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.

LABORYTORY TEACHING. By Charles Loudon Bloxam. Fourth edition. Illustrated. Philadelphia: Lindsay & Blakiston. 12mo., pp. 261.

In the ten years since this useful manual was first published its fitness as a guide to the beginner in practical chemistry has been amply demonstrated. The present edition differs from the last chiefly in giving the formulæ for the compounds to be studied. The book is well printed and has a good index.

FOUNDATIONS AND FOUNDATION WALLS. By George T. Powell. New York: Bicknell & Comstock.

A work for the house builder rather than the engineer, strictly practical, and obviously of much value to all having to do with foundation work.

ZEITSCHRIFT DES ARCHITECTEN UND INGENIEUR VEREINS ZU HANNOVER. Edited by W. Keck. Band 25, No. 1 and 2. Hannover: Schmorl & von Seefeld. 1879.

A technical journal, edited under the auspices of the Architects and Engineers' Society at Hanover, and of a very high standing in Germany. The first two numbers of 1879 contain, among other scientific and technical information, a paper on driving spiles by means of a jet of water; a statistical table showing the different observations on this subject; plans and descriptions of the Point Bridge at Pittsburg and of the proposed East River Bridge at Blackwell's Island; a carefully prepared description of the great railroad repair shops at Hanover, and a new theory for the computation of the strains in joint arch bridges.

RESULTATE AUS DER THEORIE DES BRUCKENBAUS. Von R. Krohn. Aachen: J. A. Mayer. 1879. (Results in the Theory of Bridge Building.)

In this work the author, Mr. R. Krohn, Civil Engineer and Professor at the Royal Rhenish Polytechnic School at Aachen (Aix la Chapelle) Germany, has collected and arranged the latest developments in the "Theory of Bridge Building," and has explained their application by numerous examples in an excellent manner. The work will be complete in two parts, the first of which has appeared and is now before us. It treats of iron truss bridges, their construction and calculation, the formulas, the derivation of the same, and the advantages of the several variations in the arrangement of the elements. The author has adopted the analytical and graphical method of calculation, and has based the computations of the strains on the experiments of Wohler and on the Daunhardt Weyrauch formulas. The distribution of the load and the strains arising therefrom are admirably demonstrated. The second part will treat of iron arched bridges and combination arched and truss bridges. The work is carefully illustrated and handsomely printed.

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) Olivia writes: We have a 10"x30" improved Allis Corliss engine, 95 revolutions per minute, and makes indicated h. p. as follows:

Log. π (3·14159)	0·497150	Area of piston in inches.
Log. 25	1·397940	
Log. steam pressure (60 lb.)	1·778157	
Log. piston dist. 475 ft.	2·676694	
	6·349935	
Log. 33,000	4·518514	
Log. indicated h. p.	1·831421	∴ 67·83 h. p.
Less friction, etc.		17·83
Actual h. p.		50·

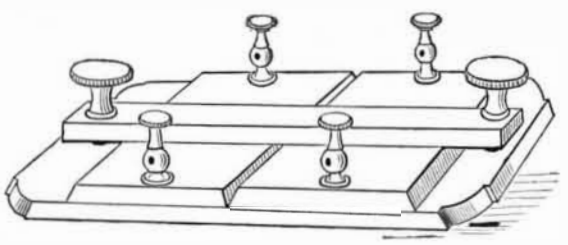
We are told that the engine will not develop over 30 h. p. by parties who claim to know. Have we figured correctly? If not, please correct us. A. Yes, if 60 lb. is the average pressure on the piston. But we suppose it is the pressure in the boiler. If so, there is your error.

(2) C. W. W. asks if there is any difference between a plumb and perpendicular line; if so, what. A. A plumb line is always a vertical line; a perpendicular line is one at right angles to some other line or surface, and may itself be vertical or horizontal, or at any angle with either.

(3) W D. M. asks: 1. How many square inches are there in a safety valve 2½ inches in diameter? A. 4·90 inches. 2. What pressure to the square inch would it require to raise a weight two feet from the center of valve and 2¾ inches from the center of the valve to the end attached to the outside of valve? A. See reply to F. J. R., p. 267, volume 40.

(4) J. L. C. asks: 1. Is it possible to become a good mechanical draughtsman without studying geometry? A. Possible, but a knowledge of geometry is very essential. 2. If so, what book or books would it be best to get on the subject, and where could I get them? A. "MacCord on Mechanical Drawing," for sale at this office. 3. Is it possible to get as good satisfaction in point of economy, out of a throttling slide valve engine, as you can from a cut off engine? A. No. 4. Which is best to do in cleaning out a boiler, to blow it out under pressure, or let the water run out after the pressure goes down? A. If there is time, let the boiler cool, the deposit will then be left comparatively soft.

