

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.

Saunders' Pipe Cutting and Threading Machines. See adv., p. 45.

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

All makes and sizes of steam hammers bored out. L. B. Flanders Machine Works, Philadelphia, Pa.

Steam Launches built and delivered to any part of the country. Address R. A. Morgan, Noank, Conn.

Toope's Pat. Felt and Asbestos Non-conducting Removable Covering for Hot or Cold Surfaces; Toope's Pat. Grate Bar. Chas. Toope, Mfg. Agt., 353 E. 78th St., N. Y.

Hotchkiss' Mechanical Boiler Cleaner, 84 John St., N. Y., only device in existence automatically removing sediment from boilers by circulation at first cost. Engineers make 10 per cent selling other parties than employers. Circular free.

Protect your steam pipes and boilers with genuine Asbestos Covering. H. W. Johns Mfg. Co., 87 Maiden Lane, New York, sole manufacturers of Asbestos Roofing, Liquid Paints, etc.

List 25.—Descriptive of over 2,000 new and second-hand machines, now ready for distribution. Send stamp for same. Forsaith & Co., Manchester, N. H.

Complete Sets of Castings for 2 x 2 Vertical Engines, with cylinder and slides bored, and small casting brass. Price, \$500 each. Photo for stamp. Address J. W. Westwick, Galena, Ill.

Pure Oak Lea Belting. C. W. Army & Son, Manufacturers, Philadelphia. Correspondence solicited.

For Machinists' Tools, see Whitcomb's adv., page 28.

Two Patents for sale. R. Munroe, Fitchburg, Mass.

Within the last ten years greater improvements have been made in mowing machines than any other agricultural implement. It is universally acknowledged that the Eureka Mower Co., of Towanda, Pa., are making the best mower now in use, and every farmer should write to the manufacturers for catalogue, with prices.

Eureka Vegetable Boiler Scale Eradicator, strictly vegetable, and perfectly harmless to iron. Warranted to remove scale of any thickness, and to prevent scaling from either fresh or salt water use. Circulars and particulars of G. E. Brinkerhoff, 107 Liberty St., N. Y.

The Sweetland Chuck. See illus. adv., p. 12.

Moulding Machines for Foundry Use. 33 per cent saved in labor. See adv. of Reynolds & Co., page 12.

The I. B. Davis Patent Feed Pump. See adv., p. 12.

Jenkins' Patent Valves and Packing "The Standard." Jenkins Bros., Proprietors, 11 Dey St., New York.

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

Superior Malleable Castings at moderate rates of Richard P. Pim, Wilmington, Del.

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

The "1880" Lace Cutter by mail for 50 cts.; discount to the trade. Sterling Elliott, 262 Dover St., Boston, Mass.

The Tools, Fixtures, and Patterns of the Taunton Foundry and Machine Company for sale, by the George Place Machinery Agency, 121 Chambers St., New York.

Experts in Patent Causes and Mechanical Counsel. Park Benjamin & Bro., 50 Astor House, New York.

Corrugated Wrought Iron for Tires on Traction Engines, etc. Sole mfrs., H. Lloyd, Son & Co., Pittsburg, Pa.

Malleable and Gray Iron Castings, all descriptions, by Erie Malleable Iron Company, Limited, Erie, Pa.

Power, Foot, and Hand Presses for Metal Workers. Lowest prices. Peerless Punch & Shear Co., 52 Dey St., N. Y.

Recipes and Information on all Industrial Processes. Park Benjamin's Expert Office, 50 Astor House, N. Y.

For the best Stave, Barrel, Keg, and Hogshead Machinery, address H. A. Crossley, Cleveland, Ohio.

National Steel Tube Cleaner for boiler tubes. Adjustable, durable. Chalmers-Spence Co., 40 John St., N. Y.

The Brown Automatic Cut-off Engine; unequalled for workmanship, economy, and durability. Write for information. C. H. Brown & Co., Fitchburg, Mass.

Best Oak Tanned Leather Belting. Wm. F. Fore-augh, Jr., & B. Os., 581 Jefferson St., Philadelphia, Pa.

