

Business and Personal.

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For best Fixtures to run Sewing Machines by Power, address Jos. A. Sawyer & Son, Worcester, Mass. Small Boat Engines for boats drawing 6 to 12 in. water. Direct acting, link motion. T. & K., Box 559, Owego, N. Y.

Emery Wheels for various purposes, and Machines at reduced prices. Lehigh Valley Emery Wheel Company, Weissport, Pa.

National Steam Pump. Simple, reliable, durable. Send for catalogue. W. E. Kelly, New Brunswick, N. J.

Electrical and Telegraph Supplies. Jerome Reading & Co., No. 30 Hanover St., Boston, Mass.

Pony Planers. P. Prybil, 467 W. 40th St., N. Y.

Thomas D. Stetson, 23 Murray St., New York, serves as Expert in Patent Suits.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 285.

The Baker Blower ventilates silver mines 2,000 feet deep. Wilbraham Bros., 2318 Frankford Ave., Phila., Pa.

Machine Knives for Wood-working Machinery, Book Binders, and Paper Mills. Large knife work a specialty. Also manufacturers of Solomon's Parallel Vise. Taylor, Stiles & Co., Riegelsville, N. J.

Wheelbarrows.—The "A. B. C. bolted" will outlast five ordinary barrows. \$24 per doz. A. B. Cohn, 197 Water St., N. Y.

Windmill.—State Rights to Manufacture the Windmill illustrated on page 291 of this paper, or the entire patent will be sold on reasonable terms. Address C. B. Post & Co., New London, O.

\$275 Horizontal Engine, 20 H. P. See page 317.

Park Benjamin's Expert Office, Box 1009, N. Y. Recipes and information on all industrial processes.

To stop leaks in boiler tubes, use Quinn's Patent Ferrules. Address S. M. Co., So. Newmarket, N. H.

To Capitalists, Steam Fitters, Founders, etc.—Patent right for sale of new Steam Heat Radiator. Address, for particulars, J. N. Farnham, Waltham, Mass.

Steam Traps; best and cheapest in use. No blowing through to start. T. Sault, New Haven, Conn.

Buzz Planers. P. Pr. Ibil, 467 W. 40th St., N. Y.

Drawing Materials. G. S. Woolman, 116 Fulton St., N. Y.

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

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.

Brass or Iron Gears; list free. G. B. Grant, Boston.

The Friction Clutch that is doing work in many places satisfactorily, that has never been done by any other, can be seen at Institute Fair, New York. D. Frisbie & Co., New Haven, Conn.

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.

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

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

Steam Excavators. J. Souther & Co., 12 P.O. Sq. Boston.

Bradley's cushioned helve hammers. See illus. ad. p. 302.

Sheet Metal Presses, Ferracete Co., Bridgeton, N. J.

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

Telephones repaired, parts of same for sale. Send stamp for circulars. P. O. Box 205, Jersey City, N. J.

Noise-Quitting 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.

Eagle Anvils, 9 cents per pound. Fully warranted.

Latest improved methods for working hard or soft metals, grinding long knives, tools, etc. Portable Chuck Jaws and Diamond Tools. Address American Twist Drill Co., Woonsocket, R. I.

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

Diamond Engineer, 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.

Eclipse Portable Engine See illustrated adv., p. 318.

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

Tight and Slack Barrel machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus'd adv. p. 80.

Linen Hose, Rubber Hose Steam Hose, and Hose for all purposes. Greene, Tweed & Co., 18 Park Place, N. Y.

Walrus Leather.—Wheels covered with walrus, and polishers' supplies of all kinds. Greene, Tweed & Co., New York.

Elevators, Freight and Passenger, Shafting, Pulleys, and Hangers. J. S. Graves & Son, Rochester, N. Y.

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

Magic Lanterns and Stereopticons of all prices. Views illustrating every subject for public exhibitions. Profitable business for a man with small capital. Send stamp for 80 page illustrated catalogue. McAllister, Manufacturing Optician, 49 Nassau St., New York.

Pat. Steam Hoisting Mach'y. See illus. adv., p. 318.

Solid and Opening Die Bolt Cutters, Screw Plates, and Taps. The Pratt & Whitney Co., Hartford, Conn.

Hydraulic Cylinders, Wheels, and Pinions, Machinery Castings, all kinds; strong and durable; and easily worked. Tensile strength not less than 65,000 lbs. to square in. Pittsburgh Steel Casting Co., Pittsburgh, Pa.

Rue's New "Little Giant" Injector is much praised for its capacity, reliability, and long use without repairs. Rue Manufacturing Co., Philadelphia, Pa.

For best low price Planer and Matcher, and latest improved Sash, Door, and Blind Machinery. Send for descriptive catalogue to Rowley & Hermance, Williamsport, Pa.

