

(24) G. F. P. asks: 1. Will steel castings answer for large horseshoe magnets? A. We do not know that steel castings have been tried for this purpose. We think, however, that they would answer. 2. How large a horseshoe magnet shall I use for a magneto call bell engine on a telephone line 1,000 feet long? A. Use an 8 inch. 3. I think of having the permanent magnet to revolve in front of the electro-magnet, instead of the reverse, as is usually done. Will this be attended with any disadvantage? A. Jarring works injury to permanent magnets. 4. In the modified form of Bell telephone with compound magnet ending in a soft iron core, how is the core attached, and how long is it? A. The flattened end of the core is clamped between the magnets. It should be about 2 inches long.

(25) G. F. B. asks for a simple way by which to determine the resistance of the rheostat, described in SCIENTIFIC AMERICAN of November 9, 1878. A. Use a galvanometer.

(26) H. J. R.—The pressure of water is about 0.433 lb. per square inch per foot of depth.

(27) W. L. L. asks: 1. Are not the climatic zones constantly but slowly changing their position on the surface of the earth, and if so, in what direction do they move? A. Has been asserted; evidence insufficient. 2. Can you explain why it is, at least navigators say so, that there is a greater field of ice and more dense at the South pole than that of the North? A. The southern hemisphere does contain more ice; attributed to greater land masses and higher elevations about the South pole. 3. When the earth is nearest the sun in December, what part of the globe's surface receives the most direct solar rays? A. South torrid zone. 4. When and by whom was this planet of ours named earth? A. Earth is an English word from the early Saxon. There is no means of telling how old the word is.

(28) J. B. D. asks: Will a cannon ball shot directly up acquire as great a velocity in falling as is imparted to it by the force of the powder; in other words, that it will strike the ground with the same velocity and force that it leaves the gun? A. If the shot were fired in a vacuum it would have equal velocities of ascension and descension. The resistance of the air impedes the shot.

(29) D. H. E. asks (1) how to proportion gin running gear. The mule track is 30 feet in diameter, cast iron segments 9 feet diameter, pinion 18 inches, and gin pulley 9 inches in diameter. What size shall the band wheel be to drive the gin 150 revolutions per minute, and let mules travel 3 miles per hour? A. About 6 feet 9 inches. 2. Is there any difference in the power required, speed of gin being the same, to have a large cog wheel and small band wheel or a large band and small cog wheel? A. There is no essential difference, as we understand you.

(30) J. M. asks for the easiest way to magnetize small steel bars. A. Place the steel bar within a helix of copper wire through which passes the current from several Bunsen or bichromate cells for a minute or two; then interrupt the current and remove the magnet. Full directions in SCIENTIFIC AMERICAN SUPPLEMENT No. 142, in "How to make a Telephone."

(31) J. H. K. asks: What kind of metal is best to work in cream with, on churn dashers for example? A. Well tinned iron is good, but wood for many reasons is preferable to metal of any kind.

(32) W. H. S. asks what material to use in making flexible tubes for conveying air which is hot enough to render a room uncomfortable. A. Canvas tubes, saturated with strong aqueous solution of sodium tungstate and dried might fulfill the requirements, as we understand them.

(33) J. H. D. writes: We regulate the pressure of the street gas between the main and meter. Would it not be advantageous to the consumer to have a regulating lock? Just inside of the meter allow full pressure on the meter (a dry one) from the company's gasometer. Is gas compressible? If so, would it not pack slightly in the meter under the gasometer pressure? A. The density of gas is influenced both by pressure and temperature. Little if any advantage would result from the arrangement proposed, under ordinary circumstances.

(34) W. S. W., Jr., and others, who ask how to detect gold in sulphurets, etc. A. See Plattner's "Manual of Qualitative and Quantitative Analysis with the Blowpipe," pp. 318, 330, and 422. In practice, the most satisfactory method of detecting very small quantities of gold in such ores is as follows: Reduce the whole of a sample of several ounces of the ore, by grinding, to an impalpable powder, that will pass readily through an 80 mesh sieve; mix about a drachm of the well mixed powder with ten times its weight of pure lead and one or two fragments of borax glass the size of peas, place in a scorifier and expose in a closed muffle to bright red heat until the lead is all fused and the ore floats on top; then open the muffle and let a current of air pass slowly over the red hot scorifier and its fused contents until the ore has been absorbed and the fused metal has disappeared beneath a covering of litharge; then remove, cool, break, remove and clean the lead button, and place it carefully in a heated cupel weighing somewhat more than the bead; when the lead has melted the muffle is opened and air allowed to pass over the fluid mass until the lead has all been converted into litharge, and the litharge absorbed by the cupel, leaving the gold and silver behind; if the bead is white, silver is present; add about twice the weight of the bead of pure silver, fuse together with the blowpipe flame on a charcoal support, flatten while hot on an anvil, and heat for some time to boiling with pure nitric acid, which dissolves the silver, leaving the gold, if any were present in the ore, as a brownish black mass, which shows the characteristic luster when pressed with a knife blade, and when brought into contact with a drop of aqua regia, and then with a crystal of stannous chloride develops a purplish-red, violet, or brownish-red coloration—purple of Cassius.

(35) L. J. O. and others.—We intend publishing at an early date in the SCIENTIFIC AMERICAN SUPPLEMENT a description of a telephone call.

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

G. H.—No. 1 is chiefly quartz and iron sulphide. No. 2. The fragment contains a little gray copper. No. 3 is a variety of bituminous coal. No. 4 is iron sulphide with a little copper. Nos. 5 and 6 are principally iron sulphide. No. 7 contains lead sulphide. Some of this may contain silver.—F. F.—The white pebbles are quartz; the rest are Jasper. Of little value.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges with much pleasure the receipt of original papers and contributions on the following subjects:

A Voltaic Pile. By M. G.

HINTS TO CORRESPONDENTS.

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.

Many of our correspondents make inquiries which cannot properly be answered in these columns. Such inquiries, if signed by initials only, are liable to be cast into the waste basket.

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.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

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October 8, 1878,

AND EACH BEARING THAT DATE.

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