

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.

Vertical Engines, 10 to 15 H. P., thoroughly well made. John Hartwick & Co., 47 Gold street, New York.

Use the Patent Improved Sheet Iron Roofing and Drip Crimped Siding made by A. Northrup & Co., Pittsburg, Pa. Send for circular and prices.

For Power & Economy, Alcott's Turbine, Mt. Holly, N.J. Wanted—Band Saw Blades, also Band Saw Setter. Send prices to C. A. Walker, Kenton, O.

Large Magic Lantern and 60 Views only \$25. Catalogue free. Outfits wanted. Theo. J. Harbach, Importer and Manufacturer, 809 Filbert St., Phila.

Engine Builders' Brass Goods, Oil Feeders, Glass Oil Cups, Shaft Cups. All goods strictly first class. Address Cincinnati Brass Works.

Yacht Machinery Complete, 10 horse power, little used, or will trade for sail yacht. Thos. Hopewell, 27 Potter St., Hartford, Conn.

Dead Pulleys, that stop the running of Loose Pulleys and Belts, taking the strain from Line Shaft when Machine is not in use. Taper Sleeve Pulley Works, Erie, Pa.

Nickel Plating.—A white deposit guaranteed by using our material. Condit, Hanson & Van Winkle, Newark, N.J. English Agency, 18 Caroline St., Birmingham.

A. L. Jones' Self-Regulating Steam Trap. Most reliable one made. W. E. Kelly & Bro., General Agents, 46 Cortlandt St., New York.

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.

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

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

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

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

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

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

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.

National Steam Pump. Simple, reliable, and durable. Send for catalogue. 46 Cortlandt St., New York.

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

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.

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

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.

Alcott's Turbine received the Centennial Medal.

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.

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

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.

Kreider, Campbell & Co., 1030 Germantown Ave., Phila., Pa., contractors for mills for all kinds of grinding.

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.

Band Saws, \$100; Scroll Saws, \$75; Planers, \$150; Universal Wood Workers and Hand Planers, \$150, and upwards. Bentel, Margedant & Co., Hamilton, Ohio.

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

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

Diamond Self-clamp Paper Cutter and Bookbinders' Machinery. Howard Iron Works, Buffalo, N. Y.

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

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

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

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

Best Turbine Water Wheel, Alcott's, Mt. Holly, N. J.

Second Hand Planer, 8' long, 27 1/2" wide, 32" high, \$300, or exchange for milling machines. Hendey Machine Co., Wolcottville, Ct.

NEW BOOKS AND PUBLICATIONS.

DEPARTMENT OF THE INTERIOR: First Annual Report of the U. S. Entomological Commission. With Maps and Illustrations. Washington: Government Printing Office. 8vo. pp. 477 (292).

This volume records the first year's investigations of Messrs. Riley, Packard and Thomas, as regards the Rocky Mountain locust, its nature and habits, its habitat, and the means that have been suggested for staying its destructive attacks upon the grain fields of the West. The Commissioners have been industrious at all events, and has collected a vast amount of information. They have the satisfaction of reporting also that by their timely arrival among the people whose crops the locusts had destroyed, and by their hopeful predictions and recommendations, they were able to inspire the discouraged pioneers with new hope and confidence, and so not only stopped the abandonment of their recently conquered homes, but greatly helped to draw westward again the tide of emigration that had been stopped.

GEOLOGICAL SURVEY OF NEW JERSEY. Report on Clay Deposits, with maps. 1878. Trenton. 8vo. pp. 380.

This report contains not only a geographical and geological survey of the clay districts of New Jersey, but chapters on the composition, properties, and origin of the clays, and a review of their economical uses. As clay forms the basis of some of the great industries of New Jersey, indeed of the Union as a whole, this report has considerable industrial as well as scientific interest. The sandy clays occur in miocene strata, and the plastic clays in the lower cretaceous (lower green sand). The latter aggregate a depth of 347 feet, of which the stone-ware clay bed takes 30 feet, the South Amboy fire clay bed 20 feet, sand and kaolin 10, pipeclay 10, Woodbridge fire clay bed 20, and the Raritan beds (fire clay, sandy clay, and potter's clay) 39 feet. In 1873 there were taken from these deposits 285,000 tons of fire clay and 20,000 tons of potter's clay.

ANNUAL REPORT OF THE CHIEF SIGNAL OFFICE TO THE SECRETARY OF WAR FOR THE YEAR 1877. Washington: Government Printing Office. 8vo., pp. 570. Charts, 62.

The signal service now sustains 182 stations, of which 82 make full telegraphic reports three times a day. Telegraphic reports are also received from twelve Canadian and other British American stations, and mail reports from seven Canadian and one West Indian station. A careful analysis of the daily predictions, for each district and for each month in the year 1877, shows that a trifle over 86 per cent were verified, when the predictions of the barometric pressures, temperatures, wind-directions, and the character of the weather are taken into account. The percentage of accuracy of forecast limited to the pre-announcement of the character of the weather to be expected in the districts, exclusive of the other conditions above referred to, was 90 1/2 per cent. An extended report is given of the tornado that devastated Mt. Carmel, Ill., June 4, 1877.

