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.

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 researches 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. 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 buildings. It is built entirely of light sandstone, is about 520x380 feet, has four towers, and is 3 stories high. The drawings, details of construction, estimates, and description of the Carola Bridge which spans the river Elbe at Schandu, Saxony, are also given. This handsome bridge is arranged for a railway, vehicles, and pedestrians, and consists of 3 semi-parabolic wrought iron trusses resting upon stone abutments and piers. A detailed article on the different means for the prevention 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 PENDULO DE SEGUNDOS Y DE LA GRAVEDAD EN MEXICO. Por Francisco 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 pendulums in different places, and to deduce therefrom the level of the terrestrial spheroid and consequently its form; and second, to determine the force of gravity, this being calculated at double the space described in the first second of its motion by a body falling in vacuo from a state of rest. Notwithstanding the importance of the determination of the length of the seconds pendulum, no observation of this kind has been made in Mexico until quite recently, when it was undertaken by the two engineers, Señores Jimenez and Fernandez. The results of the labors of these two gentlemen are recorded in the pamphlet before us, which forms one of the series of the valuable scientific memoirs that are being issued from time to time by the Mexican government. Without following the authors into the intricate 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 be 0·99153 m. and at the observatory 0·99109 m.; force of gravity at the sea level 9·7860 m., and at the observatory 9·7816 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 their results are of so much the more interest in that the pendulum experimented with was more than 12 meters in length, something uncommon in pendulums designed for this class of experiments.

ETUDE SUR LES ALLIAGES DE PLOMB ET 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 type 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.

Notes & Queries

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.

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) 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.

(2) I. F. R. asks (1) whether any kind of 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 ¾ inch gas pipe? Is there any danger of the coil getting stopped with sediment. A. An upright tubular boiler. The ¾ inch coil pipe will be liable to stoppage and burn out.

(3) E. J. T.—You will oblige by giving the best receipt for making violin varnish. A. Coarsely powdered copal and glass, each 4 oz.; alcohol, 64 o. p., 1 pint; camphor, ½ 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 sulphuric acid by aid of heat. This (hot) solution will strip or dissolve off the silver plate. The silver may be recovered from its solution by the addition of salt, which precipitates it as chloride, and this, dried and fused with a small quantity of carbonate of soda, or borax and nter, gives pure metallic silver.

(5) G. J. McK. asks: 1. Can you give me a satisfactory process for waterproofing] cloth? A. Saturate the fabric with a strong hot aqueous solution of soap, press out excess, and transfer to a second bath consisting of a strong aqueous solution of sulphate or acetate of alumina or acetate of lead, for several hours Repeat if necessary, press out excess of liquid, and dry, not too rapidly, in the air. 2. Can you give me a process for determining quantitatively the presence of cinchonidine as an adulterant of quinine? A. Five to ten 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 in ether contains the quinine, while the insoluble part contains the cinchonidine. These two parts are separated by a filter, the insoluble part washed with some 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 potash 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. Suppose he places coils of gas pipe, like steam heating, and place 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 mitigate the evil. Chemicals might also be used, but they 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 run 1¼ inch pipe from the feed pump around and through both exhaust pipes and then into boiler and heat the water so as to save fuel. Will it do so? Would it interfere with the proper action of the exhaust steam? A. The plan proposed by your sawyer would be successful, but the same result can be attained by using the ordinary coil heater, and we think be less expensive.

(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, 15879×400=6351600 and $\frac{6351600}{33000}$=192·4 horse power, less 20 per cent for friction 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 this 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 materially 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 are a number of good works on this subject. Address for catalogues the book dealers who advertise in these columns.

(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, so that they will hold a compound containing linseed oil. 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 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 mach'ne 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 non-conductors 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 Paris and sand; asbestos; a metallic jacket filled with sand; terra cotta.

(14) A. C. gives the following receipt for preserving cider sweet: Make cider of good sound apples, let stand about three days, rack off, strain through flannel 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 SCIENTIFIC 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 1-10,000,000 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 steam engine, 8x12, 150 revolutions, 70 lb. pressure; I tell him it is a 25½ 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 down to 75 revolutions. I then tell him it is a 12¾ horse power engine; but he then ships on more machinery, and its revolutions are only 37½. I have now to confess that, by the rule, it is only a 6⅜ horse power engine, that is, the more work it does the less capable of doing work it is supposed to be; or, in other words, when it shows itself to be most powerful the lower it is rated. What is its horse power? A. The amount of power