Fe. Per cent.	Fe_3O_4. Per cent.	SiO_2. Per cent.	Specific gravity.	Fe. Per cent.	Fe_3O_4. Per cent.	SiO_2. Per cent.	Specific gravity.
0	0.0	100.0	2.66	37	51.0	49.0	3.54
1	1.4	98.6	2.67	38	52.4	47.6	3.57
2	2.8	97.2	2.69	39	53.8	46.2	3.60
3	4.1	95.9	2.71	40	55.2	44.8	3.64
4	5.5	94.5	2.73	41	56.6	43.4	3.67
5	6.9	93.1	2.75	42	58.0	42.0	3.70
6	8.3	91.7	2.77	43	59.4	40.6	3.74
7	9.7	90.3	2.79	44	60.8	39.2	3.77
8	11.0	89.0	2.81	45	62.1	37.9	3.81
9	12.4	87.6	2.83	46	63.5	36.5	3.85
10	13.8	86.2	2.85	47	64.9	35.1	3.89
11	15.2	84.8	2.87	48	66.3	33.7	3.93
12	16.6	83.4	2.89	49	67.7	32.3	3.97
13	18.0	82.0	2.92	50	69.1	30.9	4.01
14	19.3	80.7	2.94	51	70.5	29.5	4.05
15	20.7	79.3	2.96	52	71.8	28.2	4.09
16	22.1	77.9	2.98	53	73.2	26.8	4.13
17	23.5	76.5	3.00	54	74.6	25.4	4.17
18	24.8	75.2	3.03	55	76.0	24.0	4.22
19	26.2	73.8	3.05	56	77.4	22.6	4.26
20	27.6	72.4	3.07	57	78.8	21.2	4.31
21	29.0	71.0	3.09	58	80.1	19.9	4.36
22	30.4	69.6	3.12	59	81.5	18.5	4.41
23	31.8	68.2	3.14	60	82.9	17.1	4.46
24	33.2	66.8	3.17	61	84.2	15.8	4.51
25	34.5	65.5	3.20	62	85.6	14.4	4.56
26	35.9	64.1	3.22	63	87.0	13.0	4.61
27	37.3	62.7	3.25	64	88.4	11.6	4.66
28	38.7	61.3	3.27	65	89.8	10.2	4.72
29	40.0	60.0	3.30	66	91.2	9.8	4.78
30	41.4	58.5	3.33	67	92.6	7.4	4.84
31	42.8	57.2	3.36	68	94.0	6.0	4.90
32	44.2	55.8	3.39	69	95.3	4.7	4.96
33	45.6	54.4	3.42	70	96.7	3.4	5.02
34	47.0	53.0	3.45	71	98.0	2.0	5.09
35	48.3	51.7	3.48	72	99.4	0.6	5.16
36	49.7	50.3	3.51	72.4	100.0	0.0	5.18

LEHIGH UNIVERSITY,
October 18, 1900.

IRREGULAR DISTRIBUTION OF SULPHUR IN PIG IRON.

BY RANDOLPH BOLLING.

Received October 8, 1900.

SULPHUR determinations sometimes show marked differences when samples are drilled from different points on the same pig. M. J. Moore[1] has noticed the low results obtained from

[1] This Journal, **21**, 972-975.

"shot samples" as compared with those cast in sand. He states that the results obtained from the "shot samples" are low as compared with the gravimetric determinations. Moore used the volumetric method on his sand and shot samples.

The variations between sulphur determinations, made on drillings from the lower surface of the pig, and those made on the upper surface have been frequently noticed here, and in some cases have been so marked that a cast which was drilled from the top surface of the sample pig, on analysis, showed 0.075 per cent. sulphur, and consequently graded as "off basic" (sulphur running over 0.05 per cent.) was found to be "basic" when the drillings were taken by drilling a hole entirely through the pig; the second determination showed 0.045 per cent. sulphur.

To study the irregular distribution of sulphur a rod 12 × 14 inches was cast in sand by collecting a pound or so at intervals from the runner as a cast was being made until about 10 pounds had been ladled out, and then poured into the mold. This was then drilled at regular intervals of $1\frac{5}{8}$ inches; in all 8 holes were drilled. Sulphur was determined by the cadmium chloride method. The figure represents a cross-section of the rod reduced to a small scale. Beginning at bottom of the rod at the point marked A, the decimal points will indicate where the drill entered. The percentages of sulphur it will be noticed are lower at the bottom of the mold than at the top.

.036
.036
.036
.036
.036
.032
.03
.023
A

It will be seen that the difference between the upper and lower surface amounts to 0.013 per cent., and it would therefore be wrong to report a determination made on drillings taken either at the top or bottom; and to obtain a representative sample it would be necessary to drill a hole entirely through the sample pig, and mix the drillings well before making the determination. By this procedure a fairly average sample would be obtained.

LABORATORY VIRGINIA IRON, COAL, AND COKE CO., BUENA VISTA, VA.