Stave, Barrel, Keg, and Hogshead Machinery a specialty, by E. & B. Holmes, Buffalo, N. Y.

Downer's Cleaning and Polishing Oil for bright metals; the oldest and best in the market. Highly recommended by the New York, Boston, and other Fire Departments throughout the country. For quickness of cleaning and luster produced it has no equal. Sample vial can be sent C. O. D. for \$3. A. H. Downer, 17 Eck Slip, New York.

Wright's Patent Steam Engine, with automatic cut off. The best engine made. For prices, address William Wright, Manufacturer, Newburgh, N. Y.

National Institute of Steam and Mechanical Engineering, Bridgeport, Conn. Blast Furnace Construction and Management. The metallurgy of iron and steel. Practical Instruction in Steam Engineering, and a good situation when competent. Send for pamphlet.

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 and Tools for working Sheet Metal, etc. suit & other cantools. Bliss & Williams, Bklyn, N. Y.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 43.

Machine Knives for Wood-working Machinery, Bookbinders, and Paper Mills. Also manufacturers of Solomon's Parallel Vise, Taylor, Stiles & Co., Riegelsville, N. J.

Nickel Plating.—Sole manufacturers cast nickel anodes. Pure nickel salts, importers Vienna nickel, Condit, Hanson & Van Winkle, Newark, N. J., and 94 Liberty St., New York.

Clark Rubber Wheels adv. See page 29.

Eclipse Portable Engine. See illustrated adv., p. 30.

Oilstone Mac. Co.'s Wood Working Mach'y ad. p. 29.

Steam Engines, Boilers, Portable Railroads, Sugar Mills. Atlantic Steam Engine Works, Brooklyn, N. Y.

Peck's Patent Drop Press. See adv., page 45.

Blake "Lion and Eagle" Imp'd Crusher. See p. 45.

Apply to J. H. Blaisdel for all kinds of Wood and Iron Working Machinery. 107 Liberty St., New York. Send for illustrated catalogue.

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.

Brass & Copper in sheets, wire & blanks. See ad. p. 45.

Wren's Patent Grate Bar. See adv. page 45.

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

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

For best Indirect Radiators, see adv., page 45.

Eagle Anvils, 10 cents per pound. Fully warranted.

Gear Wheels for Models (list free); experimental and model work, dies and punches, metal cutting, manufacturing, etc. D. Gilbert & Son, 212 Chester St., Phila., Pa.

Machinists' Tools and Special Mach'y. See adv., p. 44.

Soapstone and Empire Gum Core Packing. Special rates to large buyers. Greene, Tweed & Co., New York.

The best Truss ever used. Send for descriptive circular to N. Y. Elastic Truss Co., 683 Broadway, New York.

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

Houston's Four-Sided Moulder. See adv., page 45.

H. A. Lee's Moulding Machines, Worcester, Mass.

New Economizer Portable Engine. See illus. adv. p. 45.

The Student's Illustrated Guide to Practical Draughting. By T. P. Pemberton. Sent on receipt of price, \$1. Address T. P. Pemberton, 5 Dey St., Room 13, New York.

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

Saw Mill Machinery. Stearns Mfg. Co. See p. 45.

Safety Linen Hose; a protection from fire for factories and stores. Greene, Tweed & Co., 118 Chambers St., N. Y.

Skinner & Wood, Erie, Pa. Portable and Stationary Engines, are full of orders, and withdraw their illustrated advertisement. Send for their new circulars.

4 to 40 H. P. Steam Engines. See adv. p. 45.

Use Vacuum Oil Co.'s Cylinder Oil, Rochester, N. Y. For Yale Mills and Engines, see page 45.



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.

(1) A. H. S. writes: Having heard the statement from old hunters that a rifle ball gains in velocity after leaving the rifle barrel, I wish to ask if it is true; and, if it is, what gives it an increase of velocity? I have stated that the greatest velocity is at the instant the ball leaves the barrel; but several say that a ball will penetrate further into a plank placed at a distance than it would if it were within a few feet. A. You are correct. The greatest velocity is just as the ball leaves the muzzle of barrel.