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.

Steam Engines, Automatic and Slide Valve; also Boilers. Woodbury, Booth & Pryor, Rochester, N. Y. See illustrated advertisement, page 285.

NEW BOOKS AND PUBLICATIONS.

AN ILLUSTRATED DICTIONARY OF SCIENTIFIC TERMS. By William Rossiter. New York: G. P. Putnam's Sons. 12mo, pp. 352. Price \$1.75.

A handy book of reference, containing some 14,000 scientific terms, many of them not to be found in ordinary dictionaries. The list includes the more important technical and scientific words, and those most commonly used. In all cases the pronunciation is indicated, and usually the derivation. There have been added to the dictionary proper a number of tables of weights and measures, and briefly, the nomenclatures of botanical, zoological, anthropological, chemical, and geological classification. The illustrations are unimportant.

REPORTS TO THE ST. LOUIS MEDICAL SOCIETY ON YELLOW FEVER. By Wm. Hutson Ford, A. M., M. D. St. Louis: Geo. O. Rumbold & Co. 8vo, pp. 320.

Embraces the report of the committee appointed by the St. Louis Medical Society to inquire into the relations of the epidemic of 1878 to the city of St. Louis, and Dr. Ford's Report on the meteorological conditions and etiology of yellow fever, on the etiology of sunstroke, cholera, and other diseases associated with high temperature, and on the treatment of yellow fever. The volume is well indexed.

THE BUILDING MATERIALS OF OTAGO AND SOUTH NEW ZEALAND GENERALLY. By W. N. Blair. Dunedin, New Zealand: J. Wilkie & Co. pp. 244.

A volume of great local value and of considerable general interest, describing the building stones and roofing slates of New Zealand, their geology and outcroppings; the localities of the clay banks suitable for bricks, etc., and the qualities of such clays; New Zealand limes, cements, and their aggregates; and a very interesting review of the numerous timber trees and woods suitable for builders' use. There is added a section on the metallic products of Otago. The book is well indexed.

ELECTRO METALLURGY, PRACTICALLY TREATED. By Alexander Watt. New York: D. Van Nostrand. pp. 196.

This is the sixth and enlarged edition of Watt's handbook, from the English plates of 1876. A copious index has been added.

A SKETCH OF DICKINSON COLLEGE. By Chas. F. Himes, Ph.D. Harrisburg: Lane S. Hart.

An interesting history of one of the oldest colleges in the United States, neatly printed and illustrated by woodcuts and photographs. A particularly interesting chapter is that tracing the progress in scientific education since the founding of the college in 1783.

SEEING AND THINKING. By William Kingdon Clifford. London: Macmillan & Co. Price \$1.

This, the latest volume of the *Nature* Series, includes four lectures by the late professor of applied mathematics and mechanics in University College, London, on the eye and the brain, the eye and seeing, the brain and thinking, and boundaries in general. No one who ever made an acquaintance with Mr. Clifford as a clear thinker and lucid expositor, need be told that, as an example of scientific teaching, this is one of the most valuable books of the series. In the death of Mr. Clifford the scientific world lost the most promising of its rising scholars; for he, more than any other, represented the ideal scientific intellect, at once earnest, fearless, and admirably sincere.

INDEX TO THE LITERATURE OF TITANIUM, 1783 to 1876. By Edward J. Hallock, 8vo, paper. pp. 76. Price 25 cents.

A paper read before the New York Lyceum of Natural History in 1876, and reprinted from the annals of the New York Academy of Sciences. Its plan is the same as that of Dr. Bolton's Indices to the Literature of Uranium and Manganese.

THE HORSE. By B. Pitcher. Second edition. Chicago: published for the author.

A short essay on the breeding, breaking, handling, shoeing, doctoring, and general treatment of the horse, by one who frankly declares himself to be no professor, college graduate, horse doctor, or doctor of any kind; but a humble mechanic. Mr. Pitcher is a practical smith of nearly forty years' experience and observation;

and he treats his subject wholly from the practical standpoint. He has added a chapter of advice to young mechanics, in which he shows himself the possessor of no little practical wisdom and an abundance of sterling good sense.

FIRST STEP IN CHEMICAL PRINCIPLES. By Henry Leffmann, M.D. Philadelphia: Edward Stern & Co.

Designed to make clear by explanation and illustration those points in chemical theory, notation, and nomenclature which give trouble to beginners. Dr. Leffmann is the lecturer on toxicology at Jefferson Medical College, and his little handbook contains the substance of the lectures to the quiz classes of that institution.



HINTS TO CORRESPONDENTS.

