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.

Iron can be rolled so thin that 10,000 sheets would only equal one inch in thickness, or about 80 sheets to make the thickness of one of Esterbrook's Bank Pens.

Wanted.—Superintendence of chemical works; 18 years' practical experience. Chemist, 38 Cottage Street, Bridgeport, Conn.

The premises formerly known as *U. S. Watch Factory and grounds* at *Marion*, Jersey City, will be sold at auction, Tuesday, Sept. 26, at 12 M., at Exchange Salesroom, 111 Broadway, New York, by A. J. Bleecker & Son. The building is iron, 3 and 4 stories; 30 x 250; with 3 story brick wing, 4 x 90. Suitable for light manufacturing purposes; 3 acres of ground, handsomely laid out. Map at auctioneers, 75 Nassau Street.

Baxter's Adjustable Wrenches fit peculiar corners where no other wrench will answer. Greene, Tweed & Co., New York.

Imperial Mange Cure. Best remedy ever prepared for mange on dogs or horses troubled with scratches. For sale at all gun and ammunition stores. Manufactured by H. Clay Glover, Toms River, N. J. Send for testimonials.

Electric Light and Electro-Plating Machines manufactured by Excelsior Electric Company, under the Improved System and New Patents of William Hochhausen. Mr. Hochhausen begs to inform his patrons and friends that he withdrew from the Arnoux & Hochhausen Elec. Co., January 1st, 1881, and has no further connection with that company. Wm. Hochhausen, Electrician for Excelsior Electric Co., 66 & 68 Duane St., N. Y.

See Bentel, Margedant & Co.'s adv., page 190.

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

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

50,000 Sawyers wanted. Your full address for Emerson's Hand Book of Saws (free). Over 100 illustrations and pages of valuable information. How to straighten saws, etc. Emerson, Smith & Co., Beaver Falls, Pa.

Gould & Eberhardt's Machinists' Tools. See adv., p. 190.

Barrel, Key, Hogshead, Stave Mach'y. See adv. p. 188.

For Heavy Punches, etc., see illustrated advertisement of Hilles & Jones, on page 188.

See New American File Co.'s Advertisement, p. 190.

Vertical Engines, varied capacity. See adv., p. 188.

Cutters for Teeth of Gear Wheels formed entirely by machinery. 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.

For best low price Planer and Matcher, and latest improved Sash, Door, and Blind Machinery, Send for 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.

The Sweetland Chuck. See illus. adv., p. 190.

Empire Gum Core Packing, Soapstone Packing, and all kinds of Rubber Packing. Greene, Tweed & Co.

Steam Pumps. See adv. Smith, Vaile & Co., p. 188.

The Porter-Allen High Speed Steam Engine. Southwork Foundry & Mach. Co., 430 Washington Ave., Phil. Pa.

Knives for Woodworking Machinery Bookbinders, and Paper Mills. Taylor, Stiles & Co., Riegelsville, N. J.

Send stamp to Morse Yellow Dock Root Sirup Co., Providence, R. I., for descriptive circular and sets of elegant Advertising Cards.

Bostwick's Giant Riding Saw Machine, adv., page 173.

Draughtsman's Sensitive Paper. T. H. McCollin, Phila., Pa.

For Mill Mach'y & Mill Furnishing, see illus. adv. p. 172.

Woodwork'g Mach'y. Rollstone Mach. Co. Adv., p. 173.

Common Sense Dry Kiln. Adapted to drying of all material where kiln, etc., drying houses are used. See p. 174.

Cope & Maxwell M'f'g Co.'s Pump adv., page 157.

The Berryman Feed Water Heater and Purifier and Feed Pump. I. B. Davis' Patent. See illus. adv., p. 157.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 157.

Red Jacket Adjustable Force Pump. See adv., p. 158.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 158.

4 to 40 H. P. Steam Engines. See adv. p. 94.

Drop Forgings. Billings & Spencer Co. See adv., p. 141.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 142.

Lightning Screw Plates, Labor-saving Tools. p. 126.

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

Air Pumps for High Pressure, Hand, or Steam Power, at low prices. C. Beseler, 218 Center Street, New York.

Small articles in sheet or cast brass made on contract. Send models for estimates to H. C. Goodrich, 66 to 72 Ogden Place, Chicago, Ill.

Improved Skinner Portable Engines. Erie, Pa.

Combination Roll and Rubber Co., 68 Warren street, N. Y. Wringer Rolls and Moulded Goods Specialties.

Pure Water furnished Cities, Paper Mills, Laundries, Steam Boilers, etc., by the Multifold System of the Newark Filtering Co., 177 Commerce St., Newark, N. J.

