

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.

Church Pipe Organs, new and second-hand, ready for delivery. Send for particulars. Henry Erben & Co., Organ Builders, East 23d St. near 2d Ave., New York.

For best Cylinder Oil, R. J. Chara, New York. Emery in Bbls. and Cans, all numbers, at lowest rates. Greene, Tweed & Co., 18 Park Place, N. Y.

Kreider, Campbell & Co., 1030 Germantown Ave., Phila., Pa., contractors for mills for all kinds of grinding. The only Engine in the market attached to boiler having cold bearings. F.F. & A.B. Landis, Lancaster, Pa.

To Steam Users, Engineers, Boiler Makers and Inspectors. Send for book with valuable information. The use of coal with economy; horse power of engines and boilers; safe pressure; grate and heating surface; coal and water required per horse power. Price 25 cents. Lovegrove & Co., Philadelphia, Pa.

Machine Cut Brass Gear Wheels for Models, etc. (new list). Models, experimental work, and machine work generally. D. Gilbert & Son, 212 Chester St., Phila., Pa.

The Chemical Laboratory of Rutgers College will be open from July 5 to September 5, for special courses in analytical chemistry, mineralogy, and experimental chemical investigation. For terms, etc., address Prof. P. T. Austin, Ph.D., F.C.S., Lock Box 2, New Brunswick, N. J.

For Telegraph Instruments, Electric Bells, all parts of the Telephone, etc., send to Milton F. Jones, Natick, Mass.

If Mr. Z. K. S., of Query No. 12, page 410, date June 29, will send his name and address to Wm. S. Dean, Box 600, Hornellsville, N. Y., he can learn something very much to his advantage.

Publishers of Scientific, Mechanical, or Trade Journals in any portion of the world, will serve their interests by sending sample copies with advertising rates to Chas. K. Hammitt's Advertising Agency, 206 Broadway, New York, U. S. A.

For first rate Hand, Foot, or Steam Band Saws, price \$35.00, address G. W. Baker, Wilmington, Del.

Blake's Belt Studs. The best fastening for Leather and Rubber Belting. Greene, Tweed & Co.

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

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

Best Steam Pipe & Boiler Covering. P. Carey, Dayton, O.

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

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

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

Painters' Metal Graining Plates. J. J. Callow, Cleveland, O.

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

Water Wheels, increased power. O. J. Bollinger, York, Pa.

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

For Heavy Punches, Shears, Boiler Shop Rolls, Radial Drills, etc., send to Hilles & Jones, Wilmington, Del.

2d hand Planers, 7' x 30", \$300; 6' x 24", \$225; 5' x 24", \$200; sc. cutt. b'k g'd Lathe, 9' x 28", \$300; A. C. Stebbins, Worcester, Mass.

Valuable Invention to users of Steam Boilers. See advt., page 318, May 13, '78. Address U. S. Automatic Stoker Co., No. 2 Chestnut St., Philadelphia, 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.

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

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

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.

Bound Volumes of the Scientific American.—I have on hand bound volumes of the Scientific American, which I will sell (single or together) at \$1 each, to be sent by express. See advertisement on page 30. John Edwards, P. O. Box 736, N. Y.

Friction Clutches for heavy work. Can be run at high speeds, and start gradual. Safety Elevators and Hoisting Machinery a specialty. D. Frisbie & Co., New Haven, Ct.

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

Improved Steel Castings; stiff and durable; as soft and easily worked as wrought iron; tensile strength not less than 65,000 lbs. to sq. in. Circulars free. Pittsburgh Steel Casting Company, Pittsburgh, Pa.

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

Best Wood Cutting Machinery, of the latest improved kinds, eminently superior, manufactured by Bentel, Margardt & Co., Hamilton, Ohio, at lowest prices.

We make steel castings from 1/4 to 10,000 lbs. weight 3 times as strong as cast iron. 12,000 Crank Shafts of this steel now running and proved superior to wrought iron. Circulars and price list free. Address Chester Steel Castings Co., Evelina St., Philadelphia, Pa.

