

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.

Best Turbine Water Wheel, Alcott's, Mt. Holly, N. J. Assays of Ores, Analyses of Minerals, Waters, Commercial Articles, etc. Technical formulae and processes. Laboratory, 33 Park Row, N. Y. Fuller & Stillman.

Wanted—Party to furnish Capital for Foreign Patents on a valuable invention, for interest in patents. Address R. W. Smalley, Salem, Mass.

Howard's Bench Vise and Schleuter's Bolt Cutters, Howard Iron Works.

Band Saws a specialty, F. H. Clement, Rochester, N. Y.

Magneto Call Bells for Telephone Lines. The Best. No battery required. Bunnell, 112 Liberty street, N. Y.

Write to E. & F. Gleason, 56 Canal street, Philadelphia, for standard wood tools,

Foot Lathes, Fret Saws, 6c., 90 pp. E. Brown, Lowell, Ms.

Sperm Oil, Pure. Wm. F. Nye, New Bedford, Mass.

Power & Foot Presses, Ferracute Co., Bridgeton, N. J.

Boilers & Engines cheap. Lovegrove & Co., Phila., Pa.

North's Lathe Dog. 347 N. 4th St., Philadelphia, Pa.

Telephones.—J. H. Bunnell, 112 Liberty St., New York.

Sheep's Gut Belting.—Makers will please address Wilson & Hendrie, Montague, Mich.

Bolt Forging Machine & Power Hammers a specialty. Send for circulars. Forsaith & Co., Manchester, N. H.

Catalogue of Scientific Books. Mailed free on application. E. & F. N. Spon, 44 Broome St., New York.

Pulverizing Mills for all hard substance and grinding purposes. Walker Bros. & Co., 23d and Wood St., Phila.

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

For the most durable and economical Paint for cars, roofs, bridges, iron, brick and wooden buildings, address Pittsburgh Iron Paint Company, Pittsburgh, Pa.

J. C. Hoadley, Consulting Engineer and Mechanical and Scientific Expert, Lawrence, Mass.

For Town and Village use, comb'd Hand Fire Engine & Hose Carriage, \$350. Forsaith & Co., Manchester, N. H.

Boilers ready for shipment, new and 2d hand. For a good boiler, send to Hilles & Jones, Wilmington, Del.

Punching Presses, Drop Hammers, and Dies for working Metals, etc. The Stiles & Parker Press Co., Middletown, Conn.

All kinds of Saws will cut Smooth and True by filing them with our New Machine, price \$2.50. Illustrated Circular free. E. Roth & Bro., New Oxford, Pa.

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

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

Cheap but Good. The "Roberts Engine," see cut in this paper, June 1st, 1878. Also horizontal and vertical engines and boilers. E. E. Roberts, 107 Liberty St., N. Y.

The Cameron Steam Pump mounted in Phosphor Bronze is an indestructible machine. See ad. back page.

1,000 2d hand machines for sale. Send stamp for descriptive price list. Forsaith & Co., Manchester, N. H.

Presses, Dies, and Tools for working Sheet Metals, etc. Fruit and other Can Tools. Bliss & Williams, Brooklyn, N. Y., and Paris Exposition, 1878.

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

Manufacturers of Improved Goods who desire to build up a lucrative foreign trade, will do well to insert a well displayed advertisement in the SCIENTIFIC AMERICAN Export Edition. This paper has a very large foreign circulation.

Improved Wood-working Machinery made by Walker Bros., 73 and 75 Laurel St., Philadelphia, Pa.

Bound Volumes of the Scientific American.—I will sell bound volumes 4, 10, 11, 12, 13, 16, 23, and 32, New Series, for \$1 each, to be sent by express. Address John Edwards, P. O. Box 773, New York.

Expectant Advertisers will serve their interests by consulting C. K. Hammit's Advertising Agency, 206 Broadway, N. Y.

Extra Fine Taps and Dies for Jewelers, Dentists, and Machinists: in cases. Pratt & Whitney Co., Manufacturers, Hartford, Ct.

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

Warranted best and cheapest Planers, Jointers, Universal Woodworkers. Band and Scroll Saws, etc. manufactured by Bentel, Margedant & Co., Hamilton, Ohio.

