

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.

The publishers of this paper guarantee to advertisers a circulation of not less than 50,000 copies every weekly issue.

Launches and Engines. S. E. Hartman, Worcester, Mass. Buzz and other Wood Planes. Shafting, Pulleys, Hangers a specialty. P. Frybill, 467 W. 40th St., N. Y.

The steam pipes, boilers, etc., of the Union Rubber Company, James Dwight & Co., and Albert Weber, are protected with H. W. Johns' Asbestos Boiler Coverings H. W. Johns Manufacturing Company, No. 87 Maiden Lane, New York, sole manufacturers of genuine Asbestos Liquid Paints Roofing, etc.

For Sale—A No. 3 Brainard Milling Machine, used two months; cost \$500. A bargain. John Tim, Erie, Pa Inventors' Institute, Cooper Union. A permanent exhibition of inventions. Prospectus on application. 723 Broadway, N. Y.

Wanted—A Nut Machine and a Bolt Header. Address, stating particulars and prices, B. & S., Box 773 New York city.

Brick Presses for Fire and Red Brick. 309 S. Fifth St., Phila., Pa. S. P. Miller & Son.

Fire on the Hearth.—Open grate and warm air furnace combined. Circulars by O. S. & V. Co., 78 Beekman St., N. Y. Telephones repaired; parts of same for sale. Send stamp for circulars. P. O. Box 205, Jersey City, N. J.

The Friction Clutch Captain will start calendar rolls for rubber, brass, or paper without shock; stop quick, and will save machinery from breaking. D. Frisbie & Co., New Haven, Conn.

The Baker Blower ventilates silver mines 2,000 feet deep. Wilbraham Bros., 2318 Frankford Ave., Phila., Pa. To stop leaks in boiler tubes, use Quinn's Patent Ferrules. Address S. M. Co., So. Newmarket, N. H.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, importers Vienna lime, crocus, etc. Condit, Hanson & Van Winkle, Newark, N. J., and 92 and 94 Liberty St., New York.

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

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

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

Hydraulic Presses and Jacks, new and second hand. Lathes and Machinery for Polishing and Buffing Metals E. Lyon & Co., 47 Grand St., N. Y.

Bradley's cushioned helve hammers. See illus. ad. p. 13.

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

Noise-quieting Nozzles for Locomotives and Steamboats. 50 different varieties, adapted to every class of engine. T. Shaw, 915 Ridge Avenue, Philadelphia, Pa.

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

Forbest Fixtures to run Sewing Machines where power is used, address Jos. A. Sawyer & Son., Worcester, Mass.

Sheet Metal Presses. Ferracuto Co., Bridgeton, N. J.

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.

For Machine Knives and Parallel Vises, see advertisement, p. 349. Taylor, Stiles & Co., Riegelsville, N. J.

The New Economizer, the only Agricultural Engine with return flue boiler in use. See adv. page 405.

Special Wood-Working Machinery of every variety. Levi Houston, Montgomery, Pa. See ad. page 405.

Mineral Lands Prospected, Artesian Wells Bored, by P. A. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 348.

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

Silent Injector, Blower, and Exhauster. See adv. p. 14.

The Paragon School Desk and Garretson's Extension Table Slide manufactured by Buffalo Hardware Co.

Planing and Matching Machines, Band and Scroll Saws, Universal Wood-workers, Universal Hand Jointers, Shaping, Sand-paperying Machines, etc., manu'd by Bentel, Margaret & Co., Hamilton, Ohio. "Illustrated History of Progress made in Wood-working Machinery," sent free.

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

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

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

For Superior Steam Heat. Appar., see adv., page 13.

For Pat. Quadruple Screw Power Press, see adv., p. 13.

Steam Cylinders bored from 3 to 110 inches. L. B. Flinders Machine Works, Philadelphia, Pa.

Brass or Iron Gears; list free. G. B. Grant, Boston. Millstone Dressing Machine. See adv., page 13.

Holly System of Water Supply and Fire Protection for Cities and Villages. See advertisement in SCIENTIFIC AMERICAN of this week.

The E. Horton & Son Co., Windsor Locks, Conn., manufacture the Sweetland Improved Horton Chuck.

Power Hammers. P. S. Justice, Philadelphia, Pa.

Forges, for Hand or Power, for all kinds of work. Address Keystone Portable Forge Co., Phila., Pa.

Metallic Pattern Letters to put on patterns of castings, at reduced prices. H. W. Knight, Seneca Falls, N. Y.

For Reliable Emery Wheels and Machines, address The Lehigh Valley Emery Wheel Co., Weissport, Pa.

Steam Engines; Eclipse Safety Sectional Boiler. Lambertville Iron Works, Lambertville, N. J. See ad. p. 406.

