

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.

The best results are obtained by the Imp. Eureka Turbine Wheel and Barber's Pat. Pulverizing Mills. Send for descriptive pamphlets to Barber & Son, Allentown, Pa.

Catechism of the Locomotive, 625 pages, 250 engravings. The most accurate, complete, and easily understood book on the Locomotive. Price \$2.50. Send for a catalogue of railroad books. The Railroad Gazette, 73 Broadway, New York.

The Secret Key to Health.—The Science of Life, or Self-Preservation. 300 pages. Price, only \$1. Contains fifty valuable prescriptions, either one of which is worth more than ten times the price of the book. Illustrated sample sent on receipt of 6 cents for postage. Address Dr. W. H. Parker, 4 Bulfinch St., Boston, Mass.

The Baker Blower runs the largest sand blast in the world. Wilbraham Bros., 235 Frankford Ave., Phila., Pa.

Magnets, Insulated Wire, etc. Catalogue free. Goodnow & Wightman, 176 Washington St., Boston, Mass.

Forsyth & Co., Manchester, N. H., & 213 Center St., N. Y. Bolt Forging Machines, Power Hammers, Comb'd Hand Fire Eng. & Hose Carriages, New & 2d hand Machinery. Send stamp for list. cat. State just what you want.

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

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

H. Prentiss & Co., 14 Dey St., New York, Manufs. Taps, Dies, Screw Plates, Reamers, etc. Send for list.

The Horton Lathe Chucks; prices reduced 30 per cent. Address The E. Horton & Son Co., Windsor Locks, Conn.

Presses, Dies, and Tools for working Sheet Metal, etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y.

Linen Hose.—Sizes: 1 1/2 in., 20c.; 2 in., 25c.; 2 1/2 in., 30c. per foot, subject to large discount. For price lists of all sizes, also rubber lined linen hose, address Eureka Fire Hose Company, No. 13 Barclay St., New York.

Hydraulic Presses and Jacks, new and second hand. Lathes and Machinery for Polishing and Buffing Metals. E. Lyon & Co., 470 Grand St., N. Y.

Eclipse Portable Engine. See illustrated adv., p. 189. Bradley's cushioned helve hammers. See illus. ad. p. 142.

Sheet Metal Presses, Ferracite Co., Bridgeton, N. J. Eagle Anvils, 9 cents per pound. Fully warranted.

Pat. Steam Hoisting Mach'y. See illus. adv., p. 190.

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

Noise-quieting Nozzles for Locomotives and Steamboats. 50 different varieties, adapted to every class of engine. T. Shaw, 915 Ridge Avenue, Philadelphia, Pa.

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

Solid Emery Vulcanite Wheels—The Solid Original Emery Wheel—other kinds imitations and inferior. Caution.—Our name is stamped in full on all our best Standard Belting, Packing, and Hose. Buy that only. The best is the cheapest. New York Belting and Packing Company, 37 and 38 Park Row, N. Y.

New 3/4 foot Boring and Turning Mill for sale cheap. A first class tool. Hilles & Jones, Wilmington, Del.

For best Portable Forges and Blacksmiths' Hand Blowers, address Buffalo Forge Company, Buffalo, N. Y.

Nickel Plating.—A white deposit guaranteed by using our material. Condit, Hanson & Van Winkle, Newark, N. J.

Machine Diamonds, J. Dickinson, 64 Nassau St., N. Y.

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Sawyer's Own Book, Illustrated. Over 100 pages of valuable information. How to straighten saws, etc. Sent free by mail to any part of the world. Send your full address to Emerson, Smith & Co., Beaver Falls, Pa.

Tight and Slack Barrel machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus'd adv. p. 30.

\$250 Horizontal Engine, 20 horse power. See illustrated advertisement, page 189.

Combined Universal Concentric or Eccentric and Independent Jaw Chucks. Pratt & Whitney Co., H't'd, Ct.

The only economical and practical Gas Engine in the market is the new "Otto" Silent, built by Schleicher, Schumm & Co., Philadelphia, Pa. Send for circular.

Machines for cutting and threading wrought iron pipe a specialty. D. Saunders' Sons, Yonkers, N. Y.

