The Asbestos Roufing is the only reliable substitute for tin It costs only about one-half as much, is fully as durable, is fireproof, and can be easily applied by any H. W. Johns Manufacturing Company, 87 Maiden Lane, New York, are the sole manufacturers

Business and Lersonal.

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 appearin next issue

'The best results are obtained by the Imp. Eureka Turbme Wheel and Barber's Pat. Pulverizing Mills. Send for descriptive pamphlets to Barber & Son, Allentown, Pa Portable Railroad Sugar Mills, Engines and Boilers.

Atlantic Steam Engine Works, Brooklyn, N. Y. Wanted—Parties to Purchase Right or Manufacture on Royalty, \$10 "Self-Playing Organ Attachment." Eastern or Middle States Address E. F. O'Neill, Storm

Gear Cutting Attachment for Lathes, Fine Tools, Lace

Leather Cutter, Belting, etc. Jackson & Tyler, Battimore Steam Launches. W. J. Sanderson, Syracuse, N. Y.

Brass or Iron Gears; list free, G. B. Grant, Boston. Silent Injector, Blower, and Exhauster. See adv. p. 237 Fleetwood and Dexter Scroll Saws, Tool Chests, etc.

Send for circular. Jas. T. Pratt & Co., 53 Fulton St., N.Y For a thorough practical education in the duties of steam and mechanical engineers and firemen, apply to the National Institute, Stamford, Conn. For pamphlet and particulars, address Hy. R. Foote, C.E., Director,

The best Centrifugal Machine in the world for all pur poses, can be seen in operation at S. S. Hopworth & Co.'s, 11th Ave. and 27th St., New York.

Tapping Water Main Pipes,-Machines for tapping pipes under pressure, for sale by Wm. Young, Easton, Pa Files recut. Passaic File Works, Paterson, N. J.

The surprising results in saving of fuel by the use of Asbestos Steam Pipe and Boiler Coverings are worthy the attention of every one using steam. H. W. Johns Mfg. Co.. 87 Maiden Lane, New York, sole manufacturers of genuine asbestos materials.

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

Steam Traps; best and cheapest in use. No blowing through to start T. Sault, New Haven, Conn.

The Friction Clutch that is doing work in many places satisfactorily, that has never been done by any other can be seen at Institute Fair, New York. D. Frisbie & Co., New Haven, Conn.

H. W. Johns' Asbestos Liquid Paints are strictly pure linseed oil paints, and contain no water. They are the best and most economical paints in the world.

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

Steam Excavators. J. Souther & Co., 12 P.O. Sq. Boston. The Secret Key to Health.—The Science of Life, or Self-Preservation, 300 pages. Price, only \$1. Contains fifty valuable prescriptions, either one of which is worth more than ten times the price of the book. Illustrated sample sent on receipt of 6 cents for postage. Address Dr. W. H. Parker, 4 Bulfinch St., Boston, Mass.

The Baker Blower runs the largest sand blast in the world. Wilbraham Bros., 2318 Frankford Ave., Phila., Pa. Forsaith & Co., Manchester, N. H., & 213 Center St., N. Y. Bolt Forging Machines, Power Hammers, Comb'd Hand Fire Eng. & Hose Carriages, New & 2d hand Machinery. Send stamp for illus. cat. State just what you want.

Wright's Patent Steam Engine, with automatic cutoff. 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.

H. Prentiss & Co., 14 Dey St., New York, Manufs. Taps, Dies, Screw Plates, Reamers, etc. Send for list. The Horton Lathe Chucks; prices reduced 30 per cent. Address The E. Horton & Son Co., Windsor Locks, Conn.

Presses, Dies, and Tools for working Sheet Metal. etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y.

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

Bradley's cushioned helve hammers. See illus. ad. p. 206, Sheet Metal Presses, Ferracute Co., Bridgeton, N. J. Band Saws a specialty. F. H. Clement, Rochester, N. Y Diamond Planers. J. Dickinson, 64 Nassau St., N. Y. Patent Steam Cranes. See illns. adv., page 222.

stamp for circulars. P. O. Box 205, Jersey City, N. J.

Works, Drinker St., Philadelphia, Pa.