Patent Wood-working Machinery, Band Saws, Scroll Saws, Friezers, etc. Cordesman, Egan & Co., Cinclin'ti, O.

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

The SCIENTIFIC AMERICAN Export Edition is published monthly, about the 15th of each month. Every number comprises most of the plates of the four preceding weekly numbers of the SCIENTIFIC AMERICAN, with other appropriate contents, business announcements, etc. It forms a large and splendid periodical of nearly one hundred quarto pages, each number illustrated with about one hundred engravings. It is a complete record of American progress in the arts.

The only Engine in the market attached to boiler having cold bearings. F. F. & A. B. Landis, Lancaster, Pa.

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.

Alcott's Turbine received the Centennial Medal.

NEW BOOKS AND PUBLICATIONS.

HEUSINGER, "MUSTER-CONSTRUCTIONEN FÜR EISENBAHNBAU UND BETRIEB."

We acknowledge the receipt of two parts of a new work, issued by the Helwing Publishing House of Hanover, Germany, and edited by E. Heusinger von Waldegg, a well known German railroad engineer and editor of a technical journal for railroad construction. The work is of a serial character, and called by the editor "Muster-Constructionen (normal designs) for Railways and Rolling Stock." The parts contain a number of specially selected and approved constructions, one series being devoted specially to the building of the roadway, depots, switches, signaling devices, etc., while the other series contains designs for locomotives, rolling stock, and accessories. The work is intended for the use of railroad engineers, to assist them in their labors and furnish them with approved references. It is also of advantage to beginners, as it supplies them with designs of practically tested constructions. The work, however, does not embrace bridge constructions, as these have heretofore been separately collected by Klein, Heinzerling, and others. Of interesting and ingenious constructions relating to the roadway, we may mention a wire drawgate for road crossings (system Tronchon) and a station signaling apparatus, adopted by the Hungarian state railways. In the other class a sleeping car, built for the Finnish state railway, and a tender locomotive, built by the "Winterthur Locomotive Works" for the Töss Valley Railroad, may be mentioned. The lithographic plates of each part are executed in an exceedingly clear and creditable manner, and form with the descriptive text (in German) a live work for railroad engineers and technical libraries.

THE WORKS OF SHAKESPEARE. New York: T. Y. Crowell. 1 vol. 12mo. pp. 1097. Price \$1.25.

Too often cheap editions of voluminous writers are badly made, illegible, and of uncertain text. This edition of Shakespeare appears to be a notable exception. The text is that of Clark and Wright, following generally that of their "Cambridge Shakespeare." The paper is fine and clear; the type, though necessarily small, is sufficiently distinct; and the book is well printed. There is added a copious glossary, an index to familiar passages, and an index to the characters in each play. Altogether the publisher seems to have been successful in his design to furnish an edition of Shakespeare combining the advantages of a reliable text, convenient size, clear type, and a moderate price.

Notes & Queries

(1) C. M. asks: 1. Can any more heat be communicated to the air of a small room, so as to be indicated by the thermometer, by the burning of gas or kerosene oil in a stove or other radiator than can be produced by burning the same amount of gas or oil in any other way, provided that the combustion is equally perfect in each case? A. You would get the greatest effect by using a radiator. 2. Is there any other advantage of the stoves as heat producers than having a tolerably good conductor in a convenient place? A. Yes. It renders combustion controllable, and makes it more perfect than it would be in an open fireplace.

(2) E. D. P. writes: In SCIENTIFIC AMERICAN of July 27, page 59, G. S. H. wants to know how to transplant large trees successfully. He can do it as follows: Dig a hole this fall large enough and deep enough to receive it. Then after the ground freezes this winter as far down as the roots are, dig around the tree until you get below the frost, then under tree, and turn it over on sled and haul to place, and set up, then in spring fill in to suit. In this way you do not disturb the roots in the least as the ground is frozen tight around them.

(3) A. S. M. asks for a good compound for taking the scale off and to prevent lime settling in steam boilers. I would like to know of something cheap and practicable. A. If the boiler is not a very small one, you may add once a week about one pound of soda (sodium carbonate) for every 50 gallons of the boiler's contents, taking care to blow out (through the bottom blow-out tap) this charge with the accumulated sludge before adding more, and meanwhile do not let the water run low in the boiler. The common practice is to use the blow-out while at work; but it is better to wait until after the boiler has been for a time quiet and the suspended matter has nearly settled.

