Iron Analysis Records.

E. C. Means,
M. D. T. 1885.
from U. S. Medical

56 M301

IRON

ANALYSIS

RECORDS.

WM. H. YOUNG,
NOS. 8 AND 9 FIRST, AND 214 RIVER STREET,
TROY, N. Y.
1880.

IRON

ANALYSIS

RECORDS.

WM. H. YOUNG,
Nos. 8 AND 9 First, AND 211 River Streets,
TROY, N. Y.
1870.

ATOMIC WEIGHTS.

Aluminum,	Al.	27.4
Calcium,	Ca.	40.
Carbon,	C.	12.
Chlorine,	Cl.	35 5
Chromium,	Cr.	52.2
Copper,	Cu.	63.4
Fluorine,	Fl.	19.
Hydrogen,	H.	1.
Iron,	Fe.	56.
Lead,	Pb.	207.
Magnesium,	Mg.	24.
Manganese,	Mn.	55.
Nitrogen,	N.	14.
Oxygen,	O.	16.
Phosphorus,	P.	31.
Potassium,	K.	39.1
Silicon,	Si.	28.
Sodium,	Na.	23.
Sulphur,	S.	32.
Titanium,	Ti.	50.

A
B
C
D

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A.C. & S. Ry Co. — Coal Analyses

Phosphorus			0.025
Sulphur	0.019	0.035	0.0115
Coke	57	58.51	
Ashes	1.88	3.25	4.57
Carbon	84.08	83.91	
Hydrogen	4.92	4.72	
Oxygen	9.12	8.13	
Sp. Grav.	1.282	1.285	

No. 6 — No. 7

	No. 6	No. 7
Water	5.00	4.50
Vol Mat	34.00	40.00
Fix Carb	52.00	52.00
Ash	5.00	4.00
Sul	1.00	.50

No. 6

Water	3.80	to 5.71
Vol Mat	34.93	" 40.13
Fix Carb	46.97	" 56.07
Ash	3.29	" 9.10
Sul	2.08	" 2.11

Low Moor Va. Aug. '85

Low Moor Lump Ore

By James Skelding.

PEROXIDE OF IRON,	
PROTOXIDE OF IRON,	
PROTOXIDE OF MANGANESE,	
ALUMINA,	
LIME,	
MAGNESIA,	
POTASH,	
SILICA, siliceous residue	22 1/4
CARBONIC ACID,	
PHOSPHORIC ACID,	
SULPHURIC ACID,	
SULPHUR,	
TITANIC ACID,	
WATER,	
ORGANIC MATTER,	
METALLIC IRON,	52 1/2
PHOSPHORUS,	.0034

Limonite from Bedford County Virginia — A. M. Douglas place

PEROXIDE OF IRON,	= 55.06%
PROTOXIDE OF IRON,	
PROTOXIDE OF MANGANESE,	13.21
ALUMINA,	
LIME,	
MAGNESIA,	
POTASH,	
SILICA,	13.28%
CARBONIC ACID,	
PHOSPHORIC ACID,	
SULPHURIC ACID,	
SULPHUR,	
TITANIC ACID,	
WATER,	14.15
ORGANIC MATTER,	
METALLIC IRON,	38.5
PHOSPHORUS,	

M. I. T. Laboratory 1887. Feb.

Low Moor Washed '85-

PEROXIDE OF IRON,	
PROTOXIDE OF IRON,	
PROTOXIDE OF MANGANESE,	
ALUMINA,	
LIME,	
MAGNESIA,	
POTASH,	
SILICA, insoluble residue	21.2
CARBONIC ACID,	
PHOSPHORIC ACID,	
SULPHURIC ACID,	
SULPHUR,	
TITANIC ACID,	
WATER,	9.1
ORGANIC MATTER,	
METALLIC IRON,	39.2
PHOSPHORUS,	.00.34

Iron Mountain Wash Ore of Dec. 1887.

Not dried at 100°C. but at 70° F.

PEROXIDE OF IRON,

PROTOXIDE OF IRON,

PROTOXIDE OF MANGANESE,

ALUMINA,

2.21 LIME,

MAGNESIA,

POTASH,

June 23 1888 Feb 4 '89

17.6 SILICEOUS residue 24.50 22.43

CARBONIC ACID,

PHOSPHORIC ACID,

SULPHURIC ACID,

SULPHUR,

TITANIC ACID,

WATER,

ORGANIC MATTER,

45.85 METALLIC IRON, 41.61, 42.09

1.33 " Manganese

PHOSPHORUS,

M. S. L. Mar- 1886

Limonite from
Longdale Iron Works - Va

PEROXIDE OF IRON,	69.01 %
PROTOXIDE OF IRON,	
PROTOXIDE OF MANGANESE.	2.17
ALUMINA,	2.32
LIME,	.70
MAGNESIA,	.10
POTASH,	
SILICA,	14.38
CARBONIC ACID,	
PHOSPHORIC ACID,	1.27
SULPHURIC ACID,	
SULPHUR,	
TITANIC ACID,	
WATER,	10.17
ORGANIC MATTER,	Slight -
METALLIC IRON,	48.31
PHOSPHORUS,	Cal as P_2O_5 -

Analysis by E. C. M -

Low Moor, Jigged Ore 188

1888. From bins without drying- Drift

Feb. 27th. March 2 dried 80° June 18 Black

59.34	PEROXIDE OF IRON,	57.01		1.95
	PROTOXIDE OF IRON,			
	PROTOXIDE OF MANGANESE,			
	ALUMINA,			
	LIME,			6.8
	MAGNESIA,			1.2
	POTASH,			
23.65 ~~17.16~~	SILICious residue	23.75	22.70	9.53
	CARBONIC ACID,			
	PHOSPHORIC ACID,			
	SULPHURIC ACID,			
	SULPHUR,			
	TITANIC ACID,			
15.35	WATER,	17.98		0.5
	ORGANIC MATTER,			Fac
41.5 %	METALLIC IRON,	39.91	43.36	
0.53%	PHOSPHORUS,	0.52		

Ore 1888 Low Moor, Limestone — March 7.

		Drift No 1	Drift No 4
		Black Stone	Medium
	1.95	~~PEROXIDE OF IRON,~~ Fe_2O_3, Fe_2O_3 & Al_2O_3	1.37
		PROTOXIDE OF IRON,	
		PROTOXIDE OF MANGANESE,	
		ALUMINA, see above	
	96.8	~~LIME~~ $CaCO_3$	89.52
	1.2	~~MAGNESIA~~, $MgCO_3$	1.4
		POTASH,	
22.70	9.53	SILICA,	7.05
		CARBONIC ACID,	
		PHOSPHORIC ACID,	
		SULPHURIC ACID,	
		SULPHUR,	
		TITANIC ACID,	
	0.50	WATER,	0.50
	Trace	ORGANIC MATTER,	
43.36		METALLIC IRON,	
		PHOSPHORUS,	

Drift No 1 Black Stone June 18 80°

1888

Dolly Ann Lump Ore

March 20 — March 14 — April 2

	PEROXIDE OF IRON,			
	PROTOXIDE OF IRON,			
	PROTOXIDE OF MANGANESE,			
	ALUMINA,			
	LIME,			
	MAGNESIA,			
	POTASH,			
23.9	SILICA,	22.7	15.32	22.05
	CARBONIC ACID,			
	PHOSPHORIC ACID,			
	SULPHURIC ACID,			
	SULPHUR,			
	TITANIC ACID,			
14.50	WATER, ORGANIC MATTER,			
40.25	METALLIC IRON,	40.9	45.35	42.61
1.12	PHOSPHORUS,	1.16		1.120

1888

Dolly Ann Lump Ore

April 2d		June 23	July 9	Feb 9th
	PEROXIDE OF IRON,			
	PROTOXIDE OF IRON,			
	PROTOXIDE OF MANGANESE.			
	ALUMINA,			
	LIME,			
	MAGNESIA,			
	POTASH,			
22.05	SILICA,	18.21	16.12	28.07
	CARBONIC ACID,			
	PHOSPHORIC ACID,			
	SULPHURIC ACID,			
	SULPHUR,			
	TITANIC ACID,			
	WATER,			
	ORGANIC MATTER,			
42.61	METALLIC IRON,	45.90	46.21	39.63
1.120	PHOSPHORUS,			

1888

Stack Mines Wash Ox.

March 14 (Also June 14th 1889)

March 21. July 9th April 5.

	PEROXIDE OF IRON,				
	PROTOXIDE OF IRON,				
	PROTOXIDE OF MANGANESE,				
	ALUMINA,				
	LIME,				
	MAGNESIA, Aug 15				
	POTASH,				
30.8 / (30.76)	SILICA, CARBONIC ACID,	34.80	33.21	36.00	28.18
	PHOSPHORIC ACID,				
	SULPHURIC ACID,				
	SULPHUR,				
	TITANIC ACID,				
	WATER,				
	ORGANIC MATTER,				
(36.96) 37.10	METALLIC IRON,	35.23	37.32	34.85	37.98
(0.295) 0.295	PHOSPHORUS,		0.286		

Feb 9th 1889 { Iron 37.23 / Silica 29.93

1888

Stack Mines Lump Ore 1889

9th April 5.		June 20	June 21	Feb 9
	PEROXIDE OF IRON,			
	PROTOXIDE OF IRON,			
	PROTOXIDE OF MANGANESE,			
	ALUMINA,			
	LIME,			
	MAGNESIA,			
	POTASH,			
00. 28.18	SILICA,	26.04	24.76	27.70
	CARBONIC ACID,			
	PHOSPHORIC ACID,			
	SULPHURIC ACID,			
	SULPHUR,			
	TITANIC ACID,			
	WATER,			
	ORGANIC MATTER,			
.85 37.98	METALLIC IRON,	40.53	44.00	39.84
	PHOSPHORUS,			

1888 1888

Low Moor, Wash Ore.

March 31 April 4th June 21st March 3

	PEROXIDE OF IRON,			
	PROTOXIDE OF IRON,			
	PROTOXIDE OF MANGANESE,			
	ALUMINA,			
	LIME,			
	MAGNESIA,			
	POTASH,			
17.86	SILICA,	19.77	23.84	9.62
	CARBONIC ACID,			
	PHOSPHORIC ACID,			
	SULPHURIC ACID,			
	SULPHUR,			
	TITANIC ACID,			
	WATER,			
	ORGANIC MATTER,			
46.10	METALLIC IRON,	43.85	42.91	53.25
0.470	PHOSPHORUS,	0.526		0.56

1888

Low Moor, Lump Ore.

21st March 30. June 22 Feb 9th 1889 11/1/01

		PEROXIDE OF IRON,		
		PROTOXIDE OF IRON,		
		~~PROTOXIDE OF~~ MANGANESE,		.605
		ALUMINA,		
		LIME,		
		MAGNESIA,		
		POTASH,		
.84	9.62	SILICA,	18.34 13.55	21.74
		CARBONIC ACID,		
		PHOSPHORIC ACID,		
		SULPHURIC ACID,		
		SULPHUR,		.018
		TITANIC ACID,		
		WATER,		
		ORGANIC MATTER,		
2.91	53.25	METALLIC IRON,	46.75 48.89	42.61
	0.56	PHOSPHORUS,		.333
		Zinc		.417

1888

Low Moor. (Stock) wash. 1888

March 29 April 3d 9/4/01 July 7

	PEROXIDE OF IRON,			
	PROTOXIDE OF IRON,			
	PROTOXIDE OF MANGANESE,			
	ALUMINA,		1.87	
	LIME,			
	MAGNESIA,			
	POTASH,			
21.6	SILICA,	21.76	14.12	22.94
	CARBONIC ACID,			
	PHOSPHORIC ACID,			
	SULPHURIC ACID,			
	SULPHUR,			
	TITANIC ACID,			
	WATER,		5.40	
	ORGANIC MATTER,		9.12	
45.37	METALLIC IRON,	44.79	47.13	43.15
0.464	PHOSPHORUS,	0.380	.48	
			.456	Dried at

Zinc

Low Moor Tigged On.

July 7 Feb 1889

		PEROXIDE OF IRON,		
		PROTOXIDE OF IRON,		
		PROTOXIDE OF MANGANESE.		
7		ALUMINA,		
		LIME,		
		MAGNESIA,	June 18th	
		POTASH,		
12	22.94	SILICA,	22.70	28.25
		CARBONIC ACID,		
		PHOSPHORIC ACID,		
		SULPHURIC ACID,		
		SULPHUR,		
		TITANIC ACID,		
40		WATER,		
2		ORGANIC MATTER,		
1,13	43.15	METALLIC IRON,	43.36	38.90
48		PHOSPHORUS,		
56	Dried at 80°F			

1888

Iron Mountain, Lump Or.

March 28		April 7th	June 23	
	PEROXIDE OF IRON,			
	PROTOXIDE OF IRON,			
	PROTOXIDE OF MANGANESE,			
	ALUMINA,			
	LIME,			
	MAGNESIA,			
	POTASH,	Feb 9th 1884		
26.55	SILICA,	18.42	17.43	14.20
	CARBONIC ACID,			
	PHOSPHORIC ACID,			
	SULPHURIC ACID,			
	SULPHUR,			
	TITANIC ACID,			
	WATER,			
	ORGANIC MATTER,			
43.12	METALLIC IRON,	46.16	45.83	50.43
0.488	PHOSPHORUS,			

June 4th 89 { Iron 53.28 %
Silica 7.15

Farwick

9/13/01

PEROXIDE OF IRON,

PROTOXIDE OF IRON,

.641 ~~PROTOXIDE OF~~ MANGANESE.

2.40 ALUMINA,

LIME,

MAGNESIA,

POTASH,

23.8 SILICA,

CARBONIC ACID,

PHOSPHORIC ACID,

SULPHURIC ACID,

.015 SULPHUR,

TITANIC ACID,

5.06 WATER,

3.15 ORGANIC MATTER,

43.6 METALLIC IRON,

.248 PHOSPHORUS,

.843 Zinc

1888 Big Hill Ore.

Rheinhart & Teifer.

Fine stuff from piles

	June 18.		June 21	July 10
	PEROXIDE OF IRON,			
	PROTOXIDE OF IRON,			
	PROTOXIDE OF MANGANESE,			
	ALUMINA,			
	LIME,			
	MAGNESIA,			
	POTASH,			
16.26	SILICA,		16.84	34.00
	CARBONIC ACID,			
	PHOSPHORIC ACID,			
	SULPHURIC ACID,			
	SULPHUR,			
	TITANIC ACID,			
	WATER,			
	ORGANIC MATTER,			
48.31	METALLIC IRON,		48.06	33.36
	PHOSPHORUS,			

Ben Kames Ore, near Low Moor.
Aug 30th 1880 Analysis by C. E. Dwight.

72.44 PEROXIDE OF IRON,
PROTOXIDE OF IRON,
3.027 PROTOXIDE OF MANGANESE,
1.74 ALUMINA,
0.849 LIME,
.324 MAGNESIA,
POTASH,
7.31 SILICA,
CARBONIC ACID,
0.320 PHOSPHORIC ACID,
0.248 SULPHURIC ACID,
SULPHUR,
TITANIC ACID,
13.611 WATER,
ORGANIC MATTER,

50.71 METALLIC IRON,
1.914 " Manganese
.140 PHOSPHORUS,

Furnace Kilns of about 15000 tons.

Ohio Ore 1895.

Burnt Ore

	PEROXIDE OF IRON,			
	PROTOXIDE OF IRON,	Blocton		
	PROTOXIDE OF MANGANESE,	Burnt	Raw	Raw
5.018	ALUMINA,	5.85		
2.750	LIME,	3.96		
	MAGNESIA,	2.18		
	POTASH,			
16.51	SILICA,	24.14		15.45
	CARBONIC ACID,			
	PHOSPHORIC ACID,			
	SULPHURIC ACID,			
.444	SULPHUR,	.824		
	TITANIC ACID,			
	WATER,			
	ORGANIC MATTER,			
43.50	METALLIC IRON,	40.21	31.76	32.80
	Manganese	.706		
.391	PHOSPHORUS,	~~40.21~~		

Franklin Furnace O
Sand ore M. K & Co 1895

PEROXIDE OF IRON,

PROTOXIDE OF IRON,

PROTOXIDE OF MANGANESE,

ALUMINA,

LIME,

MAGNESIA,

POTASH,

SILICA, 66,18

CARBONIC ACID,

PHOSPHORIC ACID,

SULPHURIC ACID,

SULPHUR,

TITANIC ACID,

WATER,

ORGANIC MATTER,

METALLIC IRON, 21,56

PHOSPHORUS,

Sampled by Geo J. Mickle — March 1905

14 & Vermilion Chemung Potts Creek Ore

| | | |

Iron Silica Phos Manga

	Tahawus Ore	Little Rainbow	Big Rainbow	Rock in bed of creek	Double River Lump
PEROXIDE OF IRON,	52.60	54.00	49.80	45.40	49.60
PROTOXIDE OF IRON,	7.18	3.46	15.76	20.94	12.76
PROTOXIDE OF MANGANESE.	.678	1.328	.292	.677	1.076
ALUMINA,					
LIME,					
MAGNESIA,					
POTASH,					
SILICA,					
CARBONIC ACID,					
PHOSPHORIC ACID,	.144	.720	.360	.217	.057
SULPHURIC ACID,					
SULPHUR,					
TITANIC ACID,					
WATER,					
ORGANIC MATTER,					
METALLIC IRON,	51.40	37.62	34.20	31.74	34.72
PHOSPHORUS,	.062	.310	.157	.095	.025

Sullivan

Potts Creek Ore
Over 1905

Sampled by Geo T Moore
& T Morris Chem

PEROXIDE OF IRON,		Silica	.367
PROTOXIDE OF IRON,	53.00	8.68	.278
PROTOXIDE OF MANGANESE,			
ALUMINA,	45.60	13.62	.190
LIME,			
MAGNESIA,	4.50	20.74	.262
POTASH,			
SILICA,			
CARBONIC ACID,			
PHOSPHORIC ACID,			
SULPHURIC ACID,			
SULPHUR,			
TITANIC ACID,			
WATER,	40.20	13.96	.682
ORGANIC MATTER,			
METALLIC IRON,			
PHOSPHORUS,			

Alumina
Lime
Magnesia
Potash
Silica
Carbonic Acid
Phosphoric Acid
Sulphuric Acid
Sulphur
Titanic Acid
Water
Organic Matter
Metallic Iron
Phosphorus

Mix. Sample 44.80 - 6.74 - 1.2485 - 1.5584

PEROXIDE OF IRON,	
PROTOXIDE OF IRON,	
PROTOXIDE OF MANGANESE,	
ALUMINA,	
LIME,	
MAGNESIA,	
POTASH,	
SILICA,	
CARBONIC ACID,	
PHOSPHORIC ACID,	
SULPHURIC ACID,	
SULPHUR,	
TITANIC ACID,	
WATER,	
ORGANIC MATTER,	
METALLIC IRON,	
PHOSPHORUS,	

Potts Creek Sample by Peter Hain

Lower Banner Quartz Quarry Pebbles

| | | |

Power House								
Screen Station	#11	"	51.00	12.14		.750	1.115	
			49.60	13.52	.576			
	20	"	45.60	19.46	.608	.252	.197	
	28	"	48.40	15.48	.574	.369	.164	

		WATER,	ORGANIC MATTER	SULPHURIC ACID,	SULPHUR,	TITANIC ACID,	SILICA,	CARBONIC ACID,	PHOSPHORIC ACID,	POTASH,	MAGNESIA,	LIME,	ALUMINA,	PROTOXIDE OF MANGANESE	PROTOXIDE OF IRON,	PEROXIDE OF IRON,
					Sulphur			Insol	Phos		Magnesia					Lime
East Opening Sta	#33		50.40				14.00		.354		.346					.209
Shaft	#39		46.60				14.68		.812		.346					.144
Open Cut N	#45		51.40				11.96		.340		.439					.295
Shaft S.W.	45		47.60				14.54		.490		.806					.230
Churn Drill Hole			43.40				23.94		.428		.605					.201
#7 Shaft			41.40				27.84		.478		.936					.328
2nd Diamond Hole			43.00				26.02		.392		.165					.346
#6 Shaft			48.60				16.04		.442		.648					.394

Potts Creek Aug 10 & 1906

	#2 Hand Drill Hole	#3 Drill Hole	#8 Shaft	#0 "	#10 "	Rich Ore Bins Tools	#2 Shaft Sides	#3 " "	2 " "	Drill Hole #13
PEROXIDE OF IRON,	52.60	45.80	44.20	43.60	47.20	50.20	45.40	44.60	45.60	51.00	47.60
PROTOXIDE OF IRON,	10.70	19.36	18.45	24.52	18.32	1.52	16.44	17.86	16.20	13.82	16.44
PROTOXIDE OF MANGANESE,	.524	.260	.416	.952	.406	.6448	.264	.464	.680	.638	.598
ALUMINA,	1.094	.8857	.6624	.6394	.5845	.8864	1.102	1.454	.3746	.4576	1.224
LIME,	.361	.268	.288	.130	.858	.440	.352	.384	.574	.328	.343
MAGNESIA,											
POTASH,											
SILICA,											
CARBONIC ACID,											
PHOSPHORIC ACID,											
SULPHURIC ACID,											
SULPHUR,											
TITANIC ACID,											
WATER,											
ORGANIC MATTER,											
METALLIC IRON,											
PHOSPHORUS,											

Rich Ore Bins Tools
Taken on ignition 15.56%
#2 Analysis Run on Mixed Sides

Rich Patch On

10/23/01 5/24-01

	PEROXIDE OF IRON,	
	PROTOXIDE OF IRON,	
.53	~~PROTOXIDE OF~~ MANGANESE.	.324
1.70	ALUMINA,	1.876
	LIME,	
	MAGNESIA,	
	POTASH,	
30.56	SILICA,	23.96
	CARBONIC ACID,	
	PHOSPHORIC ACID,	
	SULPHURIC ACID,	
0.18	SULPHUR,	.018
	TITANIC ACID,	
	WATER,	4.127
	ORGANIC MATTER,	
37.18	METALLIC IRON,	43.91
.256	PHOSPHORUS,	.297
.345	Zinc	.489

Drill hole #13

Furnace sampling 1907

Adaplan 9/5

"

Trans. Mar 9/7

Potts Creek Ore

Iron .2141

Silica 15.64

Manganese .214

Phos Lime .241

Alumina 1.05

Lime 18.80

Magnesia 4.45

Potash .50

Silica 48.20

Carbonic Acid

Phosphoric Acid .762

Sulphuric Acid

Sulphur

Titanic Acid

Water 44.25 - 22.61 .576

Organic Matter

Metallic Iron .546

Phosphorus .562

PEROXIDE OF IRON,

PROTOXIDE OF IRON,

PROTOXIDE OF MANGANESE,

ALUMINA,

LIME,

MAGNESIA,

POTASH,

SILICA,

CARBONIC ACID,

PHOSPHORIC ACID,

SULPHURIC ACID,

SULPHUR,

TITANIC ACID,

WATER,

ORGANIC MATTER,

METALLIC IRON,

PHOSPHORUS,

PEROXIDE OF IRON,

PROTOXIDE OF IRON,

PROTOXIDE OF MANGANESE,

ALUMINA,

LIME,

MAGNESIA,

POTASH,

SILICA,

CARBONIC ACID,

PHOSPHORIC ACID,

SULPHURIC ACID,

SULPHUR,

TITANIC ACID,

WATER,

ORGANIC MATTER,

METALLIC IRON,

PHOSPHORUS,

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Lovelock Slags 1904 Feb 1 to 8

.514	Ferrous Oxide .366 ~~PEROXIDE OF IRON~~,		.642	.387
	PROTOXIDE OF IRON,			
.5576	Manganous Oxide .645 ~~PROTOXIDE OF MANGANESE~~,		.5809	.439
7.609	ALUMINA,	7.571	6.926	6.451
40.249	LIME,	42.155	36.14	40.089
2.678	MAGNESIA,	3.294	5.00	3.836
	POTASH,			
46.38	SILICA,	43.94	48.24	46.42
	CARBONIC ACID,			
	PHOSPHORIC ACID,			
	SULPHURIC ACID,			
2.0116	Ca S ~~SULPHUR~~,	2.099	2.4675	2.378
	~~TITANIC ACID~~,			
43.86	~~WATER~~,	SiO_2	48.02	44.92
6.366	~~ORGANIC MATTER~~	Al_2O_3	6.33	7.014
44.459		Ca O	41.691	42.57
2.845	~~METALLIC IRON~~,	Mg O	1.462	3.019
1.955		Ca S	1.668	1.962
.322	~~PHOSPHORUS~~,	Mn O	.442	.258
.193		Fe O	.386	.257

Low Moor Slags 1894

	Silica	Alt Iron	Lime
	46.84	8.20	33.59
PEROXIDE OF IRON,	43.47	9.22	45.79
PROTOXIDE OF IRON,	45.59	8.94	44.53
PROTOXIDE OF MANGANESE	45.25	8.82	42.59
ALUMINA,	42.31	7.17	45.98
LIME,	41.92	8.23	48.18
MAGNESIA,	Corrington 1895		
POTASH,	41.95	9.72	46.89
SILICA,	43.13		42.10
CARBONIC ACID,	43.44	10.10	41.09
PHOSPHORIC ACID,	42.10	8.85	46.42
SULPHURIC ACID,			
SULPHUR,			
TITANIC ACID,			
WATER,			
ORGANIC MATTER,			

1894 Low Moor Limestone

~~METALLIC IRON~~, Sil Res	3.35	2.39	2.66
Oxide Iron & Al	1.16	.81	.89
~~PHOSPHORUS~~, Calcic Carb	95.04	94.90	93.22
Magnesic Carb	.33	.52	2.44

Slag - Low Moor, Furnace -
June 14th 1889

	PEROXIDE OF IRON,					
	PROTOXIDE OF IRON,					
	PROTOXIDE OF MANGANESE,					
7.29	ALUMINA,	7.20,	7.40,			
	LIME,					
	MAGNESIA,					
43.45	~~POTASH,~~					
	SILICA,	43.30,	41.95,			
	CARBONIC ACID,					
	PHOSPHORIC ACID,					
	SULPHURIC ACID,					
	SULPHUR,					
	TITANIC ACID,					
	WATER,					
	ORGANIC MATTER,					
	METALLIC IRON,					
	PHOSPHORUS,					

Slags upside June 1889

White	Blue	Green	Blue	Green	Gray	
Silica	44.40 %	45.52	43.12	46.30	43.45	41.95

Slate Creek Ore — Olympia Ky

		1	2	3
76.07	PEROXIDE OF IRON,		70.57	
	PROTOXIDE OF IRON,			
.43	PROTOXIDE OF MANGANESE.		.37	
2.59	ALUMINA,		4.24	
.13	LIME,		1,55	
.28	MAGNESIA,		.63	
	POTASH,			
8.68	SILICA,		4.94	
	CARBONIC ACID,			
.73	PHOSPHORIC ACID,		2.89	
.05	SULPHURIC ACID,			
	SULPHUR,			
	TITANIC ACID,			
12.30	WATER,		14.20	
	ORGANIC MATTER,			
53.25	METALLIC IRON,		49.4	46.60
	PHOSPHORUS,		1.26	.80

Scioto Fire Brick Clay -

1870.		1895 #1	#2
traces	PEROXIDE OF IRON,	0.39	0.39
	PROTOXIDE OF IRON,		
	PROTOXIDE OF MANGANESE,		
22.80	ALUMINA,	36.48	37.14
.05	LIME,	1.19	1.19
.70	MAGNESIA,	.26	.24
.90	POTASH, & Soda	.11	.13
61.90	SILICA,	47.22	46.57
	CARBONIC ACID,		
	PHOSPHORIC ACID,		
	SULPHURIC ACID,		
	SULPHUR,		
	TITANIC ACID,		
12.90	WATER,	14.35	14.34
	ORGANIC MATTER,		
	METALLIC IRON,	Copy of Otto Mattes	
	PHOSPHORUS,		

Mount Savage - - Clay

1875

PEROXIDE OF IRON,

1.504 PROTOXIDE OF IRON,

PROTOXIDE OF MANGANESE.

25.90 ALUMINA,

.633 LIME,

.118 ~~trace~~ MAGNESIA,

" POTASH,

50.459 SILICA,

CARBONIC ACID,

PHOSPHORIC ACID,

SULPHURIC ACID,

SULPHUR,

~~2.744~~ TITANIC ACID,

12.744 WATER,

ORGANIC MATTER,

Cby OM matter

METALLIC IRON,

PHOSPHORUS,

76

Flue Dust from Dover Corner
Low Moor Furnace "B" Dec 1887

~~1.270%~~ PEROXIDE OF IRON,

1.27 PROTOXIDE OF IRON,

3.60% ~~PROTOXIDE OF~~ MANGANESE, Tetroxide

.228 ALUMINA,

1.850% LIME,

MAGNESIA,

POTASH,

2.410 SILICA,

CARBONIC ACID,

.701 PHOSPHORIC ACID, P_2O_5

.493 SULPHURIC ACID, SO_3

SULPHUR,

TITANIC ACID,

WATER,

.640 ~~ORGANIC MATTER~~, Loss on Ignition

87.660 Zinc Oxide

1.142 METALLIC IRON,

70.260% " Zinc

PHOSPHORUS,

By J. C. Smith - M. I. I.

PEROXIDE OF IRON,

PROTOXIDE OF IRON,

PROTOXIDE OF MANGANESE.

ALUMINA,

LIME,

MAGNESIA,

POTASH,

SILICA,

CARBONIC ACID,

PHOSPHORIC ACID,

SULPHURIC ACID,

SULPHUR,

TITANIC ACID,

WATER,

ORGANIC MATTER,

METALLIC IRON,

PHOSPHORUS,

Blast Furnace Slag from Low Moor Furnace 1886 Sept. Grey clay

PEROXIDE OF IRON,
1.41% PROTOXIDE OF IRON,
.65 PROTOXIDE OF MANGANESE,
6.10 ALUMINA,
53.71 LIME,
.14 MAGNESIA,
POTASH,
36.72 SILICA,
CARBONIC ACID,
PHOSPHORIC ACID,
SULPHURIC ACID,
SULPHUR, Not determined
TITANIC ACID,
WATER,
ORGANIC MATTER,

1.10% METALLIC IRON, in little globules

PHOSPHORUS,

To crushing Cinder to the following No's / Foundry Iron

No 1. Foundry Iron
Low Moor Furnace 24/5/1886

IRON,	
GRAPHITIC CARBON,	3.60 %
COMBINED CARBON,	0.06
SILICIUM,	1.68
SULPHUR,	0.03
PHOSPHORUS,	0.99
MANGANESE,	0.75
TITANIUM,	
NICKEL AND COBALT,	
COPPER,	

No. 2 Foundry —

Low Moor, Sept. 1886.

Mr. D. J. Kale. April 1887.

	IRON,	91.782 IRON
	GRAPHITIC CARBON,	2.717 GRAI
	COMBINED CARBON,	2.717 COM
1.36	SILICIUM,	3.783 SILIC
	SULPHUR,	.031 SULP
1.04	PHOSPHORUS,	.684 PHOS
0.48	MANGANESE, } J C Smith	.671 MAN
	TITANIUM,	TITA
	NICKEL AND COBALT,	NICK
	COPPER,	COPP
		.332 Sla

No 1 Foundry Iron.
Low Moor. Made Feb 13th 1884
By J. Blodget Britton.
Probably American Scotch.

91.782	IRON,
2.717	GRAPHITIC CARBON,
	COMBINED CARBON,
3.783	SILICIUM,
.031	SULPHUR,
.684	PHOSPHORUS,
.671	MANGANESE,
	TITANIUM,
	NICKEL AND COBALT,
	COPPER,
.332	Slag & Sands

Low Moor. Selvery

1889 March 19		1889 May 6th	1894 Jan 3rd	March 14
	IRON,			
	GRAPHITIC CARBON,			
	COMBINED CARBON,			
5.62	SILICIUM,	5.59 – 5.68	5.104	3.90
	SULPHUR,			
	PHOSPHORUS,	1.42 %	.687	
	MANGANESE,			
	TITANIUM,			
	NICKEL AND COBALT,			
	COPPER,			

Low Moor. Am. Scotch.