Steam Engines, Automatic and Slide Valve; also Boilers. Woodbury, Booth & Pryor, Rochester, N. Y. See illustrated advertisement, page 29.

Shafting, Pulleys, and Hangers. Nadig & Bro., Allentown, Pa.

Wheels and Pinions, heavy and light, remarkably strong and durable. Especially suited for sugar mills and similar work. Circulars on application. Pittsburg Steel Casting Company, Pittsburg, Pa.

For Sale, Low.—A 125 Passenger Light Draught Side Wheel Steamer and several Launches. S. E. Harthan, Manufacturer of Launches and Engines, Worcester, Mass.

Automatic Machines for grinding quick and accurate. Planer, Paper, Leather, and other long knives. The best Solid Emery Wheels and Portable Chuck Jaws. Made by American Twist Drill Co., Woonsocket, R. I., U. S. A.

For Sale.—Patent Rights of Schneider's Combination Step and Extension Ladder. A very salable article. For terms, etc., address M. Schneider, 35 S. Main St., Dayton, O.

Cylinders, all sizes, bored out in present positions. L. B. Flanders Machine Works, Philadelphia, Pa.

Band Saws a specialty. F. H. Clement, Rochester, N. Y. A well equipped Machine Shop desire to manufacture special machinery. Address T. H. Muller, care of P. O. Box 532, New York.

Wanted.—A second hand fifteen horse power Ames or Mann portable steam engine. Address stating condition and price, L. G. Tillotson & Co., 5 & 7 Dey St., New York.

Cooper's Folding Shaving Horse. Takes only 4 x 12 in. floor space. Address S. E. Cress, Hillsboro, Ill.

NEW BOOKS AND PUBLICATIONS.

DISTRIBUTION OF HEAT IN THE SPECTRA OF VARIOUS SOURCES OF RADIATION. BY W. W. JACQUES, Ph.D. Cambridge: John Wilson & Son.

Contains a review of the more important experiments that have been made in connection with the distribution of heat in the sun's spectrum, with an account of Dr. Jacques' own experiments.

WONDERS OF THE FLORA. BY H. ACOSTA KRESKEN. Dayton, Ohio: P. A. Kemper. 12mo, cloth, price \$1.50.

As its title does not indicate, this is a singularly good little treatise on the art of preserving flowers with their natural colors; to which is added a number of chapters on ornamental grasses and mosses and their uses, directions for collecting and preserving butterflies and other insects, the art of making wax flowers and fruits, and kindred subjects. Mr. Kresken has worked up his subject with no little patience and enthusiasm, and gives his readers the benefit of many years of experience in this department of household decoration. His exhibitions of preserved flowers at the Cincinnati Exhibition and elsewhere have been much admired, and have won him many medals. The book is prettily printed and bound.

AROUND THE WORLD WITH GENERAL GRANT. BY JOHN RUSSELL YOUNG. New York: American News Company. Parts 3, 4, and 5. Price 50 cents each.

These three numbers of Mr. Young's splendid record of the travels of General Grant, cover the experience of the party in Paris, on the Mediterranean, in the chief Italian cities, at Malta, Cairo, and up the Nile. The promise of the early numbers is well sustained both in the narrative and in the numerous and exceptionally fine illustrations.

HYGIENE AND PUBLIC HEALTH. Edited by ALBERT H. BUCK, M.D. 2 vols. 8vo, pp. 791 and 675. New York: William Wood & Co.

