive, 625 pages, 250 engravings. Most accurate, complete, and easily understood book on the Locomotive. Price \$2.50. Send for catalogue of railroad books. The Railroad Gazette, 73 B'way, N. Y.

20,000 Duc Spherical Elevator Buckets, sizes 3 1/2 to 17 inches, constantly on hand. Telegraphic orders filled. T. F. Rowland, sole manufacturer, Brooklyn, N. Y.

First Class Engine Lathes, 20 inch swing, 8 foot bed, now ready. F. C. & A. E. Rowland, New Haven, Conn.

Guild & Garrison's Steam Pump Works, Brooklyn, N. Y. Steam Pumping Machinery of every description. Send for catalogue.

Blake's Patent Belt Studs. Best & strongest fastening for Leather & Rubber Belts. Greene, Tweed & Co., N. Y.

Wanted.—Foreman for malleable iron foundry. One familiar with the running of air furnaces preferred. Address M. J. C., Letter Carrier No. 72, St. Louis, Mo.

The New System of Bee Keeping.—Every one who has a farm or garden can keep bees on my plan with good profit. Illustrated circular of full particulars free. Address Mrs. Lizzie E. Cotton, West Gorham, Maine.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 237. For Mill Mach'y & Mill Furnishing, see illus. adv. p. 236.

See New American File Co.'s Advertisement, p. 233.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 237.

Steam Pumps. See adv. Smith, Vaile & Co., p. 236.

Boiler Scale.—Parties having fine specimens for sale or loan, address Jas. F. Hotchkiss, 84 John Street, N. Y.

Farley's Directories of the Metal Workers, Hardware Trade, and Mines of the United States. Price \$3.00 each. Farley, Paul & Baker, 530 Market Street, Phila.

Woodwork'g Mach'y. Rollstone Mach. Co. Adv., p. 221.

Lightning Screw Plates, Labor-saving Tools, p. 222.

The Best.—The Deuber Watch Case.

Curtis Pressure Regulator and Steam Trap. See p. 206.

The Celebrated Wooton Desk. See adv., page 206.

Permanent Exposition.—Inventors' Institute, Cooper Union, N. Y. City. Every facility for exhibition of machinery, merchandise, and inventions. The expense is small—the advantages great. Send for particulars.

Contracts taken to manuf. small goods in sheet or cast brass, steel, or iron. Estimates given on receipt of model. H. C. Goodrich, 66 to 72 Ogden Place, Chicago.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, polishing compositions, etc. Complete outfit for plating, etc. Hanson & Van Winkle, Newark, N. J., and 92 and 94 Liberty St., New York.

Lists 29, 30 & 31, describing 4,000 new and 2nd-hand Machines, ready for distribution. State just what machines wanted. Forsaith & Co., Manchester, N. H., & N. Y. city.

"Abbe" Bolt Forging Machines and "Palmer" Power Hammers a specialty. Forsaith & Co., Manchester, N. H.

Magic lanterns, stereopticons, cond. lenses, etc., on hand and made to order. C. Beseler, 218 Centre St., N. Y.

Railway and Machine Shop Equipment. Send for Monthly Machinery List to the George Place Machinery Company, 121 Chambers and 103 Reade Streets, New York.

25' Lathes of the best design. G. A. Oil & Co., East Newark, N. J.

"How to Keep Boilers Clean." Book sent free by James F. Hotchkiss, 84 John St., New York.

Engines, 10 to 50 horse power, complete, with governor. \$250 to \$550. Satisfaction guaranteed. More than seven hundred in use. For circular address Heald & Morris (Drawer 127), Baldwinville, N. Y.

Wanted.—Patented articles or machinery to make and introduce. Gaynor & Fitzgerald, New Haven, Conn.

Water purified for all purposes, from household supplies to those of largest cities, by the improved filters manufactured by the Newark Filtering Co., 17 Commerce St., Newark, N. J.

Latest Improved Diamond Drills. Send for circular to M. C. Bullock Mfg. Co., 80 to 88 Market St., Chicago, Ill.

For Power & Economy, Alcott's Turbine, Mt. Holly, N. J.

Ice Making Machines and Machines for Cooling Breweries, etc. Pictet Artificial Ice Co. (Limited), 142 Greenwich Street. P. O. Box 3033, New York city.

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

Machinery for Light Manufacturing, on hand and built to order. E. E. Garvin & Co., 139 Center St., N. Y.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

Supplement Catalogue.—Persons in pursuit of information on any special engineering, mechanical, or scientific subject, can have catalogue of contents of the SCIENTIFIC AMERICAN SUPPLEMENT sent to them free. The SUPPLEMENT contains lengthy articles embracing the whole range of engineering, mechanics, and physical science. Address Munn & Co., Publishers, New York.