(2) G. M. J. asks: Is a jacketed steam cylinder containing steam from the boiler direct or live steam a saving or the reverse? A. We believe it is yet a "mooted" question among engineers whether a jacket heated by live steam is a source of economy. Some say it is, but we think the majority consider good felting or other non-conductor quite as economical.

(3) J. V. D. asks how to anneal steel to make it very soft. A. For a small quantity, heat the steel to a cherry red in a charcoal fire, then bury it in sawdust, in an iron box, covering the sawdust with ashes. Let it stay until cold. For a larger quantity, and when it is required to be very soft, pack the steel with cast iron (lathe or planer) chips in an iron box as follows: Having at least half three-quarters of an inch in depth of chips in the bottom of the box, put in a layer of steel, then more chips to fill spaces between the steel and also a half or three-quarters of an inch space between the sides of the box and steel, then more steel; and lastly, at least one inch in depth of chips, well rammed down on top of the steel. Heat to and keep at a red heat for from two to four hours. Do not disturb the box until cold.

(4) J. Q. asks: If a pipe two inches in diameter is flowing into a cistern, how many pipes, one inch in diameter, are required to carry away the water that will flow through the two inch pipe? The pressure on the pipes is equal and the incline is equal. A. Four, leaving out of the question the friction of the water passing through the pipes.

(5) J. G. writes: 1. I want to make fifteen electro-magnets of about the same strength as common two-inch horse shoe magnets that are sold in the city at ten to fifteen cents each. What sized wire and how much will be required for each magnet (they are to be connected close together)? A. Make the cores of your magnets three eighths of an inch in diameter and one and a half inch long, and wind with six or eight layers of No. 20 magnet wire. 2. How many cells of gravity battery

will I need to work them, the battery being also close to the magnet? A. You should allow one cell of battery for each magnet, if you work them all at the same time.

(6) C. R. A. writes: I am making a small yacht, 15 feet long and 42 inches beam and 3 feet depth of hold; engine 3x4, to run at 300 revolutions, and be 1½ horsepower; boiler 20 inches diameter by 30 inches in height; supposed to run from eight to ten knots an hour. Do you think that is beam enough? A. Yes; but keep all your weights as low in the boat as you can.

(7) J. H. W. asks: 1. What is the horse power of an engine 20 inch diameter of cylinder, 48 inch stroke, making 55 revolutions per minute, with 70 pounds steam pressure to the square inch? A. See SUPPLEMENT, 253, for rule for calculating horse power of engines. 2. Where can I get some good books on steam engineering? A. Write industrial publishers who advertise in our columns. 3. What was the horse power of the engine that ran the machinery at the Centennial? A. 1,200 to 1,400 horse power, but only one-eighth to one-tenth of this power was used.

(8) J. D. C. writes: I have a gauge connected with a set of boilers, and eighty feet away I have another gauge. The carrying pipe is thoroughly covered, boxed, etc. The pressure on each glass is exactly the same, that is, at boilers 40 lb., eighty feet away 40 lb. Is the temperature of the steam the same at both gauges? A. If there is steam at both gauges, and the pressures are equal, the temperature will be the same; but it is probable that in use you have water and not steam in the gauge which is eighty feet from the boilers.

(9) C. W. asks: 1. How many Bunsen cells, ordinary size, will it take to make an electric light? A. To make an electric light of any considerable power will require 25 cells. 2. If a Knowles steam pump were to be made to run by compressed air at the rate of thirty strokes a minute, and a pressure of 100 lb., and to pump air into the same vessel that it is taken from to run the pump, could you keep the pressure the same, or would it increase or diminish? A. The pressure would diminish.

(10) J. J. asks: How are the bottoms of boots and shoes finished to give them a good bright polish and light color? A. The color is independent of the polish, the latter being made by vigorous work with the brush stick, after the sole has been buffed. All good oak and union leather will make a fair colored bottom, though some tannages are lighter than others, but in many of the hemlock tannages, where the hide is "plumped" by a mineral acid, the color is very dark. Some of the manufacturers stain such hemlock bottoms to imitate oak, but on account of the acid in the leather, the color given is not enduring. One stain much used is made of equal quantities of borax, oxalic acid, and water, with which the sole is dampened, and, when nearly dry, it is rubbed with French chalk or pipe-clay.