March 14

IRON,

GRAPHITIC CARBON,

COMBINED CARBON,

3.90 SILICIUM, 4.11

SULPHUR,

PHOSPHORUS, 1.27

MANGANESE,

TITANIUM,

NICKEL AND COBALT,

COPPER,

Low Moor, No. 1 – Foundry –

IRON,

GRAPHITIC CARBON,

COMBINED CARBON,

SILICIUM,

SULPHUR,

PHOSPHORUS,

MANGANESE,

TITANIUM,

NICKEL AND COBALT,

COPPER,

Ashland 1892

"Ft Lake Silvery" Dec 1893

Jany 1894

IRON,		
GRAPHITIC CARBON,	.58	2.304
COMBINED CARBON,	1.31	.080
6.167 SILICIUM,	8.17	7.950
SULPHUR,	.02	.017
PHOSPHORUS,	.797	1.343
.634 MANGANESE,	1.66	
TITANIUM,		
NICKEL AND COBALT,		
COPPER,		

B. Britton Chemist

Analysis by J. J. Evans —

~~Asst. Member~~

~~Ashland Steel Co Chemist~~

Dec 1893 50% Ore + 50% Cinder

Jan 1894 57 " 43 "

Ashland 1892

No 1

1892		Dec 1893 A	Jan 1894 B
	IRON,		
0.628	GRAPHITIC CARBON,	2.338	
0.339	COMBINED CARBON,	.085	
8.588	SILICIUM,	8.026	5.782
.002	SULPHUR,	.009	
.998	PHOSPHORUS,	1.251	
1.650	MANGANESE,		.771
	TITANIUM,		
	NICKEL AND COBALT,	B Britton Chemist	
	COPPER,		

~~Ash. Steel Co~~
~~Chemist~~
J. J. Evens
Chemist Calumet Ind. Co

A 50% Ore + 50% Mill Cinder
B 57% " + 43% "

Ashland - No 2 - Silvery
Sept 1893

Chemist. Addystone Pipe Works -

IRON, by difference	88.477	88.425
GRAPHITIC CARBON,	3.034	3.124
COMBINED CARBON,	0.216	0.209
SILICIUM,	5.717	5.692
SULPHUR,	0.040	0.044
PHOSPHORUS,	1.556	1.543
MANGANESE,	0.960	0.963
TITANIUM,		
NICKEL AND COBALT,		
COPPER,		

Ashland Sta E Silver
Nov 1893
Chemist Blodget Britton

	IRON,
2.574	GRAPHITIC CARBON,
trace	COMBINED CARBON,
5.399	SILICIUM,
.039	SULPHUR,
1.768	PHOSPHORUS,
	MANGANESE,
	TITANIUM,
	NICKEL AND COBALT,
	COPPER,

Feb 5th 1894

J Blodget Britton Chemist

Belle Fonte Charcoal Iron

	No 1	No 2
IRON,	93.800	94.560
GRAPHITIC CARBON,	3.400	3.300
COMBINED CARBON,	.615	.610
SILICIUM,	.832	.419
SULPHUR,	.024	.038
PHOSPHORUS,	.689	.508
MANGANESE,	.547	.461
TITANIUM,		
NICKEL AND COBALT,		
COPPER,		
Undetermined	.093	.104
	100.000	100.000

Hamilton Furnace
Means Kyle & Co
Nov 10th 1894

No 1 Foundry		No 2
	IRON,	
3.640	GRAPHITIC CARBON,	3.708
.240	COMBINED CARBON,	.220
2.605	SILICIUM,	2.530
.006	SULPHUR,	.005
.427	PHOSPHORUS,	.394
	MANGANESE,	
	TITANIUM,	
	NICKEL AND COBALT,	
	COPPER,	

Pine Grove
Charcoal Iron
Means Kyle & Co

№ 1		№ 2	№ 3	№ 4
	IRON,			
3.690	GRAPHITIC CARBON,	3.693	3,200	3.190
.224	COMBINED CARBON,	.235	.240	.250
1.148	SILICIUM,	1.594	1.257	.692
.003	SULPHUR,	.005	.008	.014
.337	PHOSPHORUS,	.353	.337	.343
	MANGANESE,			
	TITANIUM,			
	NICKEL AND COBALT,			
	COPPER,			

Analysis "Pencoat"
Ferro Silicon

	IRON,		
1.92	GRAPHITIC CARBON,	1.52	1.52
.07	COMBINED CARBON,	.03	.06
10.34	SILICIUM,	11.26	12.19
Trace	SULPHUR,	.02	Trace
.43	PHOSPHORUS,	.19	.48
.54	MANGANESE,	.84	.76
	TITANIUM,		
	NICKEL AND COBALT,		
	COPPER,		

Ashland
High Silicon
Jany 23rd 95
Britton Chem

85.55 IRON,
2.233 GRAPHITIC CARBON,
0 COMBINED CARBON,
9.340 SILICIUM,
.018 SULPHUR,
1.418 PHOSPHORUS,
1.167 MANGANESE,
TITANIUM,
NICKEL AND COBALT,
COPPER,

Scotch Pig - General run
analysis

No 1		No 3	Silvery
	IRON,		
.45 to 1.35	GRAPHITIC CARBON,	.88 to 1.12	1.34
2.44 to 3.40	COMBINED CARBON,	3.02 to 3.42	1.28
1.06 to 3.55	SILICIUM,	3.33 to 5.04	7.16
.03 to .13	SULPHUR,	.06 to .12	.02
.17 to .81	PHOSPHORUS,	.62 to .81	.23
1.01 to 2.58	MANGANESE,	1.26 to 1.61	1.32
	TITANIUM,		
	NICKEL AND COBALT,		
	COPPER,		

Lowellville Iron Feb 1904

IRON,

GRAPHITIC CARBON,

COMBINED CARBON,

SILICIUM,

SULPHUR,

PHOSPHORUS, .678 - .756 - .620 - .640

MANGANESE, .792 - .636 - .864 - .756

TITANIUM,

NICKEL AND COBALT,

COPPER,

Phos. .616 - .572 - .596

Mang. .763 - .720 - .792

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PAGE(S)

Rush No 6 Coal Worlds Fair
Analyses J. S Cary Chemist Oct 93

Water	4,54
Vol Matter	43.07
Fixed Carbon	50.40
Sulphur	.049
Ash	1,50

IRON,
GRAPHITIC CARBON,
COMBINED CARBON,
SILICIUM,
SULPHUR,
PHOSPHORUS,
MANGANESE,
TITANIUM,
NICKEL AND COBALT,
COPPER,

Missie Bituminous Coal
1892 Dr Peters

Volatile Matters ~~0.00~~	39.
Dense Coke	54,80
Ash	6.20

IRON,

GRAPHITIC CARBON,

COMBINED CARBON,

SILICIUM,

SULPHUR,

PHOSPHORUS,

MANGANESE,

TITANIUM,

NICKEL AND COBALT,

COPPER,

Semi Cannel Coal 1892

Vol. Matters	41.
Dense Coke	54.36
Ash	4.64

IRON,

GRAPHITIC CARBON,

COMBINED CARBON,

SILICIUM,

SULPHUR,

PHOSPHORUS,

MANGANESE,

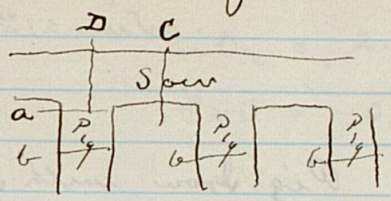
TITANIUM,

NICKEL AND COBALT,

COPPER,

1892 Kentucky Cannel Coal
Mercer Station - oven Chemist
Volatil Matters 66.90
Dense Coke 28.30
Ash 4.80

Iron Age June 21, 1888



1		2.	3.	4.
4.06	GRAPHITIC CARBON,	3.80	3.91	3.25
0.10	COMBINED CARBON,	0.25	0.20	0.70
2.38	SILICIUM,	2.20	2.23	2.31
	SULPHUR,			
0.250	PHOSPHORUS,	0.249	2.47	0.275
0.58	MANGANESE,	0.61	0.60	0.78
	TITANIUM,			
	NICKEL AND COBALT,			
	COPPER,			

Analysis 1. Broken across D show open uniform structure.
2. Broken across C show less open - less uniform - 3. Pig broken at a plane of contact, open, uniform.
4. Pig broken at b center of pig closer, irregular grain -

From the Iron Age

June 21st 1888

Analysis of Pig Iron with Spat in the center

open part		Spat
3.10	GRAPHITIC CARBON,	2.25
0.50	COMBINED CARBON,	0.88
2.05	SILICIUM,	2.01
	SULPHUR,	
0.250	PHOSPHORUS,	0.274
0.79	MANGANESE,	0.80
	TITANIUM,	
	NICKEL AND COBALT,	
	COPPER,	

Low Moor Limestone –

SiO_2 = 2.12

Fe_2O = 0.84

Flue dust Shipped 1900

Low Moor Furnaces 140 $\frac{200}{}$ Tons

Ore used 102.587 $\frac{2150}{}$ Tons

% saved 0.136 %

Cornington Furnace 138 $\frac{250}{}$ Tons

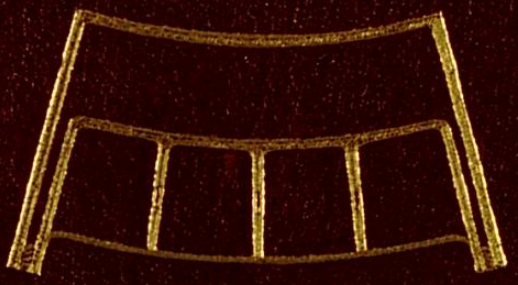
Ore used 56280 $\frac{1595}{}$ Tons

% saved 0.245 %

56M301

FURNACE MANAGERS

MEMORANDA.



BEST, FOX & CO.

Brass Founders and Pipe Fitters,

25th and Railroad Streets,

PITTSBURG, PA.

MANUFACTURERS OF

CLIMAX BRONZE TUYERES, COOLERS,

GAYLEY BOSH PLATE, Etc.

Furnace boshes fitted up, as also general pipe fitting for steam, water, etc.

1892

ELLISON C. KEANE

ELLISON C. MEANS.

The
wall at
The p
fuel ec
largely
been d
cooling
the mo
sarily t
at tha
wear.
outlas
a resu
nor fu
contin
strate
fact t
quali
only
bosh;
many
this v
will

PREFACE.

The importance of maintaining the Bosh wall at its original lines is now fully realized. The phenomenal results in output and fuel economy obtained in recent years are largely attributable to this cause. It has been demonstrated again and again that a cooling plate inserted in the wall affords the most perfect protection. This is necessarily true, since the cooling effect is exerted at that part of the wall which is exposed to wear. With proper protection the bosh will outlast any other part of the lining, and as a result, the output will not be reduced nor fuel consumption increased as the blast continues; this has been practically demonstrated. It can be set down as an established fact that the best results in quantity and quality of metal and economy of fuel are only obtainable through a well protected bosh; a furnace during its blast will repay many times over the expenditure made in this way. Plates made of bronze or copper will invariably give better results than

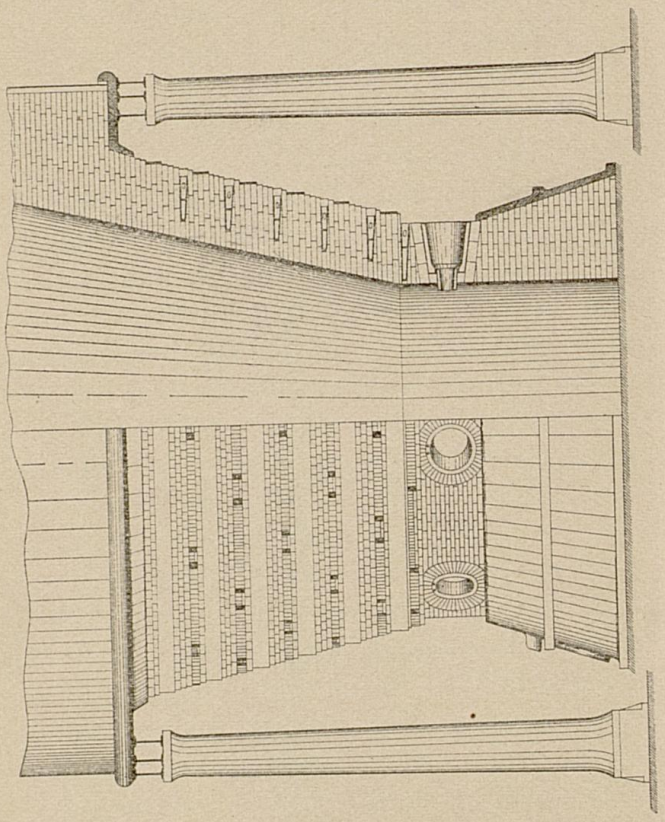
FIG. 1.

THE GAYLEY PATENT BOSH COOLING PLATE.

those made of iron. It is also necessary to use a plate that can be readily changed in case a leak occurs. This saves valuable metal and preserves the slope of the bosh. In the following pages will be found a description and method of using the Gayley Bosh Cooling Plate which has demonstrated its efficiency, through service at many different works.

The Gayley Bosh Plate, shown in Fig. 1, was designed by Mr. James Gayley, Sup't of Edgar Thomson Furnaces, and is the only form of plate among all the various kinds that have been tried at those works which has given satisfactory results in preserving the bosh walls. It is essentially a wedge shape plate with plain surfaced top and bottom. There is but one water course, the water being admitted through one arm to the cooling chamber, passing through and being discharged at the other. This continuous passage prevents the deposit of sediment. The studs in the water course and the webs outside, resist any crushing by the brick work. The webs are provided with openings in the middle for the insertion of a withdrawing hook. The water space being ten inches wide, maintains a large body of water at the hottest part of the furnace, and this space is of such size

FIG. 2.



that it gives eight times the cooling effect obtained from a plate with two iron coils, 1¼ in. in diameter.

In Fig. 2 is shown a furnace equipped with the Gayley Bosh Plates. The method of construction is exceedingly simple, and for this reason is securing rapid adoption among practical furnace men. As shown in the drawing, the arms on the outside are placed flush with the brick work. Between the arms are placed bricks on edge to present a more finished appearance; by removing these bricks, the plate is exposed to view and readily examined. In case of a leak the water flows down along the bottom of plate and can be quickly observed. The plate can be withdrawn in thirty minutes and a new one inserted, preventing any loss of bronze or copper. If the plate is only "drilled" it can be plugged and used again. Bricks of special design are not required in construction. The ordinary nine-inch or thirteen inch brick or tile answer the purpose perfectly. These plates will maintain the bosh wall in perfect shape, and will, therefore, produce the most economical results in quantity and quality of metal, and consumption of fuel.

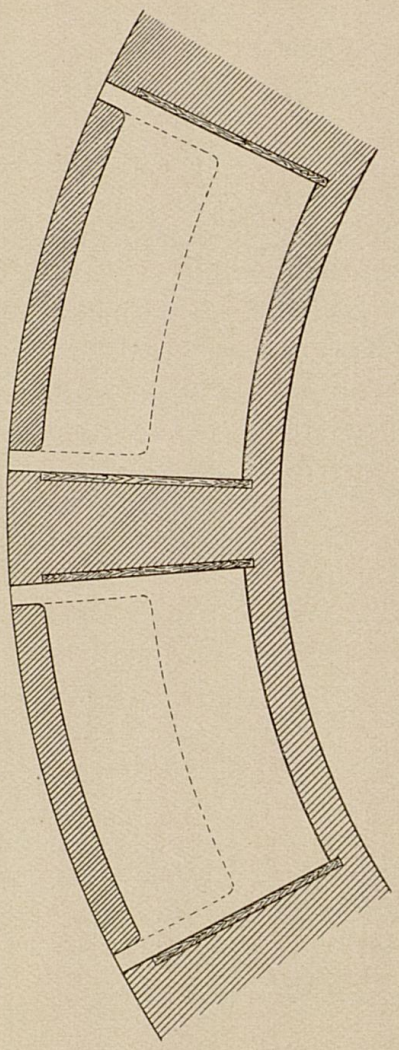


Fig. 3.

DIRECTIONS FOR SETTING THE PLATES.

The plates are enclosed in the brick work as shown in Fig. 3. The inner edge of plate can be placed from two to six inches—as preferred—from edge of lining. The plates are placed twelve inches apart at their inner points; this will allow nine inches for brick work and also space for the packing. Alongside of the end of the plate is laid a strip of wood three-quarters of an inch thick, and between this strip and the plate is put in a clay packing of about one-half inch thick, so that the plate will draw readily. The strip of wood is built in as shown in the drawing, this will become charred and permit of expansion. The upper side of the plate is horizontal, with water outlet at the top. On the upper and lower sides of the plate put in a clay packing one-half inch thick. The arms for inlet and outlet water should be flush with outer edge of lining. The offset between the arms is filled in with nine inch bricks placed on edge. The first row of plates can be placed from two feet to two feet six inches above tuyeres; those

FIG. 4.

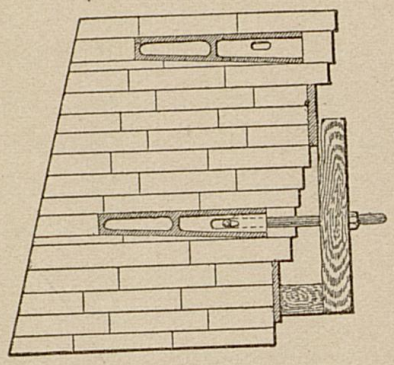
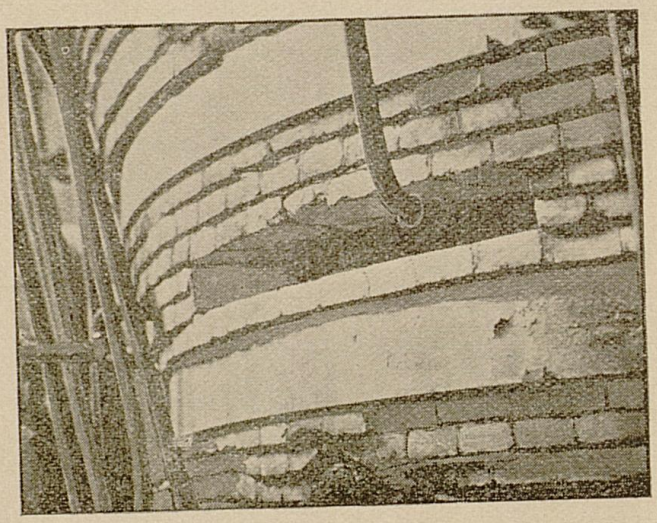


FIG. 5.



above from fifteen to twenty-four inches apart as preferred.

Two or more plates can be connected, depending on the distance above tuyeres and head of water. It is advised that in the row immediately above tuyeres, the plates be supplied separately with water, as they are more exposed.

A row of this kind of Bosh Plate can be inserted in an old furnace in fifteen to twenty-four hours.

METHOD OF REMOVING THE PLATE.

When necessity requires, this plate can be readily withdrawn and another inserted. In Fig. 4 is shown one method of removal, by a screw-jack arrangement. Proceed as follows: place a platform, of trestles and boards on top, at a convenient working height, insert the hooked end of withdrawing bar (inch and a quarter bar) in slot in the web partition; place the wooden brace over the threaded end of the bar, put on washers and nut, and tighten. It is necessary to have two bars, adjusting them to

the outer webs. When both are in position, tap the plate with a heavy bar and screw up on nuts. The plate will be found to start readily. Another method is to use a bar with slotted end which is placed around the middle web, drive a key through holes in the ends of this bar and in web to secure it. Then by means of the "Welshman," or by jarring with a heavy claw puller the plate can be started. The appearance of th brick work after plate is withdrawn is shown in Fig. 5, which is from a photo-graph taken after the removal of a plate from an old furnace. The bricks remain in position and the plate opening is left intact.

No 1 Blowing Engine
Askland 84 in diam x 72 stroke

Sarah 72 " " x 48 "

A - 2205 = 1.39 A@30 rev 6840 cu ft
S - 1584 = 1.00 S@44 " 4928 " "

CHANGES IN BURDEN Low Moor

Furnace B- 1893

Date	Ore	Stone	Coke	Date	Ore	Stone	Coke
Dec 23	7100	2860	4300	July 1	6924	2800	4200
7	6926	2800	4200	Aug 12	6950	2840	4130
9	7000	"	"	13	7042	2900	4000
12	7050	2820	"	16	"	2840	"
16	"	2800	"	21	"	"	3940
17	"	2720	"	27	"	"	3900
18	7140	2740	"	31	6975	"	"
23	"	2640	"	Sept 4	7050	"	"
24	7200	"	"	6	"	"	3840
31	7200	2560	"	7	"	"	3600
93 Jan 7	6897	2800	"	9	"	"	3840
28	7140	2840	"	12	"	"	3900
Feb 4	7200	2900	"	13	"	"	4000
11	6987	"	"	14	"	"	3900
18	6987	"	"	29	"	"	3840
Mar 11	6987	"	"	Oct 3	"	"	3770
18	6986	"	"	5	"	2800	"
25	7042	"	"	8	"	"	3800
April 1	6987	"	4250	9	"	"	3770
8	6924	"	"	Nov 10	"	"	3750
15	6987	"	"	12	7650	"	3750
May 6	"	"	4200	19	7125	"	"
13	7050	"	4250	Dec 2	"	"	3770
20	6987	"	4200	4	"	"	3800
27	6800	"	4200	8	7050	"	3770
June 3	6800	"	"	10	7125	"	"
10	6875	"	"	28	"	"	3750
17	6675	3040	"	30	"	"	3770
24	6705	3000	"	31	7050	"	"

CHANGES IN BURDEN.

Furnace B. - Law Moor

Date	Ore	Stone	Coke
94 Jany 1	7200	2800	3800
2	"	"	3750
8	"	"	3770
10	"	"	3800
13	7050	"	"
14	"	"	3770
17	7125	"	"
28	"	"	3800
Feb 4	"	"	"
6	"	"	3770
20	"	"	3750
Mar 15	"	"	3770
16	7050	"	3800
25	"	"	4200
26	"	"	3800
27	"	"	3770
28	7125	"	"
Apl 2	"	"	3800
5	"	2700	"
11	"	"	3840
13	"	2800	4200
14	7050	"	"
16	"	"	3900
22	"	"	4000
23	"	"	3900
June 2	"	"	3850
"	"	2700	"
3	"	"	"
6	"	"	3900
7	"	2610	4200
10	7050	2600	4200
17	"	"	"
22	"	2800	"
29	"	"	"
29	6925	"	"
July 1	"	"	"
3	7050	"	"
8	6900	"	"
10	"	"	4000
11	6975	2900	"
13	"	3000	"
15	"	"	"
16	6862	2800	"
17	6975	"	"
18	7050	"	"
21	"	"	4200
22	"	2600	4200
26	6950	2560	"
30	7050	"	"
Aug 4	7125	"	4000
5	"	"	"
10	"	"	3900
12	"	"	"

out of blast
Aug 15th 1894

CHANGES IN BURDEN.

Week ending

Ashland No. 1

Date	Ore lbs	Stone lbs	Mill Cinder lbs	Date	Ore Coal pounds	Stone Coke pounds	Iron Made tons	Labor per ton
92 11/19	3705	2080	2795	Coal Coke Made				
26	3705	2080	2795					
12/3	3705	2080	2795					
93 4/8	3250	2080	3250		6400	1200	316	$1.73
4/22	"	"	"		5600	1600	324	1.70
4/29	"	"	"		4800	2400	309	1.72
5/6	"	"	"		"	"	324	1.72
20	"	"	"		6400	1600	296	1.86
27	"	"	"		"	"	302	1.68
6/10	3000	1920	3000		5600	2000 Aluminia	255	2.05
17	"	2100	4000		"	"	310	1.76
24	2000	"	"		6400	1600	313	1.78
7/1	"	"	"		"	"	302	1.89
8	"	"	"		7200	800	271	1.86
15	3250	2080	3250		6400	1600	279	1.94
29	3250	"	"		"	"	299	1.68
8-5	"	"	"		"	"	272	1.75
12	"	"	"		4800	2400	313	1.50
19	"	"	"		"	"	307	1.59
26	"	1980	3000		6400	1600	293	1.70
31	3000	1980	"		4800	2400	93	2.75

Blast off 10 40 AM Aug 30 93

	Ore	Stone	Cinder	Coal	Coke	Iron
12-23	3150	2080	3150	4800	1600	364
1894						
Jan 6	3705	1950	2795	4800	1601	355
13	2964	"	"	5600	1200	336

CHANGES IN BURDEN.

Ashland No 2

Date	Ore	Stone	Cinder	Date	Coke Ore	Coke Stone	Iron	Labor
	lbs	lbs	lbs		lbs	lbs	tons	
93 4/8	3250	2080	3250		6400	1200	326	$1.67
75 charges	2600			Scrap				
15	26 " 0	"	"		"	"	339	1,63
" 22	26 " 0	"	"		"	"	345	1,60
" 29	26 " 0	"	"		"	"	352	1,52
5" / 6	26 " 0	"	"		~~4800~~ ~~2400~~ 6400 1600		348	1,64
	"	"	"				379	1.45
20	3250	2920	3000		6400	1600		
27	"	2080	3250		"	1200	348	1,46
6/ 3	"	"	"		"	"	352	1,52
10	"	"	"		7200	800	323	1,62
17	"	"	"		"	"	324	1,68
24	"	"	"		"	"	329	1,71
7/ 1	"	"	"		"	"	312	1,80
8	"	"	"		"	"	288	1,75
15	"	"	"		"	"	323	1,68
22	"	1820	"		"	"	296	1,82
29	"	1755	"		8000	"	280	1,78
8 - 5	"	1625	"		"	"	286	1,63
12	"	"	"		"	"	278	1,78
19	"	"	"		"	"	299	1,68
26	2600	1600	3000		"	"	283	1,76
31	3250	1625	3250		6400	1600	143	1,79

Blast off 9:20 A.M. Aug 31st 93

12	2	3150	2080	3150	4800	1600	348	
	9	3000	1900	3000	6400	1600	348	
	16	"	1800	"	"	"	317	
12	23	3150	2016	3150	4800	1600	379	
1894								
Jan	6	3705	1950	2795	4800	1600	333	
	13	2964	"	"	5600	"	373	

Bessemer — CHANGES IN BURDEN. — Wages for two Pineers

Mark Sudduth — Norton Furnace

Date	Ore	Stone	Coke	Date	Ore	Stone	Iron Made	Hours lost
1893	tons	tons	tons	tons		tons		
3/26	1216	259	782	127		798		4½
4-2	1212	264	794	120		786		3½
~~4~~	~~1212~~	~~264~~	~~794~~					
4 9	1040	233	686	86		627		1600.35
16	769	217	751	54		563		
~~1891~~			~~1891~~					
~~12-13~~						~~701~~		
~~20~~	~~947~~	~~226~~	~~698~~			~~478~~		
~~27~~			~~354~~					

1892 Blast #2

Date	Ore	Stone	Coke	Coal	Iron	Wages 2 with Bessemer
10-9	557	136	550		235	
16	1119	252	775	15	663	$1123.05
23	1149	304	805	77	693	1611.35
30	1408	375	974	104	813	
11-6	1230	341	912		699	1742.85
13	1214	335	891		670	
20	1111	297	781	31	584	
27	1335	349	876	96	738	
12-4	1140	357	830	111	606	
23	1234	439	756	81	670	Foundry iron
93 1-1	1382	414	831	89	753	Bessemer
8	1210	286	778	87	684	
2-5	1433	310	851	109	788	
12	1567	335	941	149	895	$1850.75
19	1465	290	856	134	783	
26	1415	285	811	140	850	$1758.35
3-19	1361	277	819	131	811	
26	1216	259	782	127	798	$1742.60

Bess

Date
1892
1-10
17
24
31
2-7
14
21
28
3 6
13
20
27
4 3
10
17
24
5 1
8
15
2
2
6
1

Bessemer CHANGES IN BURDEN.

Norton Furnace

Time lost + Wages

Date	Ore	Stone	Coke	Date	Ore	Stone	
1892	Tons	Tons	Tons	Tons	Tons from	Tons each	
1 - 10	1392	378	918		759		Cost 7 hours
17	1309	347	855		676		$1998.40
24		573	922		766		
31		375	875	70	812		$2029.50
2 - 7		360	773	117	728		
14		417	866	54	822		$1884.45
21		434	790	129	804		
28		455	787	118	776		$1901.00
3 6		451	792	141	849		
13		448	795	131	832		$2061.60
20	1427	425	774	126	770		
27		438	797	115	781		
4 3		329	623	70	605		
10	1320	413	753	64	761		$1716.45
17		407	744	116	755		
24		419	781	105	708		$1950.55
5 1		437	906	94	823		
8		292	606	82	545		
15	874	250	512	80	473		
22	1337	340	792	131	787		$1767.60
29	1277	290	791	126	749		
6 5	1154	269	789	136	707		$1755.15
12	282	75	211	36	223		

Furnace banked June 8th 1892

No 1 CHANGES IN BURDEN. Ashland

Date	Ore	Stone	Cinder	Coal Charges Coal	Coke Charges Coke	Stone	Iron
1894 Feb 3	3150	2080	3150	5600	1200	200	
"	2520	"	"	4×800 Ex	"	62	380.47
10	3150	"	"	5600	"	193	
"	2520	"	"	6×800 Ex 6400	800	55	347.73
17	2400	2040	3600	5600	1200	171	
	1800	"	"	4×800 Extra		80	352.17
24	2400	2040	"	"	"	38	
	1650	1760	3300	"	"	2	
	2200	1650	"	"	"	162	
	1650	1760	"	"	"	59	327.73
Mar 3	3705	2015	2795	"	"	118	
	"	1950	"	6×800 Ex	"	33	
	2964	"	"	"	"	69	357.70
10	3591	1953	2709	"	"	190	
	2873	"	"	6×800 Ex	"	70	370.43
17	3591	"	"	"	"	217	
	2873	"	"	10×800 Ex	"	40	349.43
24	3591	"	"	"	"	169	
	2873	"	"	10×800 Ex	"	80	335.74
	3591	"	"	"	"	177	
	2873	"	"	12×800 Ex	"	71	340.04
Apr 7	3591	"	"	"	"	193	
	2873	"	"	10×800 Ex	"	54	332.04

May 10th 1894 Miners refuse to return to work at Rush & Grant

No

Date
1894 Feby 3
"
10
"
17
24
Mar 3
10
17
24
31
Apr 7
Sept 15
22

No 2 CHANGES IN BURDEN. Ashland

Date	Ore	Stone	Cinder	Coal Date	Coke Ore	Charges Stone	Iron
1894 Feby 3	3150	2080	3150	5600	1200	184	
"	2520	"	"	4x800 Ex	"	57	392.12
10	3150	"	"	6400	800	131	
"	2520	"	"	6x800 Extra 5600	1200	88	344.70
17	3705	"	2795	10"x800 Extra	"	164	
	2964	"	"	"	"	56	360.72
24	3705	"	"	"	"	16	
	2964	1950	"	"	"	73	
	3705	"	"	"	"	143	356.13
Mar 3	3705	2015	"	"	"	136	
	2964	1950	"	10x800 Extra "	"	81	
	3705	"	"	"	"	30	328.48
10	3591	1953	2709	"	"	160	
	2873	"	"	6x800 Ex "	"	52	305.95
17	3591	"	2705	"	"	193	
	2873	"	"	10x800 Ex "	"	35	305.65
24	3591	"	2709	"	"	154	
	2873	"	"	10x800 Ex "	"	66	294.39
31	3591	"	"	"	"	156	
	2873	"	"	12" Extra "	"	70	305.95
Apl 7	3591	"	"	"	"	173	
	2873	"	"	10x800 Extra "	"	54	308.39
Sept 15	3000	2400	3000	3200	2400	164	
	2400	"	"	"	"	"	350.34
22	3000	"	"	"	"	31	
	2900	"	2900	4000	2000	115	"
	2400	"	"	4800	1600	55	
	3000	"	"	"	"	33	317.90

No 1 CHANGES IN BURDEN. Ashland

1894	Ore	Stone	Cinder	Coal	Coke	Steel
July 28	3021	2120	2279	400	3800	20
	3192	2240	2408	"	"	37
	3306	2320	2494	800	3600	131
	3420	2400	2580	"	"	76
Aug 4	3306	2320	2494	"	"	59
	2976	"	"	"	"	78
	"	"	"	1600	3200	142
11	2645	"	"	"	"	178
	3306	"	"	800	3600	59
	"	"	"	1600	3200	40
18	3192	2240	2408	800	3600	26
	"	"	"	1600	"	134
	2554	"	"	2400	3200	77
25	3192	"	"	2400	"	94
	2554	"	"	"	"	22
	"	"	"	3200	2800	41
	"	"	"	4800	2000	93
Sept 1	3192	"	"	6401	1200	109
	3306	2320	2494	4000	2400	58
	2736	2400	2580	"	"	140
15	3420	"	"	3200	"	189
	3000	"	3000	"	2800	51
22	3000	"	"	"	"	26
	2900	"	2900	4000	2400	95
	2400	"	"	4800	2000	72
	3000	"	"	"	"	33
29	"	"	3000	"	"	34
	"	"	"	5600	1200	123
	2400	"	"	"	"	62

No

1894
Oct 6
Scrap
13
Scrap
Oct 20
Nov 3
10
17
24
Dec

No 2 CHANGES IN BURDEN. Ashland

1894	Ore	Stone	Cinder	Coal	Coke	Charges	
Oct 6	3000	2400	3000	5600	1200	54	Iron
	3100	"	3100	"	"	64	Made
Scrap	2520	"	3150	"	"	71	
	3150	"	"	"	"	35	313.56
13	"	"	"	"	"	158	
Scrap	2520	"	"	"	"	76	341.91
Oct 20	3150	"	"	"	"	17	
	3250	2340	3250	"	"	75	
	"	2210	"	"	"	38	
	2600	2240	"	"	"	20	
	2640	"	3300	"	"	18	
	"	276	"	"	"	17	
	2560	"	3200	"	"	13	
	3200	"	"	"	"	42	363.60
27	"	"	"	"	"	56	
	3250	2210	3250	"	"	73	
	2600	"	"	"	"	75	
	3200	2176	3200	"	"	36	356.87
Nov 3	"	"	"	"	"	188	
	2560	"	"	"	"	57	364.00
10	3200	"	"	"	"	189	
	2560	"	"	"	"	55	356.95
17	3200	"	"	"	"	97	
	3250	2216	3250	"	"	114	
	2600	"	"	"	"	36	360.21
24	3200	2176	3200	"	"	20	
	3250	"	3250	"	"	163	
	2600	2210	"	"	"	53	348.43
Dec	3250	2145	"	"	"	148	
	2600	"	"	"	"	71	344.09
	3150	2080	3150	"	"	17	

Pocahontas Coke

No 1 CHANGES IN BURDEN. Ashland

Date 94	Ore	Stone	Cinder	Coal	Ore	Stone	Tons Iron	Date 94
Dec 8	3250	2210	3250	4800	1600	187		Dec 8
	2600	"	"	"	"	56	347.39	
15	3250	"	"	"	"	166		15
	2600	"	"	"	"	75	355.30	22
22	3250	"	"	"	"	151		
	2600	"	"	5600	1200	76	360.30	29
29	3250	"	"	"	"	178		
	2560	2176	3200	4800	1600	60	336.65	Jan 5
Jan 5	3200	"	"	"	"	174		
	2560	"	"	5600	1200	73	345.56	12 N.S.
12	3200	"	"	"	"	144		
	2560	"	"	"	"	90	330.52	19
19	3200	"	"	"	"	144		
	2560	"	"	"	"	93	328.52	26
26	3200	"	"	"	"	164		
	2560	"	"	"	"	71	321.74	Feb 9
Feb 9	3200	"	"	"	"	128		
	2560	"	"	"	"	76		
	3100	2108	3100	"	"	37	325.75	Mar 9
Mar 9	"	2170	"	4800	2400	53		
	3150	2205	3150	5600	1200	91		30
	2520	"	"	"	"	73	295.00	
April 13	3000	1920	3000	"	"	138		April 13
	2400	"	"	"	"	89	299.04	
May 4	3000	1960	"	"	"			May 4
	2900	1914	2900	4800 x 800	"			
	2320	"	"	"	"			18 Rose Run ore
18	3050	2013	3050	6400	800			
	3100	2046	3100	"	"			
25	3050	2013	3050	5600	1200			

land

CHANGES IN BURDEN. No 2

Date	Ore	Stone	Cinder	Coal	Ore	Slag	Tons Iron
Dec 8	3150	2080	3150	5600	1200	188	
	2520	"	"	"	"	56	342.00
15	3150	"	"	"	"	251	344.08
22	2520	2142	3780	"	"	161	
	1890	"	"	"	"	100	402.30
29	2520	"	"	"	"	200	
	1890	"	"	"	"	64	388.53
Jan 5	3250	"	"	4800	1600	179	
	1890	"	"	5600	1200	76	386.74
12	2440	2074	3660	6400	800	137	
H.S.	1830	2135	"	"	"	87	322.09
19	2440	2074	"	"	"	138	
	1830	"	"	"	"	89	316.52
26	2440	"	"	"	"	167	
	1830	"	"	"	"	76	334.17
Feb 9	2560	2176	3840	"	"	130	
	1920	"	"	"	"	73	
	2480	2108	3720	"	"	36	342.56
Mar 9	3200	2240	3200	"	"	165	
	2560	"	"	"	"	70	312.09
30	2520	2205	3780	"	"	231	
	1890	2142	"	"	"	87	303.21
April 13	2520	2205	"	"	"	85	
	2480	2170	3720	16x8 00 "	"	53	
	1860	"	"	"	"	92	325.43
May 4	3100	2108	3100	"	"	106	
	3150	2142	3150	36x800 "	"	123	295.30
18	3150	1575	"	"	"	}	Rose Run Ore and Mill Cinder
Rose Run Ore	3200	1560	3200	"	"		
25	3150	1542	3150	"	"		

CHANGES IN BURDEN.