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

List 28, describing 3,600 new and second-hand Machines, now ready for distribution. Send stamp for same. S.C. Forsaith & Co., Manchester, N.H., and N.Y. city.

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

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

Ice Making Machines and Machines for Cooling Breweries, etc. Pictet Artificial Ice Co. (Limited), 142 Greenwich Street. P. O. Box 3083, New York city.

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.

Jas. F. Hotchkiss, 84 John St., N. Y.: Send me your *free* book entitled "How to Keep Boilers Clean," containing useful information for steam users & engineers. (Forward above by postal or letter; mention this paper.)

Steel Stamps and Pattern Letters. The best made. J. F. W. Dorman, 21 German St., Baltimore. Catalogue free.

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

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

Wood-Working Machinery of Improved Design and Workmanship. Cordesman, Egan & Co., Cincinnati, O.

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

Presses, Dies, Tools for working Sheet Metals, etc. Fruit and other Can Tools. E. W. Bliss, Brooklyn, N. Y.

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

Presses & Dies (fruit cans) Ayar Mach. Wks., Salem, N.J.

NEW BOOKS AND PUBLICATIONS.

JOURNAL AND PROCEEDINGS OF THE ROYAL SOCIETY OF NEW SOUTH WALES, 1881. Edited by A. Liversidge, Professor of Chemistry and Mineralogy, University of Sydney. Sydney: Thomas Richards, Government Printer.

This newly incorporated society (grown out of the Philosophical Society of Australasia) shows a commendable degree of vitality. Many of the papers would do credit to any scientific society. Among those of more than local interest presented last year are notes of a Journey on the Darling, by W. E. Abbott; Astronomy of the Australian Aborigines, by Rev. Peter MacPherson; New Double Stars and measures of some of those found by Sir John Herschel, by H. C. Russell, Government Astronomer, Sydney; and Census of the Genera of Plants hitherto known as Indigenous to Australia, by Baron Ferd. von Mueller.

THE FIRE PROTECTION OF MILLS. By C. J. H. Woodbury. New York: John Wiley & Sons.

A book well up to the times, embodying the results of the latest and best experience in the construction, furnishing, and management of textile mills with a view to diminishing the hazards of fire. There is need of similar works devoted to flouring and woodworking mills.

A TREATISE ON THE CONSTRUCTION AND USE OF UNIVERSAL MILLING MACHINES, as made by Brown & Sharpe Manufacturing Company. Providence, R. I.: Brown & Sharpe Manufacturing Company.

The scope of this work is sufficiently described on the title page. It is handsomely printed and bound.

THE INDUSTRIES OF NEW SOUTH WALES. By Charles Lyne. Sydney: Thomas Richards, Government Printer.

A readable survey of the industrial affairs of this enterprising colony by a capable observer who has gone carefully over the ground. As the information he presents has been subjected to local criticism, by being printed in letters to the Sydney *Morning Herald*, its general accuracy may in all probability be safely trusted. Its most promising industrial products appear to be wool, wine, gold, and tin.

MANUAL OF WOOD ENGRAVING FOR THE AMATEUR. By Arthur Hope. Chicago: The Colegrove Book Company.

The young people who want to try their hands at wood engraving next winter will find this a simple and practical guide to begin with.

MANUAL EDUCATION IN PUBLIC SCHOOLS. By L. H. Marvel. Boston: New England Publishing Company. 8vo, pp. 34. Plates.

A review of the manual instruction and training now given in some progressive schools, with reasons for extending such work. The subject will be more fully considered elsewhere.

COLLODIO-ETCHING. By Benjamin Hartley. New York: Industrial Publication Company.

A brief but sufficient guide to collodio-etching. The drawing is done with a needle upon a glass plate coated as for photographing and then printed like an ordinary photograph. It seems to be a cheap and simple method of duplicating sketches; and the author says that the drawing can be done rapidly out doors.

THE SCIENTIFIC EVIDENCES OF ORGANIC EVOLUTION. By George J. Romanes. London: Macmillan & Co.

This latest volume of the Nature Series presents with great felicity an epitome of the broader arguments for the doctrine of organic evolution.

GRAHAM'S LITTLE TEACHER OF STANDARD PHONOGRAPHY.

Gives in a miniature volume Graham's Outline of Standard Phonography, standard phonographic reading and writing exercises, and correspondents' list of word signs and contractions. The book is neatly printed, and legible to such as have good eyes.

PROFESSIONAL PAPERS OF THE SIGNAL SERVICE. Prepared under the direction of General W. B. Hazen, Chief Signal Officer, Washington. Government Print.