(4) H. writes: I am building a bicycle with round rubber tire one inch in diameter. The ordinary rubber cement is not strong enough to hold the joint of tire. What shall I use, and how apply it? A. You may try the following: Melt together in a suitable iron vessel gutta percha and pitch, in about equal proportions, over a gentle fire, stirring until a homogeneous mass is obtained. Use warm.

(5) H. S. asks for a recipe for embalming bodies so that they will keep some time in this hot climate, either by rubbing it on the outside or injecting it inside, with full instructions how to apply it. A. See pp. 271 and 103, SCIENTIFIC AMERICAN, vol. 37, and p. 136, "Science Record" for 1874.

(6) W. L. A. asks: Will you please tell me what polishing ink is used for? A. See p. 316 (4), SCIENTIFIC AMERICAN, vol. 38.

(7) M. D. L. asks for a recipe for making a gum same as is used on postage stamps, in order to use it to fasten labels on microscopic slides. A. Dissolve 2 ozs. of dextrin in 5 ozs. of hot water, and 1 oz. of acetic acid, and 1 oz. of spirits of wine.

(8) P. J. F. asks: What is the difference between benzine and gas naphtha? A. Pure benzine (C<sub>6</sub>H<sub>6</sub>) is obtained in the fractional distillation of coal oil. The same name is given to several of the lighter distillates of petroleum (between 176° and 194°). The name naphtha is used to designate a mixture of several of the lighter distillates of petroleum. It is also applied to several of the distillates of coal oil after ben-

zine. The least volatile portions of these contain the hydrocarbon xylene (C<sub>8</sub>H<sub>10</sub>).

(9) A. J. W. writes: When the double glasses of an opera glass get clouded between them, how can they be got apart to clean them? A. Soak them in turpentine. When separated clean thoroughly and cement together with a fine quality of balsam of fir.

(10) P. L. asks: Can electricity harm a bird that might be sitting on a telegraph wire? A. No.

(11) A. J. C. asks if there would be any difference in two thermometers hung up, one in the draught of the wind and the other where there is no draught. A. The one in the draught would probably indicate a lower temperature.

(12) W. J. B. asks: How is galvanizing on cast iron generally done? If by a battery, how is it made? If they are dipped in melted zinc (zinc galvanizing is what I refer to) how are the castings prepared? How is the superfluous zinc removed after they are dipped? A. Clean the work thoroughly by pickling it in dilute sulphuric acid, and scouring, if necessary, pass through a strong bath of aqueous zinc chloride solution slightly acidified with hydrochloric acid, and then through a bath of molten zinc covered with sal ammoniac.

(13) G. R. B. asks: 1. How many ohms resistance should the magnets of a relay be to operate on a line 2 miles long? A. Make the resistance of the relays equal to the resistance of the rest of the circuit, including batteries. 2. Which would give the best results on said line—to operate two bells, to use a relay, or operate the bells directly? A. Better use a relay. 3. Are there any tables by which the resistance of any given length of copper wire may be known? A. You will find such tables in works on telegraphy.

(14) G. E. A. asks (1) if fruit, vegetables, or meats will keep in their natural state if placed in a vessel and the air exhausted. A. For a limited time, yes. Efforts in this direction have not been very successful. 2. Also, is it necessary that the vessel should be placed in such a position that the air is taken from the lowest extremity? A. No.

(15) A. M. S. writes: I have tried to make an electro-magnet, but failed. I made the staple of horseshoe iron, 3 inches long, 1/2 inch diameter, wrapped with iron wire known as broom wire, insulated with black paint. The wire was wound up and down four times, making the wire 4 thicknesses, connecting it to a good strong battery. A. Use silk or cotton covered copper wire.

(16) G. V. B. asks: How can I polish a glass lens which has been scratched badly by carrying in the pocket with other articles? A. If the scratches are not deep stretch a piece of silk over the face of the lens, and apply to it a ball of sealing wax that is warm enough to take the form of the lens when it is pressed on the silk. When the wax is cool remove it and the silk together from the lens and coat the silk with a paste of putty powder. Rub the face of the lens with the instrument thus made, giving it a gyratory motion. Keep the putty powder moist.