Low Moor Blast 5 "A" Fur.

Date	Ore	Stone	Coke
1894	6 cords wood		
	30 tons Coke		
5 Charge	400	160	3600
5 "	500	240	"
5 "	1000	400	"
5 "	2000	800	"
25 "	3000	1200	4200
12 "	3600	1440	"
22 "	4200	1680	"
29 "	5100	2020	"
70 "	7000	2800	"
Sep 23	6300	2700	"
25	6550	2800	"
27	6674	"	"
30	"	2700	"
Oct 1	6500	2900	"
4	6750	3000	"
7	6850	3100	"
8	6987	3200	"
10	6712	"	"
14	6740	3100	4418
17	6575	3000	4200
21	"	3100	4418
23	6437	3200	"
26	6425	"	"
28	6800	2800	"
29	"	"	4200
30	"	3000	"
Nov 1	"	3300	"
3	"	2800	"

Date	Ore	Stone	Coke
Nov 4	6300	2800	4200
5	6550	2900	"
7	6749	"	"
8	6987	3000	"
9	7125	3100	"
10	"	"	4000
12	"	3200	"
15	"	3100	"
16	"	"	4200
17	6850	3000	"
24	"	"	"
25	6712	2900	"
27	"	2800	"
29	6674	"	"
30	"	"	4800
Dec 1	6550	"	4200
3	6674	"	"
9	"	"	"
10	6750	2840	"
12	6924	2900	"
14	7050	2940	"
16	"	"	4000
17	"	"	3900
22	"	"	"
29	"	"	"
95 Jan 2	"	3000	3733
6	"	"	3720
13	6940	"	3840
14	7050	"	"
20	"	"	3900

5

Date
95 Feb 2
12
15
22
28
Mar 4
7
16
Mar 12
14
May 10
June 4
15
26
July 7
11
17
21
Aug 1
4
Sept 1
12
15
Fee St

5A

CHANGES IN BURDEN.

3B

Date	Ore	Stone	Coke
95 Feb 2	7125	3000	3900
12	7050	"	"
15	7125	2900	"
22	7050	"	"
28	7125	3000	"
Mch 4	"	"	3866
7	"	"	3900
16	7050	"	"
Mch 12	"	"	3867
14	"	3060	3866
May 10	"	"	3900
June 4	"	2800	"
15	"	2900	"
26	"	"	3945
July 7	"	"	3935
11	"	"	4000
17	"	"	3945
21	"	2940	"
Aug 1	"	"	3900
4	7125	"	"
Sept 1	7200	"	"
12	"	2800	3945
15	"	2860	"

Fee Stopped Sept 21st 95

Date	Ore	Stone	Coke
95 Sept 28	4800	1920	4200
29	5400	2160	"
30	6000	2400	"
Oct 1	6600	2660	"
2	6950	3000	"
3	7200	3040	4000
5	"	3100	"
12	"	3000	4200
14	7125	2900	"
16	7050	"	"
24	7125	"	4000
31	"	"	3900
Nov 11	"	"	4000
28	"	2800	4200
7	"	3000	"
Dec 14	"	3100	4000
22	"	3280	3840
26	"	"	3600
96 Jan 4	7200	3200	3840
20	"	"	3600
Feb 15	8520	3600	4200
17	"	"	4400
29	8660	"	"
Mch 2	"	3500	"
15	"	3600	4800
28	8520	3700	"
30	7050	3200	4000
Apl 12	7125	"	"
18	8400	3600	4800
97 Oct	9000	4000	4850

No 3 - CHANGES IN BURDEN. Ashland

Norton Furnace -

Date	Ore	Stone	Cinder	Coal	Coke	Charge	Iron Made
95 May 11	3050	1952	3050	5600	1200	154	
	3000	1920	3000	6400	800	62	298.67
18	"	"	"	"	"	200	
	3075	1968	3075	"	"	35	332.23
25	"	"	"	"	"	19	
	3100	1984	3100	"	"	189	
	3150	2016	3150	"	"	36	357.39
June 1	3100	1984	3100	"	"	176	
	3150	2016	3150	5600	1200	61	351.56
8	"	"	"	"	"	201	
	3100	1984	3100	"	"	41	353.97
15	"	"	"	"	"	37	
	3150	2016	3150	6400	800	207	355.06
22	3000	1984	3000	"	"	155	
	3100	2046	3100	"	"	87	364.58
29	3000	2046	3000	7200	400	194	
	3050	2013	3050	6400	800	33	321.32
July 6	"	2016	"	7200	400	208	
	"	1952	"	"	"	39	354.17
13	3100	2016	3100	"	"	195	
	3050	1952	3050	"	"	35	325.54
Aug 3	2360	2184	3540	6400	800		
	1770	"	"	6x800 5x	"		327.06
10	2360	1947	"	"	"		328.30
24	"	1888	"	"	"		332.82
Sept 7	3100	1810	3100	"	"		357.60
	"	1860	"			106	
14	3150	1890	3150	"	"	170	406.28
Burned	Down Oct 21						
21	5192	3006	708	5600	1200		
	"	2124	460	6400	800		313.78
28	5190	2200	708	"	"		325.28

Ash

Date	
95 Jan 5	
22	
29	
July 6	
20	
27	
Aug 3	
Oct 12	
Nov 16	
30	
Dec 14	
28	
96 Jan 11	
18	
25	
Feb 1	

Ashland CHANGES IN BURDEN. No 2

Date	Ore	Stone	Cinder	Coal	Coke	Charge	
95 Jan 5	2480	2232	3720	7200	800	137	High Silicon
	1860	"	"	"	"	82	
	used 3/4 Jackson & 1/4 burned Olympia Ore						279.34
22	2480	2232	3720	7200	800	126	
	1860	"	"	"	"	85	273.87
29	2480	"	"	8800	0	124	
	1860	"	"	7200	800	79	254.30
July 6	2480	"	"	8800	0	139	
	1860	"	"	"	0	62	246.00
20	"	"	4340	"	0	88	
	1240	"	"	7200	800	118	268.30
27	1860	"	"	"	"	29	
	1240	2108	4960	"	"	45	
	620	"	"	"	"	19	
	620	2046	"	"	"	112	287.26
Aug 3	1240	"	"	"	"	63	
	3100	1984	3100	6400	"	73	
	2480	"	"	"	"	94	303.56
Oct 12	3050	1890	3050	"	"	252	361.65
Nov 16	"	1920	"	"	"	243	358.74
30	3100	"	3100	5600	1200	236	358.91
Dec 14	3200	"	3200	6400	800	232	332.25
28	3100	"	3100	"	"	251	352.40
96 Jan 11	3150	"	3150	"	"	247	356.56
18	2360	1960	3540	"	"	229	High Sil.
	"	"	"	"	1200	86	341.04
25	2320	1920	3480	"	800	148	
	1740	"	"	"	1200	93	305.35
Feb 1	2320	"	"	"	"	153	
	1740	"	"	"	"	92	315.95

No 1 CHANGES IN BURDEN. Ashland Furnace July 7th 95

Date	Ore	Stone	Coal	Coke	Ore	Stone	Iron
July 13	7200	1190	800	4400			414.74
	7400	1224	"	"			"
	7590	1292	"	"			"
20	8500	1500	"	"			601.26
27	8800	2043	2400	3600			
	8600	"	"	"			531.45
Aug 3	8500	2550	"	"			
	8400	2520	"	"			
	"	2604	"	"			475.24
10	8200	2296	"	9x400 5# "			447.
17	8000	2080	"	5x400 5# "			443.52
Sept 14	8000	2084	800	4400			
	7400	1924	"	"			549.08
21	7600	1998	"	"			574
28	"	2052	"	8x400 2# "	Crowther leaves		596.65
Oct 5	"	"	"	"	Lyons begins		566.35
12	"	"	"	"			553.70
19	"	"	"	"			529.91
26	7700	2079	"	"			560.78
Nov 16	7400	1998	"	"			
	7800	2100	"	"			
	8000	"	"	"			542.74
23	8200	2145	"	"			
	8400	2184	"	4800			556.52
30	8000	2100	"	"			
	8200	2214	"	"			
	8400	"	"	"			564.95
Dec 7	8700	2262	"	"			
	8500	2220	"	4400 5#			594.74

No

Date
95 Oct 12
Nov 2
16
23
30
Dec 14
96 Jan 6
11
18
25
Feb 15
22
April 4
July 11
Sept 12
19
26
Oct 3
Nov 7

CHANGES IN BURDEN.

No 3 (bottom) Ashland

Date	Ore	Stone	Cinder	Coal	Coke	Chips	
95 Oct 12	2280	1860	3420	6400	800	214	8% Sil
	2360	"	3540	"	"	44	331,78
Nov 2	3150	1920	3150	"	"	241	Silvery 345.17
16	3200	2048	3200	"	"	235	325.58
23	2400	1920	3600	6800	"	~~3~~	8% Sil 333.73
30	"	"	"	6400	"		340.15
Dec 14	3100	2000	3100	4800	1600	295	7 days Soft Sil
	3200	"	3200	5600	"	9	~~344~~ 349.43
96 Jan 6	2360	1900	3540	5600	1200	253	8% Sil
	"	"	"	6400	"	22	369.71
11	2360	"	"	5600	"	238	
	1770	"	"	6400	"	33	329.69
18	2360	"	"	5600	"	273	
	"	"	"	6400	"	4	358.06
25	3150	2000	3150	5600	"	263	Silvery 368.39
Feb 15	"	1980	"	"	"	209	
	"	"	"	"	1600	39	349.15
22	"	"	"	4800	"	117	
	"	"	"	5600	1200	160	409.30
April 4	"	2016	"	4800	1600	221	
	"	2000	"	5600	"	36	363.00
July 11	2280	2040	3420	"	"	239	
	2360	2080	3540	6400	1600	18	354.76
Sept 12	2280	1960	3420	"	1200	142	
	"	"	"	"	1600	83	298.06
19	2360	2000	3540	4800	"	246	331.28
26	5400	2280	600	6400	1600	132	Ferro.
	"	"	"	4800	2400	86	272.10
Oct 3	6000	2280		"	"	242	285.58
Nov 7	2240	2380	3660	6400	1200	240	315.08

CHANGES IN BURDEN. No 1 Ash

Date	Ore	Brucite	Stone	Coal	Coke	Stone	Iron	
May 8	2120	3180	2140	5600	1200	262	32 7.7	
29	3000	3000	2240	"	"	225	33 2.22	
July 10	2120	3180	2140	"	"	262	30 9.17	
17	"	"	"	"	"	265	31 2.35	
24	2160	3240	"	"	"	226		
	3000	3000	2220	6400	"	20	28 7.17	
Oct 8	"	"	2000	8000				
Nov 27	3600	2400	2100	6400	1200		29 2.78	
1900 July 28	2000	3000	2200	4400	2400	235	26 5.65	
Aug 4								
1900			No 2 Ash					
Sept 22	2080	3120	2160	3200	2400	250 (3200 76)	27 0.6	H.S.
1900			No 1 Ash					
Dec 29	2600	2600	1800	4000	2000	217	} No 1	
	2800	2800	2100	4800	2000	55		
	2240	3360	2300	4000 4800	2000 1600	66 210	} No 3	H.S.

Date
97 Dec 25
98 Jan 1
8
15
22
29
Feb 5
12
19
26
Mar 5
12
19
26
Apl 2
9
16
23
30
M 7
14
28
J 4
11
25
J 2
9
16
30
Aug 6

No 1 CHANGES IN BURDEN. Ashland

Date	Ore	Stone	Coke	Stone	Coal	Ore	Stone	Rate	Iron made
97 Dec 5	76	1,15	72	228		48	1,40	33	5,78
98 Jan 1	79	118	74	234		50	1,44	32	4,78
8	80	120	72	239		51	1,36	31	9,22
15	79	119	75	237		50	1,40	32	0,00
22	79	118	74	237		50	1,40	31	8,
29	95	95	64	203		45	1,29	34	4,09
Feb 5	98	98	64	206		51	1,34	32	3,48
12	73	109	65	175		56	1,37	34	2,52
19	75	112	70	223		49	1,47	31	9,52
26	78	118	74	248		50	1,60	30	0,26
Mar 5	78	118	61	229		48	1,54	31	4,82
12	74	111	58	226		47	1,53	30	7,56
19	71	106	70	223		47	1,43	31	6,52
26	76	115	71	231		49	1,37	32	5,95
Apl 2	75	113	64	220		47	1,37	34	4,21
9	73	109	57	213		45	1,46	31	7,72
16	73	110	64	227		47	1,57	31	0,56
23	74	111	67	224		48	1,44	32	9,48
30	78	116	72	237		50	1,50	31	5,56
M 7	75	112	71	238		48	1,44	31	0,17
14	79	118	75	258		51	1,65	28	5,82
28	74	111	61	194		62	1,57	31	5,13
J 4	78	118	60	174		87	1,54	30	7,70
11	75	113	62	225		58	1,57	29	3,21
25	78	118	66	218		70	1,68	29	2,04
J 2	79	118	66	216		70	1,72	27	5,17 H.S.
9	78	117	65	210		70	1,60	28	6
16	81	121	68	218		72	1,60	30	0
30	103	103	50	218		66	1,53	31	5
Aug 6	109	109	53	231		70	1,60	29	3,8

No 2 CHANGES IN BURDEN. Ashland

Date	Ore	Coke	Stone	Date	Ore	Coke	Stone	Iron	
Jan 15	1,03	1,03	.65	1,68	.65	1,48	32 8,6		
22	.92	.92	.58	1,57	.52	1,25	386,8		
29	.90	.90	.60	1,54	.54	1.20	369,65		
Feb 5	.91	91	.59	1,56	.53	1,13	384,26		
12	89	90	57	1.50	.51	1,18	397.04		
19	89	89	58	1.51	.50	1,21	387.70		
26	90	90	55	1,59	.52	1,36	353.09		
Mar 5	93	93	47	1,63	.54	1.32	367.82		
12	93	93	48	1.68	.55	1.39	339,53		
19	88	88	45	1,64	.53	1,34	338,13		
26	88	88	45	163	54	133	335.		
apl 2	87	87	41	156	52	125	377,		
9	88	88	37	160	52	137	339,		
16	94	95	42	163	53	136	357,17		
23	98	98	45	172	56	138	342		
30	98	98	50	171	56	135	352		
May 7	100	101	53	176	58	129	350		
14	98	99	52	172	57	136	346		
28	102	102	47	178	59	149	332		
June 4	101	101	43	175	58	146	325		
11	99	99	42	183	57	144	318		
25	78	117	61	165	73	148	330		
July 2	80	120	63	176	75	165	305		
9	79	118	62	174	74	158	288		
16	74	111	70	164	80	179	269		
30	100	100	44	160	80	153	316		
Aug 6	175	33	72	179	89	178	277	Horse	
13	211		83	189	94	185	273	"	
20	210		83	188	94	178	282	"	
27	215		85	193	96	190	265	"	

No 3 CHANGES IN BURDEN. Standard

Date	Ore	Limestone	Stone	Coal	Coke	Slate	Iron	
Jan 1	2,06		81	185	92	170	239,	Ferro
8	211		83	189	94	172	274,	"
15	180	36	85	194	97	175	265	"
22	96	107	70	196	65	138	335	
29	92	92	61	167	55	124	342,65	
Feb 5	95	95	61	163	54	110	384.5	
12	97	97	62	164	53	117	380.6	
19	96	96	61	163	54	131	365,5	
26	1,33	66	67	174	67	143	329,26	
Mar 5	1.98		78	177	188	1,49	312,78	Ferro
12	2.05		80	183	91	159	294,26	"
19	1,69	47	87	209	94	176	264,21	"
26	106	114	64	213	71	1.45	264,00	
Apl 2	1.04	1.04	51	188	62	1,32	330.00	
9	1,02	1.02	46	175	58	1,19	360,26	
16	103	103	51	177	58	136	334,76	
23	189	19	87	187	90	174	265,82	Ferro
30	206	13	102	199	98	178	270,67	"
M 7	80	120	79	221	71	151	313,43	
14	98	106	76	189	66	146	332,32	
28	77	116	78	213	66	150	328.04	
Jn 4	76	114	75	213	65	151	311,80	
11	88	113	64	184	62	138	340,32	
25	83	123	80	193	93	151	305,52	Ferro
July 2	186	24	86	203	101	182	255,95	
9	79	118	78	213	79	153	297,15	
16	100	97	57	195	67	142	319,13	
30	92	119	85	225	101	202	240,15	HS
Aug 6	81	121	80	218	82	161	276,91	"
13	112	112	48	215	71	150	285,67	

B Fce

CHANGES IN ~~BURDEN.~~

B Fce

Loco Moor

Date	Tons Ore per ton iron	Tons Stone per ton iron	Tons Coke per ton iron	Labor per ton	Yard per Ore	Stone	Iron made
1893							Blast # 2
July	2.18	.92	1.33	1.39	.45⁸		3761
Aug	2.13	.86	1.23	1.28	.46²³		4110 6th
Sept	2.22	.81	1.23	1.15½	.44⁵⁹		4188
Oct	2.26	.90	1.21	1.20⅝	.44¹²		4281 19th
Nov	2.32	.90	1.20	1.14⅘	.43⅛		4342 9th
Dec	2.23	.87	1.17	1.13⁸	.44⁷⁸		4520 13th
94 Jany	2.21	.86⁷	1.17	1.11½	.45¹⁸		4502 4th
Feby	2.19	.86	1.16	1.02⁸	.45⁶		4329 4th
Mar	2.26	.89⁴	1.20	1.09¹	.45³		4464 6th
April	2.23	.87	1.23	1.13	.446		4143 9th
May	2.27	.86	1.21	1.21⁸	.45⁹		3971 12th
June	2.09	.79	1.23	1.22⁴	.47⁷		3958 4th
July	2.12	.83	1.25	1.17²	.47		4125 14th
Aug	2.11	.76	1.19	1.38	.48⁵		2001 21st
1895							Blast #3.
Oct	2.21	.91	1.27	1.28	.45¹		3936 11th
Nov	2.21	.89	1.24	1.28	.45¹		3853 18th
Dec	2.29	1.07	1.28	1.29	.43⁵		3906 13th
96 Jan	2.25	.98	1.13	1.20	.44³		4176 14th
Feby	2.22	.94	1.11	1.14	.44⁹		3983 2nd
Mar	2.22	.92	1.19	1.09	.44⁸		4401 11th
April	2.22	.98	1.28	1.07	.449		4474 18th
May	2.18	.91	1.22	.93	.457		5151 2nd
June	2.18	.93	1.23	.99	.458		4673 19th
July	2.03	.88	1.17	1.07	.48		2067 5th
Sept	2.49	1.08	1.46	1.33	.40		1691 2nd
Oct	2.32	1.04	1.26	.93	.434		4755
Nov	2.29	1.04	1.23	.87¹	.435		4776

A

Date
1894
Sept
Oct
Nov
Dec
95 Jan
Feb
Mar
April
May
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July
Aug
Sept
95 May
June
July
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Oct
Nov
Dec
96 Apr
Mar
June
July
Aug
Sept

A Fe Low Moor CHANGES IN BURDEN. A. J. Co

Date	Ore	Stone	Coke	Ladle	Yield Ore	Stone	Iron Made
1894	Tons per ton of iron				%		in tons 2300 lbs
Sept	2.27	.93	1.51	1.59	.438		1647 8/23
Oct	2.28	1.05	1.47	1.56	.436		3053 7/23
Nov	2.16	.95	1.33	1.33	.461		3409 18
Dec	2.18	.91	1.27	1.27	.458		3752 12
95 Jan	2.23	.95	1.21	1.17	.448		4043 8
Feb	2.36	.98	1.29	1.24	.434		3465 18
May	2.24	.948	1.23	1.186	.446		3936 7
April	2.19	.95	1.21	1.21½	.454		3953 16
May	2.15	.938	1.18	1.19	.464		4124 12
June	2.19	.89	1.21	1.22	.456		3888 3
July	2.14	.88	1.20	1.21	.467		4082 12
Aug	2.17	.89	1.19	1.24	.46		4065 1
Sept	2.15	.87	1.17	1.35	.464		2661 18
			Covington Furnace Black No 1				
95 May	2.07	.838	1.43	1.40	.482		3159 1
June	2.22	.807	1.45	1.59	.449		2786 9
July	2.23	.94	1.54	1.49	.447		3170 13
Aug	2.23	.818	1.51	1.46	.447		3166 12
Sept	2.19	.78	1.47	1.39	.454		3202 5
Oct	2.16	.78	1.40	1.30	.462		3536 6
Nov	2.14	.78	1.36	1.49	.467		3225 13
Dec	2.21	.80	1.41	1.62	.451		3190 6
96 April	2.34	.97	1.52	1.42	.426		1542 12
May	2.22	1.02	1.35	1.14	.450		3764 5
June	2.21	1.06	1.37	1.27	.451		3517 6
July	2.14	1.07	1.34	1.17	.465		3535
Aug	2.19	1.08	1.37	1.19	.455		3396 4
Sept	2.13	1.06	1.36	1.05	.467		3638 5

Low Moor ORE MIXTURES. Furnace B

Name of Ore	Date 12/3/92	12/10/92	12/17/92	12/24/92	12/31/92	1/7/93	1/28/93	2/4/93
A I M M Co	1815	605	595	595	600	587		
L M Mach	3025	3025	2975	3570	3600	2350	4760	4800
Big Hill	605	605						
A I M Co	605							
Stock	1050	1050	1050			525		
R. P. I. Co		1815	1785	2380	2400	3525		
Hematite			595					
Dolly Ann				595	600		2380	2400

Name of Ore	Date 2/11/93	2/18/93	3/11/93	3/18/93	3/25/93	4/8/93	4/15/93	4/29/93
A I M M Co	587	587	587	587	593	588	588	
Stock Mine	525	525	525	525	525	1050	525	525
Low M. Mach	3525	4700	3525	2937	2962	2937	4112	4112
R P I Co	1175		1175	1762	1777	1762	587	587
Dolly Ann	1175	1175	1175	1175	1185	587	1175	1175
						~~Rich Patch~~ Craig's Creek		588

ORE MIXTURES. Low Moor Furnace B

Name of Ore	Date 13th May					6/17/93	6/24/93	7/1/93

Craig's Creek 588

ORE MIXTURES. Low Moor Furnace B

Name of Ore	Date 5/6/93	13th May 5/13/93	5/20/93	5/27/93	6/3/93	6/10/93	6/17/93	6/24/93	7/1/93
Stock	525	525	585	1050	1050	1050	1050	1575	1050
Rich Patch	882	1175	1175				1125	1140	
L. M. Wash	4112	3525	3525	4600	4600	4660	3375	3420	4112
Dolly Ann	1175	1175	1175	575		582	563	570	
Craigs Creek	293	588	587		575	583	562		
Iron Mt		Iron Mt		575	575				587
							Keyford		1175

	7/2/93	7/9/93	7/16/93	7/23/93	8/12/93	8/19/93	8/26/93	9/2/93	9/9/93
Stock	1050	2100	2100	1050	1050	525	"	1050	1050
Low Moor	2200	3375	3375	3525	3540	3555	"	3555	3600
Craigs Creek	2200			1175		1185	"		
Dolly Ann	1100	1125	1125	1125	1180	1185	"	1185	1800
			Tea ford		1180		"	593	600
Iron Mtn						592	"	592	

Low Mow — ORE MIXTURES. — Furnace B —

Name of Ore	Date 1893 Sept 16	9/23	9/30	10/7	10/14	10/21	10/28	11/4	11/11
Stack	1050	=	=	=	1050	1050	=	1050	=
Low Mow	3600	=	=	=	2400	3000	=	2400	=
Dolly Ann	1800	=	=	=	1800	1800	=	1800	=
Seaford	600	=	=	=	600	600	=	600	=
Rich Patch					1200	600	=	1200	=

	1894 July 1	July 3	July 8	July 11	July 16	July 17	July 18	July 21	July 22
Stack	1050	=	2100	1575	1575	1575	1050	1050	1050
Low Mow	2350	2400	2400	2400	2350	2400	3000	3600	3600
Iron Mt	1175	2400	2400	3000	2937	3000	3000	2400	2400
Dolly Ann	1175								
Rich Patch	1175	1200							
Coke	4200	=	4200	4000	4000	=	=	4200	4200
Lime	2800	=	2800	3000	3000	2800	=	=	2600
	№ 1 205	№ 2 655	№ 1 66		№ 1 99		tons	921	№ 1 70
			" 2 742		№ 2 724		"		№ 2 688
	№ 3 97		" 3 83		№ 3 104		"		№ 3 148

ORE MIXTURES.

Name of Ore	Date 1894								
									July 26

	205	655	" 2	742	№ 2	722	" 3	921	№ 2 688
	№ 3 97		" 3	83	№ 3	104			123 148

ORE MIXTURES.

Name of Ore	Date 1894 May 20	May 27	June 3	June 6	June 10	June 24	June 27	June 29	July 26
Stack	1050	=	1050	=	=	1050	1050	1050	1050
Lowthorn	3600	2400	2400	3600	=	4200	3600	3525	3540
Iron Mt	2400	3600	3600	2400	=	1200	1200	1175	2360
					Rich Patch	600			
					Dolley Ann		1200	1175	

	1894 July 29	July 30	Aug 1	Aug 5	Aug 12				
Stack	1050	=	525	525	=				
Lowthorn	2360	2400	2400	2400	=				
Iron Mt	2360	2400	2400	2400	=				
Dolley Ann	1180	1200	1200	1200	=				
Rich Patch			600	600	=				
Coke	4200	=	4000	4000	3900				
	2650	=	=	2560	=				
Iron № 1		262		279	180				
№ 2		608		677	162				
№ 3		91		34	110				

Furnace 13 Stopped night of Aug 15th

1894 Low Moor ORE MIXTURES. Furnace A.

Date 6 cords wood - 30 tons Coke then as follow

Name of Ore	5 Chgs	5 Chgs	5 Chgs	5 Chgs	7 Chgs	12 Chgs	22 Chgs	29 Chgs	70 Chgs 15 Sept 94
Low Moor	200	250	500	1000	1000	1200	1400	1700	2300
Stack	200	250	500	1000	1000	1200	1400	1700	1050
Iron Mt									1150
Dolly Ann					1000	1200	1400	1700	2500
Coke	3600	=	=	=	4200	=	=	=	=
Limest	160	240	400	800	1200	1440	1680	2020	2800

	Sept 23	= 25	= 27	= 30	Oct 1	Oct 4	Oct 7	Oct 8	
Stack	1050	=	=	=	2100		525	=	=
Low Moor	3150	3300	3375	=	3300	3375	3450	3525	3375
Dolly Ann	1575	1650	1687	=	1100	2250	1725	1762	1687
Rich Patch	525	550	562	=		1125	1150	1175	1125
Coke	4200	=	=	4200	=	=	4200	=	=
Lime	2700	2800	=	2700	2900	3000	3200	3200	=
Iron	№2/357	№3/322/Sil 62		№1-26-№2-373-№3-727 Sil 97			№1-86-№2-272-№3 383		

ORE MIXTURES.

Date

Name of Ore ... Nov 5 Nov 6

Iron | №2/357 | №3/322/Sil 62 | №1-26-№2-373-№3-727 Sil 97 | №1-86-№2-272 №3 383

ORE MIXTURES.

Name of Ore	Oct 14	Oct 17	Oct 21	Oct 23	Oct 26	Oct 28	Oct 30	Nov 5	Nov 6
Stock	525	=	=	=	1050	=	=	1050	=
Low Mor	3390	3300	=	3225	=	3150	=	3300	=
Dolly Ann	1695	1650	=	1612	1075	1050	=	1100	550
Rich Patch	1130	1100	=	1075	=	1050	=	1100	=
Iron Mt									550
Coke	4418	4200	4418	-	=	4418	4200	=	=
Lime	3100 (№1-97 №2-280)	3000 №3-311	3100 (№1-27	3200 №2-206	=	2800	3000	2900	=

	Nov 7	Nov 8	Nov 9	= 17	= 24	= 26	= 29	= 30	Dec 1
Stock	525	=	=	=	=	=	1050	=	=
L M	3375	3525	3600	3450	=	3375	=	=	3300
D. A	562	587	600	575	=	562	=	=	550
R. P.	1125	1175	1200						
I Mtn	1162	1175	1200	2300	=	2250	1687	=	1650
Coke	4200	=	=	=	=	=	=	4800	4200
Limeston	2900	3000	3100	3000	=	2900	2800	-	=

Ice A ORE MIXTURES. Law Moor

Name of Ore	Date 94 Dec 2	= 3	= 10	= 12	= 14	= 16	= 17	= 22	= 29	30
Stock	1050	=	=	=	=	=	=	=	=	=
Law Moor	3300	3375	3420	3525	3600	=	=	=	=	=
Iron Mt	1650	1687	1710	1762	1800	=	=	=	=	=
Daley Ann	550	562	570	587	600	=	=	=	=	=
Coke	4200	=	=	=	=	4000	3900	=	=	=
Limestone	2800	=	2840	2900	2940	=	=	=	=	3000
	95 Jan 2	= 4	= 6	= 9	= 11	= 13	= 13	= 14	= 20	= 22
Stock	1050	=	=	=	=	=	2100	1050	=	=
Law Moor	3600	=	=	5400	3600	5400	4800	2400	3600	=
Iron Mt	1800	2400	=	600	1400	600	0	3600	1200	=
Daley Ann	600									
								Rich Peter	1200	=
Coke	3900	3733	3720	=	=	=	3840	=	=	3900
Limestone	3000	=	=	=	=	=	=	=	=	=

ORE MIXTURES.

Name of Ore	Date 95									

ORE MIXTURES.

Name of Ore	Date 95 Jan 27	= 31	Feb 2	= 12	= 15	= 17	= 20	= 22	= 26	= 28
Stack	1050	=	525	1050	525	=	=	1050	=	525
Low Mon	3600	3000	3000	3600	=	2400	3600	2400	3600	3000
Iron Mt	1200	1200	0	0	0	0	0	0	0	0
Dolly Ann	0	600	2400	1200	1800	3600	2400	3000	2400	3600
Rich Patch	1200	=	=	1200	=	600	=	600	0	0
Coke	3900	=	=	=	=	=	=	=	=	=
Limestone	3000	=	=	=	2900	=	=	=	=	2800
	95 Mar 3	= 16	= 18	April 14	= 17	May 5	= 10	June [illegible]	= 2	= 4
Stack	525	1050	=	=	=	=	=	1050	=	=
Low Mon	3600	=	=	1200	2400	1200	=	2400	=	=
Iron Mt	0	0	0	0	0	0	=	0	0	0
Dolly A.	3000	1800	2400	4800	3600	3600	=	3600	2400	3600
Other		600				1200	=		1200	0
Coke	3900	=	=	3866	=	=	3900	3900	=	=
Limest	3000	=	=	3060	=	=	=	3060	2800	=

Law Moor ORE MIXTURES. Furnace B. Blast 3.

Name of Ore	Date 27th Sept 95	Burden	5 Charges	5 Chgs	5 Chgs	5 Chgs	5 Chgs	5 Chgs	5 Chgs	28th Sept
Phillips Mercy	8 cwts do	Law Moor	150	200	350	500	1000	1200	1333	1600
fired Furnace	wood	Dally Ann	150	200	350	500	1000	1200	1333	1600
at 8:40 A.M.	84000	Stack	150	200	350	500	1000	1200	1333	1600
Blast on	1 ½ Coke	Coke	3600	=	–	=	=	4200	4200	=
4:40 P.M.	with Limestone	Lime	180	240	420	600	1200	1440	1600	1920
	½ Flux	Sept	28th First Cinder 6 A.M.					First Iron 3 P.M.		
	Sept 29	= 30	Oct 1	Oct 2	= 3	= 16	= 24	= 29	Nov 1	30
Law Moor	2700	3000	3300	3525	3600	4650	3000	3600	=	3000
Dally Ann	1800	1000	1100	1125	1200	=	1200	2400	3000	3000
Stack	900	1000	1100	H			525	525	=	
Seaford		1000	1100	1175	1200	600	1200	600		600
Rich Patch				1175	1200	600	Mc 1200		McClinton	520
Coke	4200	=	=	=	4000	4200	4000	=	3900	4200
Lime	2160	2400	2660	3000	3100	2900	2900	=	=	2800

ORE MIXTURES.