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

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

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

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

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

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

(1) C. M. asks for a preparation to prevent nets from rotting in water. Mynets are made of American hemp line, about 1/4 inch in diameter, and therefore expensive. If I knew of some preparation or waterproof mixture that would prevent the water soaking into them and rotting them, it would be a great saving to me. A. The following treatment is said to preserve nets for a long time in good condition: Soften one lb. good glue in cold water, then dissolve it in ten gallons of hot soft water with one half lb. curd soap. Wash the nets in soft water, then boil them in this for 2 hours, press out excess of the liquid and hang up over night. The second bath consists of alum 2 lb., water, 5 gallons; heat nearly to boiling, and immerse the nets in this for about three hours, then press and transfer to a strong decoction of oak bark or a solution of sumac in warm water (water 5 gallons, sumac 8 lb.) and let them remain immersed in this for 48 hours, or longer, if convenient.

(2) R. G. B. asks for a method for electroplating flowers. A. See pp. 380(39), 47, and 434, Vol. 35.

(3) L. C. P. asks: 1. What is a good wash (red) for brick pathways? A. Try the following: red ochre, 5 lb.; water glass, 1/2 lb.; dissolve the latter in boiling water and add the ochre, to form a thin wash. Apply with a stiff brush, preferably while hot. 2. What is a good remedy to destroy ants in pantries, cellars, etc.? A. Try boracic acid powder.

(4) S. A. writes: I light my hotel with vapor of gasoline from a gas machine, and on the third floor and above it the light is much more brilliant and combustion more perfect with the same style of burners. Please explain the cause. A. In a column of air saturated with vapor of naphtha diffusion is never perfect, the heavier hydrocarbons tending to accumulate in the lower portions, and the combustion at these points is incomplete in ordinary burners, owing to the richness of the vapor in hydrocarbons.

(5) P. B. asks for a receipt for making a cheap imitation of mildeu bronze. A. Dissolve equal weights of nitrate of iron and hyposulphite of soda in 8 parts of water; immerse the articles in this until of the right tint, then well wash with water, dry, and brush; 1 part chloride of iron and 2 parts water in parts to brass a fine antique green. Brush well and lacquer with pale gold lacquer, or polish with oil.

(6) G. writes: 1. On page 218 you publish an article on making cloth, etc., fireproof; would either the first, second, or third composition also tend to render the fabric mildeu-proof; and if so, to what extent? A. Under ordinary circumstances the treatment would prevent mildeu. 2. Would frequent wetting and rough usage be apt to wash or shake off the composition? A. Yes.

(7) N. C. M. asks for a recipe for making boots waterproof. A. Linseed oil, 1 part; mutton tallow, 1/2 lb.; beeswax 1/2 lb.; melt and mix thoroughly together, and apply to the warm, dry leather with a brush. A small quantity of ivory black is sometimes added to this mixture.

(8) H. K. & W. M. W. ask (1) for a receipt for a size to mix bronze powder with so that it can be painted on with a brush (on iron gas fixtures, etc.). A. To one pint of methylated finish add 4 oz. of gum shellac and 1/2 oz. gum benzoin. Put the bottle in a warm place and agitate it occasionally. When the gums are dissolved, let it stand in a cool place 2 or 3 days to settle, pour off the clear portion and reserve for finest work, using the sediment, which by addition of more alcohol, may be made workable, when strained for first coat or coarser work. Add the bronze (q. s.) to this, and apply to the clean, smooth, warm iron, using a soft brush. Repeat, after drying, if necessary. Thin with alcohol (if necessary), to avoid wrinkles and brush marks. Varnish over all. 2. How is the glossy black obtained that I have seen on so many nice chamberlains? A. What you refer to is probably enamel or Japanese work.

(9) W. H. F. asks: 1. What kind of paper do stereotypers use for what is known as the paper process of stereotyping? A. First, soft sized cotton tissue paper; second, soft unsized printing paper of not too short fiber; backing, cartridge paper. 2. What is the paste made of that is used in the paper process of stereotyping? A. Good starch paste answers very well. 3. Is there such a machine known as an engraving machine, and by whom manufactured? A. Yes; several of these have been described and illustrated in the back numbers of the SCIENTIFIC AMERICAN. 4. Can terra alba (or white earth) be used in making moulds of plaster of Paris? A. It is occasionally used for fine castings, but not often.