INTERNATIONAL EXHIBITION, 1876. Reports and Awards. Groups 11, 13, 16, 19, 22. Edited by Francis A. Walker. Philadelphia: J. B. Lippincott & Co., 1877.

These reports cover, respectively, jewelry, watches, silverware, bronzes, etc.; paper industry, stationery, printing and book-making; military and sporting firearms and explosives; vessels and apparatus for transportation; machines, apparatus and implements used in sewing and making clothing, lace, etc.

RAILROADS: Their Origin and Problems. By Charles Francis Adams, Jr. New York: G. P. Putnam's Sons. 12mo., pp. 216. \$1.25.

In this volume Mr. Adams first reviews the genesis of railways, depending mainly upon contemporary accounts of the opening of the pioneer railroads of this country and England, then proceeds to examine the financial, social, and industrial problems to which railways have given rise. His aim is rather to discover what these problems are than to present any plan for their solution. Seeing that they embrace not a few of the most important conditions of modern life, as well as the most complex, Mr. Adams wisely prefers to watch and wait, leaving it to a better instructed future to determine their final settlement.

RAILWAY SERVICE. I. Trains and Stations. II. Baggage Car Traffic. By Marshall M. Kirkman. Published by the Railroad Gazette. New York. 1878. 12mo. pp. 261 and 252. \$2.

In "Trains and Stations" Mr. Kirkman has described the physical life of the railway, the composition and movement of railway trains, and the laws governing the same, with an exposition of the duties of train and station men. A chapter is given to telegraph operators and repairers; one to the regulations of the Austrian railway service, and another to the management of English roads. "Baggage Car Traffic" illustrates the customs, rules and regulations of the baggage department, and the parcel traffic of railroads in this country and in Europe.



(1) C. W. Z. asks: What are the ingredients, proportions, and complete process for manufacturing carbons for electrical apparatus? A. Fine dust of coke and coking coal is first put into a close iron mould of the shape required for the carbon, and exposed to a red heat. When cool it is taken from the mould and soaked in thick sirup and reheated. This operation is repeated until the carbon acquires the necessary solidity and conducting power.

(2) R. W. M. asks: Can I do any electroplating with seven jars Callaud battery, and how? A. Yes; see p. 209, vol. 38, SCIENTIFIC AMERICAN. For copper plating use a bath composed of pure copper sulphate dissolved in about 5 parts of water. For gold,

dissolve in solution of 4 ounces of potassium cyanide in 1 gallon of water, half an ounce of gold (by battery) or 0.77 of an ounce of gold chloride—use the bath hot (about 150° Fah.); for silver, add to a strong aqueous solution of one ounce of silver nitrate potassium cyanide dissolved in a little water, until no further precipitate forms (avoid adding excess); settle, decant the supernatant liquid, wash the residue with water, dissolve it in a small quantity of strong aqueous solution of potassium cyanide, and dilute the solution to one gallon with pure water for use. For copper use a copper anode, for silver a silver anode, etc. Potassium cyanide is poisonous.

(3) J. W. asks: How and of what material is Indian ink (in blocks or sticks) made? A. Indian ink consists of finely divided carbon cemented together by certain glutinous vegetable juices, gum, gelatin, etc. The precise nature of the cement or mullage used by the Chinese in the manufacture of their inks is not known. But the greater part of the ink now sold as Indian ink consists of fine lampblack and glue. Purify fine lampblack by washing it with a solution of caustic soda, dry, and make it into a thick paste with a weak solution of gelatin containing a few drops of musk essence and about half as much ambergris; mould and dry. Instead of gelatin the following solution may be used: seed lac, 1 oz.; borax, 1/4 oz.; water, 1 pint; boil until solution is effected and make up with water to 3/4 pint.

What chemical (insoluble in water) will dissolve glue and not injure its tenacity? A. We do not know of such a solvent.

How is the Chinese cement made? A. Shellac dissolved in enough alcohol or wood spirits (wood naphtha) to make a liquid of the consistence of molasses; or boil shellac, 4 parts; borax, 1 part; and a small quantity of water until dissolved, and concentrate the solution.

(4) J. W. asks if enameled tin vessels will resist the action of acid substances as effectually as glass or queensware. A. No; though some of these enamels resist dilute acids very well.

(5) D. T. E. asks for a recipe for making a first class article of violet copying ink? A. For blue violet, dissolve in 900 parts of boiling water methyl-violet 5B, Hofmann violet 3B, or gentiana violet B. For reddish violet, dissolve in a similar quantity of water methyl-violet BR. A small quantity of sugar added to these inks will improve the copying qualities. If the writing when dry retains a bronzy appearance more water must be added.

