

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.

New Quick Adjusting Parallel Bench Vise, with screw clamp. Strictly first-class. Machine made. 4 1/2 size ready. Price \$10.50. Address J. Thomson, 9 Spruce Street, N. Y.

Railroad Supplies. Manufacturers' Supplies and Polishers' supplies. Send for catalogue. Greene, Tweed & Co., New York.

For Sale.—A Beam Engine, condensing; 34 inch cylinder by 48 inch stroke; Sickle's cut-off; now developing 300 horse power by card. Flywheel, 20 feet diameter by 36 inch face. Can be seen running at the Brooklyn City Flour Mills, Jewell Milling Company, foot of Fulton Street, Brooklyn, N. Y.

Wanted.—A large Drill Press. Address James Cuddy, Forty-third Street, Pittsburg, Pa.

JORDAN IRON AND CHEMICAL WORKS. 117th and 5th Sts., Brooklyn, N. Y. June 8, 1882. H. W. Johns Mfg Co., 87 Maiden Lane, New York:

GENTLEMEN: We take pleasure in testifying to the admirable fireproof qualities of your Asbestos Roofing. At a fire which occurred at our works, May 26 last, our Roofing resisted the action of the flames after the wood-work on which it rested was almost or entirely destroyed.

We have found the roofing to be very durable where there is much walking upon it. Respectfully yours.

JORDAN IRON & CHEMICAL WORKS. J. H. Kolb, Superintendent.

"Abbe" Bolt Forging Machines and "Palmer" Power Hammers a specialty. S. C. 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.

Cotton Belting, Rubber Belting, Leather Belting, Soapstone Packing, Empire Packing. Greene, Tweed & Co., New York.

Lehigh Valley Emery and Corundum Wheels are acknowledged to be the safest, freest cutting, and most durable wheels in use. Write for prices, stating sizes you use. L. V. E. W. Co., Leighton, Pa.

American Fruit Drier. Free Pamphlet. See adv., p. 390.

72" Independent 3 Jaw Chucks, \$42; 48", \$36; 24", \$30. Warranted best in the world, and sent on trial. American Twist Drill Co., Meredith, N. H.

Ball's Variable Cut-off Engine. See adv., page 389.

Fire Brick, Tile, and Clay Retorts, all shapes. Borgner & O'Brien, M'Frs, 23d St., above Race, Phila., Pa.

Drop Forgings of Iron or Steel. See adv., page 389.

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

Paragon School Desk Extension Slides. See adv. p. 389.

Brass & Copper in sheets, wire & blanks. See adv. p. 388.

The Chester Steel Castings Co., office 407 Library St., Philadelphia, Pa., can prove by 15,000 Crank Shafts, and 10,000 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. Dujeon, 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. 388.

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

For Mill Mach'y & Mill Furnishing, see illus. adv. p. 388.

Something new and interesting in Stemwinding Permutation Locks. See adv. of D. K. Miller Lock Co., p. 389.

Sewing Machines and Gun Machinery in Variety. The Pratt & Whitney Co., Hartford, Conn.

Wanted.—Orders.—Penfield Pulley Block Co., Lockport, N. Y.

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.

Steam Pumps. See adv. Smith, Vaile & Co., p. 388.

Patent Key Seat Cutter. See page 388.

Wanted a Superintendent; a thoroughly capable man who understands the malleable iron business and is competent to manage the manufacturing department. State experience, reference, and salary expected. Address "Malleable," P. O. Box 332, Pittsburg, Pa.

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.

Bostwick's Giant Riding Saw Machine, adv., page 372.

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.

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

The Berryman Feed Water Heater and Purifier and Feed Pump. I. B. Davis' Patent. See illus. adv., p. 373.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's adv. p. 372.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 374

4 to 40 H. P. Steam Engines. See adv. p. 372.

First Class Engine Lathes, 30 inch swing, 8 foot bed, now ready. F. C. & A. E. Rowland, New Haven, Conn.

Cope & Maxwell M'g Co.'s Pump adv., page 353.

Supplee Steam Engine. See adv. p. 357.

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

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 342.

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

Agents Wanted.—None but intelligent and energetic need apply. Must furnish good recommendations, or no notice will be taken of applications. Exclusive territory given. Agents are now making from \$10 to \$15 a day. Address, for terms, The Infallible Coin Scale Co., 267 Broadway, New York City.

Improved Skinner Portable Engines. Erie, Pa.

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.