(11) E. B. K. asks: 1. When does a gas holder give the greatest pressures, when completely filled or when nearly empty? A. When completely filled. 2. Is it possible to entirely shut off the pressure on the street mains (gas) by the governor; that is, so that no pressure will show on the pressure gauge? A. Yes, if pipes, valves, and connections are perfectly tight, and the initial pressure in the pipes is relieved.

(12) W. H. asks: What is the composition of the indelible ink used with type by shirt and collar makers? A. Nigrosine dissolved in a sufficient quantity of water. Printer's ink is also used.

(13) W. E. S. asks: 1. How strong will a battery need to be to heat to redness a strip of platinum half an inch long, one-eighth of an inch wide, and one-sixty-fourth of an inch thick? A. Use twenty quart Bunsen or bichromate cells. 2. Can a strip of platinum as above be heated to or nearly to redness while in close contact with glass? A. Yes. 3. I send a sample of shell marble; is it of any value? A. The shell marble is of little value.

(14) C. S. P. asks: Will the addition of say 25 per cent of almond or olive oil, to kerosene oil of 112 degrees reputed fire test, render it practically non-explosive? If not, then what may I add to attain this end? A. Nothing can be added to poor kerosene oil that will effectually prevent the escape of the volatile hydrocarbons which make it dangerous. These can easily be separated, however, by fractional distillation.

(15) A. H. R. says: In the study of chemistry great difficulty is experienced by many students in remembering the formulæ of chemical substances, and the want of a short and concise reference book has been our constant trouble. He suggests the following form: The metal sodium forms a series of salts:

Na ₂ O	Sodic Oxide.
Na ₂ S	" Sulphide.
Na ₂ SO ₄	" Sulphate.
NaCl	" Chloride.
NaNO ₃	" Nitrate.
NaHO	" Hydrate.

and the metals hydrogen, potassium, and ammonium, form the same series. The metal barium forms the compounds

BaO	Baric Oxide.
BaS	" Sulphide.
BaSO ₄	" Sulphate.
BaCl ₂	" Chloride.
Ba(NO ₃) ₂	" Nitrate.
Ba(HO) ₂	" Hydrate.

and the metals strontium, calcium, zinc, lead, copper, silver, mercury, form the same compounds. A. There are several recent publications (German) on chemical formulæ in which tables similar to those you suggest are employed. In such books the new system of nomenclature (which is now in almost universal use) should be employed; and in order to make the book serviceable to others besides chemists proper, the various names (older) under which each substance is known to the pharmacist or druggist and in the trades should be added in a "ready reference" and comprehensive form.

(16) W. H. B. asks: Is there a process by which I could nickel-plate faucets myself? also, if I can do it without taking them off while plating them? A. You cannot nickel-plate the faucets without taking

them off. See article on nickel plating, p. 209, Vol. 88, SCIENTIFIC AMERICAN.

(17) L. D. G. asks: 1. Is the pressure on the feed pipe the same as on the boiler? A. A trifle more. 2. Is the pressure on the glass water gauge or tube the same as on the boiler? A. Yes. 3. Will dipping a knife in hot water injure the temper? A. Not unless kept there a great length of time.

(18) S. & R. ask: 1. What kind of steel is best for knives for a spoke lathe cutting mostly dry oak timber? A. What is known as "chrome steel" will probably answer your purpose.