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

Nellis' Cast Tool Steel, Castings from which our specialties in Plover Shares, Also all kinds agricultural steels and ornamental finings, Nellis, Shriver & Co., Pittsburg, Pa.

Electro-Bronzing on Iron. Philadelphia Smelting Company, Philadelphia, Pa.

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

For Shafts, Pulleys, or Hangers, call and see stock kept at 78 Liberty St., N. Y. Wm. Sellers & Co.

NEW BOOKS AND PUBLICATIONS.

CONTRIBUTIONS FROM THE E. M. MUSEUM OF GEOLOGY AND ARCHAEOLOGY OF PRINCETON COLLEGE. No. 2. Topographic, Hypsometric, and Meteorologic Report. By William Libbey, Junior, and W. W. McDonald, of the Princeton Scientific Expedition of 1877.

With these reports are three maps: the first containing the results of a topographical reconnaissance of the valley of Smith's Fork, in the Uintah mountains of Utah; the second containing the triangulation of the same region; the third showing the country between Fort Bridger and the Uintah mountains. The meteorological and topographical work was confined mostly to this region. The only work of scientific value done in Colorado was hypsometric. The report is embellished by a number of admirable artotype prints from photographs of typical scenery in Colorado and Utah. For students' work the entire report is decidedly creditable, and speaks well for the instruction given in the college.

DICTIONARY OF COMMERCE AND MANUFACTURES. By L. de Colange, LL.D. Boston: Estes & Lauriat, 1 vol. quarto, pp. 1,200. Published in 25 parts. Each 50 cents.

The first four parts of this dictionary (A1 to Cologne Water) cover a wide range of subjects, and contain much useful information. The compiler, however, does not seem to have had access to the latest information in all cases; and too frequently his definitions show haste or carelessness in their wording. The illustrations also are for the most part rather ancient and not always such as to justify their insertion in a work of this nature.



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.

When we receive a 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) C. T. W. asks: 1. Can paper be subjected to any chemical process so as to change color by the impact of any hard substance, and thus give impressions of coins or seals without the intervention of ink or coloring matter? A. As we understand you, no. 2. Has any successful attempt ever been made to obtain lithographic copies of the original writing or drawing without transferring to the stone, by the use of artificially prepared paper? A. Your question is rather ambiguous. There are several autolithographic and photolithographic processes in successful use. Consult the back numbers of the SCIENTIFIC AMERICAN and the records of the Patent Office. 3. Is there any prepared oil or varnish by which paper can be rendered impervious to water and still be capable of receiving ink, so as to, in a measure, take the place of the lithographic stone? A. We believe no practical success has been achieved in this direction.

(2) C. writes: A serious fire just took place in a large hotel heated by steam and having electric bells, annunciators, etc. In the room where fire originated between the flooring, a large bunch of bell wires run, also steam and gas pipes, chimney in room also. The proprietors claim there has been a gas leak in room, under flooring, a long time. During the afternoon the bell indicating that room rung at intervals from some unknown cause (fire occurred in evening). The general belief is, that fire originated from spark of two wires coming in contact (insulation eaten off) igniting the escaping gas. Now, is it possible for such a contingency, with only four Leclanche batteries in circuit? Isn't it more probable fire took from steam pipes coming in contact with woodwork? A short circuit from same batteries, even from 12 elements, would not light gas at a burner without an induction coil by experiment. A. It rarely happens that a fire is caused by the contact of steam pipes with woodwork. When it does occur it is generally traceable to some highly inflammable substance accumulated around the pipe. If there was a considerable gas leak, the fire might have been communicated from the chimney, or from a distant gas flame. It is also quite possible that it might have been ignited by an electric spark, if the wires could have been brought into contact by any means. In your experiment you seem to have forgotten that the helices of an electro-magnet are really induction coils from which

a spark may be obtained with small battery power whenever the circuit is broken.

(3) G. F. W. asks: What material will mix with an oil filling for wood, and stain the wood black or nearly so? A. Boettger recommends the use of the vegetable fuel contained in the anacardium nut in this connection. The oily matters are obtained from the crushed-nuts by means of petroleum spirit or bisulphide of carbon.

(4) S. W. F. writes: I am having made a spiral vane as described in your reference book. The spiral is made of thin sheet copper, such as tanners use for boilers, etc. Can I cement the mica or small pieces of looking glass to the spiral so that it will stand the weather and stay on? A. Melt together in an iron pan over a moderate fire pitch and gutta percha, in about equal parts, and add to the mixture about 10 per cent of shellac. Use hot, warming the parts to be joined, and avoiding the use of too much cement in the joint.