Noise-Quieting Nozzles for Locomotives and Steam-Stave, Barrel, Keg, and Hogshead Machinery a specialty, by E. & B. Holmes, Buffalo, N. Y.

Standard Belting, Packing, and Hose. Buy that only. The best is the cheapest. New York Belting and Packmg Company, 37 and 38 Park Row, N. Y.

The New Economizer, the only Agricultural Engine

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York. Cut Gears for Models, etc. (list free). Models, work-

als, Greene, Tweed & Co., 18 Park Place, New York.

Belting, Polishing Belts. Greene Tweed & Co., N. York

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

Pays well on small investments; Magic Lanterns and Stereopticons of all kinds and prices: views illustrating every subject for public exhibition and parlor entertainments. Send stamp for 80 page Illustrated Catalogue. Centennial medal. McAllister, 49 Nassau St., New York

Fine Taps and Dies in Cases for Jewelers, Dentists, and Machinists. Pratt & Whitney Co., Hartford, Conn. Deoxidized Bronze Patent for machine and engine ournals. Philadelphia Smelting Co., Phila., Pa.

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

Hand Fire Engines, Lift and Force Pumps, for fire and all other purposes. Address Rumsey & Co., Seneca

Falls, N.Y. and 93 Liberty St., N. Y. city, U.S.A. Steam and Gas Fitters' Tools a specialty. Send for

circulars. D. Saunders' Sons, Yonkers, N. Y. Wm. Sellers & Co., Phila., have introduced a new

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

Injector, worked by a single motion of a lever.

NEW BOOKS AND PUBLICATIONS.

REPORT ON PRELIMINARY INVESTIGATION OF THE PROPERTIES OF THE COPPER TIN ALLOYS. Washington: Government Printing Office. 1879.

This report of the committee on metallic alloys embraces the results of the first complete and systematic searches ever made upon copper tin alloys, the most important of all the alloys of the useful metals. The investigation was entered upon under a resolution of the United States Board to test iron, steel, and other metals, passed April 17, 1875. The special work of the committee was begun in 1877, under the direct supervision of the chairman of the committee, Professor Robert H. Thurston, who edits this report. The work, which determined approximately the mechanical properties of all alloys of copper and tin, was done in the Mechanical Laboratory of Stevens Institute of Technology, Hoboken. The aim of the committee has been to ascertain the practical value of commercial metals to the brassfounder and the constructor, when treated in the ordinary manner, the investigation of the effect of various kinds of fluxes and methods of fluxing, and of special methods of treatment of the alloys after casting, being reserved for future research. Six plates show photographs of fractures of copper tin alloys; and twenty-one plates are devoted to graphical representations of the physical properties of the same alloys: and fifty-four plates give facsimiles of the autographic strain diagrams of tests by torsion. There is appended a number of selected papers on the metallic alloys: a review of the earlier researches on the properties of the metallic alloys, with lists of authorities in the department of research; and translations of the elaborate researches of Alfred Riche and M. G. Wertheim.

ZEITSCHRIFT DES ARCHITECTEN UND INGENIEUR. Vereins zu Hannover. Vol. 25, No. 3. Hannover: Carl Rümpler. 25, 1879.

The third number of the 25th volume of the above publication is now before us. It contains the plans of the new building for the Technical High School at Hanover. The same was to be the residence of the former king, but as it was never finished, the Prussian government had the same reconstructed and transformed into one of the most handsome of college build-520x380 feet, has four towers, and is 3 stories high. The Elbe at Schandu, Saxony, are also given. This hand-A detailed article on the different means for theprevention of rust on iron, by Dr. J. Treumann, and extracts from all technical and patent journals, constitute the remainder of the work.

DETERMINACION DE LA LONGITUD DEL Jimenez y Leandro Fernandez. Mexico: 1879.