(10) C. A. R. asks: 1. What is the value per ton of chromate of iron ore which assays 40 per cent oxide of chromium, delivered in New York or other Eastern cities? A. About \$30 per ton. It would not be profitable to ship such an ore East. 2. Is there any cheap mode of extracting the chrome from the ore, which could be set up at the mine, to save transportation? A. The neutral chromate (yellow) and dichromate (red) of potassium, sodium, or calcium (lime), are the only preparations made direct from the ore. The chrome iron ore, previously pulverized and cleansed, is mixed with carbonate and nitrate of potassa, soda, or lime, as the case may be, and roasted on the hearth of a reverberatory furnace. The sintered mass after cooling is ground up, lixiviated with boiling water, silica, and alumina, precipitated from the solution by addition of wood vinegar (pyrolygneous acid), and the clear liquid drawn off and evaporated until a film of saline material begins to form on the surface, when it is left to crystallize. From these crystals (yellow or neutral chromate of potassa or sodium), potassium (or sodium) dichromate is prepared by the addition to their solution of sulphuric or nitric acid; the dichromate crystallizes out on concentrating and cooling the solution.

(11) E. P. S. asks: Are there southern lights at the south pole, as there are northern lights at the north pole? A. Yes; Aurora Australis.

(12) C. J. D. asks (1) for a receipt for violin varnish (the best, if you please). A. Coarsely powdered gum copal and glass, each 4 oz.; alcohol, 64 o. p., 1 pint; camphor, 1/2 oz.; heat in a water bath with frequent stirring, so that the bubbles may be counted as they rise until solution is complete, and when cold decant the clear portion. When oil varnish is used it is made from artists' vinegar copal. 2. Receipts for stains for violins? A. To darken the wood rub over it nitric acid, specific gravity 1.2, and, after standing twelve hours, wash and dry thoroughly. Then use either of the following: First, prepare a groundwork with strong hot aqueous solution of logwood extract; then apply a solution of 3 oz. potash, 3 oz. red sanders; 2 1/2 lb. gum shellac, and 1 gallon water, dissolved over a quick fire. 2. Boil 1 oz. logwood extract in 1 pint water (soft), and add 1-5 oz. cream of tartar. Use the stain hot, and give several coats, if necessary, drying between each. Use a "saw-edged" graining brush and asphaltum varnish, sufficiently thinned, to produce the proper markings.

(13) E. L. writes: We have tried a good many times, but without success, to melt the following metals, namely, 1/4 oz. brass, 3 oz. pure silver, 1 oz. bismuth, 2 oz. common salt, 1 oz. of arsenic, and 1 oz. of potash. You will please let us know through your SCIENTIFIC AMERICAN what kind of crucible to be used, what kind of fire, whether it should all be put in the crucible at once, how to melt it, and when melted, whether to use plaster of Paris or brass moulds? A. You can use a French clay melting pot (crucible). Melt the brass and silver first under a layer of charcoal, then add your fluxes and finally the bismuth and arsenic wrapped in paper; after which pour as soon as possible, with care to avoid inhaling the poisonous arsenical fumes. With good management a four ounce charge may be fused in a good ordinary stove. For larger charges a regular crucible furnace will be required. You can mould in plaster of Paris. See "Hints to correspondents," above.

(14) S. A. F.—The following is a good composition for blackboards: Shellac, 6 oz.; alcohol, 1 1/2 pints; warm the latter and digest in it the shellac until solution is effected. Then strain through a cloth, filter, and introduce about 5 ounces of a mixture of equal parts bone black (floured) and emery flour, stirring until a uniform distribution of these is secured. The mixture should have the consistency of very thin sirup. Thin with more alcohol, if necessary, and apply two coats, using a soft smooth edged brush.

(15) H. M. Co. ask: How can we in an inexpensive manner get the tin, solder, and dirt off old copper bottoms so as to make them clean? A. Cleanse first in a boiling solution of 3 parts caustic soda, 1 part niter, and 5 parts water, and then dilute sulphuric acid; or dip momentarily in warm nitric acid, specific gravity 1.2, and wash immediately in running water.

(16) H. L. W. asks: To what extent is air compressible? Or what is the limit of the compressibility of air? A. We do not know that the limit of compressibility has ever yet been ascertained.

(17) C. K. asks: Which chain has the most strength, one with 1/2 twist links, or one with 3/4 straight links? A. One with straight links, because the stress is in the direct line of the link, which is not the case with the twisted link.

(18) C. N. K. asks if there is any way of finding the number of pounds of coal that is necessary to run 1 horse power when you have the following given: 1. The sum of the horse power of each machine. 2. The number of hours that each machine has run. 3. The total number of pounds of coal consumed. Is there any different way of arriving at the same thing? My object is to find out, after using several kinds of coal, which is the cheapest. A. 1 horse power has been produced by the combustion of 2 lb. of coal per hour; on the other hand, with badly designed engines and boilers, 8 or 9 lb. of coal per hour have been consumed to produce the same result; the quality of the coal affects the economy. The only way to get at the result you wish, is to weigh the coal consumed in a given time, and measure the water evaporated.