These valuable contributions to astronomy and meteorology embraces: I. "Total Eclipse of the Sun, July, 1878," by Professor Cleveland Abbe; II. "Isothermal Lines of the United States, 1871-1880," by Lieut. A. W. Greeley, Acting Signal Officer; III. "Chronological List of Auroras, 1870 to 1880," by Lieut. Greeley; IV. (not received); V. "Information Relative to the Construction and Maintenance of Time Balls;" VI. "Reduction of Air Pressure to Sea Level at Elevated Stations West of the Mississippi River," by Henry A. Hazen.

GEOLOGICAL SURVEY OF NEW JERSEY. Annual Report of the State Geologist, for 1881, with Map. Trenton: John L. Murphy.

The larger portion of this year's volume is a discussion of the climate of the State by Professor J. C. Smock. An interesting chapter of the main report is devoted to a discussion of the encroachments of the sea upon the shore since the settlement of the country, and the evidence for and against a supposed slow but general lowering of the New Jersey coast within a century or so. The statistical chapter shows New Jersey to rank fourth in the list of iron-producing States. It leads all others in the manufacture of green glass.

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.

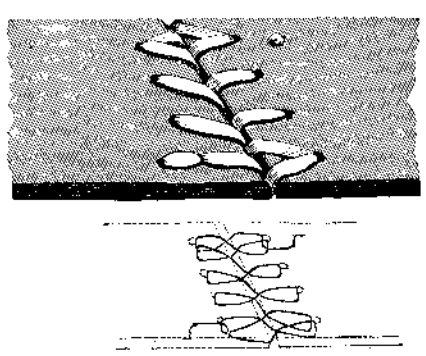
Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

(1) R. F. asks: How many tons pressure is required to punch a one inch round hole through one inch wrought iron? A. It depends much upon the character of the iron and the construction of punch and die. The average is about 150,000 pounds.

(2) G. F. R. asks, 1st, whether tall chimneys sway while in the process of erection, or at any time? 2d. If not, why workmen have that idea? 3d. If they do sway, what is the explanation of it? A. They sway under the action of the wind.

(3) J. B. asks: 1. Is there any process other than by grinding or moulding by which a solid sphere of glass, from one-quarter to one-half inch in diameter, can be made? A. We know no process for making small spheres of glass, other than moulding or grinding. 2. What is the simplest and cheapest method of melting optical glass in small quantities? A. If you only wish to change the form or spread out glass that is already made, you may heat it on a plate or in any form made of clay, or clay spread upon an iron plate, so as to prevent the glass from sticking; and heating it in a muffle furnace, such as dentists and enamelers use. If you wish to make optical glass you will need the appliances of a glass house on a small scale; your pot will need be of the purest clay free from iron. The materials, pure white sand, or calcined and pulverized flints and oxide of lead or litharge, caustic soda and niter, are used in various proportions for making flint glass. The lead, soda, and niter are called the fluxes. The exact ingredients are kept a secret by glass makers, but the following proportions have been given as making a very fine glass: 120 parts fine clear sand, 40 parts purified pearl ash, 35 litharge, 13 niter, 1 part black oxide of manganese. 3. What "flux" is used for optical glass, and in what proportions? A. See answer above. 4. Is a sphere of glass a good and true magnifier? If so, what size is the best? A. A true sphere is a good magnifier, the smaller size having the greatest power.

(4) A. P. H. writes: I send you a sample of belt lacing which I am using in my factory. It is far superior to any other way of lacing. It runs smoother on small pulleys, as it bends to fit them. To lace it commence in middle or either side. If in middle divide



the string into equal lengths; if on edge, same as sketch, by fastening one end and running across and back. You will readily see its advantages. I suggest it, so others may be benefited. Do you think a dry pipe in a boiler is as good as a steam dome? A. No.

(5) R. N. writes: I am about to construct an electro-magnet, and would like to make the core one inch diameter; but do not know what length to make it, or the number or length of wire, or the number of Grove cells to use so as the magnet can support a weight of forty pounds. A. There is no particular rule for determining the length of the cores of an electro-magnet; but generally speaking a magnet intended for lifting great weight should have cores rather long in proportion to their diameter. For your purpose, say 10 diameters long. Wind these cores with 10 layers of No. 16 wire, and use two cells of Grove's battery.

(6) C. M. H. asks: Can you give me a cheap and effective method for purifying water that is impregnated with coal gas? The water is in a gas holder tank, very near my residence, and at times the odor from it is very disagreeable. A. Filtration through a bed of spongy iron ore, covered and underlaid with one of charcoal in fine fragments, will rid the water of this disagreeable contamination.