Combination Roll and Rubber Co., 27 Barclay St., N. Y. Winger Rolls and Moulded Goods Specialties.

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

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

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

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

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

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.

DIE ANNA-LISE. A German Play, by Hermann Hersch. With an interlinear translation and directions for learning to read German. By Prof. Charles F. Kroeh. New York: D. Appleton & Co.

The second part of Kroeh's German course. The plan of the course is eminently reasonable; and in carrying it out the author keeps always in mind the immediate requirements of the beginner. We have seen nothing better calculated to secure easy, rapid, and intelligent progress in learning to read German.

DIE ASPHALT-STRASSEN. Von E. Dietrich, Berlin, 1882. Commissions-Verlag von Julius Bohné. 8vo, 207 pp. \$2.50.

Professor Dietrich's book describes very fully the crude materials, the manner of preparing the roadbed and footpath, the cleaning and repair of asphalt streets, with all the tools and machinery illustrated.

THE SILK WORM: BEING A BRIEF MANUAL OF INSTRUCTIONS FOR THE PRODUCTION OF SILK. By C. V. Riley, M.A., Ph.D., U. S. Entomologist. Washington: Government Printing Office.

In this second edition of Professor Riley's Silk Worm Report (Special Report No. 11, Department of Agriculture), the author says that every year's experience with osage orange as food for silk worms confirms all that he has said of its value. For eleven consecutive years he has obtained the best quality of silk from a race of worms fed on this plant (osage orange, *Machra aurantiaca*). The tests made at the recent silk fair at Philadelphia showed that a larger yield of silk was obtained from worms fed on osage orange than from mulberry fed worms.

INSECTS INJURIOUS TO FOREST AND SHADE TREES. By A. S. Packard, Jr., M.D. 8vo, paper. pp. 275.

This Bulletin, No. 7 of the U. S. Entomological Commission, is intended to give a brief summary of the little that is known of the habits and appearance of insects injurious to American forest and shade trees. There is a vast amount of necessary work to be done in this department of entomology; and Mr. Packard's compilation seems to be well suited to interest tree owners and others in taking part in the work, at least so far as to report observations and send specimens to the entomologists of the department.

CONVERSATIONS ON THE PRINCIPAL SUBJECTS OF POLITICAL ECONOMY. By William Elder. Philadelphia: Henry Carey Baird & Co. 8vo, cloth. pp. 316. \$2.50.

The author belongs to the American school of political economists whose views of the disputed questions of social and commercial affairs are more apt to be determined by the facts of history and the requirements of our national life than by the theories of closet philosophers or the interests of British trade. The discussions of International Trade and the beneficial influence of the protective development of home industries may be heartily commended to our legislators and voters.

COMPARATIVE NEW TESTAMENT. Philadelphia: Porter & Coates.

A good idea well carried out. The King James version of the New Testament and the new revision are arranged in parallel columns, the most convenient form possible for comparison and reference. The type is large and clear. The volume contains a history of the revision; the readings preferred by the American committee; notes, etc.

FIRST LESSONS IN GEOLOGY. By A. S. Packard, Jr. Providence, R. I.: Providence Lithograph Company. 8vo, paper. pp. 127.

Discusses in a popular way the action of water in earth sculpture and in moving materials; the geological action of heat; and sketches in a hasty manner the varying aspects of America during the several geological periods. It is intended to accompany the "Chautauqua Scientific Diagrams," to which it constantly refers. The illustrations should be in the book to make it generally useful.

RELATORIO DA ADMINISTRAÇÃO GERAL DAS MATAS relativo ao anno economico de 1879-1880. Lisboa. Imprensa nacional, 1881. pp. 298. 4vo.

In addition to numerous statistics and other valuable tables contained in this volume, we have a series of colored plates, 16 in number, in which are shown the isothermal lines and the geological formations of Portugal, as also the regions where different species of pines, oaks, and other trees abound.

BRIGHT FEATHERS; OR, SOME NORTH AMERICAN BIRDS OF BEAUTY. By Frank R. Rathbun. Auburn, N. Y.: Published by the Author. Parts II., III., and IV. Each \$1.

The birds illustrated in these numbers of Bright Feathers are the rose-breasted grosbeak, the American goldfinch, and the summer warbler, giving in each instance male and female. Progressive improvement is shown in the coloring.

DIE ELEKTRISCHE BELEUCHTUNG UND IHRE ANWENDUNG IN DER PRAXIS; VON DR. ALFRED VON URBANITZKY. Mit 85 Abbildungen. Wien, Pest, Leipzig. pp. 215. Small 8vo. Price \$1.00. "THE ELECTRICAL ILLUMINATION AND ITS PRACTICAL USE."