(5) C A. P. asks (1) how to make an effectual lightning arrester to be used on a short line (400 feet) of telegraph. A. The engraving shows a common form of lightning arrester. It consists of two small brass plates mounted on a larger metallic plate and separated from it by a sheet of mica. The upper plates are put in the circuit, the lower plate is connected



with the ground wire. An overcharge of electricity passes through the mica and finds its way to the earth. 2. Do I infringe on any one's rights or break any law relating to patents when I make a pair of telephones like those (using horseshoe magnets) described in your SUPPLEMENT, No. 142—would I be doing so if I sold them? A. See Rights of Investigators, p. 128, volume 39, of SCIENTIFIC AMERICAN.

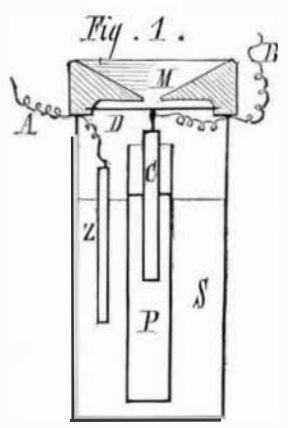
(6) C. E. B. says: I am using a small compressed air boiler, and I am troubled with a few leaks at the hub on the side: will two or three coatings of lead on the inside check it? If not, what will? A. Stop the leaks by calking if possible. If you do not succeed in this you may apply the white lead.

(7) W. H. R. writes: I have a cylinder, 6 inches diameter and 1 inch long, filled with water at 100 lb. pressure per square inch. 1 How many tons, acting on the 6 inch piston that works in the cylinder, would be required to compress the water 1-16 inch? A. That is equivalent to 1-96 its bulk; no liquid is susceptible of that amount of compression. 2. Is there any other liquid less compressible than water that will not affect either iron or brass? Is mercury less compressible? A. Mercury is less compressible than water, and does not affect iron. It will, however, affect brass.

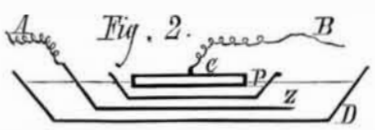
(8) A. B. J. asks how to use ultramarine blue for a wash blue, that will not spot in hard water. A. We know of no practical way of overcoming this, as the blue does not form a true solution. For this purpose Nicholson's blue (blue aniline) is preferable to ultramarine.

(9) W. J. asks: What is the horse power of an engine required to ascend a grade of 7 (seven) inches to the foot on a cogged rail for center of track, cog wheel to fit in same not to exceed 12 inches diameter, the weight to be taken up exclusive of the engines, and boiler's weight about 35 hundred weight? A. You do not give the speed at which you wish to run, but assuming 4 miles per hour, the power required would be, with engine, weight, say 20,000 lb. and other weight 3,800 lb., total 23,800 lb., 151 horse power, and to this add 25 per cent for friction and other losses. If weight or speed be increased, increase the power in proportion.

(10) H. W. F. writes: I have lately been making some interesting electrical experiments, and have arrived at very satisfactory results, some of which I would like to make known. Fig. 1 represents the



section of a telephone, which I think has one novel feature, the production of the electric waves at the source of the electricity. S is an ordinary battery jar, filled with salt and water, in which the zinc, Z, is suspended. P is a porous cup filled with ordinary battery solution of bichromate of potash. In this is suspended a piece of carbon, attached to a vibrating diaphragm, D. The wire, B, extends from the upper part of the carbon.



When a sound is made in the mouth piece, M, the diaphragm vibrates, the carbon is alternately immersed and drawn out of the fluid, the result is a series of electric impulses which act on an ordinary telephone receiver. In this way I have been able to transmit articulate speech with distinctness. Fig. 2 shows a section of a very powerful and cheap battery. D is the containing vessel, either a pie or soup plate. Z is a piece of amalgamated sheet zinc, with the wire, A, attached. P is a flower pot saucer which takes the place of the porous cup. C is a flat piece of gas carbon with the wire, B, fastened on the upper side, so as not to be eaten off by the acid. The plate, D, is filled with salt and water; P, with battery fluid. This makes a very good battery for three reasons; first, it is powerful; second, it is easily made; third, it is cheap.

(11) J. C. K. writes: I beg to differ from your answer to L. C. R. (36), in issue of 12th July. I remember that 45 years ago nails were made by hand and sold by count, and not by the pound—fourpenny at 4 pence per 100, sixpenny at 6 pence per 100, and so on through the different numbers; the term penny or number of pence was the retail price for 100. I notice the penny is pretty generally dropped now, and the simple numbers substituted, as 6's, 8's, 10's, etc., instead.