NEW BOOKS AND PUBLICATIONS.

OFFICIAL ARMY REGISTER FOR JANUARY, 1883. 8vo, pamph., pp. 394. Washington.

HOW TO BUILD A HOUSE. New York: C. B. P. Association, 24 Beekman Street. Price 50 cents.

WEALTH CREATION. By Augustus Mordredien, with an introduction by Simon Sterne. Cassell, Petter, Galpin & Co., New York, London, and Paris. pp. 308.

A proper understanding of the causes which produce wealth is a great promoter in the production of wealth. This most recent work on political economy attempts to make this clear by defining what wealth is, and discussing the aids and obstacles to its creation. The author also shows that education and morality both promote and are promoted by the creation of wealth. The most valuable portion of the book is that in which he shows the expense and cost of wars and war preparations, while he points out how worse than useless they are. His method of settling international differences would be by arbitration. In the appendix he gives the draught of a constitution that he would like to see adopted by the great and small powers of Europe, forming a council that should settle all differences. He believes free trade to be a boon to a nation whether others adopt it or not, for an excess of imports is mostly a sign of wealth, and, strange as it may sound, he asserts that protection discourages native industry. Notwithstanding some of these absurd statements, the book is deserving of a careful reading.

Notes & Queries

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.

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

(1) L. M.—The method of obtaining boron by electricity is not satisfactory, as it can only be obtained in minute quantities. It is preferably prepared by treating boric acid with an equal weight of potassium and igniting the two at a strong heat in an iron tube.

(2) G. W. H. asks: 1. Should fine oil paintings ever be varnished? I have one that has been varnished. Should anything be done to modify the effects of the varnish, such as oiling or anything else? If it does not hurt an oil painting to varnish it, what varnish should be used? A. Most oil paintings are varnished. Nothing is to be done to modify its effects. If it is in bad condition, revarnish it. Use the finest mastic varnish; it comes expressly for this purpose. 2. Does the gas that escapes from soft coal stoves injure oil paintings to a serious extent? A. Gas has an injurious effect upon paintings in a general sense, but in your case the injury possibly depends upon the amount of gas escaping, etc. We do not believe it would be serious. 3. What varnish is used over silver leaf to make it look like gold? A. Use gold lacquer. 4. Can a correct thermometer be made open at the top? A. Yes, but if opened the oxygen of the air would in course of time oxidize the mercury and so injure its utility. Of course alcohol would volatilize in the case of an alcohol thermometer.

(3) F. A. D.—Oleate of soda is formed by heating equal parts of soda and oleic acid with a small quantity of water; it forms a gelatinous mass which must be purified by dissolving it in alcohol. Probably pure Marseilles soap will answer your purpose.

(4) C. R. asks how much boracic acid to use for preserving one hundred pounds of fresh meat. A. About six pounds, and it should be injected.

(5) O. W. B.—Krewanek's analysis of the composition on Swedish matches of one variety is: glass, 1 1/4 parts; glue, 1 part; potassium bichromate 3/4 part; potassium chlorate, 6 1/4 parts; iron peroxide, 1/2 part; black manganese oxide, 2 parts; sulphur, 1 part. Jettel thinks that half the amount of sulphur would be enough. The friction surface contained: glue 1 1/2 parts; manganese 4 1/4 parts; antimony sulphide, 16 1/2 parts; and amorphous phosphorus, 10 parts.

(6) U. W. writes: In the manufacture of harness leather, we occasionally have spots from which the lime has not been worked. What shall we use to rub upon such spots neutralize the lime, so the leather will take the blacking, as it is impossible to black such spots under ordinary treatment, while the remainder of the leather blacks perfectly? A. The spots may be treated with a little dilute muriatic acid and then washed.

(7) J. O.—For indelible pencils take of Kaolin ..... 8 parts. Finely powdered manganese dioxide... 2 " Silver nitrate..... 3 "

Mix and knead intimately with 5 parts of distilled water, then dry the mass and inclose it in wood. Transfer paper is made by rubbing white paper with a composition of 2 ounces tallow; half an ounce powdered black lead; a quarter of a pint of linseed oil; and sufficient lampblack to make it of consistency of cream. These should be melted together and rubbed while hot on the paper. When dry, it will be fit for use.