(19) L. A. R. writes: I have an iron pipe leading sirup from sugarhouse to refinery. The sirup is slightly acid, and is colored by its contact with the iron. It affects materially the quality of our sugars. The use of a copper pipe would obviate this trouble, but, besides the cost, I consider it unhealthy. What would you recommend? Is there such a thing as enameled pipe? If so, where can I find it? A. That copper is not generally believed to exercise any deleterious action upon sirup may be inferred from the fact of the vessels in some of the largest refineries being formed of that metal. We have seen one of Howard's patent vacuum pans eight feet in diameter, which consisted of a copper pan within which was a worm or coil of copper pipe through which steam was passed for boiling the juice; and in the SCIENTIFIC AMERICAN for November 27, 1880, will be found a description of Deeley's enormous vacuum pan, the coils of which are also formed of copper. Gun metal has also been used for the fittings and scoops in refineries. In some instances moulds of porous clay have been supplanted by others of iron coated either with varnish or glaze, or even painted with white lead paint. The iron pipe in question might be superseded with advantage by one of glazed earthenware or of wood; but the best conduit pipe would be one of iron coated with vitreous enamel of the same nature as the blue colored agate ware now becoming so generally employed for articles in culinary use.

(20) E. V. S. asks: Is there any special publication on potter's glass? A. One of the best and most comprehensive works on this subject is a "Treatise on the Origin, Progressive Improvement, and Present State of the Manufacture of Porcelain and Glass," It is published by Longmans, of London, England, but may easily be obtained through any bookseller.

(21) G. B. inquires: What is methylated spirit of wine? A receipt given to me contains this, and I cannot obtain it at any drug store in our city. A. It is ordinary alcohol adulterated with ten per cent of wood naphtha to prevent its being used for potable purposes, as, with a view to encourage the arts and manufactures, the English government permits it to be sold free of all excise duty. Any attempt to deodorize methylated spirits in that country subjects the experimentalist to severe penalties. Common alcohol may be employed for every purpose for which the methylated preparation is recommended.

(22) J. A. S. asks: 1. What is a gelatine mould for casting plaster ornaments composed of? A. Allow twelve ounces of gelatine to soak for a few hours in water until it has absorbed as much as it can, then apply heat, by which it will liquefy. If the mould is required to be elastic, add three ounces of treacle and mix well with the gelatine. If a little chrome alum (precise proportions are immaterial) be added to the gelatine it causes it to lose its property of being again dissolved in water. A saturated solution of bichromate of potash brushed over the surface of the mould, allowed to become dry and afterwards exposed to sunlight for a few minutes, renders the surface so hard as to be unaffected by moisture. 2. What change does calcined plaster undergo while setting? A. Calcined sulphate of lime, or plaster of Paris, when mixed with water, produces heat and hardens to a solid mass, slightly enlarging its bulk, hence its value in giving a sharp impression. The rapid hardening is explained by the anhydrous burnt sulphate of lime again chemically combining with as much water as it lost during the ignition. Had the heat at which the gypsum was calcined exceeded 320° Fahr., it would have lost its affinity for water and consequently would not harden.

(23) L. S. H. asks: What kind of solution may be used by cigar makers to dip the leaves in to give the cigars an agreeable flavor? A. Ordinary cigars may be scented by moistening them with a strong tincture of cascarrilla to which a little gum benzoin and storax is sometimes added; or the leaves which are to form the cigars may be soaked for a short time in a strong infusion of cascarrilla, and then dried by a gentle heat. A small quantity of camphor, together with the oils of cassia and cloves, are by some added to the tincture mentioned.

(24) W. H. inquires: What is the solution sometimes employed by opticians to stain brass of a black color? A. A solution of chloride of platinum is the stain most commonly used for this purpose. A cheaper preparation is obtained by dissolving the black scales of iron of the blacksmith's forge (proto-sesquioxide of iron), in muriatic acid to saturation.

(25) C. F. A. asks: Is there not a wire screen that you can put to a window in a basement and look out into the street, but through which one cannot look into the room? A. Any wire screen formed with fine meshes will, if painted on the outside, fulfill these conditions. Finely perforated zinc is much employed for this purpose. These, together with flowered white muslin, prevent any one from seeing the interior of a room, while they present no serious barrier in the way of looking out through them.

(26) B. L. G. asks: 1. By what means can I obtain lead absolutely pure for chemical purposes? A. Reduce nitrate of lead with charcoal. The soft lead of commerce is in most instances sufficiently pure for every purpose. 2. How may I prepare chemically pure zinc? A. Granulate commercial zinc (which is seldom if ever pure) by melting and pouring into water, then place in a Hessian crucible with a fourth its weight of nitrate of potash; cover well and apply heat. After deflagration, remove the dross, melt the zinc, and pour into an ingot mould.