(5) E. R. asks how to make a small induction coil such as is used with the Blake transmitter. A. Make a thin wooden spool 3 inches long, 5/8 inch internal diameter. Fill the hole through the spool with a bundle of No. 20 iron wires well straightened. Wind on the spool 4 layers of No. 20 silk covered copper wire. This is the primary wire, which is connected with the battery and transmitter. Cover the primary coil with paraffine paper, and wind on it six or eight courses of No. 38 or No. 40 silk covered copper wire. The ends of this coil are connected with the line which includes the receiving telephones.

(6) A. E.—Phosphor-bronze contains 90 to 91 per cent of copper and 9 to 10 per cent of tin. The proportion of phosphorus added is about 1/4 of one per cent. The phosphorus imparts greater fluidity to the metal in the crucible and greater strength and elasticity, etc., to the castings.

(7) W. N. W. writes: 1. In "Hints to the Young Steam Fitter," page 355, third column near bottom—S. A., December 6—the writer says: "But the maximum pressure of steam to be carried must never exceed the equivalent of a difference in level of water between the water line of the boiler and the lowest part of the distributing main." I would like to ask him why, and what difference it can make whether you carry one pound of steam or three? A. Mr. Baldwin has furnished us with the following: The words mentioned apply to low pressure gravity apparatus, as they usually exist, the distributing mains being of size barely sufficient to expel the air from the radiators furthest from the boiler, when a mercury column or good low-pressure steam gauge will often show 2 or 3 lb. at the boiler. Thus at the part of the distributing main furthest from the boiler, we will say a gauge will show 1/2 lb. pressure and at the boiler 3 lb., the reason of the difference is, we are dealing with an elastic and condensable fluid, of tension so low that its velocity is not great enough to keep a nearly initial pressure throughout the system above the water. Now, again, put a gauge on the boiler at the water line, and it will show 3 lb. pressure also. Again, tap into the return relief at the same level, and it will show 3 lb. Why? because we are dealing with a fluid that has no practical elasticity and will raise in a pipe 2 1/2 feet (very nearly) for every pound of difference between terminal and initial pressures, and this head of water will rise into the main unless it is high enough above it. I wish also to call inquirers' attention to page 356, No. 23, S. A., where it says: "To have the water of condensation return directly into the boiler under all conditions and pressures, the main pipes must be large enough to maintain the pressure of the boiler to within 1 or 1 1/2 lb. in every part of the apparatus." 2. I would also like to ask him to make a little plainer his rule for calculating size for steam mains. A. The areas of the cross section of pipes are to each other as the squares of their diameters. Thus if the size of a one inch pipe in the main at the boiler is enough for 100 square feet of heating surface, a 4 inch pipe will do for 1,600 square feet. Thus square of 1=1. Square of 4=16-1=16 hundred square feet, or if you have the heating surface, and want to find the size of main, take 1-10 (one tenth) the square root of the heating surface in feet, and it gives the diameter of the pipe in inches.

(8) W. H. writes: I have a steam job to do in a store. Two of the radiators are forty feet from the boiler, and there is no cellar underneath for that distance. The joint lay on the ground. I have taken out a trench and placed my pipes in it, and made it ten inches lower at the connection on the main distributing pipe than that at the radiators, and run the return the same way. So you see the water in the supply pipe running against the steam. I do not see any other way to do. Am I right? A. If the distributing main is ample, and the pipe in trench large enough, it will answer; but should these two radiators give trouble and act differently from the other radiators in the job, take their steam pipe directly to the boiler.

(9) C. C. asks: 1. Why does a ball rise above the direction in which it is shot from a gun? A. We think this could not happen with a rifle, and it would not be likely to occur with a smooth bore, except with an imperfect ball. 2. When a balloon is above all obstructions, and has no other motor than the wind, will it go faster than the wind that moves it? A. No. 3. If we run a locomotive on a level road, two miles in two minutes, will there not be more friction than if we ran it one mile in two minutes? A. In the aggregate for time, yes; for distance, no.

(10) H. N. asks: 1. Has a locomotive with low drive wheels more power of traction than it would have if the circumference of the wheels were larger? If so, why? A. Yes, other things being equal, because the pressure on the piston has greater leverage on the point of resistance, the radius of the wheel. 2. Of what particular use is the vacuum of the marine or condensing engine? A. To remove the pressure of the atmosphere from behind the piston.

(11) W. S. W. writes: I have a well, 7 feet in diameter; shall I, by multiplying 3.1416 x 7, get the circumference of the well? A. Multiply 3.1416 by the diameter, the product is the circumference. 2. What will I divide by to find out how many cubic feet in 1

foot? A. To get the contents multiply the diameter by 0.7854, and the product by the length of the column—all in inches—the final result is cubic inches. You should study some good elementary work on mechanics.

(12) C. H. B. writes: In your issue of September 27, page 204 (No. 24), you say that a 4 inch solid pillar will support more weight than a 4 inch hollow pillar. A. Your former question was simply whether a solid or hollow pillar of a given diameter would carry the greatest load; the answer was correct. 2. Now, suppose two pillars to contain the same amount of material, one being cast solid, the other hollow, which will sustain the greatest weight? A. The hollow pillar will be the strongest in this case, and the larger the diameter the better, so long as the thickness is sufficient to insure sound castings.