(8) H. H. W.—Lead amalgam may be prepared by triturating lead filings with the mercury introducing the mercury into the lead when it is in a melted condition. Care should be taken to not inhale the fumes of the mercury.

(9) R. N. A.—The method of making luminous paint given in the SUPPLEMENT 249 referred to is the correct one. Still, it is possible that you did not use the right kind of oyster shells; we understand that the manufacturers claim that a certain kind must be used. "Flowers of sulphur," is a term used in distinction to "roll sulphur." It is prepared by carrying the vapor of sulphur into a cool room, where it condenses and falls in the shape of dust or flowers. Sublimed sulphur is the same as the flowers of sulphur.

(10) T. G. C.—In mixing glycerine and litharge a paste is obtained which will harden in from ten to twenty minutes, depending upon the amount of litharge used. See also SUPPLEMENT No. 158 for receipts for cements.

(11) G. W. L.—Hydrochloric acid will dissolve shells. Use a very dilute bath and watch the action; if it is too strong, acetic or citric acid may be used.

(12) M. G. M.—As a general rule, a one-quarter inch area per horse power is given for steam pipes for high pressure engines, where the distance is not great, or under 50 feet. This quantity has to tally with the standard sizes of pipe, if of wrought iron. Therefore, when they do not exactly agree, use the next size larger, as you may judge by the distance you have to carry the steam. For engines of less than 15 horse power, a less area may be used for short connections, say one-fifth of an inch.

(13) J. W. W.—The plant received with your late communication is Lespedeza striata, Hook and Arn (Japan clover). It belongs to the leguminous or pulse family of plants, the same as the clover, pea, bean, etc. How or from where it was introduced into the Southern States is not known. See American Naturalist, vol. i., page 495, also ii., 39.

(14) G. H. R.—For a celestial eye piece for power of 80 to 100, use a field lens 1 1/4 inch focus and an eye lens of three-eighths inch focus—seven-eighths inch face to face of lens—plane sides next the eye Huyghens' form, diaphragm in the middle or focus of eye lens. The terrestrial eye piece described in SUPPLEMENT No. 252 will give you a power of about 40 with your object glass. Make the tube 2 inches shorter than the focal length of the object glass, so that the Huyghens eye piece will fit the adjusting tube when shoved well in. The terrestrial eye pieces must also be fitted to the adjusting tube, so that you can bring it to the focal range by pulling the adjusting tube out a short distance.

(15) W. M. asks: 1. How many miles per hour will water run in a ditch or race with one-quarter of an inch fall per rod; said race being (we will say) 4 feet wide on top, 2 feet 6 inches on the bottom, and 3 feet deep, and conveying about 400 inches of water; said race having several moderate curves per mile? A. Making moderate allowance for friction of bends, 2-15 miles per hour. 2. How much fall should such a race have per rod, in a tolerably tenacious subsoil, so as not to cut the sides? A. About 8 inches per mile.

(16) W. A. H. asks: 1. In making a magnet (horseshoe) by putting each end in a helix, will it increase the magnetism to let it remain a greater length of time or not? A. Beyond the period required to saturate the magnet, nothing is gained by prolonging the operation. A magnet can be fully charged almost instantaneously. 2. Will it be better to have the magnet made of a flat bar of steel, or a square one? I think that in a magnet made of a flat bar there will be more lines of force in proportion, from pole to pole, to act on the helix to be placed between them. A. Within reasonable limits the form of the bar makes very little difference. Probably the square form is best. 3. Will it give more power to make the helix of No. 33 gauge wire for a small machine, or should the wire be smaller? A. Finer wire would yield better results. Use No. 36. 4. In regard to the commutators, would it not be best to have the wire from each end of the helix join on to a collar at each end? A. You can arrange them in that way for alternating currents. For description of electric motor, see SUPPLEMENT No. 259.

(17) D. M. L. asks: 1. What is used for making paper labels adhere to tin? A. Starch paste to which a little Venice turpentine had been added while it was warm, answers very well. The following is good: Soften good glue in water, then boil it with strong vine-

gar, and thicken the liquid, during boiling, with a fine wheat flour, so that a paste results.

(18) J. S. R.—The following receipts are used to remove odorous compounds from porcelain and glassware, and might be found efficacious for your purpose. Wash the articles with ground mustard and some water. A. Hubner finds that ground flaxseed, almonds, and other oily seeds have the same effect.

(19) R. L.—Asbestos makes the most durable felting for cylinders. If you can get the crude asbestos, you can make a plastic material by crushing and mixing with one-tenth its weight of good clay; add enough water to work it, and plaster the cylinder. If you wish to use the pure asbestos felting, you may obtain it in sheets of dealers whose advertisements will be found in our advertising columns.