(27) R. O. asks how to make a hair dye like that used by barbers. A. Cleanse the hair with dilute ammonia water. Then moisten it uniformly with dilute solution of gallic acid or ammonium sulphide, and go over it with a comb moistened with solution of one part nitrate of silver in nine parts of water, touching the scalp as little as possible. Stains may be removed by applying a little dilute solution of iodine in iodide of potassium dissolved in water, and then with solution of sodium hyposulphite.

(28) L. W. D. asks: Do you know of any material or process by which a fine gloss, white finish, on wood can be obtained without the use of damar varnish? A. You might try spirit copal or shellac varnish, and polish down with pumice stone or rotten stone and oil.

(29) G. W. S. asks: 1. Are not blinds that are used on horses' bridles injurious to their eyes? A. We think not. 2. When Paris green is sprinkled on vegetables will the dew and air draw the poison out so that it will be less fatal if eaten? A. No.

(30) C. C. H.—The "oiled tissue" you send is goldbeater's skin, prepared from the peritoneal membrane of the cæcum, which, as soon as it is detached, is stretched and dried, soaked in a weak solution of potash, and stretched on a frame. While in this position a similar membrane is applied to it so that the surfaces which adhered to the muscular membrane of the intestine come together. They unite perfectly and soon dry. They are then glued to frames, washed with alum water, dried, washed with solution of isinglass in wine to which spices have been added, and varnished with white of egg.

(31) A. U. asks: 1. How are opals separated from the matrix? Are there any machines that can be used for that purpose? A. Consult Traill's "Treatise on Quartz and Opal." Emanuel's "Diamonds and Precious Stones," and Byrne's "Handbook for the Artisan." The latter contains a good article relative to the best methods and machinery for such work. Address the booksellers and dealers in machinery who advertise in this paper. 2. Is there likely to be a market for these stones in America? The specimens are very brilliant fire opals, and I have seen pieces two inches in diameter and half an inch thick. A. Yes.

(32) E. M. asks: 1. Can Jupiter's great spot be clearly seen with the telescope described in SUPPLEMENT, 252? A. Yes, when an achromatic objective is used.

(33) C. B. C. asks: How is chloride of silver made? A. Although it may be formed by the direct union of chlorine with silver the easier and better way is to dissolve chloride of sodium (common salt) in water in one vessel, and nitrate of silver in another, distilled water being used by preference for the latter. Now pour the one solution into the other, and instantly there will be formed a dense, white, curdy precipitate. Next pour off the supernatant fluid and add plain water two or three times to wash the chloride free from the traces of the nitrate of soda, the other product of the decomposition. The combining equivalent of nitrate of silver being 170, while that of chloride of sodium is 58.5, these proportions should be adhered to when dissolving the salts. The proportion of water is immaterial.

(34) L. B. F. wishes a receipt for making an acid-proof cement. A. It would have been desirable had particulars of the object for which it is required been given, as acids act so differently upon different substances. A mixture of equal parts of pitch, resin, and dried plaster of Paris is much used as a cement in chemical works where sulphuric acid is prepared. Troughs for holding acids may be effectively cemented by the following: Resin, 6 lb.; dried red ochre, 1 lb.; calcined plaster of Paris, ½ lb.; linseed oil, ¼ lb. These must be incorporated by well stirring together when melted. For smaller purposes an alcoholic solution of shellac, or a solution of bitumen in benzol, answers well. To render this latter less brittle, it is desirable to add a few drops of a solution of India-rubber. Marine glue also resists acids. It may be formed of India-rubber 1 part, digested, with heat, in a covered vessel containing 12 parts of mineral naphtha, to which, when solution is effected, 20 parts of powdered shellac are added. When liquefaction is complete pour out on a slab to solidify.