Date 96						97	98		
					Dec 15	Oct 30	Aug 26	Oct 22	

ORE MIXTURES.

Name of Ore	Date 96 Jan 12	- 19	Feb 2	- 15	Mar 1	Dec 15	97 Oct 30	98 Aug 26	Oct 22
Low Moor	3600	2400	3195	=	3255	3050	3750	4725	3300
Valley Hem	2400	3600	3195	=	3255	3050	5250	4725	6600
Seaford	1200	1200	1065	=	1085	1525			
		Stock	1065	=	1065	1300			
Coke	3600	3600	4200	=	4400	4800	4850	4850	=
Lime	3000	3200	3800	3600	3600	4200	4000	4100	4200

Ashland Nº 2

ORE MIXTURES.

Date	ore	Cinder	Lime	coal	coke	Labor	Make		Date
98 Sept 3	213		84	191	95	1.90	267	Ferro	98 Sept 3
10	78	113	75	206	72	1.64	306	H.S.	" 10
17	100	100	48	188	62	1.41	337		" 17
24	99	99	48	192	61	1.37	366		" 24
Oct 1	99	99	60	202	63	1.50	318		Oct 1
15	211		83	189	95	1.78	261	Ferro	15
22	219		90	196	98	1.82	262	"	22
29	230		95	202	101	2.00	250	"	29
Nov 5	203	18	88	197	96	2.01	236	"	Nov 5
12	80	120	77	209	72	1.52	305	H.S.	" 12
19	102	102	57	180	60	1.51	328		" 19
26	103	103	54	178	59	1.41	348		26
Dec 3	89	106	62	183	61	1.31	342		Dec 3
10	228		94	193	97	193	252	Ferro	10
17	225		95	187	94	202	271	"	17
24	226		97	186	95	212	267	"	24
31	217		93	144	108	192	285	"	31
99 Jan 7	112	101	88	210	85	210	281	H.S.	99 Jan
14	79	119	80	206	79	198	272	"	14
28	63	124	80	233	75	2.08	259	"	2
Feb 4	81	121	69	201	65	1.60	320		Feb 4
11	77	116	65	193	68	1.39	370		11
18	82	124	68	194	71	1.75	316		1
25	80	120	63	186	62	1.58	332		May 2
Mar 4	206	10	85	177	86	1.70	313	Ferro	2
11	232		101	186	93	2.12	283	"	June
18	216		98	171	88	1.96	287	"	1
25	208		93	1.33	100	1.82	308	"	2
April 1	194	28	100	1.61	106	1.95	281	"	July
8	77	116	81	1.95	67	1.73	324	H.S.	

Name of Ore

Date

Ashland No. 3

ORE MIXTURES.

Date	Ore	Cinder	Lime	Coal	Coke	Labor	Make	
98 Sept 3	100	100	45	209	64	150	311	
" 10	98	106	52	219	70	168	289	
" 17	75	114	70	175	85	146	319	H.S.
" 24	71	107	66	173	80	145	320	"
Oct 1	77	116	72	215	69	157	311	"
15	76	115	82	206	68	135	334	"
22	78	117	84	210	69	140	319	"
29	76	114	82	206	68	133	346	"
Nov 5	76	115	82	231	49	136	336	"
" 12	75	113	80	211	58	137	320	"
" 19	78	118	84	205	67	138	328	"
26	78	117	81	224	70	153	306	"
Dec 3	81	122	84	227	73	141	323	"
10	83	125	86	232	75	151	315	"
17	81	121	84	215	71	129	341	"
24	104	117	75	210	68	134	332	
31	108	108	66	202	64	137	330	
99 Jan 7	111	111	68	199	66	122	363	
14	113	113	68	203	66	133	343	
28	109	109	67	213	65	141	326	
Feb 4	85	125	85	226	73	150	316	H.S.
11	87	131	89	210	81	133	328	"
18	89	134	91	214	86	152	292	"
May 20	103	103	63	127	90	147	322	
27	99	99	65	185	60	146	358	
June 3	100	100	65	182	59	138	388	
10	103	103	68	195	61	160	362	
24	100	100	68	195	60	163	372	
July 1	102	102	67	198	61	167	368	
8	101	101	67	182	68	172	353	

Ashland No 1

ORE MIXTURES.

1898 Date	Ore	Cinder	Lime	Coal	Coke	Labor	Make	
Oct 15	105	105	61	164	81	146	333	
22	101	100	68	161	80	141	321	
29	97	97	63	150	75	128	392	
Nov 5	99	99	63	179	60	132	359	
12	104	104	62	181	60	140	346	
19	99	99	56	169	56	130	381	
26	104	105	59	175	58	138	354	
Dec 3	103	103	58	174	58	126	376	
10	102	102	57	171	57	130	373	
17	104	105	58	175	62	146	358	
24	90	123	81	209	72	167	338	H.S.
31	102	107	69	191	64	145	344	
Jan 7	111	111	74	209	73	167	293	
14	105	106	66	185	62	153	346	
28	102	102	62	183	68	162	332	
Feb 4	109	109	67	195	71	161	320	
11	113	114	70	193	74	169	306	
18	111	111	68	197	72	180	304	
25	102	102	63	187	67	161	325	
Mar 4	86	122	63	197	64	163	311	
11	79	119	63	203	61	174	344	
18	81	122	68	208	67	168	336	
25	80	120	72	188	63	165	339	
April 1	79	118	71	183	76	153	359	
8	79	119	71	184	68	153	365	
15	79	119	71	184	61	150	375	
22	79	119	71	209	66	188	313	
29	80	120	69	206	62	195	299	
May 6	102	102	71	214	61	189	283	
13	87	116	75	157	89	175	324	

ORE MIXTURES.

1899 Date	
April 15	
22	
29	
May 20	
27	
June 3	
10	
24	
July 1	
8	
15	
22	
29	
Aug 5	
12	
19	
26	
Sept 2	
9	
16	
23	
30	
Oct 7	
14	
21	
28	
Nov 4	
18	
25	
Dec 2	

Ashland No 2

ORE MIXTURES.

1899	Ore	Cinder	Lime	Coal	Coke	Labor	Irwake	
April 15	78	117	80	221	64	1,81	311	H.S.
22	79	119	81	198	66	181	326	H.S.
29	79	118	81	211	65	189	308	"
May 20	80	120	82	202	67	178	299	"
27	74	112	77	185	62	153	378	"
June 3	241		96	150	100	175	288	Ferro
10	202		90	169	93	177	308	"
24	200		90	192	80	176	323	"
July 1	196		87	188	78	1.80	328	"
8	204		91	196	81	1.87	310	"
15	130	67	83	199	78	215	298	H.S.
22	77	116	80	215	67	204	295	"
29	77	116	79	232	67	188	314	"
Aug 5	79	119	81	218	68	197	322	"
12	77	116	79	218	66	191	304	"
19	80	120	82	211	69	181	335	"
26	75	114	78	203	65	186	328	"
Sept 2	75	112	77	207	64	177	333	"
9	80	121	83	223	69	193	280	"
16	84	125	86	228	73	193	284	"
23	76	114	78	115	114	171	320	"
30	78	117	80	107	117	165	329	"
Oct 7	77	115	78	111	115	160	369	"
14	81	121	83	172	95	183	326	"
21	95	118	82	171	96	204	289	"
28	161	40	82	161	93	181	323	" Ferro
Nov 4	206		91	184	92	198	297	" "
11	79	117	83	148	98	190	329	"
18	78	119	84	141	98	186	323	"
Dec 2	77	114	82	143	99	170	343	"
9	79	118	85	143	102	190	326	"

Date of Coke

Ashland No 1

ORE MIXTURES.

1899	Ore	Cinder	Lime	Coal	Coke	Labor	Make	
June 3	.79	1.18	.76	1.31	.98	1.58	318	
10	.73	110	78	1.61	.91	1.72	317	
24	.75	112	87	2.34	.67	1.82	314	H.S.
July 1	.77	116	84	2.13	.70	1.79	324	"
8	78	118	82	1.85	.93	1.85	314	"
15	76	114	81	1.40	1.02	1.80	357	"
22	81	121	86	195	94	2.13	282	"
29	104	107	77	220	71	1.88	314	"
Aug 5	104	104	76	229	69	203	312	
12	105	105	77	277	51	212	284	
19	98	110	80	296	43	212	285	
26	76	111	80	207	63	188	325	
Sept 2	80	113	81	226	65	187	316	
9	82	116	84	234	67	183	294	
16	78	112	81	223	66	180	305	
23	80	114	82	133	113	159	346	
30	81	116	83	133	116	166	328	
Oct 7	83	116	84	134	118	161	365	
14	81	116	84	186	91	173	343	
21	82	117	84	216	108	177	333	
28	81	117	84	235	67	182	320	
Nov 4	81	116	83	228	60	180	325	
18	81	117	84	214	69	186	334	
25	81	117	84	209	76	178	337	
Dec 2	83	119	86	194	86	167	349	
9	84	121	87	180	99	214	288	
16	83	120	86	172	103	182	339	
23	84	119	86	171	103	172	348	
30	82	119	85	170	102	185	322	
1900 Jan 6	79	113	82	163	98	176	342	
13	82	118	85	169	102	185	331	

Date

Number of Ores

Ashland No 2

ORE MIXTURES.

Date	Ore	Sinter	Lime	Coal	Coke	Labor	Make	
1899 Dec 23	77	1.17	.83	1.36	1.00	1.60	377	H.S.
30	81	1.21	.87	1.45	1.05	171	348	"
1900 Jan 6	194	08	.90	1.73	.89	185	327	Ferro
13	204		91	1.76	88	194	316	"
20	85	108	80	1.39	98	205	345	H.S.
27	78	117	81	135	100	204	342	"
Feb 3	77	116	81	141	100	224	311	"
10	77	116	81	135	100	203	336	"
17	79	119	83	138	103	205	354	"
24	206		94	174	87	265	257	Ferro
Mar 3	210		94	124	118	250	287	"
10	208		82	120	120	241	276	"
17	89	115	86	140	109	217	311	H.S.
24	77	116	80	133	100	197	345	"
31	74	111	77	128	96	188	356	"
Apl 7	75	112	78	129	96	204	320	"
14	76	113	80	181	98	208	317	"
28	74	111	77	137	96	206	322	"
May 5	72	102	75	125	93	198	300	"
12	74	111	77	134	95	210	304	"
19	107	91	79	156	93	228	276	H.S
26	118	78	80	141	91	215	297	Ferro
June 2	205		92	180	90	226	269	"
9	204		91	177	88	225	272	"
16	161	49	91	182	95	239	255	H.S.
23	81	121	81	169	84	198	310	"
30	78	118	87	181	84	211	289	"
July 7	85	113	86	171	81	177	331	"
14	77	116	88	182	83	218	303	"
21	86	129	84	193	91	244	242	"
28	81	121	74	168	84	203	298	"

Ashland No 1

ORE MIXTURES.

1900	Ore	Cinder	Lime	Coal	Coke	Labor	Make	
Jan 20	80	113	.82	1.64	.84	205	346	
27	77	115	76	177	86	202	346	
Feb 3	77	116	76	174	87	217	322	
10	78	117	77	176	88	213	321	
17	79	118	78	178	88	211	345	
24	80	120	79	180	90	214	316	
Mar 3	83	124	82	185	93	225	320	
10	83	124	82	186	93	206	323	
17	79	118	76	166	94	197	342	
24	81	122	80	145	109	202	337	
31	78	116	77	142	104	196	344	
April 7	77	116	76	140	104	203	322	
14	78	119	77	142	105	208	317	
28	78	118	78	151	105	211	314	
May 5	74	111	73	147	99	197	298	
12	75	113	74	156	101	210	305	
19	79	118	78	167	106	222	285	
26	76	116	72	158	102	207	308	
June 2	77	116	69	156	104	203	300	
9	78	118	70	195	96	200	307	
16	78	117	69	174	104	203	299	
23	80	120	79	161	107	207	297	H.S
30	79	119	82	170	107	201	303	"
July 7	77	116	84	166	104	194	301	"
14	74	111	81	167	100	218	303	"
28	80	120	88	194	106	223	265	"
Aug 4	80	121	87	194	108	206	294	
14	82	123	89	201	110	205	297	
20	114	99	91	195	110	216	279	
Sept 1	80	121	87	181	108	190	309	H.S.
8	83	125	90	195	111	206	292	"

Date

Name of Ore

ORE MIXTURES.

Ashland No 3

	Ore	Cind	Lime	Coal	Coke	Labor	Make		
1900									
May 5	191		94	123	116	190	336		Ferro
12	116	83	86	149	110	219	308		
19	71	107	76	145	92	181	351		H S
26	76	114	79	163	98	191	328		"
June 2	77	116	81	167	100	181	338		"
9	78	117	82	228	91	200			"
16	68	117	82	190	100	192	316		"
23	90	93	66	153	91	186	321	Out of blast	
Sept 1	104	104	68	129	95	180	309		
8	106	106	72	166	82	191	284		
15	107	107	74	174	84	184	299		
22	108	86	81	205	74	175	305		H S
29	177	27	91	166	102	193	297	254	Ferro
Oct 6	163	49	89	178	89	182	313	163	" H.S.
13	137	79	92	190	90	195	299	109	" Ferro
20	212		89	170	85	201	291	291	"
27	99	100	87	195	72	181	332	82	"
Nov 3	107	107	76	208	69	179	310		H.S.
10	110	110	83	211	70	189	293		
17	105	105	82	197	63	173	328		
24	85	120	85	206	67	171	332		H.S.
Dec 1	82	124	87	203	67	158	359		"
8	81	122	86	204	67	164	352		"
22	81	122	84	215	65	177	327		"
29	95	120	88	218	73	175	317		"
1901									
Jan 5	224		94	177	115	215	292	213	Ferro
12	177	39	90	169	113	225	269		H S
19	105	135	92	235	99	212	281		H.S.
26	109	109	71	199	82	174	350		"
Feb 2	111	111	93	211	73	188	306		"
9	96	119	87	181	96	188	318		"

~~CINDER ANALYSES.~~

Ashland Furnace No 1

Date 1893	Silica Ore to ton of iron	Alumina Mill Cinder to ton of iron	Alumina Limestone to ton of iron	Date	Silica Coal to ton iron	Silica Coke to ton iron	Alumina Labor to ton iron	Total Iron made
June 17	.72	1.19	.66		1.62	.90	1.76	310
24	.59	1.29	.67		1.98	.76	1.78	313
July 1	.59	1.31	.68		2.46	.40	1.89	302
8	.89	1.17	.65		2.68	.30	1.86	271
15	1.00	1.08	.61		2.35	.58	1.94	279
22	.93	1.01	.64		2.23	.56	1.83	295
29	.91	1.01	.63		2.22	.55	1.68	299
Aug 5	1.00	1.05	.66		2.17	.65	1.75	272
12	.96	1.02	.65		1.70	.85	1.50	313
19	.94	1.02	.65		1.82	.78	1.59	307
26	.92	.98	.64		1.77	.87	1.70	293
31	.76	.76	.49		1.36	.63	2.75	93

Blast off 10⁴⁰ AM Aug 30th 93

Dec 23	.99	.99	.65		1.70	.56	1.31	364
30	1.07	.87	.59		1.64	.53	1.29	346
1894 Jan 6	1.00	.85	.59		1.84	.45	1.29	355
13	.97	.85	.59		1.92	.41	1.39	336
20	.92	.81	.56		1.82	.39	1.30	351
27	.94	1.00	.63		2.00	.43	1.28	362
Feb 3	.92	.97	.63		1.93	.41	1.24	380
10	.95	1.00	.64		2.21	.32	1.39	347
17	.70	1.15	.64		2.04	.43	1.33	352
24	.74	1.18	.60		2.24	.47	1.46	327

~~CINDER ANALYSES.~~

Ashland Furnace No 2

Total Iron made	Date 1893	Silica On 80 ton	Alumina Mill Cinder	Alumina Limestone	Date	Silica Coal	Silica coke	Alumina Labor	Total Iron 80 ton of Iron Made
310	Aug 17	.93	1.00	.63		2.47	.27	1.68	324
313	24	.96	1.02	.64		2.54	.27	1.71	329
302	31	.96	1.03	.65		2.57	.28	1.80	312
271	Sept 8	.92	.99	.62		2.45	.27	1.75	288
279	15	.92	.99	.63		2.45	.27	1.68	323
295	22	.93	1.01	.56		2.74	.27	1.82	296
299	29	.96	1.04	.53		2.86	.29	1.78	280
272	Oct 5	1.02	1.07	.53		2.94	.29	1.63	286
313	12	1.02	1.09	.54		3.01	.30	1.78	278
307	19	.94	1.02	.51		2.81	.28	1.68	299
293	26	.96	1.02	.50		2.49	.51	1.76	283
93	31	.82	.90	.44		1.58	.61	1.79	143

Blast off 9 AM Aug 31st 93

	Nov 25	1.12	1.12	.76		1.86	.71	1.54	291
	Dec 2	.73	1.27	.66		1.75	.59	1.43	348
	9	.78	1.10	.59		1.86	.57	1.43	348
	16	.92	.92	.54		2.12	.54	1.42	317
364	23	.92	.92	.59		1.59	.52	1.27	379
346	30	1.05	.86	.58		1.58	.52	1.38	324
355	94 Jan 6	.92	.79	.54		1.52	.50	1.37	333
336	13	.94	.83	.57		1.87	.40	1.45	323
351	20	.95	.84	.58		1.88	.40	1.38	331
362	27	.91	.98	.62		1.96	.42	1.33	347
380	Feb 3	.82	.86	.56		1.72	.37	1.21	392
347	10	.82	.92	.58		1.96	.30	1.40	344
352	17	.95	.76	.56		1.72	.36	1.30	360
327	24	1.00	.81	.57		1.83	.39	1.35	356

No 1 ~~CINDER ANALYSES~~.

Ashland

94 Date	Silica	Alumina		Date	Silica	Alumina	Total	94 Date	Si
Mar	Ore to Ton Iron	Mill Cinder to Ton Iron	Limestone	Coal	Coke	Labor	Labor		
3	1.16	.94	.65	2.12	.45	1.42	328	Mar 3	
10	1.06	.85	.61	1.97	.42	1.28	370	10	
17	1.15	.88	.63	2.06	.44	1.32	349	17	
24	1.11	.89	.63	2.07	.44	1.38	335	24	
31	1.10	.88	.62	2.05	.43	1.34	340	31	
April 7	1.14	.89	.64	2.09	.44	1.41	332	A 7	
21	1.13	.91	.61	2.11	.45	1.45	321	21	
28	1.08	.89	.58	2.07	.44	1.43	331	28	
May 5	1.08	.88	.59	2.06	.44	1.38	326	M 5	
	Miners Strike May 10 th 1894								
July 28	1.21	.93	.86	.30	1.53	1.46	314		
Aug 4	1.04	.85	.78	.46	1.32	1.26	363		
11	.95	.81	.76	.36	1.30	1.28	359		
18	1.09	.86	.80	.71	1.40	1.46	293		
25	.96	.83	.76	1.31	1.03	1.32	325		
Sept 1	1.08	.86	.79	2.05	.68	1.30	314		
8	1.05	.87	.77	.95	1.02	1.14	384	Spt 8	
15	.95	.93	.77	1.17	.84	1.25	330	15	
22	.91	.97	.78	1.63	.82	1.40	303	22	
29	.95	1.01	.79	2.06	.50	1.52	290	29	
Oct 6	.90	.96	.76	1.99	.42	1.56	284	Oct 6	
13	.94	1.00	.79	2.02	.46	1.62	278	13	
20	.90	.95	.68	1.65	.55	1.37	320	20	
27	.91	.97	.67	1.67	.67	1.40	312	27	
Nov 3	.93	.98	.68	1.75	.58	1.35	308	Nov 3	
10	.93	.97	.67	1.64	.54	1.24	345	10	
17	.96	.99	.69	1.66	.55	1.27	349	17	
24	.98	1.00	.69	1.66	.55	1.37	336	24	
Dec 1	.93	1.00	.67	1.66	.55	1.40	318	Dec 1	

~~CINDER ANALYSES.~~ No 2

Ashland

Total Iron	Date '94	Silica over	Alumina Mill Cinder	Alumina Limestone	Date	Silica coal	Silica coke	Alumina Labor	Total Iron for work
28	Mar 3	.95	.76	.56		1.72	.36	1.30	357
70	10	1.05	.83	.59		1.94	.41	1.54	305
49	17	1.15	.90	.64		2.12	.44	1.51	305
35	24	1.12	.90	.64		2.11	.44	1.57	294
40	31	1.11	.89	.63		2.07	.44	1.50	305
32	Apr 7	1.12	.88	.63		2.06	.44	1.52	308
21	21	1.09	.88	.59		2.06	.43	1.60	292
31	28	.95	1.01	.60		1.78	.57	1.57	300
26	May 5	.89	.96	.57		1.67	.55	1.40	320
	Miners Strike May 10th 1894								
14									
63									
59									
93									
25									
14									
84	Sept 8	1.02	.93	.79		.90	1.06	1.34	328
330	15	87	.93	.73		1.11	.83	1.18	350
303	22	.92	.97	.77		1.60	.67	1.34	317
90	29	.89	.95	.74		1.95	.44	1.38	319
84	Oct 6	.92	.98	.75		2.00	.42	1.42	313
78	13	.90	.97	.72		1.91	.41	1.32	341
320	20	.90	.95	.65		1.84	.40	1.22	363
312	27	.90	.97	.65		1.88	.40	1.23	356
308	Nov 3	.91	.96	.64		1.90	.40	1.14	364
345	10	.92	.97	.65		1.91	.41	1.21	356
349	17	.96	.99	.66		1.91	.41	1.23	360
336	24	.96	.98	.65		1.89	.40	1.32	348
318	Dec 1	.93	.98	.64		1.92	.41	1.30	344

Ashland ~~CINDER ANALYSES.~~ Mixed No 1

Date	Silica in Cinder to ton Iron	Alumina in Cinder to ton Iron	Lime to ton Iron	Coal to ton Iron	Slag to ton Iron	Alumina Labor to ton Iron	Output
94							
Dec 8	.96	1.02	.67	1.67	.56	1.33	347
15	.92	.98	.66	1.62	.54	1.25	355
22	.92	.99	.67	1.84	.45	1.32	360
29	.98	1.01	.68	1.92	.46	1.30	336
95 Jan 5	.95	1.02	.68	1.81	.52	1.42	345
12	.93	1.01	.67	1.98	.42	1.48	330
19	.95	1.03	.69	2.02	.43	1.50	328
26	.97	1.04	.70	2.05	.43	1.55	321
Feby 9	.98	1.05	.70	2.07	.44	1.38	325
23	1.00	1.08	.75	2.15	.46	1.48	307
Mar 2	1.07	1.14	.78	2.22	.53	1.72	275
9	.96	1.03	.74	1.97	.53	1.53	295
16	.90	.98	.68	1.98	.42	1.38	334
23	.91	.99	.64	2.01	.43	1.43	327
30	.91	.99	.63	2.02	.43	1.33	328
April 6	.90	.98	.62	1.99	.43	1.40	325
13	.93	1.01	.64	2.16	.45	1.61	299
20	.92	1.04	.67	2.17	.44	1.66	291
27	.91	1.00	.64	2.05	.44	1.47	319
May 4	.92	1.00	.65	2.18	.45	1.69	289
11	.95	1.02	.66	2.25	.40	1.62	293
18	.99	1.07	.70	2.50	.31	1.75	275
25	.90	1.00	.63	2.10	.42	1.58	296
June 1	.90	.97	.61	1.96	.45	1.47	321
8	.95	1.03	.64	2.02	.60	1.66	282
15	.89	.97	.59	2.00	.42	1.51	297
22	.96	1.01	.61	2.08	.44	1.55	294
29	.96	1.04	.63	2.35	.35	1.66	268
July 6	.94	1.02	.59	2.19	.43	1.61	280

Ashland ~~CINDER ANALYSES.~~ Mikely No 2

Date	Silica	Alumina	Iron	Date	Silica	Alumina	Output
	On Cinder			Coal	Coke		
	to ton iron	=	=	=	=	=	=
Dec 8	.95	1.00	.68	2.00	.42	1.35	342
15	1.02	1.02	.66	2.05	.44	1.30	344
22	.66	1.09	.61	1.81	.38	1.18	402
29	.71	1.13	.63	1.83	.43	1.12	388
Jan 5	.69	1.11	.62	1.65	.48	1.27	386
12	.68	1.13	.64	2.22	.27	1.52	322
19	.70	1.17	.65	2.29	.28	1.55	316
26	.66	1.18	.66	2.32	.29	1.50	334
Feb 9	.73	1.19	.66	2.23	.27	1.31	342
23	.93	1.05	.71	2.30	.29	1.39	328
Mar 2	1.00	1.06	.73	2.36	.29	1.46	325
" 9	1.01	1.07	.74	2.40	.30	1.45	312
" 16	.98	1.06	.73	2.37	.33	1.52	303
23	.77	1.21	.71	2.31	.34	1.49	313
30	.72	1.21	.68	2.30	.28	1.45	303
Apr 6	.68	1.14	.63	2.16	.27	1.41	322
13	.70	1.18	.68	2.44	.28	1.48	325
20	.75	1.27	.72	2.42	.32	1.67	290
27	.75	1.24	.72	2.40	.30	1.59	294
May 4	1.08	1.08	.72	2.59	.31	1.65	295
11	1.03	1.16	.76	2.65	.33	1.76	269
Repair 18	1.02	1.11	.54	2.49	.31	1.54	314
25	1.01	1.11	.53	2.51	.32	1.57	299
Jun 1	1.01	1.09	.60	2.44	.33	1.51	315
8	.82	1.21	.76	2.43	.46	1.61	291
15	.78	1.30	.77	2.82	.31	1.62	279
22	.76	1.27	.75	2.78	.30	1.67	273
29	.79	1.32	.78	3.31	.09	1.75	254
July 6	.83	1.35	.80	3.59	0	1.83	246

No 3 CINDER ANALYSES. Ashland

Norton Furnace

Date	Sio	Al	Cinder	Stove	Coal	Sio	Al	Iron
95 May 11	.98		.98	.61	2.21	.23	1.31	298
18	.94		.94	.60	2.26	.28	1.21	332
25	.94		.94	.59	2.18	.27	1.16	357
June 1	.98		.98	.62	2.20	.31	1.19	351
8	.95		.95	.60	1.91	.41	1.17	353
15	.96		.96	.60	2.00	.37	1.24	355
22	.89		.89	.58	2.12	.26	1.15	364
29	.95		.95	.63	2.50	.16	1.30	321
July 6	.94		.94	.61	2.51	.13	1.14	354
13	.97		.97	.62	2.54	.14	1.29	325
20	.95		.95	.60	2.49	.16	1.23	340
27	.95		.95	.60	2.44	.17	1.17	343
H.S. Aug 3	.77		1.22	.74	2.48	.31	1.26	327
H.S. 10	.84		1.34	.81	2.72	.34	1.40	310
" 17	.82		1.23	.71	2.49	.31	1.32	328
" 24	.78		1.19	.63	2.42	.30	1.29	332
31	.82		1.25	.66	2.53	.31	1.33	320
Silvery Sept 7	1.01		1.01	.60	2.34	.29	1.26	357
14	.94		.94	.56	2.17	.27	1.09	406
Becomes high Silicon 21	1.87		.23	.73	2.39	.42	1.39	313.7
28	1.97		.26	.82	2.56	.42	1.43	325.3
H.S. Oct 5	1.12		.94	.70	2.40	.38	1.43	338.7
12	.79		1.19	.63	2.48	.31	1.42	331.8
Silvery 19	.81		1.24	.64	2.51	.31	1.39	334.
26	.89		1.15	.61	2.20	.41	1.62	300.5
Nov 2	.98		.98	.59	2.23	.27	1.47	345.2
9	.95		.95	.57	2.16	.27	1.23	387.5
16	1.03		1.03	.65	2.30	.30	1.38	325.6
H.S. 23	.74		1.17	.61	2.26	.34	1.44	333.7
30	.76		1.21	.64	2.44	.30	1.38	340.1

Date	Si
95	
July 13	.7
20	.7
27	.
Aug 3	.
10	.
17	.
24	.
31	.
Sept 7	.
14	.
21	.
28	.
Oct 5	.
12	.
19	.
26	.
Nov 2	
9	
16	
23	.
30	
Dec 7	.
14	.
21	
28	
95 Jan 6	
11	
18	
25	.
Feby 1	

No 2 CINDER ANALYSES. Ashland

Date	Silica	Alumina	Cinder	Stone	Coal	Coke	Ashes	Iron
95								
July 13	.74	1.26	.75	3.34	0	1.70	264.1	
20	.50	1.48	.75	2.98	.19	1.68	268.3	
27	.29	1.55	.65	2.57	.28	1.57	287.3	
Aug 3	.79	1.22	.67	2.50	.30	1.48	303.5	
10	.94	1.04	.66	2.41	.30	1.55	306.2	
17	.92	.98	.61	2.26	.28	1.50	316.4	
24	.93	1.01	.64	2.34	.29	1.71	313.2	
31	.88	1.00	.65	2.30	.28	1.58	316.	
Sept 7	.82	.99	.62	2.57	.28	1.73	289.	
14	.87	.98	.61	2.25	.28	1.48	327.7	
21	.88	.96	.60	2.22	.27	1.38	351.7	
28	.93	.99	.62	2.28	.28	1.46	330.5	
Oct 5	.88	.96	.59	2.24	.28	1.35	357.9	
12	.95	.95	.58	2.23	.27	1.42	361.6	
19	.93	1.03	.63	2.42	.30	1.73	294.8	
26	.93	.93	.56	2.07	.32	1.49	329.8	
Nov 2	.89	.94	.58	2.22	.27	1.56	328.4	
9	.92	.92	.56	2.17	.27	1.43	348.9	
16	.92	.92	.57	2.16	.27	1.40	358.7	
23	.94	.94	.57	2.19	.27	1.50	341.9	
30	.91	.91	.55	1.88	.37	1.42	358.9	
Dec 7	.94	.94	.57	2.18	.27	1.50	345.0	
14	.99	.99	.59	2.23	.28	1.76	332.2	
21	.95	.95	.55	2.19	.27	1.64	353.7	
28	.99	.99	.60	2.27	.28	1.42	352.4	
96 Jan 6	.91	.91	.56	2.11	.26	1.52	376.3	
11	.97	.97	.58	2.21	.27	1.60	356.5	
18	.82	H.S. 1.22	.67	2.48	.33	1.60	341.0	
25	.73	1.22	.66	2.52	.37	1.57	305.3	
Feby 1	.73	1.20	.66	2.48	.46	1.54	315.9	

No 1 CINDER ANALYSES. Bessemer Ashland

Date	Lime	Alumina	Stone	Coal	Silica	Manganese	Iron
1899 July 13	2.04		.34	.25	1.37	1.30	414
20	1.88		.32	.24	1.05	1.01	601
27	1.79		.42	.55	.84	1.15	531
Aug 3	1.78		.54	.57	.86	1.23	475
10	1.80		.52	.58	.88	1.35	447
17	1.82		.48	.60	.91	1.35	443
Sept 14	1.78		.46	.20	1.13	1.00	549
21	1.72		.44	.20	1.13	.97	574
28	1.69		.44	.20	1.10	.97	596
Oct 5	1.71		.45	.20	1.11	1.03	566
12	1.77		.48	.21	1.16	1.12	553
19	1.82		.49	.22	1.20	1.15	529
26	1.75		.47	.44	1.01	1.05	560
Nov 16	1.89		.49	.21	1.18	1.08	542
23	1.85	Mill Cinder	.46	.22	1.12	1.13	556
30	1.71	.09	.47	.02	1.18	1.10	564
Dec 7	1.72	.11	.48	.13	1.07	1.12	594
2							

No 3 Boston on Bessemer Iron

1899	Ore	Cinder	Stone	Coal	Coke	Labor	Iron
July 22	170	16	37	14	122	123	574
29	168	10	53	10	132	128	636
Aug 5	181		59	18	126	124	641
12	185		58	21	120	110	683
19	176		57	20	116	108	703
26	180		59	21	122	107	692
Sept 2	178		59	21	126	117	625
Oct 7	1.76		.57	22	102	116	710
14	1.81		.61	22	124	110	733
21	1.78		.61	22	122	105	763

CINDER ANALYSES.