(12) H. J. P. asks how strong a battery is necessary to show the repulsion of bismuth from the poles of a magnet. I intend to try it with three cells of Leclanche, but do not think that will be enough. A. Use a magnet about 4 inches long, and 4 cells of Bunsen battery.

(13) A. Y. asks: 1. Is charcoal hammered No. 1 boiler plate always marked C. H. No. 1? A. For steamboat boilers, yes. 2. May plate not so marked be C. H. No. 1 iron to fill specification? A. No.

(14) H. J. C. asks for a detailed description of an "induction coil," suitable to be used with "Lyons transmitting telephone" which you described in SUPPLEMENT, No. 163. Please give diameter of central core, diameter and length of coil. No. and length or weight of both primary and secondary wires. The whole to be used on a circuit, two miles long, with ground connections. A. The core consists of a bundle of No. 18 iron wire 4½ inches long, ⅝ inch diameter. The spool upon which the primary and secondary wires are wound is as thin as it is possible to make it. Two layers of No. 18 silk covered copper wire are wound on the spool for the primary, and about eight layers of No. 36 silk covered wire are wound upon the primary, the several layers being separated by pieces of thin writing paper.

(15) W. A. M. asks how to prepare the so-called fish food used in fresh water aquaria, and what amount to use in an aquarium of about six gallons capacity, with from eight to twelve small fishes. A. We do not know to which preparation you refer. Seth Green says in relation to gold fish: "Feed them all they will eat and anything they will eat, worms, meat, fish wafer, or fish spawn, but take great care that you take all that they do not eat out of the aquarium."

(16) G. B. F. asks for the simplest and best process for estimating the amount of potassic iodide in a known quantity of co. fluid extract sarsaparilla. A. If the solution contains no chlorides, evaporate to dryness in a porcelain capsule, and heat cautiously to redness to destroy the carbonaceous matters. Moisten the residue thoroughly with silver nitrate dissolved in water, warm, throw on a tared filter, wash with water, dry in the dark, and weigh. One part of this is equivalent to 0·706 KI, nearly.

(17) W. M. asks: 1. Will a ten horse power boiler run a ten horse power engine, or is the boiler of greater power then the engine? A. Usually the boiler is more than equal to the power at which the engine is rated. 2. What is the reason that a person weighs as much before as after eating? A. Try the experiment of weighing yourself before and after eating. If you find you do not weigh more after eating we would be pleased to know what kind of food you eat. 3 In speaking of perpetual motion, do you not mean a machine that will act the same as an engine, that is, to drive other machinery? A. Any machine or apparatus that would keep in motion without any external aid would be called a perpetual motion.

(18) W. W. asks (1) how to make a small still on a cheap scale. A. You may use an ordinary iron retort capable of holding say 3 pints, and a small glass or block tin worm; place the worm in a tub or bucket, the lower end passing through a cork fitting a hole bored for its reception near the bottom of the vessel. Adjust the beak of the retort to the upper end of the worm. During the distillation conduct a stream of cold water to the bottom of the tub or bucket, and draw off the heated water near the top. See No. 110 of SCIENTIFIC AMERICAN SUPPLEMENT. 2. Please give a receipt for making a first class vinegar for family use. A. See p. 267, (19), volume 39, SCIENTIFIC AMERICAN.

(19) J. F. B. writes: 1. I have a 4x4 engine, and will 129 feet of ½ inch pipe give heating surface sufficient to run it; if not, how much more do I want? A. No, if your engine works up to 200 revolutions per minute, ½ inch pipe will be very likely to stop up; use the same length of ¾ inch pipe. 2. Is there any patent on a simple coil boiler? A. No.

(20) W. E. P. asks for the dates on which Mars came to opposition in the years 1858, '60, '62, '64, and '67. A. About as follows: 1858, May 15; 1860, July 22; 1862, September 29; 1864, November 23; 1867, January 30.

(21) F. P. K. asks: 1. Where can the fine red clay used in the manufacture of imitation lava ware be procured? A. Consult the report on "Clay and Clay Deposits of New Jersey," Professor George H. Cook, New Brunswick, N. J. 2. Is there any chemical that, by mixing with white clay, will in the burning turn it to a red color? A. Moisten it with strong aqueous solution of sulphate of iron, common copperas. 3. What can I mix with clay, to strengthen and toughen it? A. Try one or two per cent of fluorspar. The clay should be properly washed.

(22) G. A. F. asks: 1 How are scorification assays of gold and silver ores made? A. The powdered ore is mixed and covered with about ten times its weight of pure granulated lead in a small dish of refractory clay (scorifier) and introduced into the muffle of a cupellation furnace. If the ore is at all basic a few