(20) J. T. S. writes: Noticing in your issue of March 10, among Notes and Queries, No. 1, J. F. asks: "What is the best cement, etc?" Please say to him that the very best cement in the world in his case is copper rivets. Drill through the pulley at regular intervals holes just as large as the rivets; drive from the outside and rivet inside. No cement however good will hold in this case, for the push of the belt will make the covering travel. There must be something to hold the belt positively. The leather covering should be first wet and drawn down tight as fast as the riveting progresses, and at the finish a square butt joint should be made. In the case of No. 2, I would drill through as before, and either countersink from inside and use wood screws or use tire bolts, in which case there would be no need of countersinking. When the lagging is being put on, glue the edges with good common glue. He will never be troubled with lagging coming off if put on in this way.

(21) A. W. asks: How hot can water be made with exhaust steam without a back pressure on engine? A. There is always some back pressure with a high pressure engine. It can be heated to 210° or 212° without more back pressure than is due to the atmosphere.

(22) W. M. K. asks: In increasing the speed of a well formed ship from say 15 to 18 knots per hour, what proportion of the increased resistance is due to skin friction? A. Frictional resistance varies with the model of the vessel, fairness of bottom, and smoothness of surface. For high speeds, for average proportions of model, etc., frictional resistance varies from 50 to 70 per cent of total resistance.

(23) M. B.—A pendulum for seconds in latitude 23° should be 9919.58 millimeters in length.

(24) W. H. P.—For your tin battery cells, dissolve shellac in alcohol, and add about a spoonful of turpentine to each quart of solution.

(25) A. W. B. asks: 1. How can I make a liquid that will burn with a red flame? Must be a liquid. A. Dissolve a lithium salt in alcohol, and it will burn red. 2. How can I give marbles or balls a gold or silver coating without plating them? A. Coat them with size and then cover them with bronze or gold powder.

(26) F. O. B.—For floor polish cut beeswax into small pieces or else grate it up. Add turpentine, allow the mixture to stand for twelve hours, then heat the mixture over the fire till it dissolves. Care must be taken not to heat the mixture too hot, and also the flame must not come too near, for explosive vapors are generated, which are liable to catch fire. Brushes specially manufactured are now in the market for polishing floors.

(27) H. G.—Railroad paint, are made by grinding the colors in a small portion of linseed oil, and the mixture is then thinned out with benzine; sometimes petroleum oils or resin oils are used.

(28) C. D. M. writes: 1. A friend and myself are building a small oscillating engine (2 1/2 by 5 inches) for a launch 22 feet in length and 6 feet beam. Please inform me what length of piston rod you would recommend to get the greatest possible speed. A. Of length to give clearance from stuffing box bolts sufficient to screw up the gland when engine is running. 2. And what would that speed be with 60 pounds pressure? A. Speed not over six miles per hour, with a fair modeled boat. 3. What size boiler would we require? A. Should have about 48 feet heating surface.

(29) J. C. D. asks what kind of clay or mineral is used in the manufacture of aluminum. A. Decomposed feldspar or any common clay found anywhere and everywhere contains aluminum. Says an English authority in this connection: "The sources of aluminum are, therefore, boundless, and it lies at the doors of the richest and poorest members of society." It is the most common metal, with the exception of silicon, that there is.

(30) J. M. C. asks: Is there any preparation that will insure the adhesion of oil paint to copper plate so that it will not blister or peel off? A. The best cure for the difficulty would be proper treatment to begin with. Some of the necessary precautions to follow are that the copper should be thoroughly dried; no adhering moisture can be allowed to remain on the surface; also any extremes of temperature are to be avoided; the copper must not be cooled nor can be heated, and the paint must be allowed to thoroughly dry before the copper is used.

(31) I. P. S. asks how the beautiful blue finish is produced on brass instruments such as theodolites and transits. A. The steel gray or bluish tint upon instruments is made by dipping or washing with chloride of platinum solution, which is made by dissolving platinum in 2 parts muriatic (hydrochloric) acid, 1 part nitric acid, mixed; as much platinum as the quantity of acid you may wish to prepare will take up. Use platinum foil, put the whole in a glass bottle with wide mouth, cover loosely, and place in warm sand bath or any place where it will be as hot as boiling water for a few days, when it will be ready for use. As soon as the proper color is produced wash the articles in water. If the solution is not saturated, the brass will turn brown and rough.