No 1 Ashland

Date	Silica Ore	Alumina Cinder	Lime	Date	Silica Coke	Alumina Labor	Ironstone
98 Dec 14	.71	1.07	.58	1.60	.59	1.61	361.4
21	.68	1.03	.55	1.53	.63	1.55	374.0
28	.72	1.09	.64	1.63	.80	1.65	372
98 Jan 4	.77	1.14	.66	1.96	.71	1.66	299.9
11	.71	1.07	.64	1.56	.78	1.60	354.17
18	.74	1.11	.63	1.60	.80	1.61	338.3
25	.74	1.11	.64	1.61	.80	1.43	341.8
98 July 1	.72	1.08	.63	1.61	.80	1.50	323.0
15	.85	1.07	.68	1.79	.96	1.70	302.1
22	.74	1.15	.66	1.93	.75	1.53	339.7
29	.72	1.09	.63	2.18	.55	1.60	331.5
Mar 7	.77	1.16	.67	2.31	.58	1.84	275.4
14	1.19	.68	.68	1.29	1.13	1.72	296.7

Out of Blast for Lining

97	Ore	Cinder	Lime	Coal	Coke	Labor	Iron
Feb 27	1.11	1.00	.66	221	43	1.53	256

No 3 Norton ore Bessemer

99	Ore	Cinder	Stone	Coal	Coke	Labor	Iron
Oct 28	177		65	22	121	1.11	739.8
Nov 4	185		67	23	129	1.14	671.3
18	183		67	22	128	1.13	776.
25	191		72	23	131	1.21	742
Dec 2	177		66	22	121	1.12	815
9	182		65	22	131	1.25	729
16	1.77		65	22	121	1.11	808
23	1.82		67	22	126	1.23	729
30	1.90		66	23	134	1.22	690
1900 Jan 6	1.79		61	22	126	1.09	840
13	1.74		60	21	123	1.22	799

No 3 CINDER ANALYSES (Croxton) Ashland

Date	Silica Ore	Alumina Cinder	Stone	Date	Silica Coal	Alumina Coke	Tons Iron
95 Dec 14	.93	.93	.59	1.63	.54	1.12	449
21	.91	.91	.55	1.56	.51	1.24	398
28	.95	.95	.60	1.94	.54	1.18	361
96 Jan 6	.78	1.17	.62	2.10	.44	1.23	369
11	.81	1.24	.65	2.23	.47	1.43	329
18	.81	1.22	.64	2.17	.46	1.22	358
25	1.00	1.00	.62	1.99	.43	1.23	368
Feby 1	.96	.96	.59	1.82	.44	1.26	370
15	.99	.99	.62	1.98	.44	1.29	349
22	.95	.95	.59	1.79	.46	1.11	409
29	.96	.96	.59	1.89	.40	1.28	378
Mar 7	.96	.96	.59	1.66	.54	1.28	362
14	.95	.95	.59	1.63	.54	1.21	381
21	.82	1.23	.66	2.27	.47	1.42	331
April 4	.99	.99	.62	1.73	.56	1.28	363
11	.95	.95	.61	1.67	.55	1.32	355
18	.94	.94	.60	1.73	.54	1.34	345
25	.77	1.16	.64	2.30	.46	1.48	304
May 2	.95	.95	.62	2.23	.43	1.66	300
9	.74	1.11	.62	2.29	.42	1.56	320
16	.69	1.17	.65	2.24	.45	1.70	294
23	.89	.89	.58	1.80	.53	1.25	369
30	.93	.93	.60	1.80	.55	1.33	346
June 6	.78	1.18	.68	2.39	.50	1.64	290
13	.81	1.22	.74	2.06	.76	1.62	288
20	.73	1.10	.64	1.41	.85	1.23	380
27	.94	.94	.64	1.64	.71	1.37	345
July 4	.81	1.21	.72	1.86	.77	1.50	312
11	.73	1.10	.65	2.03	.57	1.29	354
18	.81	1.21	.70	2.17	.46	1.60	314

H.S.

CINDER ANALYSES. No. 2 Ashland

Date	Silica	Alumina	Iron	Date	Silica	Alumina	Iron	Tonnage
	Open Cinder		Stone	Coal		Ash		
96 Mch 5	.66	1.13	.63		2.33	.43	1.47	350.2
	22	.81	1.22	.68	2.63	.41	1.59	327.7
	29	.98	.98	.63	2.28	.28	1.53	348.3
Mar 7	.99	.99	.62		2.30	.28	1.56	324.1
	14	1.00	1.00	.63	2.36	.30	1.62	315.6
	21	.81	.96	.61	1.69	.56	1.36	365.5
Apl 4	.77	1.15	.64		2.35	.41	1.53	326.6
	11	.77	1.15	.64	2.38	.44	1.47	339.5
	18	.94	.94	.61	1.68	.56	1.35	371.5
	25	.91	.97	.63	2.12	.43	1.64	304.6
May 2	.80	1.19	.66		2.41	.47	1.46	333.5
	9	.97	.98	.63	1.76	.60	1.47	331.1
	16	.97	.97	.63	1.92	.58	1.56	305.4
	23	.61	1.15	.65	2.52	.44	1.76	283.4
	30	.96	.96	.62	2.30	.43	1.57	317.9
Jun 6	.95	.95	.62		2.33	.43	1.69	295.8
	13	.88	.97	.62	2.02	.58	1.70	323.2
	20	.80	1.09	.64	1.81	.69	1.59	315.2
	27	.74	1.11	.64	1.94	.60	1.69	295.2
July 4	.73	1.14	.66		2.06	.59	1.64	304.0
	11	.73	1.10	.63	1.98	.57	1.56	319.0
	18	.72	1.09	.63	1.97	.56	1.76	284.1
	25	.78	1.25	.68	2.25	.64	1.90	263.7
Aug 1	1.07	1.13	.74		1.85	.90	2.02	247.3
	8	.77	.97	.65	1.56	.77	1.57	334.4
	15	.92	1.01	.68	1.62	.80	1.77	282.6
	22	.93	1.01	.68	1.63	.81	1.64	304.2
	29	.93	1.01	.68	1.95	.64	1.70	293.
Sep 5	.90	.95	.64		1.83	.61	1.62	308.
	12	.91	.96	.66	2.13	.49	1.60	294

No 1 CINDER ANALYSES. Ashland

Date	Silica	Cinder	Lime	Coal	Coke	Alumina	Iron
96 Sept 12	1.04	1.04	.69	1.59	.77	1.66	300
19	1.00	1.00	.68	1.83	.61	1.54	323
26	.99	.99	.66	1.83	.61	1.53	307
Oct 3	.94	.94	.63	1.69	.56	1.57	316
10	.96	.96	.64	1.72	.57	1.59	315
17	.96	.96	.64	1.72	.57	1.44	329
24	.97	.97	.64	1.70	.56	1.38	346
31	.98	.98	.64	1.72	.57	1.45	339
Nov 7	.97	.97	.64	2.18	.34	1.55	311
14	.85	1.13	.71	2.10	.55	1.62	318
21	.79	1.18	.73	2.27	.52	1.50	338
28	.86	1.05	.69	2.16	.43	1.46	352
Dec 5	.77	1.16	.72	2.34	.44	1.39	356
12	.99	.99	.66	2.03	.43	1.59	330
19	.97	.97	.64	1.96	.42	1.50	350
97 26	.97	.97	.64	1.99	.42	1.38	356
Jan 2	.96	.96	.63	1.94	.41	1.55	354
9	.77	1.16	.76	2.05	.58	1.49	343
16	.77	1.15	.75	2.04	.44	1.45	361
23	1.03	1.03	.69	2.09	.44	1.46	338
30	.97	.97	.65	1.91	.41	1.37	364
Feb 6	.91	1.11	.75	2.13	.49	1.58	315
20	1.05	1.05	.70	2.12	.45	1.52	335
27	1.00	1.00	.66	2.21	.43	1.53	257
Mar 6	1.00	1.00	.66	2.04	.43	1.61	315
13	.77	.90	.59	1.63	.48	1.39	367
20	.85	.91	.55	1.60	.52	1.34	379
Apr 3	.92	.92	.68	1.87	.40	1.40	364
10	.90	.90	.66	1.83	.39	1.48	343
17	.90	.90	.66	1.83	.39	1.46	349

CINDER ANALYSES. No 3

1896		Iron	Cinder	Lime	Coal	Coke	Factor	Iron	
	Sept 12	.76	1.15	.65	2.41	.50	1.62	298.	
	19	.78	1.17	.65	1.78	.59	1.37	331	
	26	1.94	.19	.80	2.31	.76	1.74	272	Zero
	Oct 3	2.26		.85	2.03	1.01	1.65	285	
	10	1.18	.84	.72	1.91	.72	1.48	324	
	17	.74	1.12	.64	1.72	.71	1.51	319	H.2
	24	.81	1.22	.73	1.87	.78	1.47	356	
	31	.87	1.30	.82	1.94	.78	1.51	327	"
	Nov 7	.82	1.24	.79	2.43	.45	1.52	315	
	14	No report made							
	21	.74	1.11	.62	1.68	.64	1.45	354	
	28	.72	1.09	.60	1.65	.69	1.37	355	
	Dec 5	.94	.94	.56	1.69	.56	1.29	364	
	12	.77	1.15	.72	2.03	.58	1.40	344	
	19	.81	1.22	.75	1.78	.83	1.81	259	
	26	.72	1.08	.64	1.09	.82	1.33	365	
97	Jan 2	.74	1.12	.65	1.22	.78	1.36	336	
	9	.75	1.13	.66	1.41	.70	1.37	342	
	16	.77	1.15	.67	1.48	.71	1.45	336	
	23	.76	1.15	.67	1.72	.57	1.30	337	
	30	2.16		.85	1.93	.96	1.58	289	Zero
	Feb 6	1.76	.48	.83	1.84	.99	1.62	288	
	20	.97	.97	.65	1.55	.79	1.50	315	
	27	.96	.96	.64	1.41	.85	1.39	338	
	Mar 6	.98	.98	.66	1.74	.72	1.53	308	
	13	.83	1.11	.66	1.57	.80	1.51	296	
	20	.69	1.04	.60	1.86	.78	1.41	319	
	29	.96	.96	.62	1.68	.56	1.25	356	

No 1 CINDER ANALYSES. Ashland

Date	Silica	Alumina		Date	Silica	Alumina	Iron
97	Ore	Cinder	Lime	Coal	Coke	Labor	Made
April 24	69	1.02	70	178	55	1.44	355
May 1	75	1.12	.74	222	47	1.50	339
8	76	1.13	.75	2.24	48	1.56	327
22	90	92	.67	1.66	55	1.38	376
29	91	91	.66	1.90	41	1.46	332
June 5	90	90	66	1.87	43	1.46	331
12	81	103	70	2.07	50	1.55	312
19	83	116	76	2.36	49	164	295
26	96	96	68	197	42	143	340
July 3	82	113	76	228	48	151	316
10	85	119	80	237	51	157	309
17	80	120	80	237	51	155	312
24	87	107	81	243	51	169	287
31	102	102	74	213	45	150	323
Aug 7	97	97	70	219	44	159	305
14	100	100	66	222	45	158	306
21	91	93	62	211	42	161	300
28	80	120	81	235	54	152	335
#3 Sept 4	169	40	84	209	87	156	282 #3
11	104	104	68	223	46	155	312
18	96	96	63	207	43	143	340
25	96	96	63	214	43	143	340
Oct 2	99	99	65	215	44	142	331
9	93	93	61	228	29	137	341
16	102	102	67	272	24	176	266
23	93	95	62	176	56	130	362
30	97	97	64	216	44	147	319
Nov 6	97	97	64	217	46	149	316
13	95	95	65	211	42	142	331

Date	Si
97	Or
Jan 5	1
12	2
19	1
26	
July 3	
10	2
17	
24	
31	
Aug 7	
14	1
21	2
28	
#1 Sept 4	
11	
18	
25	
Oct 2	
9	
16	
23	
30	
Nov 6	
13	
20	
27	
Dec 4	
11	
18	

No 3 CINDER ANALYSES.

Date	Silica	Alumina		Date	Silica	Alumina	Iron
97	Ore	Cinder	Lime	Coal	Coke	Labor	Made
Jan 5	1.49	.35	.69	1.72	.61	1.35	328 F
12	2.22		.87	2.13	.89	1.72	363 F1
19	1.24	.83	.74	1.91	.70	1.46	309
26	94	94	.67	185	39	123	352
July 3	94	94	65	189	40	136	322
10	93	93	65	188	40	127	333
17	98	98	65	173	56	135	328
24	93	93	62	167	55	132	338
31	83	103	68	175	58	140	314
Aug 7	99	1.11	80	206	68	139	315
14	182	26	81	207	73	152	302 F
21	214	07	89	221	88	178	263 F
28	221		89	220	91	177	258 F
Sept 4	82	123	83	243	52	154	314 #1
11	81	122	82	210	73	148	300 HS
18	80	121	81	243	52	150	292 HS
25	78	117	78	232	48	137	317 HS
Oct 2	80	120	80	233	49	139	325 HS
9	79	119	80	267	31	143	312 HS
16	88	125	83	338	07	161	267 HS
23	73	119	79	266	35	152	303 HS
30	88	103	69	180	57	1.25	348
Nov 6	186	08	79	197	82	1.47	286 F
13	223	—	96	211	101	1.66	274 F
20	211	18	97	196	99	1.82	248 F
27	80	120	83	226	90	1.56	299 HS
Dec 4	95	95	68	179	57	1.29	339
11	99	99	66	213	44	1.42	311
18	94	94	62	178	56	1.29	343

Low Moor Iron Company of Virginia,

Cost of ORE ~~ANALYSES~~.

Low Moor Mines.

~~ORE~~ Date	~~Iron~~ Lump	Coal	~~Silica~~ Wash	Coal	~~Phos.~~ Lump	~~Sulphur~~ Tons	~~Mang.~~ Wash	~~Lime~~ Tons	~~Magnesia~~ Total	~~Alumina~~ Tons	~~Water~~
Date											
1890 Sept	1.80	9/10	1.99	3/10		543	2692		3235		
Oct	1.82	7/10	1.98			439	3084		3523		
Nov	2.03	1/5	2.35	3/4		496	2485		2981		
Dec	2.31	4/5	2.49	47/50		149	2075		2224		
91 Jany	2.11	1/2	2.47	7/10		236	2602		2838		
Feby	2.49	7/10	2.75	9/10		213	2652		2865		
Mar	2.56	7/10	2.82			219	2346		2565		
Apl	1.88	3/5	2.08	3/10		329	3261		3590		
May	2.09		2.21	2/5		281	4120		4401		
June	1.74	3/10	1.84	23/50		351	4437		4788		
July	1.51	3/5	1.61	1/5		352	5848		6200		
Aug	1.70	7/20	1.83	1/10		135	5267		5402		
Sept	1.76	9/10	1.85	1/10		120	5242		5362		
Oct	1.62	55/100	1.74	78/100		440	4965		5405		
Nov	1.89	78/100	2.02	80/100		42.1	4127		4548		

ORE ANALYSES.

~~ORE~~ Date	~~Iron~~	~~Silica~~	~~Phos.~~	~~Sulphur~~	~~Mang.~~	~~Lime~~	~~Magnesia~~	~~Alumina~~	~~Water~~

| | | |

Cost of Ore — Lowthwaite Iron Co

ORE ~~ANALYSES~~.

Lowthwaite Mines

ORE	Date	Iron	Silica	Phos.	Sulphur	Mang.	Lime	Magnesia	Alumina	Water
	Date	Lump Coal	Wash Coal		Lump	Tons	Wash	Tons	Total	Tons
93	April	1.47 $\frac{75}{100}$	1.66 $\frac{66}{100}$			904	4212		5116	
	May	1.51 $\frac{15}{}$	1.67 $\frac{81}{}$			945	3905		4850	
	June	1.68 $\frac{40}{}$	1.83 $\frac{19}{}$			921	3641		4562	
	July	1.72	1.94		Average	923	2907		3830	
	Aug	1.47 $\frac{11}{}$	1.69 $\frac{86}{}$	1.60 $\frac{8}{}$		2776	4231		7007	
All	Sept	1.10 $\frac{60}{}$	1.25 $\frac{41}{}$	1.21 $\frac{65}{}$		2649	7822		10472	
"	Oct	1.26 $\frac{51}{}$	1.43 $\frac{26}{}$	1.39 $\frac{33}{}$		2407	7842		10249	
"	Nov	1.20	1.39 $\frac{38}{}$	1.34		2926	8035		10961	
"	Dec	1.10 $\frac{9}{}$	1.27	1.23 $\frac{44}{}$		1707	5633		7340	
94	Jany	1.05 $\frac{8}{}$	1.18 $\frac{8}{}$	1.16 $\frac{4}{}$		787	3494		4281	
"	Feby	1.05	1.15 $\frac{5}{}$	1.11 $\frac{6}{}$		587	2961		3549	
"	March	1.10 $\frac{6}{}$	1.19 $\frac{3}{}$	1.17 $\frac{6}{}$		1475	6031		7506	
"	April	1.95 $\frac{8}{}$	1.06 $\frac{9}{}$	1.04 $\frac{2}{}$		874	3432		4306	
"	May	1.05 $\frac{7}{}$	1.13 $\frac{2}{}$	1.12		1034	7401		8436	
"	June	1.01 $\frac{8}{}$	1.14 $\frac{5}{}$	1.12 $\frac{4}{}$		1633	8254		9887	

ORE ANALYSES.

All Mines

								Magnesia	Alumina	Water

" May	1.03½	1.13½	1.12	1034	7	4	0	1	8	5	6
" June	1.01½	1.14⅝	1.12⅝	1633	8	2	5	4	9	8	8 7

ORE ANALYSES.

All Mines

ORE	Date	Iron Lump Coke	Iron Wash Coke	Silica	Phos.	Sulphur Average	Mang. Lump Ores	Lime Wash Ores	Magnesia	Alumina Total	Water
94	July	1.08⅝	1.206		1.17⅞	2039	6	6	9 8	8	7 3 7
	Aug	1.09¼	1.194		1.172	2348	8	2	5 4	10	6 0½
	Sept	1.08⅝	1.295		1.17	2678	6	8	0 5	9	4 8 3
	Oct	1.16½	1.298		1.215	1858	5	9	9 7	7	8 5 6
	Nov	1.32½	1.445		1.42	1146	4	3	3 7	5	4 8 3
	Dec	1.8447	1.963		1.94	632	2	6	6 6	3	2 9 9
95	Jan	1.91	205		2.02	956	2	9	1 6	3	8 7 2
	Feb	1.698	1.797		1.76	1516	2	8	8 1	4	3 9 7
	Mar	1.67	1.818		1.77	2007	3	7	5 2	5	7 5 9
	April	1.378	1.521		1.49	1541	6	0	2 5	7	5 6 7
	May	1.20	1.30		1.28	2396	9	6	3 7	12	0 3 3
	June	1.206	1.366		1.33	2793	9	6	2 7	12	4 2 0
	July	1.12	1.245		1.22	2892	11	2	9 4	14	1 8 7
	Aug	1.23	1.343		1.31	3493	13	6	2 0	15	6 2 0
	Sept	1.247	1.397		1.34	4360	8	9	1 1	13	2 7 2
	Oct	1.34	1.473		1.43⅜	3840	9	9	3 0	13	7 7 1
	Nov	1.096	1.213		1.18	4141	11	9	2 7	16	0 6 8

All Mines, Lowdwoor Co—

ORE ANALYSES.

	ORE	Lumps Dioxide	Lumps Iron	Mash Silica	Mash Phos.	Average Sulphur	Average Mang.	Lime	Magnesia	Alumina	Water
		Coeff	Tons	Coeff	Tons	Coeff	Tons				
95	Dec	1.18	2548	1.30	7415	1.26	9964				
96	Jan	1.28	2548	1.39	8992	1.36	12540				
	Feb		2641		8975		11616				
	Mar	1.05	4114	1.153	12607	1.13	16722	←			
	April	1.30	3733	1.42	11657	1.39	15391				
	May	1.30	3473	1.425	12175	1.399	15649				
	June	1.23	3437	1.32	12595	1.30	16033				
	July	1.129	4322	1.214	11078	1.185	15400				
	Aug	1.22	3662	1.303	9915	1.28	13577				
	Sept	1.12	3400	1.21	9901	1.19	13301				
	Oct	1.20	4313	1.287	11851	1.26	16164				
	Nov	1.14	3574	1.24	10458	1.21	14033				
	Dec	1.24	2389	1.40	8194	1.37	10583				
97	Jan	1.27	2665	1.42	8101	1.39	10767				
	Feb	1.39	2617	1.55½	7132	1.51	9749				
	Mar	1.33	3824	1.456	9804	142	13624	58756			

ORE ANALYSES.

	ORE	Lumps Dioxide	Lumps Iron	Mash Silica	Mash Phos.	Average Sulphur	Average Mang.	Lime	Magnesia	Alumina	Water

	Feb	1.59	2677	1.502	7152	1.51	9749				
	Mar	1.33	3824	1.456	9804	1.42	13624	58756			

ORE ANALYSES.

	ORE	Date	Lump Iron Cost	Lump Iron Tons	Mach Silica Cost	Mach Phos. Tons	Average Sulphur Cost	Average Analysis Tons	Lime	Magnesia	Alumina	Water
97		April	1.14	4539	1.24	10394	1.21	14934				
		May	1.00	3183	1.08	9065	1.08	12248				
		June	.98	1937	1.06	8217	1.04	10155				
		July	1.08	2448	1.17	7503	1.15	9952				
		Aug	.99	2043	1.08	9282	1.05	11325				
		Sept	.92	2605	1.01	10997	.99	13602				
		Oct	.91	2330	.99	10320	.98	13650				
		Nov	1.03	1582	1.11	10802	1.10	12385				
		Dec	.97	1530	1.06	6757	1.03	8287				
98		Jan	1.65	1297	1.77	3205	1.74	4502				
		Feb	1.65	1045	1.75	2532	1.72	3577				
		Mar	1.10	1162	1.19	5975	1.17	7137	35888			
		April	1.18	1585	1.27	6367	1.25	7952				
		May	.98	1424	1.06	8457	1.04	9881				
		June	1.20	1825	1.32	9111	1.30	10936				
		July	1.33	1901	1.43	8333	1.41	10234				
		Aug	1.26	1925	1.37	8849	1.35	10774				

All Mines ORE ANALYSES. Low Mines

ORE	Lump Coke	Lump Iron	Wash Coke	Wash Iron	All Coke	All Iron	Lime	Magnesia	Alumina	Water
98 Sept	1.28	1970	1.39	8953	1.36	10924				
Oct	1.51	1864	1.60	5310	1.58	7174				
Nov	1.73	1691	1.34	8078	1.31	9770				
Dec	1.13	1189	1.27	6477	1.25	7667				
99 Jan	1.34	733	1.49	6872	1.46	7605				
Feb	1.60	292	1.82	4486	1.80	4478				
Mar	1.30	935	1.42	8278	1.41	9214				
April	1.19	946	1.32	9010	1.30	9957				
May	1.43	1614	1.54	9623	1.53	11238				
June	1.24	1680	1.36	9411	1.34	11091				
July	1.26	1451	1.37	8827	1.36	10278				
Aug	1.35	1340	1.46	8794	1.44	10134				
Sept	1.38	1728	1.51	7875	1.48	9604				
Oct	1.44	1765	1.56	8283	1.54	10048				
Nov	1.43	1342	1.58	7209	1.55	8551				
Dec	1.34	1358	1.47	4911	1.44	6270				

1.47 all
1.48 wash

ORE ANALYSES.

1900	Lump	Wash	All	Lime	Magnesia	Alumina	Water
	Alumina Phos	Alumina Phos	Sulphur Mang				

Nov	1.43	1342	1.50	7209							
Dec	1.34	1358	1.47	4911	1.44	6270					

ORE ANALYSES.

1900

ORE	Lump		Wash		All		Lime	Magnesia	Alumina	Water
	Phos.	Tons	Phos.	Tons	Phos.	Tons				
Jany	1.54	987	1.76	3807	1.71	4795	1.54 all 1.57 wash			
Feb	1.27	966	1.47	3731	1.43	4697				
Mar	1.30	1796	1.45	5268	1.42	7065				
April	1.26	1301	1.39	4955	1.36	6257				
May	1.43	1726	1.57	6224	1.52	7951				
June	1.27	2755	1.43	8590	1.39½	11346				
July	1.68	2277	1.97	7665	1.90	9943				
Aug	1.54	2580	1.72	9107	1.68	11688				
Sept	1.67	2218	1.91	6347	1.86	8565				
Oct	1.17	3752	1.34	10412	1.29	14165				
Nov	1.31	2648	1.47	8670	1.44	11319				
Dec	1.38	1673	1.55	6474	1.52	8148				
1901 Jany	1.95	1030	2.23	4804	2.19	5834				
Feb	1.53	1502	1.78	6737	1.74	8239				
Mar	1.22	1175	1.40	9910	1.37	11085				
	1.25	1177	1.44	9444	1.42	10621				
May	1.55	1052	1.74	9764	1.73	10816				

ORE ANALYSES. Coal all mines.

1900 ORE	Date	Iron	Silica	Phos.	Sulphur	Mang.	Lime	Magnesia	Alumina	Water
		Lump	Mach		All					
June	1.38	847	1.56	8655	1.54	9502				
July	1.35	622	1.58	10011	1.57	10634				
Aug	1.50	363	1.68	10234	1.67	10594	Delivered Coal.			
Sept	1.55	534	1.76	9892	1.76	10426	"	"		
Oct	1.37	1514	1.58	12632	1.57	14147	"	"		
Nov	1.54	1189	1.79	11713	1.77	12902	"	"		
Dec	2.25	396	2.62	4985	2.60	5362	"	"		
1902 Jan	2.42	540	2.83	6327	2.80	6867	"	"		
Feb		155		5451		5607				
Mar				8699		8697				
April		191		11282		11301				
May		140		13616		13756				

ORE ANALYSES.

ORE	Date	Iron	Silica	Phos.	Sulphur	Mang.	Lime	Magnesia	Alumina	Water

ORE ANALYSES.

ORE	Date	Iron	Silica	Phos.	Sulphur	Mang.	Lime	Magnesia	Alumina	Water

ORE ANALYSES.

ORE	Date	Iron	Silica	Phos.	Sulphur	Mang.	Lime	Magnesia	Alumina	Water

ORE ANALYSES.

ORE ANALYSES.

ORE	Date	Iron	Silica	Phos.	Sulphur	Mang.	Lime	Magnesia	Alumina	Water

Lump Ore Coal

ORE ANALYSES.

ORE	Date	July	Aug	Sept	Oct	Nov	Dec	95 Jan	Feb	Mar
Low Moor	94	1.153	1.182	1.16	1.06	1.15	1.25	1.21	1.15	1.43
Stack		1.01	1.131	1.24	1.26	1.38	None	None	none	Dant
Dolly Ann		.655	.708	.66	1.28	None	〃	=	=	=
Iron Mt		1.33		1.30	1.14	〃	〃	=	=	=

	95	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Low Moor		1.71	1.495	1.35	1.27	1.48	1.38	1.23	1.20	1.39
Stack		1.257	1.197	1.43	1.34	1.36	1.31	1.65	1.74	1.44
Dolly Ann		.853	.83	.85	.85	1.01	1.10	1.32	.85	.85
Iron Mt		Dant	1.56	1.34	1.11	1.17	1.20	1.48	1.04	1.14

	96	Jan	Feby	Mar	April	May	June	July	Aug	Sept
Low Moor		1.287	1.321	1.11	1.33	1.45	1.31	1.28	1.604	1.45
Stack		1.896	1.75	1.30	1.41	1.28	1.30			
Dolly Ann		.970	.9304	.8532	1.27	1.00	.99	98	1.05	.92
Iron Mt		1.742	1.60	1.24	1.25	1.79	1.63	1.05	0.93	.95

Mark Ore Coal

ORE ANALYSES.

								95		

Dolly Ann	.970	.934	.853	1.27	1.00	.99	98	1.05	.92
Iron Mt	1.742	1.60	1.24	1.25	1.79	1.63	1.05	0.93	.95

ORE ANALYSES.

Mark Ore Coer

95

ORE	Date	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Low Mon	94	1.27	1.299	1.27	1.17	1.25	1.365	1.351	1.257	1.561/2
Stock		1.217	1.269	1.40	1.50	1.58	mons	mons	mons	Post
Dolly Ann		.74	.782	.77	1.39	Mons	〃	〃	〃	〃
Iron Mt		1.42	1.179	1.30	1.24	〃	〃	〃	〃	〃

ORE	Date	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Low Mon	95	1.874	1.625	1.55	1.377	1.594	1.48	1.33	1.31	1.51
Stock		1.443	1.455	1.71	1.63	1.589	1.57	1.91	2.10	1.63
Dolly Ann		.933	.898	.96	1.06	1.097	1.23	1.44	.94	.95
Iron Mt		Post	1.628	1.44	1.32	1.257	1.33	1.59	1.12	1.24

ORE	Date	Jany	Feby	Mar	April	May	June	July	Aug	Sept
Low Mon	96	1.361	1.44	1.201/2	1.44	1.60	1.39	1.40	1.78	1.54
Stock		2.149	1.97	1.491/2	1.63	1.51	1.46			
Dolly Ann		1.076	1.02	.921/2	1.86	1.09	1.07	1.04	1.13	1.00
Iron Mt		1.848	1.686	1.33	1.35	1.88	1.71	1.11	1.01	1.03

Cost of LIMESTONE ~~ANALYSES~~ At Law Moor Va

Date	~~Name~~	~~Silica~~	Alumina	~~Lime~~	~~Magnesia~~	Phos.
1892	Nov	.3910	1895	May	.406	
	Dec	.4299		June	.610	
1893	Jany	.4638		July	.480	
	Feby	.4235		Aug	.365	
	Mar	.3925		Sepr	.446	
	April	.4550		Oct	.460	
	May	.4348		Nov	.490	
	June	.4486		Dec	.390	
	July	.3940	1896	Jan	.580	
	Aug	.3869		Feby	.626	
	Sepr	.3400		Mar	.554	Covin
	Oct	.3693		April	.481	
	Nov	.4700		May	.430	.382
	Dec	.3940		June	.477	.63
1894	Jany	.4230		July	.650	.55
	Feby	.3460		Aug	.61	.53
	Mar	.3930		Sepr	.54	.24
	April	.4100		Oct	.47	.67
	May	.4500		Nov	.50	.46
	June	.3500		Dec	.49	
	July	.4480	1897	Jan	.51	
	Aug	Preparation		Feb	.51	
	Sepr	none		Mar	.564	
	Oct	.4270		April	.610	
	Nov	.4660		May	.520	
	Dec	.5110		June	.435	
95	Jan	.4200		July	.50	
	Feb	.5260		Aug	.48	
	Mar	.4600		Sepr	.42	
	April	.5310		Oct	.48	

Add 5% drilling fund
" 10% foreign ore

LIMESTONE ANALYSES.

Phos.	Date	Coal Name	Silica	Alumina	Coal Lime	Furnace Magnesia	Phos.
	97 Nov	.470	1900	July	.62		
	Dec	.490		Aug	.86		
	98 Mar	.600		Sept	.90		
	April	.440		Oct	.65		
	May	.510		Nov	.74		
	June	.490		Dec	.66		
	July	.51	1901	Jany	.94		
	Aug	.50		Feb	1.96		
	Sept	.51		Mar	.72		
	Oct	.59		April	.75		
Covin	Nov	.47		May	.78		
	Dec	.53		June	.69		
382	99 Jan	.48		July	.64		
63	Feb	54		Aug	.62		
55	Mar	50		Sept	.71		
53	April	.47		Oct	.67		
24	May	.49		Nov	.66		
67	June	.62		Dec	.78		
46	July	.53	1902	Jan	.72	41.9	
	Aug	.55		Feb			
	Sept	.56		Mar	.78		
	Oct	.55		April	.68		
	Nov	.69		May	.635	67.45	
	1900 Dec	.50					
	Jan	.63					
	Feb	.58					
	Mar	.53					
	April	.59					
	May	.72					
	June	.62					

LIMESTONE ANALYSES.

Date	Name	Silica	Alumina	Lime	Magnesia	Phos.	Dat

Phos.

LIMESTONE ANALYSES.

Date	Name	Silica	Alumina	Lime	Magnesia	Phos.

Cost of FUEL ~~ANALYSES~~. Low Moor Coke

Date	NAME	Fixed Carbon Coke	Volatile Matter Coke	Sulphur Coke	Thous made	yield of Ash Coal	REMARKS
93	Jany	3.16	.31 1/2	2.84 3/5	5010	60%	
"	Feby	3.16	.31 2/5	2.84 3/5	4586	"	
"	Mar	3.16 3/10	.31 7/10	2.84 3/5	5098	"	
"	April	3.14 4/5	.30 1/5	2.84 3/5	5015	"	
"	May	3.14 3/10	.29 7/10	"	5203	"	
"	June	3.12 8/10	.28 1/5	"	4979	"	
"	July	3.13 85	.29 28	"		"	
"	Aug	2.64 41	.30 41	2.34		"	
"	Sept	2.59 67	.25 67	"		"	
"	Oct	2.60 35	.25 35	2.35		"	
"	Nov	2.61	.26	2.35		"	
"	Dec	2.63 6	.28 6	"		"	
94	Jany	2.61	.26	"		"	
	Feby	2.589	.24 7	2.29 1/5		"	
	Mar	2.54 3	.25 1	"		"	
	April	2.55 3	.26 1	2.29 1/5		"	
	May	2.547	.25 5	"		"	

FUEL ANALYSES.

	NAME	Fixed Carbon Coke	Volatile Matter Coke	Sulphur Coal	Phos	Ash	REMARKS

	April	2.553	.261	2.29½		"	
	May	2.547	.255	"		"	

FUEL ANALYSES.

Date	NAME	Fixed Carbon	Volatile Matter	Sulphur	Phos.	Ash	REMARKS
94	June	2.563	.271	2.297			
	July	2.546	.256	2.292			
	Aug	2.617	.325	2.292			
	Sept	2.625	.333	2.292			
	Oct	2.579	.285	2.292			
	Nov	2.578	.286	"			
	Dec	2.592	.30	"			
95	Jan	2.553	.261	"			
	Feb	2.57	.278	"			
	Mar	2.573	.281	"			
	April	2.532	.24	"	Covington Coal		
	May	2.522	.23	"		2.24	
	June	2.562	.27	"		"	
	July	2.582	.29	"		"	
	Aug	2.558	.266	"		"	
	Sept	2.557	.265	"		"	
	Oct	2.833	.283	2.55		"	

Coal FUEL ANALYSES Lowmoor

Date	NAME	Fixed Carbon Labor	Vol. Matter Coal	Sulphur Total	Phos Made Coke Tons	Ash Coal Tons delin	REMARKS
95							Coming ton $2.24 for 2000 lbs
	November	.328	2.55	2.878		53 Brought	
	December	.260	"	2.810			
96	January	.253	"	2.803	Tons		
	February	.251	"	2.801	4682	7.60	
	March	.266	"	2.816	4732		
	April	.290	"	2.840	4707	731	
	May	.288	"	2.838	4989	1685	
	June	.270	"	2.82	4856	1497	
	July	.268	2.29	2.605	2046	286	
	Aug	Nonemade -					
	Sept	.460	"	2.75	1593	1075	
	Oct	.275	"	2.56½	4607	1860	
	Nov	.250	"	2.54	4885	1067	
	Dec	.280	"	2.57	4917	2609	
97	Jan	.290	"	2.58	4493	2052	
	Feb	.261	"	2.55	4395	1306	

FUEL ANALYSES.