For Shafts, Pulleys, or Hangers, call and see stock kept at 79 Liberty St. Wm. Sellers & Co.

The Turbine Wheel made by Risdon & Co., Mt. Holly, N. J., gave the best results at Centennial tests.

Hand Fire Engines, Lift and Force Pumps for fire and all other purposes. Address Rumsey & Co., Seneca Falls, N. Y., U. S. A.

Wm. Sellers & Co., Phila., have introduced a new Injector, worked by a single motion of a lever.

NEW BOOKS AND PUBLICATIONS.

PHYSICAL TECHNIQS. Translated from the German of Dr. J. Frick by John D. Easter, Ph.D. J. B. Lippincott & Co., Publishers, Philadelphia, Pa.

This is a second edition of a work which for many years has been recognized as a valuable guide for the student of physics. Its aim is to instruct how to perform the experimental part of the science with the simplest materials and at the least cost, and the information given is of the directly practical order, which is requisite in a handbook designed for ready and constant reference. The chapters of the opening part relate to the arrangement of the laboratory and the necessary manipulations of glass, metals, etc., in the preparation of apparatus. Then follow chapters describing experiments on the equilibrium of forces, on motion or acoustics, on light, on magnetism, on electricity, and on heat, illustrated by about eight hundred engravings. The present edition has been revised and some new matter added. The work is an excellent one, and to all engaged in teaching the science will be of especial utility.

THE SPEAKING TELEPHONE, TALKING PHONOGRAPH, AND OTHER NOVELTIES. By George B. Prescott. Published by D. Appleton & Co., 549 and 551 Broadway, New York.

This is the first extended publication in book form which has appeared giving a complete and connected account of the recent remarkable inventions above noted, together with the history of their inception. For this reason, and because also the book is prepared excellently well by a very eminent electrician, we can commend it to our readers, and especially to the large number who constantly send us inquiries as to the mode of construction of the telephone. Mr. Prescott opens with a general review of the various kinds of telephones, then gives a complete account of Bell's researches, telephonic investigations abroad, the production of galvanic music, and the labors of Gray, Edison, Dolbear, Channing, Blake, and others. There is a capital chapter on the phonograph, a concise exposition of the quadruplex system of telegraphy, and two valuable discussions on electric call bells and the latest improvements in the electric light. The work is timely and interesting, and deserves to be widely read.

A MANUAL OF THE CARBON PROCESS. Translated from the German (6th) edition of Dr. Paul E. Liesegang by R. B. Marston. The Scovill Manufacturing Co., New York, Publishers.

This is a complete practical handbook, giving all the various processes of carbon printing or permanent photography. The different subjects are very elaborately treated, the descriptions are clear and are supplemented by good illustrations. Directions are given for preparing the various chemicals and papers, how to make, transfer, and color prints, how to multiply and enlarge negatives, and there is an excellent chapter on the failures which a tyro in the art is likely to meet with, with instructions how best to remedy or avoid them.

Notes & Queries

(1) L. A. H. asks for a good work on perspective drawing. I have a slight knowledge of isometrical perspective, but wish to become thoroughly competent to draw plans of machinery, etc., in perspective. A. See lessons on pp. 229 and 1019, SCIENTIFIC AMERICAN SUPPLEMENT. Consult Church's "Descriptive Geometry" and Warren's "Higher Linear Perspective."

(2) A. H. C. writes: Having a controversy with a gentleman about the moon's having a great effect on the weather, and he saying that the U. S. Signal Service took the moon for one basis, we refer it to you to settle it. A. We take no observations of the moon at this office when we take our observations of the weather. The distance of the moon from the meridian influences the height of the barometer, but so slightly that the moon's position is not taken as a factor in prognosticating the weather.—J. T. C., U. S. Signal Office, New York city.

(3) C. H. W. asks: Is there any work published which treats of the construction and working of the microscope? I want to make an instrument magnifying from two to three hundred and fifty diameters. A. Consult "The Microscope," Hogg; "The Microscope and its Revelations," Carpenter; "How to Work with the Microscope," Beale; "Text Book of the Microscope," Griffith and Henfrey.