The most important cyclopedia of individual and public sanitation ever published. The several papers, each a treatise in itself, have been written by American physicians and scientific investigators of established reputation, with special reference to the climates, conditions of soil, habits, modes of life and laws of the United States. The introductory chapter, by Dr. John S. Billings, U. S. A., sets forth in some seventy pages the scope and importance of the subject, the causes of disease, and the jurisprudence of hygiene. Then follow: Infant Hygiene, by Dr. A. Jacobi; Food and Drink, by Dr. James Tyson; Drinking Water and Public Water Supplies, by Professor William Ripley Nichols; Physical Exercise, by Dr. A. Brayton Ball; The Care of the Person, by Dr. Arthur Van Harlingen; Soil and Water, by Dr. Wm. H. Ford; The Atmosphere, by Dr. D. F. Lincoln; General Principles of Hospital Construction, by Dr. Francis H. Brown; Hygiene of Occupation, by Dr. Roger S. Tracy; Hygiene of Camps, by Surgeon Charles Smart, U. S. A.; Hygiene of the Naval and Merchant Marine, by Dr. Thos. J. Turner, Medical Director, U. S. Navy; Hygiene of Coal Mines, by Henry C. Sheaffer, of the *Miner's Journal*; The Hygiene of Metal Mines, by R. W. Raymond, Ph.D.; Infant Mortality and Vital Statistics, by Dr. Thos. B. Curtis; Public Nuisances, by Dr. R. S. Tracy; Adulteration of Food, by Stephen P. Sharples, S. B.; Sea Board Quarantine, by Dr. S. S. Oakley Vanderpoel; Inland Quarantine, by Dr. S. S. Herrick; Small Pox and other Contagious Diseases, by Dr. Allan McLane Hamilton and Dr. Bache McE. Emmett; The Hygiene of Syphilis, by Dr. F. R. Sturgis; Disinfectants, by Elwyn Waller, Ph.D.; Village Sanitary Associations, by Dr. R. S. Tracy; School Hygiene, by Dr. D. F. Lincoln. The writers will be recognized as among the best known physicians, medical and surgical professors, sanitary inspectors, and health officers of the country. For the medical profession and for public health officers and inspectors the work must prove of the highest value. If it could have a proper popular circulation, the benefit would be inestimable. It is too much to hope, however, that the public will take anything like a sufficient interest in matters of such vital importance as to secure to the work anything like the general reading it should have. It should have a place certainly in every public library.

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.

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) F. B. G. writes: I send per mail a sample of rock for examination. It is unlike any of the other rocks and ledges about here; we use it for cutting glass. It makes a good polishing powder. A. It is quartz rock. 2. Is there anything used in refining kerosene oil that would cause it to be unsafe to take as a medicine? A. Usually, no. We cannot recommend such a "medicine," however.

(2) "Engineer" asks: What is the Great Eastern steamship doing at present? Have you given any news about this ship in any previous number of your

paper, as I believe it was reported lately in the London *Times* she was being newly fitted up for some new trade? A. We last heard that she was being fitted up for the cattle trade between Texas and Great Britain.

(3) T. H. J. asks by what process the two lenses (forming an achromatic lens) can be separated, the balsam cement (uniting the two) having become hardened by age. A. Heat them in hot water.

(4) R. B. N. asks: What is torsion strength in horse power of 2 inch wrought iron turned shafting, ten, forty, and fifty feet long, driving pulley being at end of shaft; and what breaking strain at ten feet? A. It depends upon the speed of the shaft. You must have the bearings close enough together to prevent a serious spring of the shaft from the strain of the belts.

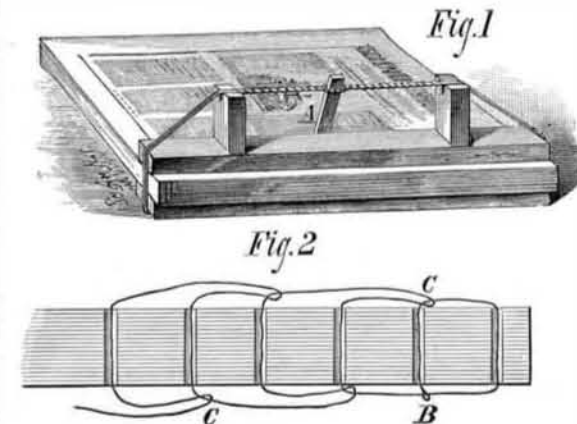
(5) W. C. asks: 1. How many ounces of pure gold are obtained from one ton of high class California quartz? A. There is a wide difference in the yields of different mines—from 30 cents per yard (hydraulic gravel) to \$1,000 per ton (quartz lode); from \$6 to \$70 would perhaps comprehend the average variation of those quartz mines at present profitably worked. 2. How much is one ounce of gold worth? A. Pure gold is worth \$20.67 per ounce.

(6) J. C. C. writes: 1. I have a boat 18 feet long by 4 feet broad; she also has very fine lines. I have a link motion engine 2x2. Is the engine large enough for the boat? A. No. 2. Would you advise me to use one of Herreshoff's coil boilers, or a common one? A. A common one. 3. How big a wheel should I use, and what speed would she make? A. 15 or 16 inches diameter. Probably about 4 miles per hour, if you have plenty of boiler.

