had the founder understood how to allow for the new chemist's methods of analysis.

Two other factors are to be mentioned that affect the value of analyses: The character of the chemist's work and the purity of the chemicals used. Serious harm may be done by a careless chemist and such men should have no place in a chemical laboratory. Mistakes are liable to happen with any man, but where one is indifferent to them, no consideration should ever be extended. The strength and purity of chemicals is an important matter also. To guard against variations in this regard, chemicals are tested when received, and the impure rejected. To determine the variation due to the method and to personal factors, the practice of standardizing drillings is followed. A chemist will first obtain from five to twenty pounds of clean, fine, well-mixed drillings, out of which he will send samples for analysis to four or more chemists of known ability and accuracy in their work. The reports of these analyses may be two to five months in coming back. When all are received he will accept the average as a standard. The labor and expense involved in procuring standardized drillings for testing chemicals or analyses are considerable, and suggest the question, Why cannot a central laboratory be maintained where all chemists dealing with cast iron could obtain standardized drillings, promptly and at a price comparatively small? As the writer is surrounded by blast furnaces and their laboratories, he has often thought of the steps that might be taken toward the establishment of such a standardizing laboratory for furnace work and iron founding.

In a paper read at the November meeting of this association, the writer solicited the addresses of chemists willing to analyse drillings, so that the results could be checked up and compared. It was surprising, the great interest manifested in the work. As a result of this call the writer has the pleasure

TABLE 1—COMPARATIVE ANALYSES OF FOUNDRY IRON.

Laboratory.	Sil.	Sul.	Phos.	Man.	G.C.	C.C.	T.C.
*A...	1.95	.011	.69	.63	3.35	.18	3 83
B..	2.00	.010	.513	.56	...	...	4.27
C..	2.02	.0015	.615	.56	2.99	.61	3 63
D ..	2.05	.010	.59	.69	3.20	.52	3.72
E ..	2.05	.007	.59	.60	3.11	15	3.86
F....	2.06	.011	.617	.62	.....	.....	3.85
G...	2 06	.013	.579	...	.....	.....	.....
H ..	2.11	.011	.617	.51	3.12	.80	3 92
I....	2.13	.006	.503	.56	3.01	.11	3 18
J ...	2.153	.018	.....	...	.....	..	.....
K ..	2.16	.015	.612	.550	...	...	...
L..	2.19	.012	.591	.501	3 29	.82	4 11
M...	2 21	.008	.61	.46	2.82	.36	3.18
N ..	2.21	.018	.600	.546	3.59	.32	3.91
O..	2.22	.024	.51	.59	3.32	.25	3.57
P ..	2 221	.018	.603	.59	3.12	.29	3 71
P ..	2.219	.019	.615	.60	3 15	.23	3 68
P ..	2 228	.017	.610	.58	3 36	.10	3 76
Greatest Variation.	.27	.0155	.114	.23	.77	.59	1.09

*Corresponding letters in the four tables signify that analyses are from the same laboratory or firm.

TABLE 2—COMPARATIVE ANALYSES OF BESSEMER IRON.

Laboratory.	Sil.	Sul.	Phos.	Man.	G.C.	C.C.	T.C.
A ..	2.12	.030	.088	.73	3.19	.75	3.91
C ..	2.15	.018	091	.93	2.78	.85	3 63
D....	2.20	.036	.086	.91	3.10	.61	3.71
F ...	2.21	.031	.093	.95	...	...	3.81
S ..	2 25	.058	.090	.90	...	...	...
E ..	2.29	.018	.080	1.09	3.11	.57	3.71
R ..	2 30	.051	.087	.910	3.16	. 0	3.96
B ..	2.31	.036	.083	.89	.....	.....	3.80
K ..	2.31	.060	0865	.896	...	...	...
O....	2.32	.051	.086	.81	3.06	.25	3.31
L ...	2.32	.035	.111	.809	3.51	.81	4.35
Q ..	2.37	.038	.087	.83	2.92	.82	3.74
P ..	2.415	.061	.086	.93	3.15	.67	3.82
P ...	2.402	066	.081	.98	3.20	.68	3.78
P ...	2.413	.060	.086	.96	3.12	.72	3.84
Greatest Variation.	32	.018	.031	.36	.73	.69	1.04

TABLE 3—COMPARATIVE ANALYSES OF CHARCOAL IRON.

Laboratory	Sil.	Sul.	Phos	Man.	G.C.	C.C.	T.C.
D ...	95	.019	.89	1.76	2.90	.76	3.68
A ...	.97	.017	.96	1.77	3.10	.88	3 98
L ...	.97	.013	.929	1.795	2.91	.91	3.85
E ...	.98	.016	91	1 80	3.01	.79	3.80
R ...	.98	.022	.957	1.98	3.25	.60	3.85
C ...	.99	.016	.9.6	1.90	2.81	1.02	3.86
T ...	1.00	.016	.952	1.90	2.69	18	3.17
F ...	1.02	.017	.918	1.93	...	....	3.95
B ...	1.01	.021	.905	1.83	.....	.....	3.76
N ...	1.09	.033	.932	1.768	3.30	.11	3.71
P ...	1.161	.027	.931	1.85	3.20	.56	3.76
P ...	1.152	.025	930	1.89	3.28	.11	3.72
P ...	1.157	.024	930	1.90	3.25	.18	3.73
Greatest Variation	.21	0.29	.067	22	.61	58	.30

TABLE 4 FIRMS AND CHEMISTS FURNISHING COMPARATIVE ANALYSES.

Laboratory.	Analyses.	Concerns Furnishing Analyses.
A	3 Sets.	Buffalo Furnace Co., Buffalo, N.Y., Frank Hersh, Chemist.
B ..	3 Sets.	Carnegie Steel Co., Cochran, Pa., J. M. Camp, Chemist.
C	3 Sets.	Tennessee Coal, Iron & Ra'.road Co. Birmingham, Ala. J. R. Harris, Chemist.
D	3 Sets.	Embreville Iron Co., Embreville, Tenn., F. E. Thompson, Chemist.
E ..	3 Sets.	Phillips Testing Laboratory, Birmingham, Ala.
F	3 Sets.	Illinois Steel Co., So. Chicago, Ill.
G ..	1 Set.	Spearman Iron Co., Sharpsville, Pa., W. E. Dickinson, Chemist.
H	1 Set	Thomas Iron Co., Hokendauqua, Pa.
I ..	1 Set.	Everett Furnace, Everett, Pa., F. R. Bennett, Chemist.
J	1 Set.	Booth, Garrett & Blair, Philadelphia, Pa.
K ..	2 Sets.	Crane Iron Co., Catasauqua, Pa., H. A. Knauss, Chemist.
L	3 Sets.	Hamilton Furnace Co., Hamilton, Ontario.
M.	1 S t.	James C. Foster, Sheffield, Ala.
N .	2 Sets.	Warwick Iron Co., Pottstown, Pa., Wm. A. Stephan, Chemist.
O	2 Sets.	Andrews & Hitchcock Iron Co., Youngstown, Ohio.
P	9 Sets.	Dr. R. Moldenke Met. Eng., Pittsburg, Pa.
Q ..	1 Set.	Bethlehem Iron Co. So. Bethlehem, Pa., A. L. Colby, Met. Eng.
R ..	2 Sets.	Claire Furnace Co., Sharpsville, Pa., D. K. Smith, Chemist.
S ...	1 Set.	Stewart Iron Co., Sharon, Pa., E. R. Sanborn, Chemist.
T	1 Set.	Superior Charcoal Iron Co., Detroit, Mich., W. P. Putnam, Chemist.