(4) H. W. K. writes: While listening in a telephone there is a continual crackling noise, which is greatly increased in a foggy or rainy day. Is not this caused by currents of electricity in the ground (the telephone has a return circuit through the ground), and why are they more intense in damp weather than in dry? A. The crackling may be produced by earth currents. It may also proceed from currents induced in the telephone line by parallel telegraph wires.

How many cells Calland battery will it take to melt a No. 40 copper wire? A. About 40.

(5) H. R. asks: 1. Can you inform me how strong horseshoe or other magnets can be made? A. a. By placing on each end of a hardened steel bar a soft iron cylinder, and surrounding the whole with a helix which is connected with the poles of a powerful battery. b. By placing the hardened steel bar against the face of a strong electro-magnet. 2. Is there such a thing as an electric engine? A. Yes. See any work on physics. 3. What kind of lime is used for making the lime-light? A. A good clear piece of common unslaked lime will answer. It is sometimes prepared by calcining marble.

(6) E. D. S. asks: 1. How is the signal bell on the telephone worked without a battery? A. With a small magneto-electric machine. 2. How can I make something of the kind, or to answer the purpose? A. An alarm cannot be easily made. See answer to L. O.

B. on this page. 3. What is the size of the inclosed wire, and will it answer to construct a telephone line a half mile long? A. The wire is No. 16. It will answer, but larger would be better.

(7) W. J. P. writes: I want to drive a machine shop 1,200 feet from a boiler and engine. Which is the best and cheapest way to transmit my power? A. Use an endless wire cable.

(8) J. B. writes: I have a telephone line 1 mile long, with Bell's telephones at each end. Now when I speak at one end how does the sound reproduce itself at the other end? A. When a sound is made in the mouthpiece of the transmitting instrument, the diaphragm of the instrument vibrates in unison with the sound, and by approaching and receding from the magnet disturbs its normal magnetic condition and thus generates electric currents in the surrounding helix. These currents are transmitted to the helix of the receiving instrument, where they change the magnetic condition of the bar contained by the helix so that the diaphragm of the receiving instrument vibrates in exactly the same manner as that of the transmitting instrument.

(9) L. O. B. asks for a description of the machine for generating electricity, without the use of a battery, such as is used in connection with telephones to strike bells and call attention. A. We intend to publish in the SCIENTIFIC AMERICAN SUPPLEMENT, at an early date, a full description of a small magneto-electric machine that will answer your purpose.

(10) S. L. asks for a recipe for turpentine varnish, and for "Worcestershire sauce." A. Mastic in tears, 12 ozs.; powdered glass, 5 ozs.; camphor, 3/4 oz.; oil of turpentine, 1 quart; digest with agitation until dissolved; then add Venice turpentine 1 3/4 ozs., previously liquefied by a gentle heat. Mix well and the next day decant. The recipe for Lea & Perrin's Worcestershire sauce is not published.

(11) A subscriber inquires how peach brandy is made. A. Bruise the peaches, steep them in twice their weight of brandy, and express the liquor; or, bitter almonds (bruised), 2 ozs.; proof spirit, 10 gallons; water, 3 gallons; sugar, 6 lbs.; orange flower water, 3/4 pint; macerate together for two weeks.

Is there any handy book published showing, by its aid, how to make cheese? A. We know of no work devoted entirely to cheese making; Willard's "Practical Dairy Husbandry" may be of some service. See also pp. 178-182 Cooley's "Cyclopedia of Practical Receipts."

(12) A. A. R. asks: How can I cut a scale of inches and fractions of an inch on a glass tube which I design using for a rain and snow gauge? A. You may do it with a fine file wet with turpentine, or with a thin copper disk revolved in a lathe and wet with water charged with No. 1 emery.