(7) E. B. asks: How do the makers of carved wood work in Switzerland and Germany learn their skill, acquire their ability in imitating forms of men and animals?—for, I take it, this ability of theirs is not learned in any school. A. The skill of the Swiss and German wood carvers has been developed very largely by the instruction in this art furnished by special schools, established for the purpose in all the wood carving districts.

(8) W. T. A. writes: When a steam engine is working does the steam exert the same force on the cylinder head as on the piston? A. Yes.

(9) E. C. M. suggests the following method of binding the numbers of the SCIENTIFIC AMERICAN into compact volumes: Procure two small planks, slightly longer than the paper and, say, 1 1/2 inch wide and 3/4 inch thick; pine will do. Having nicely arranged the papers, place the volume between these planks, and tie a strong double cord loosely around them. This cord is then drawn taut by inserting two uprights, say 2 1/2 inches high, and is still further tightened by twisting by means of the short stick, A, as in the old fashioned buck saw. In this way the papers are firmly com-



pressed. Then with a 1-12 inch twist drill (using, preferably, a spiral drill tool) pierce from 13 to 14 holes along the edge of the volume, taking care that the former is supported from below at the point of drilling. Finally pass a strong waxed cord through the holes, making a slip knot at B, and continuing in a sort of lock stitch way as indicated by the diagram, always drawing the cord as tight as possible. The head of a stout pin will do to pass the cords at the points, C. Fasten the end of the cord, and all that then remains to be done is to remove the planks.

(10) J. H. W. asks: Which has the most power, a cylinder with 20 inch bore and 20 inch stroke, or two cylinders 10 inch bore and 20 inch stroke, using the same steam pressure in both cases? A. If they make the same number of revolutions, the 20 inch cylinder has double the power of two 10 inch.

(11) C. H. asks for a receipt for keeping the bright surface on polished steel instruments, such as pocket knives, razors, drawing and surgical instruments; and how to remove the tarnish. A. In finishing a film of oil remains adhering to the steel, which, under ordinary circumstances, preserves the luster. Clean them frequently, and especially after handling, with well dried chamois leather.

(12) W. M. asks how to remove wool from the skin, without clipping. I have a large quantity and find it very tedious to clip, and I think there is a process to remove it without soiling the wool. A. Short wool is removed from skins by a process called "liming," in which the skins are soaked in milk of lime until the tissues are sufficiently softened to admit of removing the wool readily by hand pulling. Due care must be observed to avoid injuring the wool.

(13) F. C. writes: On Thursday last we had a collision on the Camden and Atlantic Narrow Gauge Railroad, in which five lives were lost on the passenger train, the other colliding train being freight. Now, accounts state that the engineer of the passenger train, seeing that it was impossible to avoid a collision, opened the throttle valve of his engine to give all the impetus possible to his train, with the object of trying to knock the freight train off the track, when by so doing it would

prevent the passenger cars from telescoping and save the lives of many passengers. Was this mode of proceeding correct? A. It is stated as the result of experience, by old railroad engineers, that in all cases of apprehended collision, if the speed of the train cannot be effectually checked, and a collision be unavoidable, the safest course is to get all the speed possible, as the slowest train invariably receives the most damage.

(14) J. A. S. asks: 1. What would be the best and cheapest piping for conveying strong salt water, say 5 or 6 inch stream, for a distance of 5 or 6 miles? A. Wood tubing, also enameled iron conduits, are in practical use for such purposes, and have, we believe, proved most economical. 2. Is there a work published giving the different systems of water works, if so, where can it be had, and what would be the cost? A. There are a number of good works on this subject. Address the book dealers who advertise in these columns for catalogues.

(15) D. S. asks for a method of removing mildew from sailcloth. A. Hypochlorite of alumina is said to be one of the best remedies. Moisten with water, rub well into the cloth, moisten again with dilute sulphuric acid (1 to 20), and, after half an hour, rinse thoroughly in soft water and then in water containing about an ounce to the gallon of sulphite or hyposulphite of soda. A stiff brush may be advantageously employed in applying the hypochlorite.