Date	NAME	Fixed	Vol.	Sulphur	Phos Tons	Ash	REMARKS

97 Jan .296 " 2.5 4495 2082
Feb .261 " 2.55 4395 1306

FUEL ANALYSES.

Date	NAME	Fixed Carbon Labor	Vol. Matter Coal	Sulphur Total	Phos. Tons Make	Ash Bought	REMARKS
97	Mar	.303	2.29	2.59	4693	1773	
	April	.290	2.08⅓	2.37⅓	4688	1238	
	May	.285	2.08⅓	2.36⅔	4082	2181	
	June	.260	2.08⅓	2.34⅓	4490	1262	
	July	.28	2 "	2.36⅓	4710	866	
	Aug	.27	"	2.35⅓	4417	823	
	Sept	.28	"	2.36⅓	3976	1357	
	Oct	.25	"	2.33⅓	4840	1436	
	Nov	.23	"	2.31⅓	4780	1618	
	Dec	.246	"	2.33	4012	2620	
98	Jan	.527	"	2.61	716		
	June	.25	2.00	2.25	4658	732	
	July	.36	"	2.36	2298	2349	
	Aug	.29	"	2.29	4108	967	
	Sept	.24	2.08⅓	2.32⅓	4511	1457	
	Oct	.23	2.08⅓	2.31⅓	4616	505	
	Nov	.27	"	2.35⅓	4756	849	

IRON ANALYSES. Coke Coal Law Moor

Date	Furnace Labor	Sliced Coal	Thos. Total	Silicon Made	Boiler Metal	
98 Dec	.28	2.08⅓	2.36⅓	4528	993	
99 Jan	.26	2.11	2.26	4663	1527	
Feb	.28	"	2.28	3955	1295	
Mar	.29	208	237	4418	1540	
April	.31	2.34	2.65	4239	1418	
May	.30	"	2.64	4644	1541	
June	.28	"	2.62	4138	742	
July	.26	"	2.60	4323	1095	
Aug	.27	"	2.61	5061	721	
Sept	.31	"	2.65	4191	902	
Oct	.32	2.46	2.78	4565	145	Coal
Nov	.27	2.54	2.81	5262	333	Coal 1 ton
Dec	.32	2.87½	3.19	3734	425	1.72½
1900 Jan	.33	2.87½	3.20	4273	851	"
Feb	.32	"	3.19	3612	67	"
Mar	.34	"	3.21½	4926		"
Apl	.33	3.41	3.74	3668		205
May	.38	"	3.79	3300		"
June	.31	"	3.72	4699	312	205
July	.42	"	3.83	4651	1890	"
Aug	.32	"	3.73	4539	583	"
Sept	.35	3.16	3.51	4380	1907	190
Oct	.31	"	3.47	4326	342	"
Nov	.32	"	3.48	4319	66	"
Dec	.27	"	3.43	5530	1255	"
1901 Jan	.29	"	3.45	4800	1949	"
Feb	.33	"	3.49	2712	690	"
Mar	.27	"	3.43	5434	—	"
Apl	.36	2.87	3.23	3875	531	1.72½

Date
190

IRON ANALYSES.

Coke Cost Low Iron

Date	Furnace	Silicon	Total	Sulphur Made	Manga Bought
190 May	.34	2.87	3.21	4130	1692
June	.35	"	3.22	3557	1235
July	.36	"	3.23	3458	1591
Aug	.39	2.58	2.97	3330	2826
Sept	.32	"	2.90	4500	2656
Oct	.32	"	2.90	4740	2350
Nov	.37	"	2.95	4539	1359
Dec	.47	"	3.05	2727	548
1907 Jan	.50	"	3.08	2530	27
Feb				3152	2225.
Mar	.32			4842	247
April	.33			4372	1692
May	36	279	3.21	4328	1956

Coal Cost / ton
1.72½
"
"
"
2.05
"
2.05
"
"
1.90
"
"
"
"
"
"
"
1.72½

IRON ANALYSES.

Date	Furnace	Silicon	Phos.	Sulphur	Mang.

Low Moor

IRON ANALYSES. 1890

See A.

Date	Furnace	Stack Coke	Cross Stone	Silver	Iron
Jan	.41 11	2926	2514	1.58 3/4	3530 5m
Feb	.41 54	2924	2489	1.57	3157 22m
April	.41 67	2915	2441	1.63 1/4	3280
May	.44 3/5	2922	2331	1.75 1/4	3177
June	.45 1/4	3640	2429	1.71 3/4	3144 22m
July	.46 63	2952	2363	1.72 1/2	3239 7m
Aug	.46 89	2935	2420	1.65 2/5	3226

1890	Ore used % Lowmoor	Stack	others	Iron Made % No 1	No 2 + Silvery
Jan	.54 49	.21 15	.24 36	.36 07	.57 66
Feb	.55 60	.21 16	.23 24	.31 47	.63 25
April	.49 74	.13 28	.36 98	.50 22	.44 92
May	.54 08	.14 23	.31 69	.45 70	.40 33
June	.45 63	.14 21	.40 16	.49 47	.40 46
July	.45 90	.14 21	.39 89	.53 21	.35 72
Aug	.47 62	.14 21	.38 17	.58 80	.28 80

L. M. Ore

	Coke Coak		Coal Coak Lump	Washed
Jan	3.16 7/10	.32 1/10	2.09	2.19
Feb	3.18 1/10	.33 1/2	1.62	1.72
April	3.16 9/10	.32 3/10	1.84	1.95
May	3.18 4/5	.34 1/5	1.78	1.94
June	3.18 1/5	.33 3/5	1.98	2.21
July	3.19 7/10	.35 1/10	2.02	2.21
Aug	3.19 2/5	.34 4/5	1.60	1.79

Coal Coak
2.84 3/5 per ton Coke

Fee B- MEMORANDA. Fee B

Law Moor output Weekly-

12/3/92	948	tons	Aug	93-5	929	500	
1-7-93	963	"		12	953	1200	
1-14- "	936	"		19	946	900	
21 "	852	"		26	925		
28 "	944	"	Sept	2	897	100	
2-4-93	932	"		9	1004	200	
11 "	965	"		16	917	1100	
18 "	953	"		23	1006	700	
3-11 "	1037 3/23	"		30	978	300	
18 "	1000 13/23	"	Oct	7	945	1100	
25 "	1023 18/23			14	962	300	
4 1 "	998			21	987	700	
8 "	985 8/23			28	987	1600	
15 "	974 2/23		Nov	4	925	500	
22	1004 6/23			11	1056	500	
29	861 2/23			18	1035	1500	
May 6	946 6/23			25	~~973~~	1700	
13	949 6/23			correct 25	1016	1500	
20	967 3/23		Dec	2	986	1600	
27	892 10/23			9	960	1200	
June 3	926 2/23			16	1074	2100	
10	885 22/23			23	1002	400	
17	867 19/23			30	1043	300	
24	770 15/23		1894				
July 1	814 16/23		Jany	6	1139	800	
8	818 18/23			13	972	200	
15	826 18/23			20	988	400	
22	878 8/23			27	981	1000	
29	872 9/23		Feb	3	1039	1350	
				10	1103	1400	

Fce B — MEMORANDA. Fce. B

94 Low Moor Weekly Output Black 3

Feby 17 –	1	0	8	8	1900	95 Sept 28		7	2 5
24 –	1	0	6	2	1000	Oct 5	8	0	5 20
Mar 3.	1	1	0	1	300	12	8	8	5 16
10 –	1	0	4	8	400	19	8	4	4 6
17.		9	2	7	400	26	9	2	9 6
24.	1	0	0	1	700	Nov 2	9	0	8 21
31	1	0	0	3	300	9	8	9	5 9
April 7		9	7	4	200	16	8	9	4 12
14		9	8	3	800	23	9	0	0 10
21		9	2	3	2000	30	8	9	8 17
28		9	7	6	2200	Dec 7	8	7	0 19
May 5		9	5	8	1000	14	8	3	4 7
12		8	7	2	2000	21	9	3	9 13
19		8	7	7	400	28	9	3	0 2
26		9	2	5	200	96 Jan 4	7	8	3 15
June 2		8	8	2		11	9	2	5 11
9		9	6	1	700	18	1	0	3 5 15
16		8	8	5	1700	25	9	1	4 13
23		9	3	2	2000	Feb 1	9	7	7 11
30		9	1	9	1300	8	9	8	4 12
July 7		9	5	8	900	15	9	6	0 1
14		9	2	1	2200	22	9	4	7 4
21		9	2	1	2000	29	9	6	3 17
28		9	0	7	600	Mar 7	9	7	9 13
Aug 4		9	6	2	1500	14	9	9	1 19
15		4	5	3	1700	21	9	7	7 17
						28	1	0	2 9 22
						April 4	9	6	6 4
						11	9	4	2 19
						18	1	0	2 2 16
						25	1	1	3 3 7

Furnace B goes out of black

MEMORANDA.

Auckland No 1 Output

1892	11	19	358 tons	1893	Dec	28 364.78
		26	350 "		"	30 346.74
	12	3	355 "	1894	Jany	6 355.91
1893	4	8	316 "		"	13 336.87
		15	315.21			20 351.65
		22	324.13			27 362.52
		29	309.60		Feb	3 380.47
	5	6	324.09			10 347.78
		20	296.82			17 352.17
		27	302.03			24 327.73
	6	3	276.87		Mar	3 328.48
		10	255.39			10 370.43
		17	310.95			17 349.43
		24	313.70			24 335.74
	7	1	302.43			31 340.04
Stopt 4 hrs		8	271.78		April	7 332.04
		15	279.78			21 321.56
		22	295.56			28 331.70
		29	299.48		May	5 326.96
	8	5	272.17			Strike
		12	313.26		July	28 314.17
		19	307.87		Aug	4 363.87
		26	293.77		"	11 359.65
		31	93.39			18 293.70
						25 325.04
Stopt 10 30 AM Aug 30					Sept	1 314.56
						8 384.78
Iron made since						15 330.21
1st April 6421 15 "						22 303.56
						29 290.35
					Oct	6 284.43

MEMORANDA

Ashland No 2 1893

April	8	326.08	93 Dec	23	379.21
"	15	339.65		30	324.78
	22	345.56	94 Jany	6	383.95
	29	352.73		13	323.23
May	6	348.35		20	331.87
	20	379.13		27	347.56
	27	348.52	Feby	3	392.12
June	3	352.87		10	344.70
	10	323.87		17	360.72
	17	324.95		24	356.13
	24	329.21	Mar	3	357.70
July	1	312.73		10	305.95
	8	288.61		17	305.65
	15	323.48		24	294.39
	22	296.35		31	305.95
2/3 Rose Run on above week			April	7	308.39
	29	280.26		21	292.43
Aug	5	286.22		28	300.70
	12	278.52	May	5	320.52
	19	299.48		Strike	
	26	283.35			
	31	143.56			

Stoper 9 2nd A M Aug 31

Iron made since 1st April 6899 2nd

Nov 25	291.26	Seper	8	328.74
Dec 2	348.17		15	350.34
9	348.82		22	317.90
16	317.		29	319.22
		Oct	6	313 56

MEMORANDA Ashland

Output

		No 1	No 2	
94 Dec	1	318,00	344.09	
"	8	347.39	342.00	
	15	355.30	344.08	
	22	360.30	402.30	
	29	336.65	388.53	
95 Jan	5	345.56	386.74	
	12	330.52	322.09	
	19	328.52	316.52	
	26	321.74	334.17	
Feb	9	325.75	342.56	
	23	307.70	328.65	
Mar	2	275.70	325.04	
	9	295.00	312.09	
	23	327.43	313.82	
	30	328.00	303.21	
April	6	325.60	322.82	
	13	299.04	325.43	
	20	291.78	290.56	No 3
	27	319.70	294.91	
May	4	289.43	295.30	318.48
	11	293.26	269.52	298.67
	18	275.70	314.04	332.23
	25	296.90	299.12	357.39
June	1	321.52	315.03	351.56
	8	282.23	291.34	353.97
	15	297.74	279.34	355.06
	22	294.13	273.87	364.58
	29	268.52	254.30	321.32
July	6	280.17	246.00	354.17
"	13	Bessemer	264.14	325.54
		414.74		

MEMORANDA

		No 1	No 2	No 3
		Bessemer	High Silicon	Silvery
95 July	20	601.26	268.30	340.43
	27	531.45	287.26	343.65
			Soft Silvery	High Silicon
Aug	3	475.24	303.56	327.06
	10	447.00	306.17	310.56
	17	443.52	316.43	328.30
	24	334.30	313.26	332.82
		Foundry Silvery		
	31	341.87	316.04	320.08
				Soft Silvery
Sept	7	316.61	289.22	357.60
		Bessemer		
	14	549.08	327.74	406.28
				High Sil Basic
	21	574.00	351.74	313.78
	28	596.65	330.52	325.28
				High Sil-
Oct	5	566.35	357.91	338.69
	12	553.70	361.65	331.78
	19	529.91	294.78	334.08
				Soft Silvery
	26	560.78	329.82	300.50
		Soft Silvery		
Nov	2	326.04	328.39	345.17
	9	345.09	348.96	387.52
		Bessemer		
	16	542.74	358.74	325.58
				High Sil 6%
	23	556.52	341.95	333.73
	30	564.95	358.91	340.15
Dec	7	594.74	345.00	304.30
		Soft Silvery		
	14	361.95	332.25	449.43
	21	374.08	353.70	398.47
	28	299.91	352.40	361.08
96 Jany	6	372.22	376.30	369.71
	11	354.17	356.56	329.69
	18	338.30	341.04	358.06
	25	341.82	305.35	368.39
Feby	1	323.04	315.95	370.43
	15	302.08	350.26	349.15
	22	339.70	327.78	409.30

MEMORANDA

Fce A Blast 5 Low Moor

94	Sept	15	8 5 1/23	95	April	13	9 5 0 11/23
	"	22	7 1 6			20	8 6 1 7/23
	"	29	7 3 7 12/23			27	9 5 4 9
	Oct	6	7 2 5 5		May	4	9 7 3 5
		13	7 4 2 21			11	8 8 6 7
		20	6 8 9 5			18	9 5 9 8
		27	6 4 9 3			25	8 9 3 9
	Nov	3	6 3 4 2		June	1	9 2 4 22
		10	8 2 7 2			8	8 8 5 12
		17	8 3 5 7			15	9 0 0 100
		24	8 2 1 3			22	9 5 3 12
	Dec	1	7 4 5 12			29	9 1 4 21
		8	7 5 1 2		July	6	9 1 1 8
		15	8 6 0 14			13	8 9 1 7
		22	9 3 0 4			20	8 9 4 21
		29	8 4 0 3			27	9 7 6 5
95	Jan	5	9 4 9 2		Aug	3	9 4 7 10
	"	12	8 8 0 2			10	9 2 8 10
		19	9 3 2 5			17	9 0 2 16
		26	8 9 6 5			24	9 0 1 12
	Feb	2	9 3 3 10			31	9 2 5 7
		9	8 6 6 8		Sept	7	9 3 1 15
		16	8 4 4 9			14	9 3 1 16
		23	9 0 7 21			21	7 9 8 0
	Mar	2	8 1 6 10				
		9	8 8 6 11	Furnace A. Blown out			
		16	8 6 9 16	10 A. M. Sept 21st 1895			
		23	9 0 0 21				
	Mar	30	8 9 7 3				
	April	6	9 1 3 12				

MEMORANDA

Ice C Blank #3 Lexington & Covington Ry Co

Date	Total Run	#1	#2	#3	
98 April 9th	873	46	733	93	
16	924	88	746	88	
23	917	54	738	124	
30	783	6	655	121	
May 7	824	68	624	132	
14	875	68	696	110	
21	858	53	697	107	
28	778		506	277	
June 4	777		532	244	
11	741	24	448	269	sid
18	762	2	183	480	96
25	921	109	407	403	
July 2	855	33	539	283	
9	774		540	233	
16	810	62	471	276	
23	792	9	136	146	

Blank Ended July 19th 11 P.M.

MEMORANDA Iron

Ashland		1	2	3
96	Feb 29	331.48	348.35	378.84
	Mar 7	275.43	324.17	362.30
	14	296.74	315.60	381.60
	21	out for	365.48	331.45
	April 4	repairs	326.60	363.00
	11		339.56	355.52
	18		371.56	345.08
	25		304.65	304.76
	May 2		300.56	333.50
	9		320.48	331.08
	16		293.82	305.45
	23		283.40	369.21
	30		317.91	346.63
	June 6		295.87	290.95
	13		323.17	288.34
	20		315.17	380.65
	27		295.26	345.93
	July 4		304.04	312.45
	11		319.	354.76
	18		284.09	314.43
	25		263.70	311.36
	Aug 1		247.35	306.45
	8		834.43	299.28
	15		282.61	308.67
	22		304.17	332.43
	29		293.	322.5
	Sept 5		308.22	304.45
	12	300.78	294.56	298.06
	19	323.91	278.61	331.28
	26	307.43	298.26	272.10
	Oct 3	316.22	294.61	285.58

Produ

96 Oc

No

Rec

97 Ja

Fe

Wood

Ma

Ma

Production MEMORANDA Ashland

		1	2	3
96 Oct	10	315.60	297.87	324.32
	17	329.31	291.09	319.28
	24	346.40	325.17	356.19
	31	339.35	321.70	327.21
Nov	7	311.87	283.04	315.08
	14	318.35	297.26	
	21	338.65	312.21	354.58
	28	352.74	356.65	355.82
Dec	5	356.22	330.48	364.80
	12	330.56	332.70	344.13
	19	350.43	340.60	259.78
	26	356.74	351.82	365.69
97 Jan	2	354.95	322.70	336.04
	9	343.26	324.04	342.56
	16	361.00	280.09	336.34
	23	338.21	362.04	337.60
	30	363.91	361.00	289.67
Feb	6	315.00	330.70	287.89
	20	335.87	307.35	315.19
Blood	27	256.82	237.97	338.71
Mar	6	315.65	255.50	308.65
	13	367.22		296.61
	20	379.43	Repairing	319.76
April	3	364.00		Repairing
	10	343.35		
	17	349.26		
	24	354.80		
May	1	339.48		
	8	327.74		
	22	376.13		
	29	332.22		356.52

Ashland	MEMORANDA		Iron Made
	1	2	3
June 5	331,48	Out	328,76
12	312,3	For	263,4
19	294,9	Repair	309,5
26	340,09		352,54
July 3	316,17		322,97
10	309,17		333,36
17	312,35		328,10
24	287,17		385,78
31	323,70		314,10
Aug 7	305,52		315,15
14	306,60		302,39
21	300,87		263,71
28	335,00		258,97
Sept 4	314,22		282,39
11	312,78		300,50
18	340,70		292,34
25	340,35		317,47
Oct 2	331,61		325,52
9	341,7		312,86
16	266,61		267,04
23	362,0		303,69
30	319,96		348,69
Nov 6	315,78		286,19
13	331,17		274,
20	336,7		247,8
27	292,78		299,7
Dec 4	329,09		339,5
11	323,52		311,8
18	306,52		348,7
25	335,78		336,0
98 Jan 1	324,78		264,2

1900

Nov 24

Dec 1

8

22

29

Jan 5

12

19

26

Feb 2

9

16

23

No 1 MEMORANDA Ashland

1900	Ore	Cinder	Lime	Coal	Coke	Labor	Iron	
Nov 24	101	101	71	152	90	2.12	312	H.S.
Dec 1	105	105	74	162	81	1.75	362	"
8	105	105	75	153	91	1.95	322	
22	100	100	74	178	80	195	322	
29	103	103	71	182	87	196	310	
Jan 5	98	107	74	189	86	218	288	
12	1.16	90	84	168	94	192	348	H.S.
19	2.14	~~94~~	94	148	125	239	276	Ferro
26	220		96	152	133	251	263	"
Feb 2	96	107	82	174	98	195	326	H.S.
9	178	29	85	155	122	246	253	Ferro
16	102	102	70	142	94	183	329	
23	125	67	70	128	89	168	372	

No 2 MEMORANDA Ashland

1900	Ore	Cinder	Lime	Coal	Coke	Labor	Iron	
Nov 3	212		89	176	108	211	293	Penn
10	213		89	177	106	209	297	"
18	206		86	171	106	210	295	"
24	210		88	174	105	222	296	"
Dec 1	190	12	84	168	109	210	301	"
1901								
Feb 2	101	102	62	121	90	171	373	H.S.
9	103	103	62	120	90	178	350	"
16	105	105	66	122	91	173	347	"
23	141	71	75	145	88	197	246½	Penn

1901
Feb 9
16
23

No 3 MEMORANDA Ashland

1901	Ore	Cinder	Lime	Coal	Coke	Labor	Iron	
Feb 9	96	119	87	181	96	188	318	H.S.
16	193	13	93	132	132	237	278	Ferro
23	119	84	87	189	97	206	231	H.S
							76	Ferro

MEMORANDA

1900	① Coal	① Coke	② Coal	② Coke	③ Coal	③ Coke
Nov 3	Repairs		518	319	648	214
10			526	316	620	205
18			506	315	648	208
24	474	282	516	312	686	224
Dec 1	586	293	508	330	730	241
8	493	294			720	239
22	575	259	Repairing		704	213
1901 29	566	272			691	234
Jan 5	544	248			520	339
12	588	328			455	304
19	408	347			663	281
26	400	350			700	289
Feb 2	570	318	451	336	646	224
9	394	208	421	313	577	305
16	470	311	424	318	368	367
23	476	331	462	280	581	300

MEMORANDA

MEMORANDA

99	Coal ①	Coke	Coal ②	Coke	Coal ③	Coke
May 20	607	173	606	200	410	290
27	510	289	686	228	668	217
June 3	417	313	433	256	708	232
10	511	290	520	287	709	224
24	736	210	621	259	729	224
July 1	690	224	616	257	731	225
8	583	292	607	253	645	243
15	502	364	595	235	646	268
22	552	266	636	198	84	705
29	692	222	730	210	66	841
Aug 5	717	216	702	220	117	813
12	790	146	663	203	146	826
19	844	125	706	231	146	822
26	676	207	667	214	147	847
Sept 9	691	197	624	194	384	436
16	681	200	650	208	426	399
23	461	394	368	365	490	423
30	436	382	353	387	422	414
Oct	491	429	410	429	156	728
14	640	311	563	308	165	912
21	722	361	496	280	169	932
28	753	215	521	300	164	899
Nov 4	741	192	547	273	154	870
18	716	232	488	324	176	996
27	706	256	458	317	177	976
Dec 2	678	299	492	339	179	989
9	520	286	468	332	162	959
16	584	350	453	319	178	983
23	598	358	512	378	166	923
30	548	329	495	364	163	925

Blowers

1900
Jan 6
13
20
27
Feb 3
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Mar 3
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May 19
June 2
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July 7
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Aug 4
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Sept 1
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Oct 6
13
20

MEMORANDA

1900	Coal ①	Coke	Coal ②	Coke	Coal ③	Coke
Jan 6	558	335	565	290	187	1062
13	562	337	559	279	174	985
20	568	290	480	340	290	647
27	601	299	462	343	454	408
Feb 3	561	279	441	312	460	378
10	565	281	452	337	446	386
17	613	305	491	364	456	371
24	570	285	448	224	460	374
Mar 3	594	297	360	339	297	599
10	602	301	332	332	151	878
17	569	321	445	340	152	894
24	491	368	459	344	162	903
May 19	478	303	432	258	510	325
June 2	470	312	480	240	568	340
9	602	295	482	241	674	769
16	522	313	463	242	602	317
23	476	320	526	263	492	295
30	518	325	526	243	Repairs	
July 7	499	314	567	270		
14	507	303	554	254		
28	516	285	468	220		
Aug 4	570	319	500	250		
11	597	327	532	266		
18	545	307	464	263		
Sept 1	560	334	403	240	402	295
8	569	326	569	257	473	235
15	Repairs		421	233	522	253
29			575	272	496	304
Oct 6			583	264	560	280
13			590	272	570	271
20			601	285	496	248

Ashtabula Coal & Coke

ANACONDA

98	Coal 1	Coke	Coal 2	Coke	Coal 3	Coke
Jan 29	697	156	568	200	575	191
Feb 5	666	165	600	205	628	208
12	613	192	597	202	625	205
19	713	157	585	194	598	197
26	744	150	562	185	575	220
Mar 5	720	153	599	199	556	278
12	695	143	571	186	540	270
19	705	151	554	179	554	249
26	752	160	546	181	633	211
Apr 2	757	161	590	196	624	208
9	677	144	544	176	634	210
16	705	146	582	190	595	195
23	738	157	592	194	496	240
30	749	158	603	198	538	267
May 7	738	150	616	204	693	224
14	736	145	592	197	630	220
28	612	195	593	196	699	219
June 4	538	269	571	190	667	205
11	659	171	584	181	627	212
25	638	206	547	241	590	285
July 2	595	194	538	229	522	261
9	602	200	503	213	633	235
16	655	218	443	216	625	215
30	~~688~~	~~208~~	506	253	541	242
Aug 6	678	205	496	248	604	229
13	Out of blast		518	259	615	204
20	for repairs		532	266	610	192
Sept 3			512	256	652	200
10			632	221	636	204
17			636	211	559	272
24			704	224	555	257

98	
Oct 1	
15	
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Nov 5	
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Dec 3	
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99 Jan 7	
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Feb 4	
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Mar 4	
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18	
25	
April 1	
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22	
29	

MEMORANDA

98	Coal ①	Coke	Coal ②	Coke	Coal ③	Coke
Oct 1			644	201	670	216
15	548	273	494	248	688	229
22	518	259	516	258	671	223
29	588	294	506	253	713	237
Nov 5	645	215	464	226	778	167
12	628	208	700	241	677	188
19	645	215	590	196	675	223
26	621	207	622	206	688	216
Dec 3	655	218	628	209	735	236
10	640	213	488	244	733	236
17	734	244	508	254	628	221
24	708	245	496	255	697	226
31	660	220	412	309.6	670	213
99 Jan 7	614	215	591	240	724	240
14	640	216	559	215	698	228
28	609	224	606	195	696	213
Feb 4	625	227	645	208	718	232
11	593	228	642	252	692	267
18	599	221	608	224	628	253
25	609	203	619	206		
Mar 4	614	199	556	270	Repairing	
11	699	211	526	232		
18	700	210	491	252		
25	640	216	411	308		
April 1	657	274	452	297		
8	672	251	631	216		
15	691	230	688	202		
22	654	192	645	215		
29	616	185	651	202		

Coal MEMORANDA Ashland

		1	2	3
1896 Oct	31	580.80	677.60	636.40
Nov	7	680.80	675.20	768.00
	14	669.20	657.60	
	21	768.80	692.00	596.40
	28	764.00	708.80	590.40
Dec	5	835.20	686.60	616.80
	12	672.00	652.40	700.00
	19	688.80	680.40	462.80
	26	703.60	694.40	400.00
97 Jany	2	688.80	674.80	410.40
	9	705.60	672.00	484.00
	16	738.80	565.20	484.00
	23	705.60	530.00	580.80
	30	697.20	554.40	561.60
Feby	6	672.80	575.20	530.00
	20	712.80	556.80	491.60
	27	568.00	451.20	480.00
Mar	6	644.80	496.80	537.60
	13	601.20		468.00
	20	602.40	Out	416.00
April	3	682.	for	Out
	10	628.80	Repairs	for
	17	640.00		Repairs
	24	634.40		
May	1	753.20		
	8	733.60		
	22	623.60		
	29	631.6	Sold	600
June	5	621.6		566
	12	646.8		561
	19	695.6		592.8

MEMORANDA

		1	2	3
97				
June	26	672.00		655.20
July	3	719.60		611.60
	10	733.6		630.
	17	742.0		569.6
	24	696.8		568.8
	31	691.2		552.
Aug	7	669.6		649.6
	14	680.4		626.4
	21	634.8		583.2
	28	787.2		571.2
Sept	4	764.4	Sold	590.4
	11	697.2		633.6
	18	707.2		712.8
	25	727.6		737.6
Oct	2	715.2		761.2
	9	780.4		836.8
	16	724.8		904.8
	23	636.		808.8
	30	690.8		628.8
Nov	6	684.		566.4
	13	699.6		580.0
	20	749.6		486.8
	27	699.2		678.0
Dec	4	771.		610
	11	767.6		665.6
	18	798.4		613.6
	25	767.2		581.6
98 Jan	1	761.2		490.
	8	762.0		520
	15	759.2	553.6	518
	22	755.2	608.	660

MEMORANDA Jons Coal
Ashland Furnace Wood

Week Ending		№ 1	№ 2	№ 3
95 Aug	17	268.80	716.80	819.20
	24	302.40	732.80	806.40
	31	559.20	729.60	812.80
Sept	7	691.20	745.20	838.40
	14	112.40	739.20	883.20
	21	118.40	780.80	751.60
	28	120.00	755.20	832.80
Oct	5	114.00	803.20	843.60
	12	117.60	806.40	825.60
	19	116.00	713.60	841.60
	26	248.00	684.40	663.20
Nov	2	614.10	729.60	771.20
	9	680.40	758.40	838.40
	16	116.80	777.60	752.00
	23	112.40	748.80	756.00
Dec	7	76.40	752.00	752.00
	14	580.80	742.40	733.20
	21	574.00	777.60	615.20
	28	590.00	803.20	603.20
96 Jany	6	608.80	796.80	778.80
	11	552.00	790.40	738.40
	18	544.00	848.00	777.20
	25	551.20	771.20	736.40
Febry	1	522.40	784.00	676.40
	15	542.40	816.00	694.40
	22	656.80	864.80	731.20
	29	723.20	793.60	716.80
Mar	7	638.80	747.20	602.40
	14	386.00	745.60	624.80
	21		619.20	752.80

MEMORANDA

Week Ending		№ 1	№ 2	№ 3
April	4		768.00	631.20
96-	11		809.60	596.00
	18		624.00	599.20
	25		646.9	701.60
May	2		670.4	806.4
	9		736.0	585.6
	16		717.2	587.6
	23		715.2	665.2
	30		732.8	626.4
June	6		681.6	697.2
	13		655.2	578.4
	20		572.	538.
	27		571.6	569.6
July	4		627.2	581.6
	11		632.8	721.2
	18		560.0	682.4
	25		593.6	686.0
Aug	1		457.6	686.0
	8		522.0	620.0
	15		459.2	736.0
	22		496.0	607.2
	29		570.8	679.6
Sept	5		566.4	745.6
	12	480.80	628.4	720.0
	19	592.80	605.6	590.4
	26	564.00	652.4	628.8
Oct	3	534.00	621.6	580.8
	10	544.80	632.8	620.
	17	568.40	632.8	552
	24	591.2	691.6	667.2

Out for repairs.

MEMORANDA

Oakland — Furnaces

Tons Coal Used per Week

		No 1 Furnace	No 2
1893 Dec	23	619.20	602.40
	30	559.20	516.00
94 Jany	6	655.60	508.80
	13	649.60	604.80
	20	641.20	627.20
	27	726.80	682.00
Feby	3	735.20	676.40
	10	769.60	668.80
	17	720.40	620.00
	24	736.40	652.00
Mar	3	695.60	618.40
	10	730.70	596.30
	17	723.10	642.40
	24	697.60	622.00
	31	699.20	637.00
April	21	680.80	602.40
	28	687.20	535.60
May	5	674.00	535.70
Sept	22	494.80	508.80
	29	599.60	622.40
Oct	6	568.40	627.20
	13	564.80	655.20
	20	530.40	672.00
	27	523.20	672.00
Nov	3	540.00	686.00
	17	578.40	691.60
	24	559.20	660.80
Dec	1	528.00	660.80
	8	583.20	683.20

MEMORANDA

Date	№ 1	№ 2	№ 3 or	
94 Dec 22	664.00	730.80		Norton Furnace
29	648.80	714.40		under the
95 Jan 5	628.40	648.80		A.C.&I. Case
12	655.20	716.80		
19	663.60	726.40		
26	660.40	777.60		
Feb 9	674.80	764.80		
23	663.60	758.40		1/6 mut on №1 1/7 mut " " 2
Mar 9	580.80	752.00		
2	612.00	771.20		Stock very wet.
16	662.80	720.80		
23	658.00	724.80		
30	664.40	697.20		
Apl 6	649.60	697.20		
13	646.00	782.40		
20	634.80	704.00	№ 3	
May 4	632.00	767.20	521.60	
11	661.20	714.40	662.40	
18	688.00	784.00	752.00	
25	622.40	752.00	780.80	
June 1	630.80	770.40	775.60	
8	569.20	708.80	677.60	
15	596.40	788.40	712.40	
22	610.40	759.60	774.40	
29	632.40	843.60	804.00	
July 6	615.20	884.40	889.20	
13	103.60	884.40	828.00	
20	148.80	800.80	850.00	
27	296.40	738.00	839.90	
Aug 3	271.20	761.20	812.80	
10	261.60	739.20	844.80	

MEMORANDA

27th Oct 1893 – Mine Inspector makes volume of air at furnace 62,342 cubic ft

1st Nov 1893 Jacob Schugh resigns and James Heron becomes Supt of Mines –

7th May 1894 Miners Strike

14 Aug 1894 Start Miners

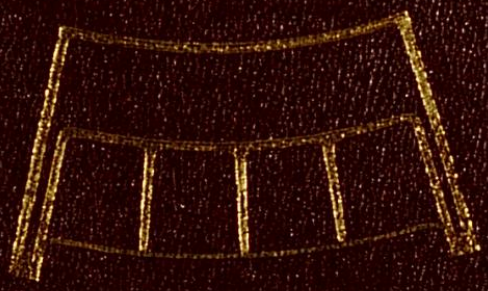
Cambria	Franklin	Marquette	Lime	Coal	Coke	
5213	2607	680	2550	2400	3600	
5152	2576	672	2520	"	"	10×400 Ex
3864	3864	672	2604	"	"	
3772	3772	656	2296	"	"	10×400 Ex

25 July 27 Cambria 1.09
Franklin .555 Bx tin iron
Marquette .174

ELLISON C. MEANS,

56 M301

E. C. Means.



The GAYLEY BOSH COOLING PLATES

ARE MANUFACTURED EXCLUSIVELY BY

BEST, FOX & CO.

