(76) F. E. K. says: We have two new boilers that have never been tested. Their dimensions are: Length, 22 feet, diameter 44 inches, thickness of shell ⅜, of heads ¼ inch, with two 16 inch fines. The heads are stayed with 5 stay rods and 20 stay bolts. They are built of C. H. No. 1 iron. There is one 4 inch safety valve for the two boilers. What is the greatest pressure at which it would be safe to run them? A. From 50 to 60 lbs.

(77) H. K. says, in reply to I. F. F., who asked which is the deepest well in the world: I believe the well at the St. Louis county insane asylum is, being 3,837 feet deep. At the depth of 3,545 feet the thermometer stood at 115° Fah.

(78) J. R. F. says, in reply to J. J., who asked how much the outside horse will gain in plowing a circular field, beginning at the center: Let d=distance between horses, r=radius of circle plowed by inside horse, and n=number of times they plow around. Then, while the inside horse is plowing around a circle with a radius, r, the outside horse is plowing round a circle with a radius $r+d$, and the distances traveled by each respectively are $r2\pi$ and $(r+d)2\pi$, and the difference is $d\,2\pi$. The total difference, for n times around, is $n\,d\,2\pi$. The inside horse in the second time around travels in the track of the outside horse the first time, and so on for each succeeding time until the last time around, when the outside horse makes a track of the radius $r+n\,d$, which the inside horse does not travel; neither does the outside horse travel in the track of the radius r, made by the inside horse in the first time around. Hence the difference in the distance traveled is $(r+n\,d)2\pi - r = 2\pi = n\,d\,2\pi$, the same as above. This, it will be observed, is simply the difference between the distance which the inside horse travels the first time around and that which the outside horse travels the last time around.

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

H. A. W.—We do not think that you would succeed in the artificial production of the mineral, even if you had the exact composition. Send us a specimen, and we will examine it for you.—C. J. J.—Send us a sample of the tin powder used in electrotypy.—W. C. S.—They are scales of decomposed mica with oxide of iron.—Rev. J. McC.—The bolt does not appear to be well made, nor of superior iron.—L. L.—It is black oxide of manganese, containing copper.—J. M. G.—It contains silex, alumina, oxide of iron, and carbonate of soda, carbonate of lime, and carbonate of magnesia.—W. M. T.—It is sulphide of iron.—E. P. C.—It is iron pyrites.—W. W. J.—It is difficult to say, without making a lengthy chemical analysis, why you cannot harden your steel.—J. W. F.—It is white iron pyrites.—F. W. B.—It is a coating of oxide of zinc. It does not injure the zinc, but rather tends to protect it from further action. If you desire, you can coat the interior of the refrigerator with paraffin.—W. B.—They are well crystallized sulphate of lime or gypsum. They are sometimes found 10 times as large as those sent, and as limpid as pure water. Have you found any such?—R. D. B.—We are unable to account for the scaling. The metal appears tough, close grained, and bright as though it had been rolled cold.—J. W. F.—No. 1 is red oxide of iron, with silicate of alumina. No. 2 is silex with black oxide of iron.—W. T. C.—No. 1 is the sulphate of baryta. No. 2: The powdered mineral contains the carbonates of lime, magnesia, and iron, with some silicates of alumina and silex.—J. E. L.—We did not detect arsenic.—T. S. L. G.—We could not detect gold in specimen sent. It was mostly iron pyrites.

J. B. F. asks: What horse power does it take to run a 3 foot corn burr and sheller?—W. E. T. asks: How can bear grass be prepared for market?—E. P. W. asks: What is a cheap material for small balloons, from 1 foot to 10 feet in diameter? Could tissue paper be made to answer by covering it with balloon varnish or some other preparation?

COMMUNICATIONS RECEIVED.

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

On a Remarkable Cloud. By J. P. N.
On Sunday at the Centennial. By J. E. F.
On the Imponderables. By W. T. Q.
On Sugar. By ——.

Also inquiries and answers from the following:

J. McM.—G. W. W.—L. S. W.—P. F. S.—A. B. L.—R. J. McC.—B. B.—L. C. C.—T. C.—J. B. S.—A. McG.—H. B.—C. L.—A. L. S.—J. H.—B. H.—C. W.—J. H.—J. B.—T. G.—P. H. J.—R. C.—B. W. J.—D. J. S.—H. M. H.—J. M. H.—J. E. B.—H. D. W.—B. A. J.—B. H. P.—F.—B. H. C.—S. N. M.—U. V. W.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent: "Who makes distilling apparatus? Who makes flax-cleaning machinery? Who makes an electricity-lighted student's lamp? Who publishes engravings of low pressure beam engines? Who sells the best tin roofing plates?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

[OFFICIAL]

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AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list including both the specifications and drawings, will be furnished from this office for one dollar. In ordering, please state the number and date of the patent desired and remit to Munn & Co., 37 Park Row, New York city

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