(16) J. H. N. asks: What preparation is used in dyeing duck deadgrass color? A. Boil the goods in a bath of 2 lb. ferrocyanide (yellow prussiate) of potassa, wring out half dry, and then boil in a solution of 1/2 lb. sulphate of copper in 10 gallons water. Use stronger copper for a stronger color.

(17) A. H. M. asks: 1. What are the proportions of the popular shoe dressing for ladies and children's shoes? It is composed of gum shellac, borax, extract logwood, bichromate of potash, and ammonia, but I cannot get the proportions to make it. A. See p. 171 (22), current volume of SCIENTIFIC AMERICAN. 2. I want to make one of those phosphorescent or illuminated faces for clocks. What shall I use and how shall I use it, and is it permanent? A. The substance employed for this purpose is a sulphide of calcium mixed with a resinous varnish. 3. I dissolved some India rubber in turpentine and benzine and applied it to cheap muslin and calico; but it will not fill the cloth so as to make it waterproof. What shall I mix with it to make it fill the cloth to be elastic and flexible? What I applied was as thick as honey. A. Moisten the cloth thoroughly, before applying the varnish, with benzol. When the coating has partially dried pass the cloth between heavily weighted soapstone rolls.

(18) D. M. C. asks how to make a good modeling wax, such as mould makers use. A. Melt 20 ounces of best white wax, and while it is cooling mix with it 1 ounce flake white. 2. I have been making a brass mould for casting white metal rings; the castings are about 2 inches in diameter, and they do not fill the mould. A. Provide plenty of small air vents, smoke your mould occasionally, and pour your metal into the mould through a deep gate or channel. If you do not succeed well with the metallic mould, try plaster of Paris, following directions given in SUPPLEMENT, No. 17.

(19) W. C. writes: In your issue of July 12, Mr. Cobb speaks of the good results he obtains from the use of refined petroleum in his boilers. Will you please inform me in your Answers to Correspondents, what he means by refined petroleum, or to what grade of oils in our markets this would apply? The water we are compelled to use here is about the worst in the world, being mostly from wells sunk in the sand. It seems to be charged with dissolved shells, etc., in addition to the usual salts of sea water, and forms a most obstinate scale very rapidly. I have tried a number of compounds, which were all highly recommended, but none of them were successful, even to the extent of modifying the evil. A. Petroleum which has been freed from earthy impurities and subjected to partial distillation in order to remove the lighter or more volatile hydrocarbons—such as petroleum ether, gasoline, etc., is usually denominated refined petroleum. Under the circumstances a feed water heater properly arranged would probably remove much of the incrustation-forming matters.

(20) F. L. asks (1) for a receipt to color iron castings black or brown. A. Mix chloride of antimony with warm olive oil to form a cream, add a few drops of nitric acid, and apply to the warm clean iron. Or apply the following preparation. Sulphate of copper, 2 oz.; chloride of iron tincture, 1 oz.; nitric acid and spirits of nitre, each 1/2 oz.; spirits of wine, 1 oz.; water, 40 oz. A strong warm aqueous solution of pyrogallol acid stains iron black. 2 To bronze castings. To make castings with green and bronze stripes. I would like a cheap made up preparation of chemicals, and at the same time one that would look well. A. Shellac, 4 oz.; benzoin, 1/2 oz.; methylic spirit, 1 pint; dissolve and strain through a fine cloth. To this add a sufficient quantity of bronze green, finely ground. Lampblack, red or yellow ochre may be added to temper the shade. Thin with methylic spirit, and apply with a brush. This work is usually given a thin coating of the clear varnish and touched up with gold powder. 3. A receipt for tinning gray iron castings, and the method of doing the work. A. Clean the castings by pickling in dilute sulphuric acid (1 to 20 of water) and scouring with sand if necessary. Then boil them in a concentrated aqueous solution of stannate of soda, with a quantity of granulated tin. 4. How to copper iron castings. A. Clean the iron as above and tumble it for a few minutes in sawdust moistened with a solution of one lb. sulphate of copper in two gallons of water made slightly acid with oil of vitriol. Wash immediately in hot water.

(21) F. H. S. asks: 1. What is the best form of a simple battery, and how many cells would be required for nickel and silver plating? A. You can use