The determination of the length of the seconds pendulum has two applications of the greatest importance; first, to find by various methods of comparison, the law of variation in length of several synchronous pendu-Telephones repaired, parts of same for sale. Send lums in different places, and to deduce therefrom the level of the terrestrial spheroid and consequently its Vertical Engines. F.C.& A.E. Rowland, New Haven, Ct. form; and second, to determine the force of gravity, this being calculated at double the space described in the Draw'g Insts. & Mat. Woolman, 116 Fulton St., N.Y. Being calculated as doubt the product of the Split Pulleys at low prices, and of same strength and from a state of rest. Notwithstanding the importance appearance as Whole Pulleys. Yocom & Son's Shafting of the determination of the length of the seconds pendulum, no observation of this kind has been made Mexico until quite recently, when it was undertaken boats. 50 different varieties, adapted to every class of by the two engineers, Señores Jimenez and Fernandez. position of the second framework and the second framework of the second framew corded in the papping before us, which forms one of pose he places coils of gas pipe, like steam heating, and the series of the valuable scientific memoirs that are Solid Emery Vulcanite Wheels-The Solid Original being issued from time to time by the Mexican govern-Emery Wheel - other kinds imitations and inferior, ment. Without following the authors into the intricate Caution .- Our name is stamped in full on all our best calculations which are given in extenso in their memoir, we may state as the result of their labors, that the length of the seconds pendulum at the sea level was found to mitigate the evil. Chemicals might also be used, but they be 099153 m, and at the observatory 099109 m.; force of gravity at the sea level 9.7860 m., and at the observatory with return flue boiler in use. See adv. of Porter Mfg. 97816 m. The geographical position of the observatory at the city of Mexico was thence found to be as follows. Latitude, 19° 26' 1.3" N.; longitude east from the meridian of Greenwich 6h. 36m. 26.67s.: height above the level of the sea 2,283 meters. The authors state that heat the water so as to save fuel. Will it do so? fess that, by the rule, it is only a 6% horse power engine, ing machinery, experimental work, tools, etc., to order. their results are of so much the more interest in that D. Gilbert & Son, 212 Chester St., Philadelphia, Pa. the pendulum experimented with was more than 12 Walrus Leather and Bull Neck for Polishing all Met-imeters in length, something uncommon in pendulums designed for this class of experiments.

Oak Tanned Leather Belting, Rubber Belting, Cotton ETUDE SUR LES ALLIAGES DE PLOMB ET Belting, Polishing Belts. Greene Tweed & Co., N.York. D'ANTIMONIE, Par F. de Jussieu, Autun (France), 1879.

> A brief but complete study of the alloys of lead and antimony, giving their compositions, and describing their physical and chemical properties, and their phenomena of liquation and supersaturation. The study of the subject of liquation (the causes of which are here satisfactorily explained) is so much the more interesting in that the phenomena connected therewith often prove a source of trouble, vexation, and unsuccess to founders, stereotypers, and others who are accustomed to manipulate the alloys in question. To the latter class of readers, therefore, the pamphlet will prove especially valuable.



HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the

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 reasonable time should repeat 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 Supple-MENT referred to in these columns may be had at this office. Price 10 cents each.

(1) H. H. C. asks: Can books be obtained giving instructions in lithography or photo-lithography, or both; if so, where? A. Yes, address the booksellers who advertise in this paper.

battery is necessary in using the telephone. A. Batteries are used where a transmitter is employed. 2, Which is best for a small engine, a common upright tubular boiler or a simple coil boiler made of % inch gas pipe? Is there any danger of the coil getting stopped with sediment. A. An upright tubular boiler. The 34 inch coil pipe will be liable to stoppage and burn out.

(3) E. J. T.—You will oblige by giving 1 pint; camphor, 1/2 oz.; heat the mixture, with frequent stirring in the water bath so that the bubbles may be counted as they rise, until solution is complete, and when cold decant the clear portion. When oil varnish is used it is made as for artists' virgin copal.

(4) H. J. writes: I have a lot of silver plated spoons. I would like to take the silver from them. How can I do it and save the silver? A. Dissolve 1 lb. of saltpeter in about 8 lb. of sulphuricacid by aid of heat. This (hot) solution will strip or dissolve off the silver plate. The silver may be recovered from its solution by this, dried and fused with a small quantity of carbonate of soda, or borax and niter, gives pure metallic silver.