25th & RAILROAD STS. PITTSBURGH,

and EDWIN E. SMEETH.

28 N. DESPLAINES ST., CHICAGO.

56 M301

PREFACE.

The importance of maintaining the Bosh wall at its original lines is now fully realized. The phenomenal results in output and fuel economy obtained in recent years are largely attributable to this cause. It has been demonstrated again and again that a cooling plate inserted in the wall affords the most perfect protection. This is necessarily true, since the cooling effect is exerted at that part of the wall which is exposed to wear. With proper protection the bosh will outlast any other part of the lining, and as a result, the output will not be reduced nor fuel consumption increased as the blast continues; this has been practically demonstrated. It can be set down as an established fact that the best results in quantity and quality of metal and economy of fuel are only obtainable through a well protected bosh; a furnace during its blast will repay many times over the expenditure made in this way. Plates made of bronze or copper will invariably give better results than

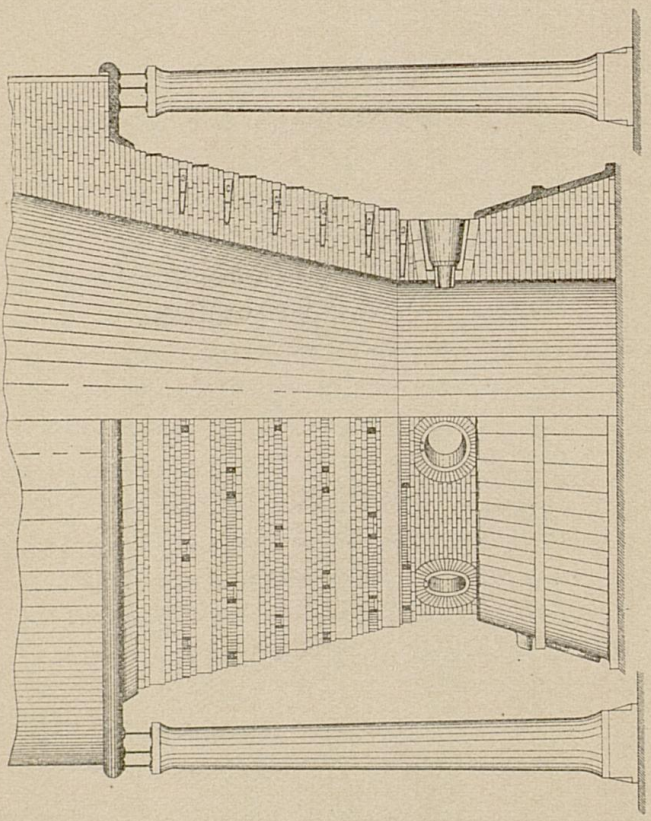
FIG. 1.

THE GAYLEY PATENT BOSH COOLING PLATE.

those made of iron. It is also necessary to use a plate that can be readily changed in case a leak occurs. This saves valuable metal and preserves the slope of the bosh. In the following pages will be found a description and method of using the Gayley Bosh Cooling Plate which has demonstrated its efficiency, through service at many different works.

The Gayley Bosh Plate, shown in Fig. 1, was designed by Mr. James Gayley, Sup't of Edgar Thomson Furnaces, and is the only form of plate among all the various kinds that have been tried at those works which has given satisfactory results in preserving the bosh walls. It is essentially a wedge shape plate with plain surfaced top and bottom. There is but one water course, the water being admitted through one arm to the cooling chamber, passing through and being discharged at the other. This continuous passage prevents the deposit of sediment. The studs in the water course and the webs outside, resist any crushing by the brick work. The webs are provided with openings in the middle for the insertion of a withdrawing hook. The water space being ten inches wide, maintains a large body of water at the hottest part of the furnace, and this space is of such size

FIG. 2.



that it gives eight times the cooling effect obtained from a plate with two iron coils, $1\frac{1}{4}$ in. in diameter.

In Fig. 2 is shown a furnace equipped with the Gayley Bosh Plates. The method of construction is exceedingly simple, and for this reason is securing rapid adoption among practical furnace men. As shown in the drawing, the arms on the outside are placed flush with the brick work. Between the arms are placed bricks on edge to present a more finished appearance; by removing these bricks, the plate is exposed to view and readily examined. In case of a leak the water flows down along the bottom of plate and can be quickly observed. The plate can be withdrawn in thirty minutes and a new one inserted, preventing any loss of bronze or copper. If the plate is only "drilled" it can be plugged and used again. Bricks of special design are not required in construction. The ordinary nine-inch or thirteen inch brick or tile answer the purpose perfectly. These plates will maintain the bosh wall in perfect shape, and will, therefore, produce the most economical results in quantity and quality of metal, and consumption of fuel.

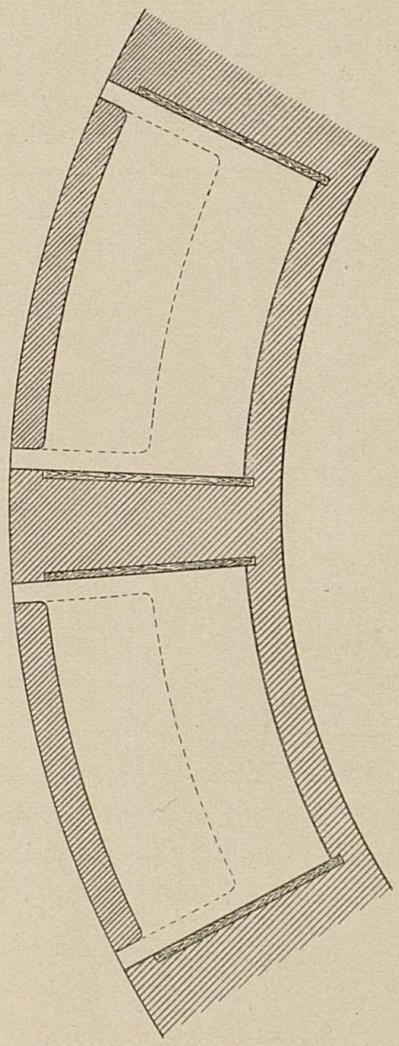


FIG. 3.

DIRECTIONS FOR SETTING THE PLATES.

The plates are enclosed in the brick work as shown in Fig. 3. The inner edge of plate can be placed from two to six inches—as preferred—from edge of lining. The plates are placed twelve inches apart at their inner points; this will allow nine inches for brick work and also space for the packing. Alongside of the end of the plate is laid a strip of wood three-quarters of an inch thick, and between this strip and the plate is put in a clay packing of about one-half inch thick, so that the plate will draw readily. The strip of wood is built in as shown in the drawing, this will become charred and permit of expansion. The upper side of the plate is horizontal, with water outlet at the top. On the upper and lower sides of the plate put in a clay packing one-half inch thick. The arms for inlet and outlet water should be flush with outer edge of lining. The offset between the arms is filled in with nine inch bricks placed on edge. The first row of plates can be placed from two feet to two feet six inches above tuyeres; those

FIG. 4.

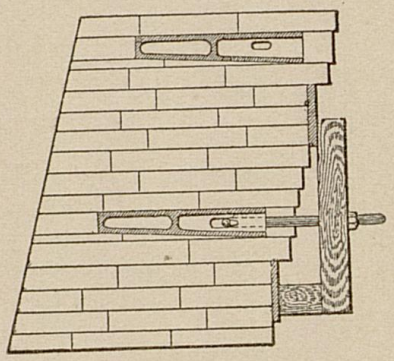
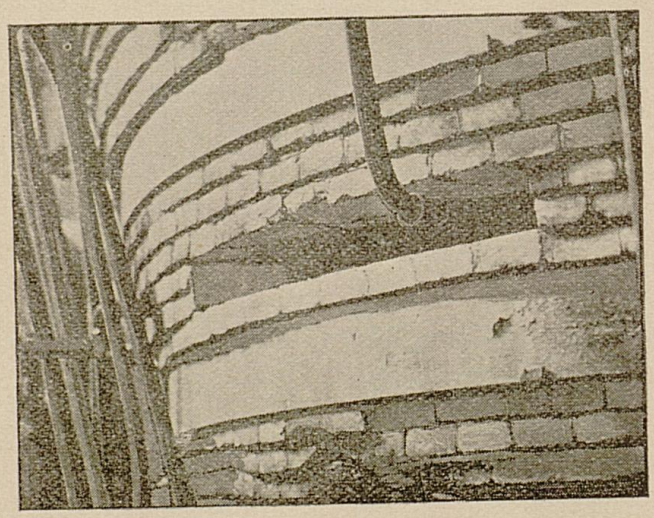


FIG. 5.



above from fifteen to twenty-four inches apart as preferred.

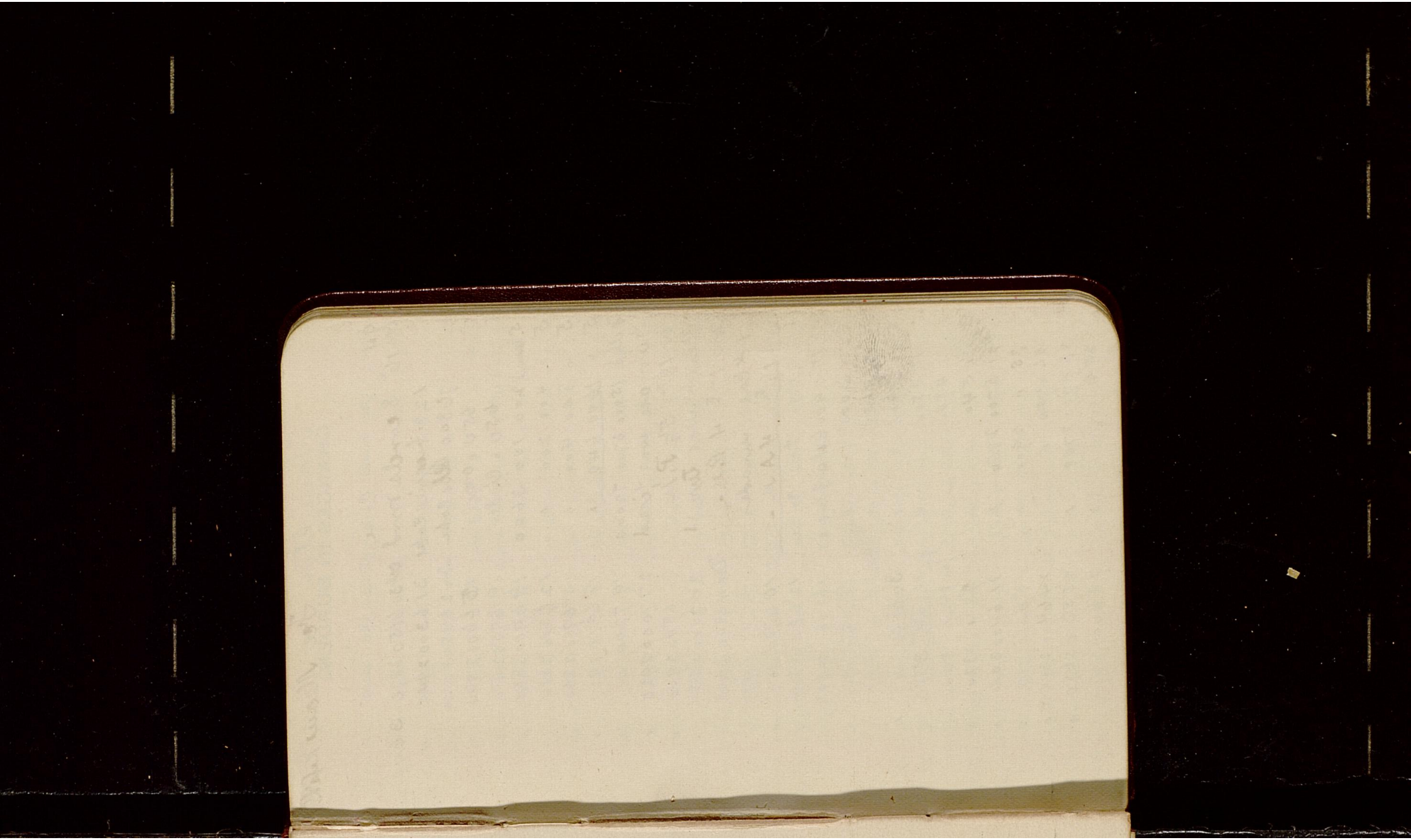
Two or more plates can be connected, depending on the distance above tuyeres and head of water. It is advised that in the row immediately above tuyeres, the plates be supplied separately with water, as they are more exposed.

A row of this kind of Bosh Plate can be inserted in an old furnace in fifteen to twenty-four hours.

METHOD OF REMOVING THE PLATE.

When necessity requires, this plate can be readily withdrawn and another inserted. In Fig. 4 is shown one method of removal, by a screw-jack arrangement. Proceed as follows: place a platform, of trestles and boards on top, at a convenient working height, insert the hooked end of withdrawing bar (inch and a quarter bar) in slot in the web partition; place the wooden brace over the threaded end of the bar, put on washers and nut, and tighten. It is necessary to have two bars, adjusting them to

the outer webs. When both are in position, tap the plate with a heavy bar and screw up on nuts. The plate will be found to start readily. Another method is to use a bar with slotted end which is placed around the middle web, drive a key through holes in the ends of this bar and in web to secure it. Then by means of the "Welshman," or by jarring with a heavy claw puller the plate can be started. The appearance of th brick work after plate is withdrawn is shown in Fig. 5, which is from a photo-graph taken after the removal of a plate from an old furnace. The bricks remain in position and the plate opening is left intact.



Hamilton Ice Means Kyle & Co

CHANGES IN BURDEN.

Date	Ore	Stone	Coke
9th			
Oct 16th	8 cords wood		
	128 buggies Coke		
	76800 lbs Coke		
	650 " Ore		
	650 " Cinder		
5 Charges	200	100	3600
5 "	400	200	"
5 "	800	400	"
5 "	1600	640	"
Filled	15000	6700	72000
Furnace was fired			
on 16th 5½ P.M.			
Blast was turned			
on 17th 4 P.M.			
1st Cast made			
on 19th 4 A.M.			
	Ore	Stone	Coke
Oct 17	2400	~~640~~	3600
	3000		"
18	3600		"
	3900		"
19	4500		"
	4800		"
20	5400		"
21	5700	2850	"
25	"	2900	"
26	~~4500~~	"	"
28	5700	2700	"
29	6000	2800 3100	"

Date	Ore	Stone	
Oct 30	6150	2870	3600
31	6300	2940	"
Nov 2	6450	3010	"
~~5~~	6600	2860	"
9	6750	2800	"
11	6900	2860	"
12	7200	2880	"
13	6900	2860	"
18	6910	2927	"
19	7200	"	"
27	7000	2920	"
"	6800	2900	"
30	7000	2880	"
Dec 4	6800	2600	"
6	"	2500	"
10	6700	"	"
12	6600	2600	"
16	"	2800	"
18	"	2900	"
24	"	3100	"
30	6800	"	"
31	"	3180	"
95 Jan 1	"	3200	"
9	"	3100	"
11	6400	3000	"
14	6600		
24	6400	2800	"
25	5600	2680	"
28	6000	2800	"

Date	
95	
Jan 31	6
Feb 2	
13	6
16	6
19	6
"	6
27	7
28	7
Mar 1	6
2	6
4	
16	7
18	
20	6
21	
25	6
May 4	6
11	6
16	
20	
25	5
Blast	
June 4	5
6	5
15	6
18	6
29	6

CHANGES IN BURDEN.

Days 95	Ore	Stone	Coke	Days 95	Ore	Stone	Coke
Jan 31	6400	2500	3600	July 22	4800	1960	3600
Feb 2	"	2400	"	24	5600	2280	"
13	6600	"	"		6000	2440	"
16	6400	2100	"	27	6200	2500	" coal
19	6600	"	"	Aug 4	"	2400	3300 + 600
"	6800	"	"	6	6300	"	" "
27	7000	"	"	7	6400	2440	3000 + 1200
28	7200	"	"	"	"	2400	3300 + 600
Mar 1	6600	"	"	12	6200	"	" "
2	6800	"	"	16	"	2480	3600 0
4	"	2400	"	25	5200	2210	"
16	7000	2500	"	26	5600	2380	"
18	"	2700	"	27	6000	2710	3000 + 1200
20	6800	2800	"	28	6200	2780	" "
21	"	2900	"	30	6000	2700	" "
25	6600	2800	"	Sept 7	"	2500	3600 0
May 4	6425	2500	"	14	"	"	3300 + 600
11	6225	2400	"	16	5800	2480	" "
	"	2500	Ore 3300 Coal 1200	24	5600	2240	" "
	"	2600	"	Oct 7	5800	2320	3000 + 1200
16	"	2500	"	24	6400	2560	3600
20	"	"	coal 600 Coke 3300	29	6000	2480	"
25	5525	2200	"	31	6400	2600	"
Blast off 9 da + 18 hrs				Nov 1	6200	2560	"
June 4	5500	2200	3600	5	5600	2240	3300 + 600
6	5875	2400	"	20	5920	2520	3600
15	6050	2400	"	Dec 7	6000	2560	"
18	6400	2680	"	9	6160	2440	"
29	4800	1960	"	16	5800	2480	"

Hamilton Fce

CHANGES IN BURDEN.

Date	Cinder Ore	Stone	Coal Coke
96 Jan 12	5802	2480	3600
18	4800	2000	"
22	5200	2140	"
Feb 1	"	"	"
6	5800	2380	"
14	"	"	6000 3300
17	"	2440	3600
19	"	2320	"
Mar 5	6000	2400	"
7	5800	2360	"
15	6000	"	"
21	"	2400	"
April 7	"	2500	"
21	5800	2840	"
26	"	2600	"
May 19	5600	2510	"
23	"	2240	"
June 9	5300	2180	"
21	5400	2600	"
23	5600	2370	"
25	5400	2580	"
27	"	"	"
30	"	2380	"
July 5	"	2200	"
Aug 6	5200	2120	4200
22	6000	2560	"

Date	Ore	Stone	
	Filling	Furnace	
19	rounds Coke	3600 lbs Coke	
	Coke	Ore	30 " " Lime
5	3600	200	100 lbs
5	"	450	250
5	"	900	400
4	"	1600	650
5	"	2000	800
5	"	2500	1000
Dec 21	"	3500 4000 4400 4800 5600 5600	1472 1672 1840 1980 2540 2480
22	"		
23	"		
25	"	5600	2440
97 Jan 2	"	5900	2400
4	"	"	2400
10	"	"	2500
20	"	5700	"
25	"	6050	2460
Feb 13	"	6200	2440
19	"	6280	2400
Mar 7	"	5600	2280
10	"	5800	2340
21	"	5200	2280
23	"	5000	2165
April 10	"	5600	2340
22	"	5800	2300
May 9	"	"	2100
13	"	"	2320
28	"	5600	2240

Date		
June 12	5	
15	5	
27	5	
28	6	
30	6	
July 1	6	
3	6	
Sept 12	7	
Nov 1	7	
27	7	
98 Mar 19	7	
98 June		
1081		
12 charge		
23 "	2	
27 "	3	
51 "	4	
25 "		
27 "		
June 18		
" 19		
" 20	5	
" 25		
July 3		
7		
15		
30		
Aug 4		

CHANGES IN BURDEN.

Date	Ore	Stone	Coke	Date	Ore	Stone	Coke	
97				98				
June 12	5800	2300	3600	Sept 25	7600	2700	4800	Doty
15	5600	2200	"	27	7800	2700	"	
27	5160	2060	"	29	8200	2720	"	
28	6240	2480	4800	30	9000	2850	"	
30	6400	2340	"	Oct 2	8800	"	"	
July 1	6700	2500	"	4	8400	3000	"	
3	6400	2340	"	5	7800	3100	"	
Sept 12	7200	2670	4680	13	8000	2880	"	
Nov 1	7600	3200	4600	22	7800	3000	"	
27	7000	2880	"	28	8000	3000	"	
98 Mar 19	7050	3100	"	Nov	48120	3200	"	
98 June 14	Filling			3	7875	"	"	
108	Buggies Coke			6	7200	"	"	
		lbs	64800	8	7400	2600	"	Williams
12 Charges	520	250	3600	11	7800	2420	"	
23 "	2800	800	"	13	7800	2460	"	
22 "	3990	2000	"	16	7400	2600	"	
51 "	4000	"	"	18	7080	2140	"	
25 "	"	"	"	27	7997½	2780	5400	
27 "	4320	2100	"	29	8400	2900	"	
June 18	"	"	"	Dec 3	8600	2760	"	
" 19	5100	2400	"	10	8787½	2720	"	
" 20	5500	3000	"	12	"	2640	"	
" 25	"	2800	"	16	8707½	2700	"	
July 3	5550	2300	"	17	8212½	2655	"	
7	5610	2100	"	23	7997½	2595	"	
15	5400	2040	"	27	8212½	2655	"	
30	5250	2100	"	30	"	2490	"	
Aug 4	"	2200	"	99 Jan 2	7997½	2595	"	

99 CHANGES IN BURDEN. Hamilton Fce

Date	Ore	Stone	Coke		
Jan 5	7597½	2490	5400		
8	7997½	2595	"		
10	8212½	2655	"		
11	8600	2760	"		
12	8787½	2820	"		
14	8935	2850	"		
17	9015	2880	"	Coal	
21	9202½	3060	"	600	
28	9310	"	"	"	
30	8787½	3000	"	"	
Feb 3	9015	2970	"	"	
4	9202½	3060	"	"	
6	9402½	3120	"	"	
16	9590	3180	"	"	
18	9015	3075	"	"	
22	9202½	3480	"	"	
25	9015	3315	"	"	
March 8	8475	3180	"	"	
19	8112½	3200	"	"	
22	7797	3150	"	"	
26	"	2180	"	300	
April 1	8209½	2170	"		
2	8400	3000	"		
5	8207	2950	"		
9	"	2790	"		
11	8400	2730			
12	8475	2500	"		
16	8800	"	"		
18	8200	2330	"		
April 19	8400	2380	5400		
21	8500	2300	"		
28	"	2400	"		
May 1	8200	2350	"		
8	8400	2250	"		
13	8000	2100	"		
25	8200	2150	"		
25	8400	1900	"		Court 15 hours break not
27	"	2055	"		
June 2	8200	2000	"		
6	7800	2100	"		
8	8000	2275	"		
9	8200	2325	"		
11	8000	2275	"		
13	7800	2310	"		
14	7400	2170	"		Blast off 20 hours cleaning flues
16	7600	2216	"		
24	8000	1830	"		
23	"	1870	"		
24	"	1970	"		
25	8200	1930	"		Malcahy
26	8400	1960	"		"
27	8600	2010	"		"
July 3	7600	2200	"		Willard Found
4	7800	2400			
5	8000	2500			
6	8200	2610			
7	"	2715			
10	8400	3000			

Date		
July	11	8
	12	
	14	
	15	
	17	8
	18	8
	21	8
	31	
Aug	1	
	2	
	6	9
	7	9
	8	
	12	
	15	9
	16	9
	19	9
	22	9
	24	10
	25	9
	28	8
	30	7
	31	7
Sept	8	7
	9	7
	16	9
	21	9
Oct	2	8
	3	9

Ice

CHANGES IN BURDEN.

Day	Ore	Stone	Coke	Day	Ore	Stone	Coke
July 11	8400	2610	5400 Coal	Oct 3	9800	2640	5388
12	"	"	4440+2100	4	9400	2745	"
14	"	"	5434-504	6	"	3210	"
15	"	"	4878-1080	8	8400	2895	"
17	8600	2670	4869-2160	9	9400	1770	"
18	8400	2700	" "	11	7000	1950	"
21	8600	2985	" "	12	"	3300	5419
31	"	"	5400-	14	6600	2610	"
Aug 1	"	2520	5388 Coal	18	6400	2745	"
2	"	2820	4878-1080	20	7600	3000	"
6	9400	1980	" "	21	8400	3450	"
7	9800	1970	" "	27	"	2565	5960
8	"	1740	" "	Nov 4	8000	1810	"
12	"	2010	" "	4	8800	1860	"
15	9400	2090	5388	8	8400	1830	"
16	9800	2160	" Coal	9	8600	1740	"
19	9000	2030	4878-1080	11	8800	1770	"
22	9800	2170	" "	15	8800	2415	"
24	10200	2230	" "	16	8600	2610	"
25	9400	2100	" "	28	8800	2655	"
28	8200	2910	5388 -	22	9000	2715	"
30	7800	2625	"	28	9200	2880	"
31	7400	2505	" Coal	Dec 2	9400	2925	"
Sept 8	7000	2370	4878-1080	9	9200	2880	5940
9	7400	2505	" "	12	9000	2820	4860-2160
16	9800	2700	" "	18	9200	2760	5940
21	9000	2070	5388	20	"	2850	5400-1080
Oct 2	8000	2220	"	25	7200	2010	5940
3	9000	2445	"	26	9000	2715	4860-2160

1900 CHANGES IN BURDEN. Hamilton Fee

Date	Ore	Stone	Coke-Coal	Date	Ore	Stone	Coke	Date	
Jan 1	9400	3045	4320-2160	Mar 22	9000	2085	5940		
4	9000	2985	5400+1080	24	9600	2175	"		
8	9400	3090	" "						
11	9200	2760	5940-						
15	8800	1840	"						
22	9200	1895	"						
23	9600	1960	"						
24	10000	2015	"						
25	10400	2215	"						
26	"	2360	"						
27	8400	3345	"						
29	"	3555	"						
30	"	3780	"						
Feb 1	"	3800	"						
5	8000	3880	"						
12	8600	2980	"						
14	"	3020	"						
19	9600	2625	"						
20	10000	2520	"						
~~Mar 2~~	"	2280	"						
Mar 4	8000	3500	"						
6	7600	3160	"						
8	7200	2920	"						
13	7600	3680	"						
15	10400	2440	"						
16	10800	2680 2825	"						
17	10000	2685	"						
19	9600	2785	"						
20	"	2175	"						

Lee

CHANGES IN BURDEN.

Date	Ore	Stone		Date	Ore	Stone	

BLANK
PAGE(S)

ORE MIXTURES. Hamilton Furnace

Name of Ore	Date 1894 Oct 20	Oct 26	Oct 28	29	30	31	Nov 2	5	9	11
Native	~~5400~~	4750	3800	4000	4100	4200	4300	4400	4500	5175
Lake		950	1900	2000	2050	2100	2150	2200	2250	1725
Limestone			2700 2800	3100	2870	2940	3010	2860	2800	2860
Coke			3600	=	=	=	=	=	=	=

	Nov 12	13	18	19	27	27	30	Dec 3	4	6
Native	~~5400~~	5175	5180	5400	5250	5100	5250	=	5100	=
Lake	1800	1725	1730	1800	1750	1700	1750	=	1700	=
Limest	2880	2860	2927	=	2920	2900	2880	2600	=	2500
Coke	3600	=	=	=	=	=	=	=	=	=

	Dec 10	= 12	= 16	= 18	= 24	= 30	95 Jan 1	= 9	= 11	= 14
Native	4950	4538	=	5363	5362½	5525	5100	5525	5200	5363
Lake	1650	=	=	825	1237½	1275	=	1375	1200	1237
Cinder		412½	412	=	0	0	425	0	0	0
Lime	2500	2600	2800	2900	3100	=	3200	3100	3000	=
Coke	3600	=	=	=	=	=	=	=	=	=

ORE MIXTURES.

Name of Ore	Date 95 Jan 24	= 25	= 28	= 29	= 31	Feb 2	= 13	= 16	= 19	= 27

ORE MIXTURES.

Name of Ore	Date 95 Jan 24	= 25	= 28	= 29	= 31	Feb 2	= 13	= 16	= 19	= 27
Native	5200	4550	4875	=	5200	=	5363	5200	5525	5687
Lake	1200	1050	1125	=	1200	=	1237½	1200	1275	1312
Cinder	0	0	0	0	0	0	0	0	0	0
Lime	2800	2680	2800	2700	2500	2400	=	2100	=	=
Coke	3600	=	=	=	=	3600	=	=	=	=
	95 Febr 28	Mar 1	= 2	= 4	= 11	= 13	= 20	= 21	= 25	= 30
Native	5850	5365	5525	=	5687½	4812½	4675	=	5362½	5775
Lake	1350	1237	1275	=	1312½	=	1275	=	1237½	825
Cinder	0	0	0	0	0	875	850	=	0	0
Lime	2100	=	=	2400	2500	=	2800	2900	2800	=
Coke	3600	=	=	=	=	=	3600	=	=	=
	May 4	= 6	= 9	= 18	= 16	= 19	= 25	June 6	= 9	18
Native	4950	4800	=	4000	=	=	3500	3750	3875	4000
Black Band	825	800	=	=	=	=	700	750	775	800
Lake	0	0	0	800	=	=	700	750	775	800
Cinder	650	625	=	625	=	=	=	625	=	800
Lime	2500	2400	2500	2600	2500	=	1200	2400	=	2680
Coke	3600	3600	Coke 3300 Coal 1200	=	=	3300 600	=	3600	=	=

ORE MIXTURES. Hamilton Fce.

Name of Ore / Date	Aug 3	= 6	= 7	= 11	= 12	= 15	= 25	= 28	= 30	Sept 7
Native 12.13	3875 775	3937.5 787.5	4000 800	4400	3875	3100	2600	3100	3000	3750
Lake	775	787.5	800	1200	1550	=	1300	1550	1500	=
Cinder	775	787.5	800	800	775	1550	1300	1550	1500	750
Lime	2500	2400.	2440	2400	=	2480	2210	2780	2700	2500
Coke	3600	3300	3000	3300	3600	=	=	3000	=	3600
Coal		600	1200	600				1200	=	

Name of Ore / Date	Sept 21	= 24	Oct 7	= 24	= 29	Nov 1	= 7	= 10	= 12	= 20
Native	3750	3500	3625	4000	3750	3875	3150	3375	3262	3330
Lake	1450	1400	1450	1600	1500	1550	1400	1500	1450	1480
Cinder	750	700	725	800	750	775	1050	1125	1087	1110
Lime	2500	2240	2320	2560	2480	2560	2240	2480	2440	2520
Coke	3300	=	3000	3600	3600	=	3300	=	3600	3600
Coal	600	=	1200				600	=		

ORE MIXTURES.

Name of Ore / Date	96 Jan 12	= 18	= 26	Feb 6	Mar 21	May 24	June 9	= 23	= 25	= 30

ORE MIXTURES.

Name of Ore	Date 96 Jan 12	= 18	= 26	Feb 6	Mar 21	May 24	June 9	= 23	= 25	= 30	
Native	3262	2400	2600	2900	2900	2800	3250	2800	4050	2700	
Lake	1450	1200	1300	1450	1550	1400	650	1400	675	1350	
Cinder	1088	1200	1300	1450	1550	1400	1300	1400	675	1350	
Lime	2480	2000	2140	2380	2360	2240	2180	2370	2560	2380	
Coke	3600	=	=	=	=	=	=	=	=	=	
	96 July 5	= 19	= 22	Aug 6	= 16	= 19	= 23	Dec 25	97 Jan 2	= 4	
Native	2700	3037.5	2925	=	2700	2900	3000	3850	3750	=	
Lake	1350	1012.5	975	=	1350	1450	1500	1400	1450	=	
Cinder	1350	1850	1300	=	1350	1450	1500	350	700	=	
Lime	2200	2320	2120	=	2240	2400	2560	2440	2400	2500	
Coke	3600	=	=	4200	=	=	=	3600	=	=	
	97 Jan 20	= 25	Feb 8	= 19	Mar 10	= 29	April 15	= 22	May 7		
Native	3875	=	=	3925	3625	3125	3500	3625	=		Native Vermilion Norman Roll Scale Mill Cinder
Lake	1475	=	1550	1570	1450	1250	1400	1450	=		
Cinder	350	700	775	785	725	625	700	725	=		
Lime	2500	2460	2440	2400	2340	2165	2340	2420	2300		Lime
Coke	3600	=	=	=	=	=	=	=	=		Coke

97

ORE MIXTURES. Hamilton Fee

Name of Ore / Date	May 9	" 23	" 28	June 6	" 15	" 20	" 23	" 30	July 11	18
Native	3625	=	3500	3625	3500	=	3225	4000	4500	4750
Vermillion	725	1450	700	725	700				450	475
Norman	725	Columbia	700	1450	1400	=	1290	1600	1800	1900
Roll Scale	725	=	700			700	645	800	450	475
Lime	2320	2320	2240	2300	2200	=	2060	2340	2560	2660
Coke	3600	=	=	=	=	=	=	4800	=	=

Name of Ore / Date	Aug 7	16	Sept 6	" 27	Oct 1	" 8	" 31	Nov 11	" 14	" 18
Native	4750	4625	4500	3600	4500	3500	4275	3375	3487½	3825
Negaunee	1900	2312½	2250	=	1800	1400	1900	1500	2150	1700
Vermillion	475		Cinder	900	900	700	950	950	387½	425
Roll Scale	475	462½	450	=			475	375	775	850
Lime	2940	2740	2670	=	2640	2200	3200	2520	2600	2780
Coke	4680	=	=	=	=	=	4600	=	=	=
						Stone off		Stone off		

ORE MIXTURES.