(6) J. J. B. asks: What is the best trap for trapping drains, so as to prevent the entry of sewer gas into a dwelling house? A. Use two ordinary S traps in each pipe.

(7) W. H. K. asks: How much shrinkage in 50 gallons kerosene oil, 175° test, say in six months, when sealed? A. The only notable shrinkage liable to occur would be through loss by evaporation or leakage; the amount of such loss will depend upon the tightness of the package.

(8) J. F. B. asks: What is the mixture applied to fish lines to render them waterproof? A. Boiled oil, 2 parts; gold size, 1 part; beat together, with a little turpentine oil if necessary; apply with a piece of flannel, and expose to the air and dry.

(9) J. M.—The specimen you send is the pupa of a cat flea. The eggs of this insect are glued to the roots of the hairs of the cat, and hatch out in about four days. The white grub falls on the floor and crawls about the carpet, feeding on vegetable substances. In nine or ten days it assumes the pupa form, retaining this form about four days. In nine days more it becomes a perfect flea. Scotch snuff rubbed thoroughly into the fur of the cat issued to be an effectual remedy. Benzine will destroy the insect at the stage of specimen sent.

(10) W. Q. writes: In your "Notes and Queries" No. 11 (August 10, 1878) Inventor wants to know the best kind of wood for sound boards. You answer, spruce. I say if hemlock be tried it will be found far superior. [We are aware that hemlock answers admirably for sounding boards, but piano manufacturers prefer spruce.—Ed.]

(11) S. W. D. writes: I have shells 1/2" in diameter, 1/4" long, closed at one end. What powder or mixture must they be filled with, leaving the one end open, to produce a report as loud or louder than a percussion cap if ignited at the open end? I have tried rifle powder, giant powder and others, but cannot get the required report. Please give me the exact proportions of the explosive material. A. If the explosive is not to be confined or tamped in the shell it will be necessary to employ a small quantity of something of the nature of silver fulminate, or potassium picrate, preferably added to flowered gunpowder, a mixture of potassium chlorate with a little sulphur, or a drop of collodion. The fulminate is prepared by adding to a hot solution of 40 grains of silver in 1/2 fluid oz. of nitric acid (specific gravity=1.37), 2 fluid ozs. of alcohol. Fumes of nitrous acid and ethyl nitrite are disengaged, and the fulminate separates on cooling, and is dried on bibulous paper in grain quantities over quicklime. To prepare the picrate add to a small quantity of water containing 13 grains of potassium hydrate, 50 grains of commercial picric acid, and after standing a short time collect and carefully dry the yellow picrate over caustic lime. As both of these bodies explode with extreme violence by heat friction or percussion it is necessary to handle them with precaution and in small quantities only.

(12) B. I. T. writes: I wish to know what substance to use in making sticky fly paper? A. Boiled linseed oil and rosin; melt and add honey. Soak the paper in strong solution of alum, and then dry before applying the above.

(13) C. F. W. asks if there is any way of removing the marks left on wall paper by the scratching of matches, an annoying habit of careless house servants. A. Generally, no.

(14) J. E. N. writes: A pump was put in a well 74 feet deep. The pump brass 3 inches in diameter with 10 inches stroke, 68 feet from the top of the

well, with 1 1/4 inch gas pipe all the way. I claim that the pump will work easier with 1 inch discharge pipe and 1 1/4 inch suction. Am I right? A. We think not.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

R. W. S.—It consists largely of antimony.—J. H. P. It contains alumina, lime, silica, iron, and manganese oxide. Not merchantable.—J. L.—No. 1 (marl) is of fair quality. No. 2, less so. It would require a quantitative analysis to determine their precise market value. The soapstone is of little value for the purpose named.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH Letters Patent of the United States were Granted in the Week Ending

July 2, 1878, AND EACH BEARING THAT DATE. [Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list, including both the specifications and drawings, will be furnished from this office for one dollar. In ordering, please state the number and date of the patent desired, and remit to Munn & Co., 37 Park Row, New York city.

Annunciator alarms, switch for, A. Gerard.....	205,540
Axle skein, G. Schreyer.....	205,689
Axle, wagon, P. R. Walsh.....	205,591
Bale tie, C. H. Victory (r).....	8,314
Barber's appliance, J. P. Molitor.....	205,495
Basins, valve for, Hennessy & Dorgan.....	205,549
Bath attachment, Kuesner & Avril.....	205,490
Bedstead, invalid, Lovins & Gibson.....	205,659
Bee hive, J. R. Spearman.....	205,585
Belt fastener, Budlong & Talcott.....	205,610
Bending machine, metal, S. P. M. Tasker.....	205,588
Blind, Venetian, T. Simis.....	205,691
Bobbin winder, W. Duchemin.....	205,532
Boiler covering, A. Sweeney.....	205,587
Boilers, fire box for steam, S. Fox.....	205,625
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