(35) J. R. S. writes requesting information respecting the recently introduced methods of obtaining reproductions of writing in inks of any desired color. A. Pour into a flat zinc trough, or upon a zinc plate having the edges turned up a quarter of an inch, a warm solution of the following substances: Water, 130 parts; sulphate of baryta, 75 parts; sugar, 30 parts; gelatine, 30 parts; glycerine, 180 parts. This mass when cool becomes stiff and forms the printing surface. The writing to be reproduced is written with any suitable ink, methyl violet being generally preferred; and this, when quite dry, is laid down upon the gelatine film and the hand rubbed over it. By this operation the ink is absorbed. Quite a number of impressions may now be obtained from this gelatinous surface, by laying upon it a sheet of paper and rubbing with the palm or edge of the hand. If the weather be very hot, to prevent the film from becoming sticky the proportion of baryta above given may be increased to 100 parts. By the following modification of this process the plate may be inked like a lithographic stone, and thus be made to yield an indefinite number of impressions in ink of any color. The proportion of water must be reduced, and the ink with which the writing or drawing is made must contain alum. On theoretical grounds the best ink to employ would be a saturated solution of the alum to which was added enough common writing ink to give it color. A wet sponge having been passed over the gelatine surface, the writing is laid down, and after the lapse of a few moments it is removed, when the writing will be found to be eaten into the film as if engraved. A roller charged with printer's ink is now passed over the surface, which, when properly inked, will now yield any required number of impressions. By preference the inking roller should be formed of India-rubber; fresh inking must be had recourse to after each impression has been taken.

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

H. R.—Barytocalcite— $\text{BaCO}_3 + \text{CaCO}_3$.—J. S. W.—No. 1 is dolomite—magnesian limestone. No. 2, datholite—a hydrated borosilicate of calcium.—M. B.—The gravel contains no metals. The bright particles are mica and a little iron sulphide pyrites. The rock is quartzose, carrying a little chalcopryite—iron-copper sulphide.—P. S.—It is lead sulphide—galena; may contain a trace of silver.—J. P.—It is blast furnace scoria—not a native mineral.—W. T.—A sandstone saturated with petroleum.

COMMUNICATIONS RECEIVED.

On Inventors' Academy. By E. W. S.
On Railroad Rail Binding. By E. A. S.
On a Curious Icicle. By E. M.
On Rainfalls. By J. T. N.

NEW BOOKS AND PUBLICATIONS.

THE AMERICAN CHEMICAL JOURNAL.

The number for December contains several very able articles, among them the following papers: "Researches on the Complex Inorganic Acids," by Wolcott Gibbs. "Estimation of Alkaloids by Potassium Mercuric Iodide," by Albert B. Prescott. Contributions from the Chemical Laboratory of Harvard University: "On the Ethers of Uric Acid: Dimethyluric Acid," by H. B. Hill and C. F. Mabery. "Researches on the Substituted Benzyl Compounds; Orthobromobenzyl Compounds," by C. Loring Jackson and J. Fleming White. "The Constitution of the Tartrates of Antimony," by F. W. Clarke and Helena Stallo. "On the Relative Stability of Certain Organic Salts," by Miles Beamer and F. W. Clarke. "Some New Salts of Uranium," by F. W. Clarke and Mary E. Owens. "Graphite from Ducktown, Tennessee," by W. I. Dudley and F. W. Clarke. "On the Distribution of Arsenic in the Human Body in a Case of Arsenical Poisoning," by S. W. Johnson and R. H. Chittenden. "Synthesis of Salicylic Acid," by Edgar F. Smith.

THEORIE DER GEWOELBE (THE THEORY OF VAULTS). By A. Foeppel. Leipzig: Arthur Felix, 1880. 152 pp.

This work is divided into four chapters, of which the first embraces the "Elementary Theory of Barrel Vaults," their conditions of stability, the graphical calculations for obtaining the pressure line, etc. The second chapter treats of the "Theories of Elasticities" in barrel vaults; the third chapter is devoted to the theory of the pressure and elasticity in domes; whereas the fourth treats of groined arches. This work was not intended for the beginner, as it requires considerable acquaintance with the subject; but for such persons it will be found to be of great value, as it contains a large store of information, especially in regard to modern developments and the elasticity of vaults.

[OFFICIAL.]

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FOR WHICH

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

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AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866, 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. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications not being printed, must be copied by hand.

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