(7) E. L. D.—To polish wood in the lathe use alcoholic shellac varnish, 2 parts, and boiled linseed oil, 1 part. Shake well together before using. Apply a small quantity with a cloth, keeping up the friction until the polish is secured.

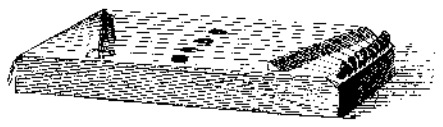
(8) W. H. F. asks how to prepare the gold saucers used by photographers. A. Grind gold leaf very fine on a marble or glass slab, using honey as a vehicle. When ground sufficiently fine, wash with water, allowing the gold powder to thoroughly subside at each washing. Finally mix the gold powder with a little gum water and apply to the saucers.

(9) J. S. V. asks: Is there any preparation that can be used that will harden immediately and be impervious to the weather for joining glass and iron together? A. See SUPPLEMENT, No. 158, "Receipts for Cements."

(10) E. L. S. asks: How can I purify the contents of a rain water cistern, holding twenty-five hundred gallons? Every now and then the water in it has a very unpleasant smell. A. This is probably caused by the decomposition of animal or vegetable matter accidentally fallen into the tank. This may be avoided by proper protection of its contents and remedied by filtering through charcoal in coarse powder.

(11) A. C. H. asks: In what vessels besides glass can I produce hydrogen gas? A. Use a lead flask in which the edges are burnt together, or soldered with the joint out of contact with the materials.

(12) A. M. G. asks how to make an Æolian harp, as they are generally made. A. Æolian harps should be made to fit into a window so as to adjust the sash to cause a strong breeze across the strings of the instrument. Make the box of thin dry pine, the top piece or sounding board of extra clear stuff about three-sixteenths of an inch thick. Sides and bottom can be one-quarter of an inch, length 2 inches shorter than the width of your window, width 10 inches, depth 2½ inches. The ends should be of hard wood, and thick



enough at one end to hold the eyes or studs for fastening the wires or catgut strings. At the other end the wood should be thick enough to hold a set of violin keys, if you use catgut; or iron piano pins, if you use wire; which should be steel. Two bridges of hard wood glued diagonally across each end, for the strings to rest upon. If steel wire is used, a round wire should be inserted upon each bridge so that the sounding wires will not cut the wood. The rest you may gather from the sketch. The tuning should be harmonic, or say thirds, fifths, and octaves. Make about four holes in sound board one inch diameter under the strings.

(13) M. A. writes: Can you inform me how peroxide of hydrogen may be made economically, and used to bleach feathers and not destroy them? A. Peroxide of hydrogen had better be bought from a druggist, but may be thus prepared: A sufficient quantity of peroxide of barium is placed in a suitable vessel and mixed with water. Sulphuric acid is then added until a piece of blue litmus paper dipped in the mixture just turns red; it is then filtered and used as directed in SUPPLEMENT, No. 339 or 319, under "Bleaching."

(14) W. T. R. asks: 1. What colors are used and how they are mixed to paint magic lantern slides? A. Aniline colors dissolved in alcohol are generally used. 2. What colors are used and how are they mixed to make opaque outlines? A. Any dense pigment mixed with drying oil or varnish will do. See SUPPLEMENT, No. 317.

(15) H. E. H. writes: I have a machine for extracting gold from sand, in which I use quicksilver. Having strained the quicksilver through a piece of bed ticking, I subject the amalgam, caught, to a bath of nitric acid, then to a little heat, and have to repeat it many times before I can bring the gold back to its natural color, and retain it in its grain form. If I use severe heat alone, it will melt it, and that is what I want to avoid. Can you suggest an easier method? A. It may be dissolved after most of the mercury has evaporated, in aqua regia, and separated as a fine purple powder by treating with a solution of sulphate of iron. Or it may be melted and granulated by pouring it into water.

(16) C. B. F. asks: What will loosen burnt core sand? I have boxes cast hollow, to hold oil, where the core is often burnt hard, making it impossible to move by the tumbler. A. Loosen the burnt sand with bent tools or files before putting in tumbler. Possibly you make your cores too hard. Put as little flour in the core sand as will make them stand handling. A few trials in this line will set you right. Pickling the castings with a sulphuric acid and water bath is much used where the cores cannot be touched with tools.

(17) M. H. says: Will you give a formula for preparing cupro-ammonia. A. It is an ammoniacal solution of oxide of copper, prepared by adding aqua ammonia to a solution of sulphate of copper under the precipitate, which at first formic is redissolved.