(5) G. J. McK. asks: 1. Can you give me satisfactory process for waterproofing] cloth? A. Saturate the fabric with a strong hot aqueous solution ings. It's built entirely of light sandstone, is about of soap, press out excess, and transfer to a second bath consisting of a strong aqueous solution of sulphate or drawings, details of construction, estimates, and description of the Carola Bridge which spans the river Repeat if necessary, press out excess of liquid, and dry, not too rapidly, in the air. 2. Can you give me a prosome bridge is arranged for a railway, vehicles, and cess for determining quantitatively the presence of cin- Paris and sand; as bestos; a metallic jacket filled with pedestrians, and consists of 3 semi-parabolic wrought chonidine as an adulterant of quinine? A. Five to ten iron trusses resting upon stone abutments and piers. grammes of the mixed alkaloids are mixed with 50 grammes of ether, and the mixture, after well shaking, left at rest until next day. By this operation the alkaloids are separated into two parts: one soluble in ether, and another insoluble in that liquid. The part soluble inether contains the quinine, while the insoluble part PENDULO DE SEGUNDOS Y DE LA GRA-VEDAD EN MEXICO. Por Francisco de l'enchonidine. These two parts are sepa-rated by a filter, the insoluble part washed with some Jimenez y Leandro Fernandez. Mexico: ether, and the ethereal solution evaporated. This insoluble part is now mixed with 40 parts of hot water, and converted into neutral sulphate by careful addition of diluted sulphuric acid, so that a solution is obtained having a slight alkaline reaction upon red litmus paper To this solution a solution of tartrate of notash and soda is added in sufficient quantity to convert the sulphates into tartrates, and after stirring with a glass rod, allowed to remain for 24 hours. If cinchonidine be present in appreciable quantity, its tartrate will be found separated in crystalline form. The tartrate of cinchonidine is collected upon a filter, washed with a little water. and dried on a water bath. One part of this tartrate represents 0.804 part of cinchonidine.

(6) W. M. E. writes: In your issue of September 20. No. 25, "Tropic" asks for something to absorb the moisture in dry room and run it out. Supplace a gutter under bottom, and then force cold water through the pipes, would not all the moisture be condensed upon the pipes and drop into the gutter and run off? Could not chemicals be used in pipes instead of water to keep them cold? A. The plan proposed would would probably require too much attention and be expensive. 2. My engine exhaust pipes are 10 feet long, with 3 inch bore, run nearly on 70 to 80 lb., with 100 to 120 revolutions per minute. My sawyer says he can down to 75 revolutions. I then tell him it is a 1234 horse run 114 inch pipe from the feed pump around and power engine; but he then ships on more machinery, through both exhaust pipes and then into boiler and Would it interfere with the proper action of the exhaust that is, the more work it does the less capable of doing steam? A. The plan proposed by your sawyer would be work it is supposed to be; or, in other words, when it successful, but the same result can be attained by using shows itself to be most powerful the lower it is rated,

(7) J. H. writes: I have Roper's book on the steam engine. I wanted to calculate the horse power of an engine, 16 inch cylinder, 2 foot stroke, making 100 revolutions a minute, steam boiler pressure being 100 lb. to square inch. I was somewhat puzzled. Will you give an explanation? Cylinder, 16 inch; area of cylinder, 201.0624; velocity of piston in feet, 400; mean pressure on piston, cut off at half stroke, 79 lb. A. You say the boiler pressure is 100 lb. Is the initial pressure in the cylinder 100 lb.? If so, then 201×79 lb. = 15,879 lb. pressure on the piston,moving at 400 feet per minute, $15879\times400=6351600$ and 6351600 = 192 4 horse power, less 20 per cent for fric-33000

tion and other losses=192.4 less 38.5=153.7 horse power.

(8) J. M. G. writes: In your last issue, one of your subscribers asked for information as to size of discharge pipe for a hydraulic ram. I have found that it depends a great deal upon the distance the water has to be forced, the amount of pressure in the supply pipe, etc. It is obvious that where there is considerable pressure in the supply pipe, and only a short distance to drive the water, a much larger discharge pipe will be required than if these conditions were reversed. There is a very simple contrivance for increasing the capacity of a hydraulic ram, which I do not think is generally known. It is this: Drill or file a small hole, say 1-32 of an inch in diameter, in the supply pipe, about a foot above the place where it enters the ram. At every stroke of the ram a small stream will be discharged from the orifice. This at first sight would seem to decrease the power rather than augment it, but when the reaction takes place in the pipe there seems to be a small quantity of air sucked in, and this air is probably liberated from the water when it reaches the air chamber, thus increasing the pressure. At least this seems to me the most feasible explanation. Certain I am that I have repeatedly tried this plan and find it to increase mateterially the power of the ram.

