1-3 ounce of pure hydrochloric acid, and let the precipitate subside. Wash this (silver chloride) several times, by decantation, with hot water. Dissolve ¼ lb. of potassium cyanide in soft water; add this gradually (warm) to the precipitate until the latter is completely dissolved, and dilute the solution to one gallon. Dip the articles (brass or copper) to be silvered in strong hot potash solution, rinse in water, scour with a brush and fine pumice, rinse again and dip in the cyanide bath. If a dark deposit is obtained, add more water to the bath; if it coats slowly, add more silver chloride. As the silver is gradually abstracted more of the chloride must be added. If properly silvered the work will admit of polishing. A trace of grease or dirt on the work will spoil the deposit. Cyanide of potassium is very poisonous, and care should therefore be taken to avoid introducing it, through cuts or otherwise, into the system.

(16) T. A. writes: I am thinking of getting a condensing steam engine, and have been told that this kind of engine takes some 20 to 30 times more water (for condensing purposes) than would a non-condensing engine. Could I use two wells for this purpose, by running the condensed steam (water) to the second well, and then the next day use this same water for condensing purposes again; and then running it to the first well again, and so back and forth, using the same water over and over again day after day; and if so how much water would be actually lost or evaporated each day, say in a 12 hours' run with 50 horse power engine? A. Your mode of using two wells will answer if they are of sufficient capacity to give time for one to cool off while using water from the other. The water should, in cooling, be reduced in temperature about 40 degrees. If your boiler and engine are tight, the loss would probably not exceed 5 per cent. But is a condensing engine necessary in your case, and if so, why?

(17) O. E. writes: I want to make an electro-magnet capable of lifting 1 ounce ¼ of an inch. 1. What size and length of wire and core ought I to use? A. Make the cores 1⅛ inch long, ½ inch in diameter, wind them with 6 or 8 layers of No. 20 covered wire. 2. What battery and conducting wire will be best, circuit about 15 feet? A. If for continued use, use two or three cells of gravity battery. If used occasionally, one cell of Grenet or Bunsen would do. For conducting wire use No 16. 3. How should I fasten the wire to the core? A. The wire is not fastened to the core. For method of making magnets and full particulars as to proportions, resistance, etc., see SCIENTIFIC AMERICAN SUPPLEMENT No. 182, article on Electro-Magnets, illustrated by over 50 cuts.

(18) E. C. B. writes: In a recent query, C. R. H. asks if it is possible for a number of persons to move a table by electricity by placing their hands upon it, without pressing upon it? You simply answer "no." Now I would like an explanation. I have been one of seven who moved a table in this way, it going around the room in a circle. We placed the legs in saucers. Time to start about twenty minutes. If it is not the electric current, what is it? A. Muscle generally, sometimes muscle combined with a vacuum formed in the palms of the hands of some of the table movers.

(19) H. G. A. S. asks: Will you be kind enough to tell me what about is the total strain on a 7⅓ octave piano? A. A 7 1-3 octave large concert grand, of Steinway & Sons' make, bears a total strain of 66,000 lb. Parlor grands of the same make average 30,000 lb. strain each; and upright pianos, having also three strings to each note, from 20,000 to 25,000 lb., according to size; the square grand pianos, 7 1-3 octave, being partly 3 stringed to each note, about 20,000 lb; 7 octave square pianos, two strings to each note, about 16,000 lb. each. 2. Some thorough work on tuning and temperament? A. The only standard work, in which tuning and temperament are most scientifically treated, which we know of as translated into the English language, is "Professor Helmholtz's Toue Sensations."

(20) C. R. N. writes: 1. If there be a small aperture in a steam boiler, say one half inch in diameter, will the steam exert a greater force to displace a plug driven into it having a square end than if the end were sharp and tapering; if so why? A. No, the pressure acts upon the total area of the opening. 2. Which has the greatest power with an equal force applied, a crank or an eccentric, the throw being equal? A. An eccentric is simply a crank.

(21) E. A. W. asks: 1. Can a circular saw be made to revolve so rapidly that it will not cut? A. No. 2. Which is the better conductor, a rapidly revolving saw or one at rest, or, in other words, will lightning strike one sooner than the other? A. We think there would be no difference. 3. Which will run easier, a wheel with boxing much too large for spindle, or one having boxing that fits the spindle neatly? A. Well fitted boxes best; the shaft is then always in proper line. With slack boxes it generally would be out of line.

(22) J. T. E. asks: 1. What is the striking force of a pile hammer falling twenty-two feet, weight nineteen cwt.? A. 35½ tons. 2. What will prevent water from foaming in steam boilers? What causes it to foam? A. There are many causes for foaming, and different remedies are accordingly required. Often a little oil forced into the boiler will check the foaming temporarily.

(23) J. H. B. asks: 1. Can a current water wheel be made that can be used successfully for running a flouring mill, and if so what is the plan for such a wheel? A. Yes. 2. Can the motion of machinery propelled by such a wheel be governed, and how? A. By a proper mill wheel governor. 3. What should the quantity and velocity of a current of water be to produce a 25 horse power? A. Consult a good millwright or engineer as to the special conditions of your case.

(24) E. M. asks (1) if it would be advisable to have small pump exhaust into boiler chimney. A. It would be a mere question of convenience. 2. Why is a siphon indispensable to a steam gauge? A. To interpose between the steam and the diaphragm of the gauge a short column of water, which prevents the heat of the steam from affecting the gauge.

(25) A. L. G. asks if expansion joints can be used with success in a line of steam pipe one hundred and twenty feet long. We have a great deal of trouble in keeping our unions tight; the steam is used for heating purposes, one line of piping 120 feet, one line of waste pipe 120 feet long, which enters a steam trap. A. Yes, with entire success, if you put in enough of them and it is properly done.

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

C. A. J.—It is chalcocite or copper glance, with malachite—a valuable ore of copper if found in sufficient quantity. The per cent of copper in it can only be determined by a quantitative analysis.—A. S.—The so-called ore consists chiefly of iron sulphide, bronze powder or Dutch gold leaf (brass), sheet metal clippings, and mercury. Evidently an attempted imposition.—E. J. L.—The gravel consists chiefly of quartz and mica. Some of this may prove auriferous.—No name.—The specimen contains much silica, iron, and lime. It may prove useful for the manufacture of bricks, cheap pottery, etc.—E. B. S.—Quartz pebbles.—W. M. B.—The object is a fossil one of the extremities of the internal bone or shell of a *Belemnite*, a cephalopod which was very abundant during the Cretaceous Period, to which the green sand of your State belongs. The animal was allied to and much like the cuttle fishes and squids of the present day. The portion you send is what the scientists call the *phragmocone*, and was divided into deeply concave air chambers (which you may see by holding a specimen up to the light), and these were connected with each other by a tube. It was originally exceedingly delicate, and owes its preservation in its present hard state to the infiltration of calcareous spar.

COMMUNICATIONS RECEIVED.

On a Mathematical Discovery. By J. C. M.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

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AND EACH BEARING THAT DATE.

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Grain elevator, A. W. Lanphere, New York city.
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Propulsion of ships, R. H. Tucker, Wiscasset, Me.
Rubber shoe machinery, T. Baylies, New York city.