This little book, which forms volume 95 of Hartleben's chemico-technical library, devotes but little space to the historical development of electric lighting, and after discussion of when and where electric illumination will pay proceeds at once to describe every known form of electrical machine; the Gramme, Buerger, Siemens, Brush, Weston, Wallace-Farmer, Guelcher, Schuckert, Edison, etc. The secondary battery is also described. All the forms of lamps are also described, and the methods of dividing the current. In the appendix the cost of electric lighting is given.

DER PRAKTIISCHE EISEN- UND EISENWAAREN-KENNER. Kaufmännische-technische Eisenwaarenkunde, von Eduard Japing. Wien, Pest, Leipzig. pp. 568. Small 8vo. "THE PRACTICAL CONNOISSEUR OF IRON AND IRON WARE."

This forms volume 97 of the above series. It is intended as a hand book for dealers, importers, and consumers of iron ware. It is illustrated with 98 wood cuts. Price \$1.50.

REVISTA GENERAL DE MARINA. Tomo X., Cuaderno 4°. Abril, 1882. Madrid, 1882.

The number and excellence of the scientific publications received from Spain show an encouraging advance in this direction.

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) O. F. H. asks how to bend half inch iron pipes into a coil 12 inches in diameter. Would it have to be heated? How many square feet heating surface should a coil boiler have for an engine 2 inches by 2 inches, with 80 pounds steam, and 300 to 380 revolutions per minute? Would it run a boat 13 feet long, 2 1/2 feet beam, 6 inches draught, with a 1 foot propeller, 5 1/2 miles an hour? A. For your coil boiler you will have to heat the pipe, which should be extra strong, to a full red, and carefully draw it to the curve you require. You will scarcely be able to manage more than six to eight inches at once. Your engine, at your statement, figures three-fourths of one horse power. It would have to turn the propeller 12 inches in diameter, 300 revolutions per minute, to accomplish 5 miles per hour, allowing 50 per cent slip. We think you would fail in the speed, from the relative size of engine and propeller, and certainly in the coil boiler. Fifty feet of half inch pipe would be equivalent to three-fourths of a horse power; this will make 17 turns in your coil of 1 foot in diameter. You would have to inject the water as fast as it would be required. This looks well theoretically, but works badly in practice.

(2) A. E. B. asks: What can we use to make netting or seines waterproof? A. See "Waterproofing," page 83, vol. xlv.

(3) R. B. C. asks if a piece of hard steel tempered to yellow, cooled, the surface brightened and drawn to the same color again, is the tool of the same temper as it was the first time it was drawn to yellow. I am told the steel is not any lower in temper if the operation is often repeated, and dispute the idea. A. Steel hardened and temper drawn to a straw color only will not be effective in hardness perceptibly, if it be polished and redrawn to a straw color only once. But if the operation is repeated several times, a change can be noticed. If the drawing be carried to the brown or deep straw color each time, the change in hardness will be still more perceptible.

(4) A. W. M. writes: I have a portable engine for thrashing purposes and farm use; but it stands idle for six or seven months in the year. Is there anything to put in the boiler to prevent it from rusting? A. If you lay up your boiler in the early part of winter, when it would be liable to freeze, you may put into the boiler three or four quarts kerosene oil, after putting out all fire, and while the boiler is hot; then

draw off all the water and as much of the oil as will run off, then close up the boiler tight so that no air can get in. Clean all the flues and put the boiler in a dry place in the barn or tool house, if it is a portable one. When you are ready to put it into use again, fill it full of water, get up steam, and blow out any oil that may be left in the boiler through the safety valve. Do this outside of any building. The handling of kerosene oil around a fire is dangerous at any time. If you can prevent the boiler from freezing you can do nothing better than to close up tight and full of boiling water and let it stand until you need it again. It will not rust inside. You can take care of the outside by cleanliness, oiling, and shelter. Oil is really better outside of a boiler than upon the inside. 2. Would crude petroleum or common coal oil answer the purpose? Has hard or lime water any other bad effect on a boiler other than to scale it? A. Lime water does no harm to a boiler other than covering the flues and shell with scale.