(13) B. A. asks how pepsin is prepared. A. Pepsin is a nitrogenous substance existing in the gastric juice, and as a viscid matter in the peptic gland and on the walls of the stomachs of animals. The mucous membrane of the stomach (of the hog, sheep, or calf, killed fasting) is scraped, and macerated in cold water for twelve hours; the pepsin in the strained liquid is then precipitated by acetate of lead, the deposit washed once or twice by decantation, sulphureted hydrogen passed through the mixture of the deposit with a little water to remove the whole of the lead, and the filtered liquid evaporated to dryness at a temperature not exceeding 105° Fah. As met with in pharmacy the strength of pepsin varies greatly. It is often prepared by simply mixing with starch the thick liquid obtained on macerating the scraped stomach with water, and evaporating to dryness. The composition of pepsin is not positively known.

(14) P. L. O. asks: How do you use emery powder to clean rusted tools? A. Apply it with oil and a piece of leather, cork, or thick cloth.

(15) F. M. C. asks: Is there any mixture that will cause iron to break by eating it away? A. Nitric, hydrochloric, or sulphuric acids, or a moistened mixture of 14 parts acid potassium sulphate, 4 parts ammonium chloride, and 7 parts potassium nitrate, powdered and intimately mixed.

(16) S. W. asks: What is meant by foot pounds when we are speaking of steam power? A. When we say that 100 foot pounds of work are performed, we mean that an effort has been exerted equivalent to raising 100 pounds 1 foot high, 1 pound 100 feet high, 2 pounds 50 feet high, or any number of pounds raised to such a height that the product of the power and weight is 100.

(17) O. L. asks: How can I make chlorine gas? A. Pour strong hydrochloric acid over black oxide of manganese in coarse powder, and apply a gentle heat; chlorine is given off abundantly. Or pour over a mixture of equal measures of black oxide of manganese and common salt a small quantity of sulphuric acid diluted with an equal volume of water.

What acids will affect platinum foil? A. A warm mixture of 3 parts strong hydrochloric and 1 part nitric acids.

(18) F. M. H. asks: Is there any process of photography that is simple, easily understood (without much practice), and at the same time cheap, in a compact form, and practical? A. Some one of the dry plate processes may possibly come within the prescribed limits. See articles on pp. 304 and 231, SCIENTIFIC AMERICAN, vol. 36, and 161, 765, 809, 1004, 1017, SCIENTIFIC AMERICAN SUPPLEMENT.

We have had great difficulty in making paint stay any length of time on our boats where they come in contact with the water of the canal which is an outlet for Chicago river impurities (sewerage, etc.). What is the cause, and how can we remedy it? A. From such data we cannot judge; test the water with a little litmus; if the reaction is notably alkaline, you have the secret. It may also be partially due to the abrasion of much suspended mineral matter. In the former case you may apply some protective varnish, such as that described on pp. 149 and 159, "Science Record," 1874.

(19) J. G. H. asks: 1. What can I put into burnishing ink, such as is used in shoe manfactories, to produce a black gloss? A. Shellac, 4 ozs.; borax, 1 oz.; water, q. s.: boil to the consistence of sirup and add a few drops of strong ammonia water. A small amount of soap is sometimes also introduced; add a sufficient quantity of this to the ink used to obtain the desired result. Instead of the above, soap is often used alone or with a trace of glycerin, ammonia, or gum arabic. 2. What causes the ink to scale, after being burnished, and how can I prevent it? A. Probably the use of a poor ink.

(20) A. W. G. asks how to make soiled wringer rolls look like new. A. Try a little dilute hydrochloric acid or strong aqueous solution of zinc chloride.

How is rubber melted to make rubber hand stamps? A. See p 1326, SCIENTIFIC AMERICAN SUPPLEMENT, No. 83.

(21) C. W. M. asks: 1. Will you give me a recipe to prevent fishing lines from rotting? A. Digest them for 12 hours in a solution of 1 lb. of white soap in 10 gallons of water; then for six hours in solution of alum, or, better, acetate of alumina in 20 parts of hot water. 2. Is there any scientific foundation for the popular superstition that fish bite better when the moon is full? A. No.

(22) E. D. A. asks if a railroad train is not more liable to run off the track in making a short curve at a high rate of speed than slow. Also scientific reasons therefor. A. Yes; because the force tending to throw it off varies as the square of the speed.