(17) C. H. H. & Co. write: We have a large quantity of silver dissolved in diluted nitric acid; we wish to use it for casting silver ornaments. How can we recover it in proper form to use? A. Add muriatic acid to the solution until all the silver is precipitated as chloride, and after settling decant the supernatant liquid, cover the precipitate with a little dilute oil of vitriol, add a few fragments of clean zinc, and allow to stand for an hour. Soluble zinc chloride and sulphate is produced, and finely divided silver remains, which, after washing and separating from any undissolved zinc, may be fused in a crucible with a little sodium carbonate.

(18) J. E. L. asks: Please give me the names and amounts of the various ingredients which compose the composition used in reducing the temperature to or near the freezing point. A.

Mixtures.	Parts by weight.	Reduction of temperature.
Sodium sulphate	8	48°-6° F.
Hydrochloric acid	5	
Pounded ice	2	50° 4'
Common salt	1	
Sodium sulphate	3	52° 2'
Dilute nitric acid	2	
Sodium sulphate	6	64° 8'
Ammonium nitrate	5	
Dilute nitric acid	4	70° 2'
Sodium phosphate	9	
Dilute nitric acid	4	40°
Ammonium chloride	4	
Potassium nitrate	4	46°
Water	8	
Ammonium nitrate	1	71°
Water	1	
Ammonium nitrate	6	71°
Sodium phosphate	9	
Diluted nitric acid	4	

See also p. 1420, No. 89, SCIENTIFIC AMERICAN SUPPLEMENT.

(19) G. W. W. asks: What is the best way to spray on to an article to freeze it? A. See recipes for freezing mixtures above. For ice machines, see pp. 159 and 387, vol. 38, and 95, 168, and 335, vol. 37, SCIENTIFIC AMERICAN.

(20) C. W. L. asks: Is there any easy and convenient method by which salicylic acid could be used to keep meat and fruit in a private family, where no apparatus would be desirable that would have to be provided on purpose, or is there any treatise on the subject? A. See SCIENTIFIC AMERICAN SUPPLEMENT, p. 1051, No. 66.

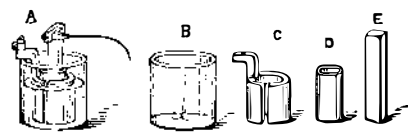
(21) E. N. H. asks if there is any preparation which will remove hair from animal bodies and prevent its further growth, yet can be used with safety. A. See p. 91 (1), current volume, SCIENTIFIC AMERICAN.

(22) M. S. C. asks: Does the water in a boiler, under ordinary circumstances, roll or stand still and level at a pressure of 60 lbs. or higher? Why is it that when the saw is started through a log at a saw mill, the water in the glass tubes, sometimes affixed to steam boilers, rises, while the steam gauge shows no lessening in quantity of steam? A. When steam is drawn rapidly from a boiler, a quick circulation takes

place, and the water rises or pulsates. In boilers with small steam spaces this is especially noticeable, as the steam raises the water with it in its flow.

(23) L. S. C. writes: The steam launch Undine of this place, Willimantic, Conn., has run one mile in 5' 6". She is 20 feet long, 52" beam, engine 4 1/2", cylinder 4" stroke, screw 2 blades, 20" diameter, 40 pitch. Has this time been beaten by a boat of her size? A. We think not. Would be pleased to hear from our readers.

(24) H. M. K., F. L. W., T. McT., and others.—A modified form of Bunsen's battery is shown in the engraving, in which A is an element complete, B is the jar, which should hold about a quart, C is the zinc, which may be made from sheet or cast metal. It should be amalgamated before use. To do this, first remove any grease or dirt, then dip it in sulphuric acid diluted with 9 parts of water, place it on a platter, pour mercury over it, rub it until it attaches itself to every