(5) G. R. A. asks: 1. Is there any way to drill holes in plate glass? A. Can be done with a hard drill and spirits of turpentine—a tedious and uncertain process, and only for small holes. A diamond drill is much better and cheaper, if there are many holes to drill. If large holes are wanted, from a quarter inch to one inch or larger, prepare a piece of thin tubing of brass or copper, of the required size of hole, of 1 or 2 inches in length, with a small spindle and grooved pulley attached, something after the style of the watch maker's bow drill. Fasten upon the plate of glass, at the point to be drilled, a ring of metal or wood for a guide to keep the tubular drill in its place, until the cut is started sufficiently to steady the cutter. Lay the glass plate horizontally, and work the drill perpendicularly with the bow, using one hand to steady the upper end of the drill stock. Feed emery (about No. 90) and water into the open end of the tube as fast as required. In a very short time you will cut a disk out of the plate. 2. Where to get a book containing information of steam engines and machinery, giving rules for reckoning power and speed of same, also sizes of boilers, amount of heating surface and steam space required for same? A. Burgh's "Pocketbook of Practical Rules for the Proportions of Modern Engines and Boilers." 3. How is the speed of gearing reckoned? Do you take the mean diameter of each, i. e., to center of teeth of each cog, and reckon same as pulleys? A. In planning gearing to work together, the diameters of the pitch lines are always considered; but in laying out the teeth, it is often found that the required number of teeth do not exactly match on a given pitch line. In this case, one or both of the assignments may be varied to make the teeth match. In laying out speeds for general machinery the computations are made by the relative number of teeth in the various wheels. Divide and multiply the same as you would the diameter of pulleys, using the number of teeth in place of the diameters of the pulleys.

(6) F. C. T. asks (1) what I can use as a flux while brazing cast iron? A. Cast iron can be brazed with brass by using borax rubbed upon a slate with water and a little caustic soda. Have the surfaces clean either by file scratching or grinding; rub the ground borax and soda well between the surfaces; tie the pieces closely with wire, and place the brass solder upon the top, so that it will not melt until the iron is hot enough to take it. A better solder can be made by melting ordinary brass with one-sixth of its weight of block tin, and pouring it slowly into water, which will separate it into granules that are very convenient for use. 2. Whether I should use common brass or brazing solder? I have tried borax, but it won't do. It all runs off the iron as soon as it becomes liquid, and acts like water thrown on a greasy surface, and the brass acts the same way as soon as it melts. It will not sweat into the joint at all, but run off to the fire. What is the matter? A. Silver solder or coin is still better, but expensive for large work. Heating the work quickly will melt the solder before the iron is hot enough to receive it, when the solder will roll off.

(7) M. J. S. asks: How can I make a thermostatic bar, so that I can regulate the heat in an incubator and maintain it at about 100°? A. Take a strip of sheet steel and a strip of sheet brass, about one inch wide and one-thirty-second of an inch thick, and from one to two feet long. Tin one side of each and bind the tinned sides together; heat and solder the pieces together with pure tin. Take off the wire binding, and screw one end fast inside of the incubator. This will be your thermostatic bar, having a considerable range, according to its length. The free end can be attached to a delicate shutter, which will operate as a ventilator; or to close and open the warm air passage, as you may find best upon trial. If you find the above combination not strong enough, you may make the pieces a little thicker, but the range will also be smaller. A glass rod or strip of plate glass and a bar of zinc about two feet long, with one end of each clamped together, the other ends fastened about one inch apart, have a great range, and have been used very successfully as a registering thermometer—their difference of expansion being greater than any two metals.

(8) E. E. M. writes: Considerable anxiety in this part about the "Wells comet." Would you please inform me through inquiry column of the SCIENTIFIC AMERICAN, when the above comet can be seen with the naked eye—where, and the exact time of night? A. The "Wells comet" does not show as well as expected. It has only been seen with the telescope, close to the horizon on the sun's track just after sunset. It may show up brighter after it passes its perihelion.

(9) A. S. asks: Can you recommend some apparatus or beer faucet to prevent beer becoming flat in the keg after tapping if not drawn off in a short time? A. Where such beverages cannot be drawn off within a few hours after tapping it is best to tap from barrels in the cellar by means of an air pressure pump and connecting tubes. There are several patented faucets in the market. See our advertising columns and Hints to Correspondents.

(10) T. C. H. asks: Is all lead pipe manufactured by hydraulic pressure? A. As a rule it is. There may be cases in the country where the drawn lead pipe cannot be obtained, that short pieces are made by hand.

(11) J. F. writes: 1. My friend says that the center of a shaft does not turn; I say it does. Which