(9) J. A. S. asks: 1. What would be the best and cheapest piping for conveying strong salt water, say 5 or 6 inch stream, for a distance of 5 or 6 miles? A. Wood tubing, also enameled iron conduits, are in practical use for such purposes, and have, we believe, proved most economical. 2. Is there a work published giving the different systems of water works: if so, where can it be had and what would be the cost? A. There (2) I. F. R. asks (1) whether any kind of are a number of good works on this subject. Address for catalogues the book dealers who advertise in these

> (10) C. E. R. asks: How can I cover copper wire with gutta percha, suitable for use in a gravity battery? A. By wrapping the wire with a thin strip of gutta percha. The wire should be warmed.

(11) J. P. writes: I want a cheap paint varnish or other coating for the insides of paper boxes, the best receipt for making violin varnish. A. Coarsely so that they will hold a compound containing linseed oil. powdered copal and glass, each 4 oz.; alcohol, 64 o. p., Glue is too brittle. Also, a cheap coating for such boxes whereby they will hold water, or one that will hold either water or oil; a somewhat elastic coating is desirable. A. You may try the following: Borax, 1 part; shellac, 4 parts; water, q. s. Boil to form a sirupy liquid. Apply hot. This may be used alone or mixed with the glue solution and a little glycerine.

(12) T. D. M. writes: We have a short telegraph line (about one and a half miles) between our office and factory, which connects telephones. It is often impossible to hear, from the crackling noise in the telephone from earth currents, or it may be a too near the addition of salt, which precipitates it as chloride, and proximity to various police and fire telegraph lines which we cross on the road. Is there any way in which we could empty our line of electricity so .that we can hear with the telephones we have (Duquet's)? We use an electro magnetic machine for signaling. A. Use one of the forms of carbon transmitter in connection with an induction coil.

> (13) J. T. N. asks: What are the best nonconductors of heat? What I mean is something that, placed in contact with heated metal, will not heat (a stove pipe for instance) nor crack. A. Plaster of sand; terra cotta.

> (14) A. C. gives the following receipt for preserving cider sweet: Make cider of good sound apples, letstand about three days, rachoff, strain through fiannel or charcoal and sand, put in clean barrel, and to each barrel add one quart grated horse radish, bung tight; this will keep it sweet, and after three or four weeks it will have a very pleasant flavor; you will scarcely notice the horse radish taste in it. [A much smaller quantity of horseradish will suffice. Sulphite of lime (calcium sulphite) is now used instead.] See article on Preservation of Cider," p. 81, current volume of Sci-ENTIFIC AMERICAN.

> (15) H. W. asks: 1. Why was the distance from the pole to the equator chosen as the basis of the metric system, in preference to some certain sized (that is, certain timed) pendulum, or the quadrant of the equator? A. Because the English had previously adopted the pendulum standard. 2. Is there any other natural basis for a system of measures except the pendulum and the size of the planet? A. Many nations have adopted standards based on the human body or its members. 3. What, according to the latest measurements, is the distance from the pole to the equator. expressed in meters? A. 10,001.850 meters. The original French survey gave a distance equal to 10,000,000 meters; that is 1-10,000,600 of the calculated distance was called 1 meter. More extended geodetical measurements have proved the length of the meridional quadrant to be as above. The meter is 1-5400 short.

(16) M. L. B. writes: A friend has a new eam engine, 8x12, 150 revolutions, 70 lb. pressure; I tell him it is a 251/2 horse power engine. But he only runs a small lathe under these conditions. He ships on a planer and something else, and the revolution is slowed and its revolutions are only 3716. I have now to conthe ordinary coil heater, and we think be less expensive. What is its horse power? A. The amount of power