part of the surface of the zinc, and allow it to stand until the surplus mercury runs off. The porous cell, D, should fit loosely in the zinc and reach 3/4 inch above it (a small porous flower pot will do for a cell). The carbon, E, half fills the porous cell and is about twice as high. It is best to buy the carbons, but that which comes from gas retorts may be used, or finely pulverized coke and caking coal may be mixed together and pressed strongly into an iron mould, and calcined at a low red heat. To set up the battery half fill the jar with a saturated solution of common salt, put in the zinc, place the porous cell in the zinc and the carbon in the porous cell. Fill the cell with a solution made as follows: Dissolve 1 lb. of bichromate of potash in 10 lbs. of hot water; when cool slowly add 5 lbs. strong sulphuric acid. Mix in a vessel that will resist acids and will not crack by heat. Clamp a wire to the carbon and attach a wire to the zinc. To make a powerful battery for occasional use, make zinc and carbon plates of equal size, and dip them, when a current is required, in a solution consisting of 2 parts of bichromate of potash, 20 parts of water, and 1 part of sulphuric acid. The bichromate solution is poisonous and should be handled with care.

(25) T. J. H. writes: I want a small fumigating apparatus for fumigating articles placed in a box or barrel, and that would burn, say, 1 lb. of sulphur at a time. Is there any such contrivance for sale, or how can I make one cheaply? A. All that is requisite, if we understand you, is a shallow earthenware dish large enough to hold the amount of sulphur it is desired to burn. It is best to fuse the sulphur before igniting it.

(26) Amateur writes: I purchased from a dealer some "red fire," so-called, for tableaux, and received a package of some reddish yellow powder, some white powder, and small vial of acid; a small quantity of reddish powder was first put on an old plate, a little of the white sprinkled on it, and then a drop or two of the acid was dropped on, when it immediately blazed up with a brilliant red fire. Can you tell me what they consist of, what kind of acid, and what the white and yellow powders were, and why it should inflame, when the acid came in contact with the white powder? The yellow reddish powder also ignites with a match, but the dealer said that the latest way was with the acid, and there could be no danger. A. 1. Powdered resin and strontium nitrate. 2. Powdered potassium chlorate and dry sugar. 3. Strong sulphuric acid.

(27) F. F. O. asks: What will remove lead pencil marks from calcimined walls? A. Mechanical erasure only is possible; try a piece of clean rubber alone or supplied with a little whiting.

(28) H. W. H. asks how to combine India rubber and white beeswax, making the wax more tough and flexible for moulded articles. Would the rubber first be dissolved in naphtha or other solvent, and united with the melted wax, or can the union be made more direct? A. It will probably be more satisfactory to soften a little both the substances with benzole or benzolene, and knead them thoroughly together while warm.

(29) F. R. M. asks how to test diamonds, that is, how to tell the genuine from glass. A. The specific gravity of the diamond is 3.52 (silicious pebbles = 2.5 to 2.8); readily scratches quartz, topaz, and corundum—not scratched by either. Refracts and disperses light powerfully (index of refraction 2.439), and, after exposure to sunlight, is phosphorescent in the dark. Not affected by hydrofluoric acid. Crystalline form (uncut) regular octohedron, usually with curved faces.

(30) E. M. F. asks for a good recipe for shoe blacking; must mix close and dry hard without cracking. If not too much trouble, I would like to know the order in which the ingredients are combined and the proportion of one to another. A. See pp. 27 (17) and 300 (45), vol. 38, SCIENTIFIC AMERICAN.

(31) A. M. Y. writes: Having two cubes or spheres of equal dimensions outside, one to be solid of a light material, the other a shell of a heavier material, that they maybe of equal weight, would their buoying qualities be equal? A. Yes.

(32) C. P. T. asks: What kind of salts are best adapted to the neutralization of the sulphur and gases arising from bituminous coal during combustion? A. The hydrates of the alkali and earth metals—soda, potash, lime, etc.

How can I make the strongest and most lasting solution of iron? A. If we understand you, dissolve the iron in a warm mixture of 1 part nitric and 5 parts hydrochloric acid, evaporate the solution to dryness, and dissolve the residue in water slightly acidified with hydrochloric acid.

(33) "Bronze" asks: Is there a recipe known to you for a preparation for bronzing old gas fixtures, one that could be put on as paint is (with brush) without heating the fixture? A. There is a varnish in market which is made expressly for this purpose.