(13) E. I. asks: 1. What is caking coal? A. Soft bituminous coal that cakes in a fire. 2. How are Hessian crucibles made? A. See p. 267 (6), Vol. 29, of SCIENTIFIC AMERICAN, for the details of crucible making. 3. How many feet in one pound No. 16 copper wire? A. About 80 feet, by Birmingham W. G., and 137 feet, by American W. G.

(14) F. D. writes: I have a telegraph line about a mile in length running into my room. The ground connection is made by means of the gas pipe. The wire used inside of the house is all insulated, and the line wire is one or two sizes smaller than is usually used. I have 3 jars of gravity battery. Is there any danger from lightning? A. If you use a lightning arrester and connect your ground wire with the gas pipe outside of the meter there is no danger.

(15) O. E. P. writes: Referring to "Notes and Queries" in SCIENTIFIC AMERICAN, p. 417 (20), last volume, A. C. says he can't dissolve bleached shellac in alcohol for varnish; you suggest that he has not pure alcohol. I have had considerable trouble with making varnish from bleached shellac, and I find there is more likely to be trouble from adulterated shellac than poor alcohol. In this city (Richmond, Va.), it is impossible to get bleached shellac which has less than 30 per cent of adulteration. With 95 per cent alcohol the varnish made with this will be curdy in the middle, alcoholic solution at the top, and a dirty whitish powder at the bottom. I would suggest that A. C. try some other shellac, and bruise in small pieces before adding the alcohol, and set it where it will be warm, say 70° Fah. If the shellac and alcohol are both good, he ought to have his varnish ready for use in from 24 to 36 hours.

(16) W. J. says that wood sawing is rendered much easier by occasionally oiling the saw with kerosene.

(17) J. E. B. asks: How much horse power can be obtained from a stream of water 40 feet head flowing through a 4 inch pipe and employing a common turbine wheel? A. Allowing for friction, etc., from 1 1/2 to 2 horse power.

(18) F. P. asks what length and diameter of screw would be required to propel a sharp built boat of twenty feet. A. 20 inch diameter, 30 to 36 inch pitch, and 5 to 6 inches length.

(19) D. M. asks: Can stone houses be built in any way to be free from dampness? A. If the walls are properly furred and the spaces between the furring and the wall are ventilated, dampness may be avoided.

(20) J. A. B. asks whether emery or corundum wheels or stone can be used for the expeditious grinding of round bottles into shape for sulphide of carbon prisms. A. Use square bottles, grind them upon the flat side of an iron disk supplied with fine sharp sand and water.

(21) S. J. M. asks for a reliable method of cleaning kid gloves. A. Put them together with a sufficient quantity of pure benzine in a large stoppered vessel, and shake the whole occasionally with alternate rest. If on removing the gloves there remain any spots, rub them out with a soft cloth moistened with ether or benzole. Dry the gloves by exposure to the air, and then place smoothly between glass plates at the temperature of boiling water until the last traces of benzine are expelled. They may then be folded and pressed between paper with a warm iron. Another way is to use a strong solution of pure soap in hot milk beaten up with the yolk of one egg to a pint of the solution. Put the glove on the hand and rub it gently with the paste, to which a little ether may be added, then carefully lay by to dry. White gloves are not discolored by this treatment, and the leather will be made thereby clean and soft as when new.

(22) M. W. asks: How can I cement parchment so that it will stand both hot and cold water? A. Mix ordinary glue with about 3 per cent of potassium or ammonium dichromate in the dark. This may be used on the paper, and after exposure to light becomes perfectly insoluble in boiling water. This glue has been very largely used in Germany for joining the parchment paper envelopes of pea sausages. The strips of paper joined by this glue are dried quickly and exposed to light till the glue changes to a brownish color; they are then boiled with water containing about 3 per cent of alum till all the excess of alkaline dichromate is extracted, and then washed in water and dried.

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

A. T. S.—The mineral is marcasite, iron sulphide, in a quartz matrix. It is not indicative of anything valuable.

COMMUNICATIONS RECEIVED.

- On Ship Railway. By F. M. O.
- On Crystallization of Bodies. By T. W. S.
- On the Origin of Coals and Ores. By R. B.
- On Ice Boats. By G. M. R.
- On Some Pre-Historic Bones. By C. H. S.
- On Ice Boats. By H. J. T. and W. B. M.
- On Ice Yachts Sailing Faster than the Wind. By F. S. C. and F. K. S.
- On Steam Jet Signals. By F. P.
- What is Good Silk? By L. L.
- On Electrical Generators. By S. W. R.