(23) L. C. B. asks: What material is best to use to harden plaster of Paris casts after the castings are made, so as to imitate white or gray marble? A. You may try strong solution of silicate of soda, alone or with concentrated aqueous solution of alum or magnesium sulphate; then wash in lime water or lead acetate.

(24) J. H. McF. asks: What kind of covering or coating will render the plastered walls of a beach house impervious to the fumes of burning sulphur and not be affected thereby? A. You may apply to the dry walls a strong benzole solution of paraffin or wax. The former is preferable.

(25) J. B. asks for a recipe to make mushroom catsup. A. Sprinkle the trimmed tops with salt, stir them occasionally for 2 or 3 days, then lightly press out the juice; add to each gallon of this 3/4 oz. each of bruised mustard seed and cloves, and 1 oz. each bruised allspice, black pepper, and gently simmer for an hour in a porcelain lined iron vessel; cool, strain, and bottle.

(26) C. M. F. writes: I would like to learn the machinist's trade so as to be a good engineer afterwards. I am 19 years old. Where would be a good place to go to learn it? A. You would probably get the greatest experience in the shortest time in a repair shop.

(27) M. says: We use a copper boiler for dyeing wool and homespun black with bichromate of potash and logwood, and same kind of goods brown with camwood, sulphuric acid, and coppers. 1. Would an iron boiler do just as well? A. No. 2. At present we use two open boilers of about 120 gallons capacity each, heated from beneath. Would steam from a shell boiler, 6 feet long and 30 inches diameter, keep the water in the above mentioned boilers, or vats of like capacity, up to the boiling point while used for dyeing purposes? A. As we understand you, not unless the steam used is under 8 or 10 lbs. pressure.

(28) W. H. P. asks for a strong waterproof and flexible cement for joining sheets of manila paper to form a board. A. Good pitch and gutta percha (about equal parts) are fused together, and to 9 parts of this are added 3 parts of boiled oil and one fifth part of litharge; continue the heat with stirring until thorough union of the ingredients is effected. This is applied hot or cooled somewhat, and thinned with a small quantity of benzole or turpentine oil.

(29) H. B. F. asks for a recipe for mixture of a whitewash for wooden or brick outdoor purposes, such as used by the government. A. Slake half a bushel good lime in boiling water in a covered vessel, and strain it through a fine sieve; add a peck of salt dissolved in a small quantity of hot water, 3 lbs. of rice boiled with water to a thin paste, 1 lb. of Spanish whiting, 1 lb. glue softened by soaking in water and then dissolved over a water bath, and 5 gallons of hot water. Agitate, cover from dust, and allow to stand several days. Apply hot. Slaked lime or hydraulic cement mixed with skimmed milk makes a cheap and durable paint for outdoor work.

(30) D. H. asks: What kind of varnish or gum would be suitable to make waterproof and put together sheets of paper to make a paper canoe, and what description of paper would be most suitable? A. Sheets of stout manila passed through a hot bath of aqueous solution of zinc chloride (at 75° B.) pressed strongly together and then soaked in dilute aqueous soda solution containing a small amount of glycerin cohere to form a strong, stiff, waterproof board admirably adapted to the construction of small boats. Single sheets of paper passed quickly through the zinc chloride bath, pressed and washed and dried, are waterproof, and may be otherwise joined to form waterproof boards by any suitable cement. See answer to W. H. P., this page; also p. 10, vol. 38, SCIENTIFIC AMERICAN.

(31) T. R. W. asks (1) for a good recipe for an indelible ink for marking on linen, either with or without previous preparation. A. (1) Add caustic alkali to a saturated aqueous solution of cuprous chloride until no further precipitate forms; allow the precipitate to settle, draw off the supernatant liquid with a siphon, and dissolve the hydrated copper oxide in the smallest possible quantity of ammonia. It may be mixed with about six per cent of gum dextrin for use. Before washing pass a hot iron over the writing. (2) Asphaltum, 1 part; oil of turpentine, 4 parts; dissolve and temper with printer's ink. Best used with a stamp. See other recipes on this page. 2. Also please inform me what solution will be durable and best suited for marking on zinc tags, exposed to the weather. A. The latter (2) may be used on zinc tags.