Name of Ore / Date	Nov 21	" 29	Dec 12	" 24	Jan 7	" 12	" 19	" 26	Feb 16	21
									4375	3825

ORE MIXTURES.

Name of Ore	Date Nov 21	= 29	Dec 12	= 24	Jan 7	= 12	= 19	= 26	Feb 16	21
Native	3937½	=	=	3375	3600	3375	3825	3937½	4375	3825
Stegamite	1312½	1750	=	1500	1600	1500	1700	1750	1750	1700
Red Scale	437½	~~875~~	437½	375	400	375	425	437½		
Cinder	1312½	875	=	750	800	750	850	875	875	1275
Lime	2880	2800	2880	2460	2600	2460	2780	2900	2980	3100
Coke	4600	=	=	=	=	=	=	=	=	=

	98 Mar 8	June 17	= 25	= 29	July 2	= 7	= 15	= 23	= 27	Aug 6
Native	3937½	2880	2975	2700	2775	2805	2700	2400	2625	=
Stegamite	1800	720	850	1800	1850	1870	1800	1600	1750	1312½
Red Scale			425			487½	450	400	875	437½
Cinder	1312½	720	850	900	925	487½	450	400		875
Lime	3100	2100	2800	2540	2300	2100	2040	2080	2000	2200
Coke	4600	3600	=	=	=	=	=	=	=	=

ORE MIXTURES.

Name of Ore	Date Aug 13	= 18	= 21	= 25	= 28	Sept 4	= 10	= 11	= 20	= 30
Native	2400	2475	3712½	4000	3175	2450	3062½	3150	3412½	3937½
Lake	1200	1237½	1750	=	2475	2100	1625	2700	2925	3375
Roll Scale	400	412½	412½	=	825					562
Cinder	800	825	825	=	875	1050	1312½	1350	1462½	1125
Lime	2000	=	2480	=	2260	2000	2540	2600	2820	2850
Coke	3600	=	=	=	4806	=	=	=	=	=
	Oct 15	Oct 18	= 28	Nov 4	= 6	Brew Summary	= 8	= 11	= 13	18
Native	3500	3412½	3500	3557½	3150	Native	1387½	1425	1462½	1327½
Norman	2000	1950	2000	2030	1800	Peganum	1850	1900	1950	1770
Vermilla	1000	975	1000	1015	900	Norman	1850	1900	1950	1770
Cinder	1500	975	1000	1015	900	Cliff Shaft	925	950	975	885
Roll Scale		487½	500	507½	450	Cinder	925	950	975	885
Lime	2880	3000	=	3200	=	Roll Scale	462½	475	487½	442½
Coke	4800	4800	=	=	=	Lime	2800	2420	2460	2140
						Coke	4800	=	=	=

ORE MIXTURES.

Name of Ore	Date Nov 22	= 25	Dec 3	= 10	= 17	= 23	= 27	Jan 5	= 8	= 14
										3500

ORE MIXTURES.

Name of Ore	Date Nov 22	= 25	Dec 3	= 10	= 17	= 23	= 27	99 Jan 5	= 8	= 14
Native	2412½	2250	2412½	2467½	2300	2250	2300	2125	2250	2500
Negaunee	1125	1045	1125	1150	1075	1045	1075	995	1045	1170
Norman	1125	1045	1125	1150	1075	1045	1075	995	1045	2975
Cliff Shaft	2250	2090	2250	2300	2150	2090	2150	1990	2090	585
Cinder	1125	1045	1125	1150	1075	1045	1075	995	1045	1170
Roll Scale	562½	522½	562½	575	537½	522½	537½	497½	522½	585
Limestone	3040	2780	2760	2720	2655	2595	2665	2490	2595	2850
Coke	5400	=	=	=	=	=	=	=	=	=

Name of Ore	99 Jan 17	= 21	= 28	# 30	Feb 4	= 6	= 16	= 18	= 22	= 25
Native	2525	2575	2600	2462½	2575	2637½	2687½	2525	2575	2525
Negaunee	1180	1205	1220	1150	1205	1230	1255 Mangan 590	1180 1205	1205	1180 1180
Norman	2950	3012½	3050	2875	3012½	3075	3137½	2360	602½	590
Cliff Shaft	590	602½	610	575	602½	615	627½	590	1205	1180
Cinder	1180	1205	1220	1150	1205	1230	1255	1180	1205	1180
Roll Scale	590	602½	610	575	602½	615	627½	590	1205	1180
Limestone	2880	3060	=	3000	3060	3120	3180	3075	3480	3315
Coke	5400	=	=	=	=	=	=	=	=	=
Coal		600	600	=	=	=	=	=	=	=

99

ORE MIXTURES. Hamilton Fee

Name of Ore	Date Mar 8	= 17	= 22	= 26	April 1	= 7	= 12	= 26	May 8	= 20
Native	2412½	2300	2187½	=	2300	2350	22%	=	=	22%
Negaunee Norman	1125	1075	1070	=	1075	1100	6½ %	=	=	6½
Cliff Shaft	562½	537½	510	=	537½	550	19½ %	=	=	19½
Maugan	1125	1075	1020	2040	2150	1100	26 %	39	=	39
Cinder	1125	1075	1020			1100	13 %	=	8⅔	8⅔
Scale	1125	1075	1020	=	1075	1100	13 %		4⅓	4⅓
Lime	3180	3200	3150	2180	2170	3000	=	2360	2750	
Coke	5400	=	=	=	=	=	=	=	=	
Coal	600	=	=	300						

1899	May 22	June 7	= 11		June 13		= 18	= 21		23
Native	22%	22	22	Native	22%	Pine Grove	11 %	12½	Pine Grove	6¼
Norman	39 %	32½	43	Columbia	13	Obin	11%		Fernillie	18¾
Cliff Shaft	26 %	32½	52	Audrey	26	Fernillie	26%	18⅔	Peradise	12½
				Fernillie	26	Audrey	26	50	Audrey	50
						Columbia Norman	13	12½		
Cinder	6½%	13	13	Cinder	13	Peradise		6½	Maugan	12½
Scale	6½%			Scale		Cinder Scale	6½		Malleable Iron	

ORE MIXTURES.

Name of Ore	Date 99 June 25	= 27		July 3	11	15	Aug 6	= 13	13	15

Scale 6½% | Scale | Scale | 6½ | Magnetic Iron

ORE MIXTURES.

Name of Ore	Date June 25	= 27		July 3	11	15	Aug 6	= 13	13	15
Pine Grove	12½%	6¼	Pine Grove	11%	5½	5½	12½	Pine Grove	18¾%	
Vermillion	18¾	18¾	Ohio	11	16½	16½	Eureka 18¾	Vermillion	12½	12½
P. Geneva	6¼	12½	Vermillion	26	26	26	12½	Audrey	18¾	18¾
Audrey	50	62½	~~P. Geneva~~	6½	6½	P. Geneva	6¼	Amelia	18¾	18¾
Maryan	12½		Columbia	13	13	13	Sparta 18¾	Sparta	18¾	18¾
			Audrey	26	26	26	18¾	Chandler	12½	18¾
			Cinder	6½	6½	13	Chandler 12½	P. Geneva		12½
	Sept 2	= 14	= 17	=	= 20	Oct	= 1	= 5	= 9	= 12
Pine Grove	13%	=	P. Geneva	12½	=	Pine Gr	26%	35	13	13
Ohio	9	=	Sparta	25	=	Ohio	9		9	9
Audrey	13	=	Chandler	43¾	=	Columbia	13	13	13	13
Amelia	26	39	Audrey	18¾		Amelia	52	52	26	13
Cinder	13	=	Amelia		18¾			Audrey	26	13
Scale	13			Bessemer				Cinder	6½	19½
Columbia	13	=						Scale	6½	6½
									Vermillion	13

ORE MIXTURES.

Name of Ore	Date 99	Wallace						Berseaver 1900	
	Oct 30	Nov 2	= 8	13	~~27~~	Dec 13	18	Jan 15 to 24th	
P. Grove	9%	12½	6¼	9%	=	9	9	Berseaver	~~Sparta~~
Obin	13			13	=	13	13	P. Geneva	12½
Audrey	19½	18¾	=	19½			19½	Top Brown	18¾
Ainslie	19½	37½	=	19½		39	19½	Sparta	25
Columbia	13			13	=	13	13	Chandler	43¾
Vermillion	13	12½	=	13			13		
Cinder	13			13	=	13	13		
	Chandler	12½	18¾	Sparta-Top Brown	52	~~53~~		~~53~~	
	P. Geneva	6¼	=					~~53~~	
1900	Jan 27	Feb 12	= 19	= 26	Mar 6	13	Berseaver	15	24
Pine Grove	9%	9%	20%	9%	=	22%	Chandler	50%	65
Obin	26	13		19½	=	19½	Sparta	10	
Ainslie	13	19½	20	19½	=	13	T Brown	25	
Columbia	13	13	Chandler 15	13	=	13	P Geneva	15	10
Audrey	13	19½	20	19½	13	13	Audrey		15
Vermillion	13	13	20	Scale 6½	Humboldt 13	19½	Ainslie		10
Cinder	13	13	5	13	=	13			

ORE MIXTURES.

Name of Ore	Date

Vermiculite	13	13	20	13	13	
Cinder	13	13	5	13	=	13

ORE MIXTURES

Date

Name of Ore

1906 ORE MIXTURES. Covington Furnace

Name of Ore	Date June 2d	June 9th
Dolly Ann	4095	4095
Trumick	4095	2730
Cliff Shaft	1365	1365
Heeton	1365 Mary	1365
Blue Billy	100	100
	Mill Cinder	1365
Coke	6000	
Limestone	4600	4520
	4480	
# 2 tons	623	709
3 "	119	62
Pipe "	56	
Over Analysis	236-040	275-037

ORE MIXTURES.

Name of Ore	Date

ORE MIXTURES.

Name of Ore	Date

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PAGE(S)

Hamilton Furnace

CINDER ANALYSES.

Pounds

Lbs ~~Tons~~ of Iron Made

Date	Silica / Alumina		Silica / Alumina		Date	Silica	Alumina	Tons Iron Made
1894	Ore	Stone	Coke					
Oct 20	9496	4604	9561				87	1/2
27	4688	2362	2960	1.20			474	1/5
Nov 3	4797	2285	2787	1.08			490	8/10
10	4508	1944	2455	1.07			580	8/10
17	4569	1883	2368	1.03			608	1/10
24	4855	1986	2442	1.02			605	7/10
Dec 1	4886	2011	2493	1.05			610	7/10
8	4653	1756	2447	1.11		Cinder	570	9/10
15	4460	1809	2525	1.17		188	554	5/10
22	4453	2015	2590	1.13		296	554	5/10
29	4862	2293	2687	1.07		64	564	1/10
Jan 5	4628	2289	2589	1.04		262	650	8/10
12	5182	2430	2818	1.11		132	531	1/10
19	5205	2376	2876	1.10		0	585	8/10
26	5016	2308	2881	1.22		0	499	9/10
Feb 2	5166	2186	3021	1.20		0	512	3/10
9	5381	1880	2820	1.14		0	545	
16	5037	1836	2816	1.23		0	531	5/10
23	5206	1627	2788	1.33		0	452	3/10
Mar 2	5021	1523	2638	1.11		0	539	1/10
9	4974	1740	2661	1.14		0	522	2/10
16	4631	1793	2597	1.16		398	522	5/10
23	4161	1938	2517	1.18		595	499	5/10
30	4750	2041	2618	1.21		40	485	4/10
May 4	4199	1818	2618	1.17		472	512	9/10
11	4087	1811	Coal 2.01 2533	1.34		456	469	5/10
18	4029	1838	Coal 802 2426	1.16		449	510	4/10
25	3914	1734	Coal 424 2590	1.16		442	496	4/10

Back off 9 days 18 hours for repairs

Hamilton ~~CINDER ANALYSES.~~

Date	Silica	Alumina	Per Ton of Iron Cake	Date	Silica	Alumina	Daily output Average	Iron
95	On	Stone		Labor	Cinder			
June 8	6507	2353	3633	2.11	622			234.8
15	3816	1671	2532	1.05	439	84.6		592.7
22	3989	1879	2571	1.03	541	84.0		546.6
29	3657	1750	2561	1.08	522	82.8		538.8
July 27	5769	2679	4209	1.93	824	43.2		259.1
Aug 3	3759	1732	2494	1.01	537	85.5		598.8
			Coal 6 8 5					
10	3925	1716	2205	1.13	560	80.1		527.0
			Coal 143					
17	3490	1634	2370	1.23	702	78.3		509.5
			Coal 5 16					
31	3194	1860	2355	1.22	1064	75.6		529.8
Sept 7	3264	1902	2615	1.23	988	80.5		523.4
			Coal 398					
14	3778	1799	2391	1.29	540	81.2		528.0
			Coal 443					
21	3758	1833	2448	1.22	536	78.1		507.7
			445					
28	3675	1715	2473	1.22	525	78.5		510.6
Oct 5	3702	1692	2676	1.14	528	80.8		545.2
			36					
12	3584	1647	2465	1.12	512	85.3		555.0
			353					
19	3902	1783	2997	1.48	557	74.8		411.9
26	3822	1758	2546	1.07	546	88.5		575.5
Nov 2	3791	1768	2505	1.17	541	86.8		543.1
			206					
9	3628	1757	2566	1.18	655	82.1		534.0
			161					
16	3399	1761	2489	1.15	784	87.2		567.2
23	3404	1787	2567	1.07	785	91.0		591.6
			199					
30	3485	1826	2509	1.07	804	88.7		576.8
Dec 7	3658	1921	2573	1.10	844	88.1		573.0
14	3810	1862	2746	1.17	879	88.5		575.5
21	3616	1888	2737	1.24	834	82.7		537.9
28	3551	1869	2680	1.18	819	83.0		540.0
			65					
995 Jan 4	3581	1884	2736	1.17	826	84.8		551.3
11	3619	1905	2765	1.14	835	83.1		581.8

Hamilton ~~CINDER ANALYSES.~~ Furnace

Per ton of Iron

Date	~~Silica~~	~~Alumina~~		~~Date~~	~~Silica~~	~~Alumina~~	Daily Average Iron made
96	Ore	Cinder	Lime	Coal	Coke	Labor	
Jan 18	3632	871	1922	0	2855	1.34	72.7
25	3279	1092	1801		3100	1.21	77.0
Feb 1	3159	1058	1743	71	2895	1.23	78.4
8	3262	1081	1805	37	2757	1.11	86.5
15	3342	1114	1829	105	2712	1.15	84.5
22	3207	1069	1736		2654	1.06	90.1
29	3138	1046	1673		2597	1.08	91.4
Mar 7	3267	1089	1745		2671	1.16	85.3
14	3244	1081	1760		2685	1.05	90.7
21	3381	1173	1793		2732	1.07	89.7
28	3352	1117	1788		2681	1.07	92.5
April 4	3388	1106	1770		2655	1.10	86.3
11	3214	1071	1769		2571	1.05	89.8
18	3288	1096	1827		2630	1.14	84.8
25	3379	1126	2100		2766	1.26	75.4
May 2	3297	1099	1971		2729	1.24	78.5
9	3124	1041	1867		2585	1.14	82.9
16	3183	1061	1902		2635	1.27	74.8
23	3443	1263	1923		2774	1.32	71.0
30	3041	1012	1622		2607	1.25	76.0
June 6	3198	1066	1705		2968	1.37	67.1
13	3191	1064	1779		2946	1.56	66.2
20	3859	551	1983		2911	1.30	74.7
27	3561	754	2011		2853	1.36	72.2
July 4	2975	991	1766		2644	1.24	79.6
11	3308	1102	1797		2941	1.26	73.0
18	3140	1046	1706		2791	1.22	74.8
25	2957	985	1641		2691	1.22	72.4

Date	Sili
96	Or
Aug	30
8	30
15	28
22	30
29	31
Sept 5	30
12	32
19	31
26	31
Nov 26	56
97-2	39
Jan 9	38
16	38
23	38
30	39
Feb 6	40
13	38
20	36
27	31
Mar 6	40
13	36
20	36
27	35
A 3	35
10	34
17	35
24	35

CINDER ANALYSES.

Date	Silica	Alumina		Date	Silica	Alumina	Daily Average
96	Ore	Cinder	Lime	Coal	Coke	Labor	Iron
Aug	3029	1009	1647		2796	1,31	72.
8	3014	1004	1639		2996	1,25	71.4
15	2894	965	1573		3117	1,25	73.3
22	3023	1007	1673		2974	1,16	79.9
29	3129	1043	1780		2920	1,19	77.2
Sept 5	3039	1013	1729		2837	1,24	71.9
12	3295	915	1744	365	3134	1,42	61.8
19	3162	964	1712		3282	1,28	68.1
26	3165	452	1408		2667	1,14	71.3
		Out of blast for repairs					
Dec 26	5616	231	2301		4111	1,43	58.08
97-2	3920	439	1869		2750	1,07	82.08
Jan 9	3821	514	1832		2645	1,13	80.81
16	3868	520	1859		2678	1,09	87.89
23	3820	408	1805		2607	1,02	89.34
30	3938	476	1833		2650	1,06	86.30
Feb 6	4058	538	1852		2725	1,08	80.00
13	3895	484	1750		2585	1,09	84.40
20	3667	524	1635		2424	1,02	90.9
27	3117	445	1389	High Water	2476	1,43	86.5
Mar 6	4092	584	1892		3175	1,55	63.6
13	3635	519	1682		2618	1,10	81.8
20	3601	533	1698		2567	1,09	82.6
27	3508	501	1748		2826	1,12	79.4
A 3	3567	509	1770		2917	1,13	78.4
10	3443	491	1704		2833	1.21	78.22
17	3558	508	1715	Roll Scale	2803	1,11	79.97
24	3547	251	1693	251	2571	1.07	85.06

97 CINDER ANALYSES. Hamilton

Date	Silica Ore	Alumina Cinder	Lime	Date	Silica Coke	Alumina Labor	Daily Ave	Date	Sil
97				Roll Scale				97	Or
May 1	3784	270	1715	270	2684	1.187	79	Nov 20	33
8	3726	207	1688	324	2643	1.185	76	27	30
15	3831		1655	547	2699	1.219	77	Dec 4	33
22	3839		1755	548	2723	1.209	76	11	34
29	3670		1678	524	2627	1.197	77	18	34
June 7	3631		1664	518	2668	1.105	78	25	31
13	4319		1713		2680	1.065	78	98 Jan 1	36
19	4197		1654		2668	1.113	76	8	35
26	3727		1699	532	2988	1.254	66	15	35
July 3	3895		1677	556	3277	1.231	66	22	30
10	3800		1568	474	3084	1.36	69	29	34
17	4137		1641	276	2888	1.004	83	9 Feb 5	34
24	4140		1662	276	2789	1.018	84	12	35
31	4129		1690	275	2791	1.038	83	19	38
Aug 7	3993		1655	266	2745	1.104	76	26	35
14	4121		1653	169	2857	1.149	73	Mar 5	34
21	4148	276	1638		2809	1.035	77	19	33
28	4123		1628	275	2781	1.09	75	26	27
Sept 4	4165		1639	277	2833	1.14	71	Apr	
11	4185		1649	279	2890	1.16	71	"	
18	4038		1589	267	2785	1.13	72	June 18	50
25	4004		1584	267	2776	1.09	74	25	34
Oct 2	3638	463	1606	209	2801	1.11	73	July 2	33
9	3624	517	1576		2916	1.29	66	9	34
16	3907	582	1838	167	3742	1.61	53	16	33
23	3437	528	1692	264	2808	1.006	81	23	33
Nov 6	3359	517	1740	258	2502	.953	87	30	33
13	3378	520	1749	260	2757	1.08		Aug 6	32

CINDER ANALYSES.

Date	Silica	Alumina		Date	Silica	Alumina	
97	Ore	Cinder	Lime	Roll Scale	Coke	Labor	
Nov 20	3362	517	1696	258	2956	1,13	
27	3097	774	1699	258	2714	1.05	
Dec 4	3237	535	1652	258	2714	1,04	
11	3416	525	1730	262	2763	1,09	
18	3410	524	1727	262	2758	1,03	
25	3179	489	1609	244	2620	1,06	
98 Jan 1	3694	568	1861	284	3300	1,314	Stove off
8	3573	550	1797	275	3201	1,30	" "
15	3558	647	1789	273	3278	1,39	" "
22	3014	532	1741	266	2831	1,05	
29	3492	537	1772	268	2855	1,10	
Feb 5	3456	531	1762	266	2795	1,098	
12	3520	541	1794	270	2847	1,157	
19	3895	556	1918		2925	1,211	
26	3541	817	1989		2935	1,22	Stoves Cleaned
Mar 5	3497	800	1867		2832	1,04	
19	3899	777	1837		2726	1,03	
26	2785	676	1624	181	2481	1,27	
	Furn. Blown out Friday 25th 3 P.M.						
"	Fired Furn 14th June 98 - Blown out 9 A.M 15th inst						
June 18	5041	784	2780		6668	2,617	
25	3463	537	2391	279	3026	1,146	
July 2	3385	693	2038	149	2865	1,207	
9	3408	340	1616	340	2639	1,10	
16	3332	333	1500	333	2588	97	
23	3351	527	1623	142	2869	1,11	
30	3364	672	1536		2852	1,128	
Aug 6	3225	676	1677	157	2882	1,188	

98 CINDER ANALYSES. Hamilton 99

Date	Silica	Alumina	Cinder	Lime	Roll Scale	Coke	Labor	
98	On	Cinder	Lime	Roll Scale	Coke	Labor		
Aug 13	3146	699	1749	349	3589	1.21		
20	3311	482	1684	344	3031	1.22		
27	3718	552	1662	41	2412	1.278		
Sept 3	3369	508	1338		2935	1.208		
10	3344	771	1482		3243	1.209		
17	3034	700	1347		2755	1.667		
24	3307	724	1477	40	4611	.995		
Oct 1	3306	508	1373	254	3410	.935		
8	3397	653	1537	131	2446	.989		
15	3444	794	1546		2580	1.05		
22	3349	565	1574	207	2536	1.05		
29	3336	513	1554	256	2508	1.022		
Nov 5	3385	521	1564	261	2494	1.068		
12	3247	449	1477	249	2599	.969		
19	3158	485	1229	243	2473	.921		
26	3141	502	1303	251	2520	.894		
Dec 3	3136	510	1328	255	2544	.966		
10	3207	572	1265	261	2481	.953		
17	3124	508	1189	254	2408	.957		
24	3232	526	1332	263	2661	1.023		
31	3130	509	1244	255	2597	1.068		
99 Jan 7	3283	534	1328	267	2833	1.243		
14	3275	533	1314	266	2627	1.044		
21	3262	531	1301	266	2435	1.031		
28	3224	525	1333	262	2352	.994		
Feb 4	3285	535	1373	267	2461	1.066		
11	3407	554	1409	277	2471	1.096		
18	3447	561	1428	280	2475	1.111		

O.P. Duty Iron Many

yield 56%

Iron Ferman

Millicans Furn Many

Stopped 3 hours

Coal

24

261

273

274

275

99

Date	
Feb 25	31
Mar 4	30
11	31
18	29
25	30
Apr 1	35
8	30
15	29
22	29
29	32
May 6	35
13	35
20	35
27	35
Jun 3	35
10	35
17	33
24	39
July 1	40
8	34
15	33
22	33
29	33
Aug 12	41
19	40
26	37
Sept 2	31
9	29
16	33

CINDER ANALYSES.

99

Date	Silica	Cinder	Lime	Silica	Silica	Labor	Coal
Feb 25	3170	531	1480	407	2409	1.085	267
Mar 4	3040	539	1515	539	2476	1.129	275
11	3182	564	1591	564	2730	1.349	303 with mate
18	2991	530	1546	530	2590	1.159	287
25	3007	533	1629	533	2752	1.232	305
Apl 1	3582	7	1150	540	2838	1.155	118
8	3038	438	1206	523	2662	1.17	
15	2981	526	1247	526	2561	1.147	Daily Aver
22	2951	520	1133	520	2529	1.198	124.4
29	3288	526	1130	245	2594	1.28	111.2
May 6	3551	531	1175		2665	1.20	112.4
13	3514	326	1092	148	2622	1.197	113.5
20	3583	356	1080	178	2726	1.28	108.
27	3591	293	1045	243	2713	1.348	113.3
Jun 3	3512	262	987	262	2612	1.329	110.7
10	3517	493	1112	32	2719	1.465	99.87
17	3346	465	1098	35	2700	1.655	100.8
24	3955	114	1031	114	2915	1.438	Initials 97.6
July 1	4003		938		2548	1.236	112.6
8	3464	253	1173	209	2677	1.232	109.6
15	3396	321	1266	186	2365 (31)	1.219	112.2
22	3361	314	1250	192	2256 (737)	1.259	109.1
29	3372	503	1342		2205 (585)	1.286	106.8
Aug 12	4182		792		2099 (464)	1.152	121.1
	4017		865		2167 (166)	1.253	110.3
26	3775		838		1929 (427)	1.291	109.4
Sept 2	3116	430	1251	413	2545 (96)	1.445	94.4
9	2939	516	1344	516	2735 (390)	2.000	76.6
16	3334	574	1260	289	2451 (235)	1.482	93.8

CINDER ANALYSES. Hamilton

99 Date	Silica	Alumina		Date	Silica	Alumina	Daily
	Ore	Scale Cinder	Lime	Coal	Coke	Labor	tons
Sept 23	3851	10	893	392	2117	1.22	108
30	3763		868		2420	1.33	104
Oct 7	4068	200	1074		2362	1.42	103
14	3361	360	1137		2841	1.71	82
21	3003	959	1634		3244	2.00	75
28	3138	928	1560		2980	1.40	96
Nov 4	3757	343	1134		2856	1.44	102
11	4109		875		2844	1.32	113
18	3700	441	1187		2928	1.38	107
25	3757	561	1307		2918	1.33	110
Dec 2	3582	535	1279		2672	1.26	116
9	3656	546	1313		2712	1.43	115
16	3839	573	1376		2689	1.698	104.2
23	3636	543	1278	233	2590	1.339	120
30	3741	559	1370	960	2455	2.00	91
1911 Jan 6	3591	536	1333	459	2212	1.72	100
13	3624	541	1349	187	2593	1.41	109
20	3578	82	848	15	2520	1.23	178.8
27	3611	15	780		21834	1.035	151.9
Feb 3	3588	536	1805		2916	1.357	112
10	3650	545	2016		3111	1.724	93
17	3519	525	1498		2826	1.43	106
24	3897	212	1041	Scale	2512	1.22	124
Mar 3	3250	391	1520	195	2727	1.36	113
10	3329	499	1611	12	3016	1.59	100
17	3737	373	1602		2634	1.54	103
24	3591		912		2259	1.25	125

CINDER ANALYSES.

Date	Silica	Alumina		Date	Silica	Alumina	

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ORE ANALYSES.

ORE	Date	Iron	Silica	Phos.	Sulphur	Mang.	Lime	Magnesia	Alumina	Water
Ohio Screened Block	98	47.50	16.51	.391	.444		2.75		5.018	
"	"	40.74	26.71							
Block Raw	"	32.80	15.45							Carb. acid etc 31.80
Screened "	"	31.76			.533					
Lime Ore	"	49.45	13.19							
Block "	"	48.80	16.16							
" "	"	48.80	10.95							Car. etc
" "	"	40.21	24.14		.824	.706	3.96	2.18	5.85	
Brookville Ore										
Sand Stone	95	21.56	66.18							
Cliffs Shaft	97	62.42	3.65	.113	.070	.35	1.15	1.00	1.70	1.06
Negaunee	"	62.05	4.55	.12	.015	.27	.30	.24	3.44	10.54
Norrman	"	61.98	3.84	.067	.004	.172	.44	.16	2.20	10.40
Bernichon	"	67.08	2.05	.142	.004	.11	1.22	.24	.98	1.11
Chandler	98	65.23	3.51	.036	Tr	.25	28	.12	1.80	5.47
Manganese	"	59.80	5.50	.034	—	.68	32	10	1.52	13.55

ORE ANALYSES.

ORE	Date	Iron	Silica	Phos.	Sulphur	Mang.	Lime	Magnesia	Alumina	Water

Chandler	98	65.23	3.51	.036	Tr	.25	28	.12	1.80	5.47
Mangan	"	59.80	5.50	.034	—	.68	32	10	1.52	13.55

ORE ANALYSES.

ORE	Date	Iron	Silica	Phos.	Sulphur	Mang.	Lime	Magnesia	Alumina	Water
Audrey	98	62.74	3.05	.060	Trace	.54	.40	.23	1.70	12.94
Columbia	"	59.13	8.20	.55	—	.06	1.35	.06	1.46	10.77
Sparta	"	65.45	2.98	.029	—	.20	.30	.25	.88	7.00
Peruvian Green	"	45.10	30.25	.008	—	.10	.52	.95	.96	5.14
Amelie	"	62.51	4.00	.074	.001	.40	.30	.23	2.80	9.80
Lufo Brown	"	60.52	6.10	056	.007	.12	51	.33	1.35	9.75

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Hamilton Furnace

IRON ANALYSES.

Date	Furnace	Silicon	Phos.	Sulphur	Mang.	Comb. Carb.	Date
94 Nov 10	No 1 Foundry	2.605	.427	.006	3.640	.240	
"	No 2 "	2.530	.394	.005	3.708	.220	
27	" 2 "	2.443	.461	.027	3.544	.320	
Oct 24	Silvery	6.951	.060	.029			
Dec 20	No 2	3.824		.041			
"	A. Mill	3.413		.065			
21	"	3.497					
"	No 3	4.324		.051			
"	No 2	4.606		.024			
22	"	3.649		.014			
23	"	3.071					
95 Feb 2	No 2 Suffr	4.509			3.202	.110	
"	Silvery	4.350			3.174	.120	

IRON ANALYSES.

Date	Furnace	Silicon	Phos.	Sulphur	Mang.

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Mehaly MEMORANDA.

Output Hamilton Furnace

			#1	#2	#3	G.F.	S.G.	
1894 Oct	20	87 1/2						
	27	474 7/10						
Nov	3	490 9/10						
	10	580 8/10						
	17	608 1/10						
	24	605 7/10						
Dec	1	610 7/10	29	400	91	76	14	
	8	570 9/10	9	324	180	54	4	
	15	554 5/10	5	386	116	27	19	
	22	554 5/10	3	391	85	41	33	
95	29	564 1/10	53	358	110		43	
Jany	5	650 8/10	34	534	69		12	
	19	585 8/10	40	403	98	39	4	
	12	531 1/10	24	189	140	164	13	
	26	499.9	25	311	105	31	27	
Feb	2	512.3	30	345	114		22	
	9	545.	8	295	74	31	137	
	16	531,5		228	81	75	128	19.
	23	452.5		241	30	18	164	
Mar	2	539,1		364	125	25	11	14
	9	522.2		249	120	56	82	12
	16	522,5		371	119	20	12	
	23	499,7	23	214	111	144		8
	30	485,4	36	297	96	34	22	
May	4	512,9	51	237	205	16	4	
	11	469,5	3	321	64	40	17	23
	18	510,1	69	201	162	68	6	2
	25	496,1	26	253	138	55	5	18
Jne	8	234.8		137	12	49		

MEMORANDA.

Date	Total	#1	#2	#3	A	S	C.S.
June 15	592.7	127	335	90	12	21	6.7
22	546.0	181	306	35		19	3.5
29	538.3	74	170	103	87	12	4.3
	Stopped for lack of coke						
July 27	259.1	26	121	30	18	46	12.3
Aug 3	598.8	139	349	51	16	21	20.8
10	527.0	86	257	105	70	3	3.6
17	509.5	40	190	64	123	16	70.5 / 2.3
31	529.8	21	297	74	51	25	*58.3 / 3.2
Sept 7	523.4	65	218	52	9	31	*144 / 3.1
14	528.0	64	317	46	38	53	7.9
21	507.7	49	169	135	88	64	2.3
28	510.6	21	261	48	47	100	31.4
Oct 5	545.2	124	281	110	22		6.4
12	555.0	94	394	61			5.6
19	411.9		203	136	47	16	8.6
26	575.5	6	224	201	61	7	75. Σ C.S.
Nov 2	543.1		210	169	71	77.4	14. Σ 11 C.S.
9	534.0	3	229	104	49	116	30. 1.2
16	567.2	56	430	70			10.6
23	591.6	84	332	80	87	1.9	6.0
30	576.8	99	315	84	34	38	4.9
Dec 7	573.0	71	330	122	39	2	7.3
14	575.5	44	315	144	40	22	8.1
21	537.9	132	226	80	63	29	6.0
28	540.0	131	278	76	40	8	5.8
Jan 4	551.3	56	302	116	60	13	3.3
11	581.8	6	262	86	38	81	7.
18	472.7	3	406	54	2		6

MEMORANDA. Hamilton

Date	Total	1	2	3	A	x	C.S.
96 Jan 25	500.5	8	409	67			16.
Feb 1	509.5	7	398	82	12	sil	8.
8	562.8	47	457	31	17	5.7	3.
15	549.3	91	347	63	19	x16.	11.
22	586.0	58	325	117	28	23	13-S/19
29	594.7	117	309	93	40		4
Mar 7	490.6	7	343	105	25		10
14	589.9	13	481	69	19		8
21	583.6		415	61	23	S 79.	6
28	601.4	66	451	74	6	1	3
Apr 4	561.4	9	290	184	44	6. x 22.4	
11	583.8	128	406	40	3		6
18	551.5	14	376	136	17		8
25	490.6	41	290	106	34	x 13.	5
May 2	471.0	181	241	30	16		3
9	538.9	142	307	47	36		2
16	486.4	64	272	83	12	x 2 4 45	6
23	462.0	84	199	111	49	16	2
30	494.3	119	302	68			5
June 6	436.6	26	294	76	38		1
13	364.1		224	85	12	S 31.7	12
20	485.9	22	255	128	37	29	11
27	469.4	35	317	89	8	6	14
July 4	438.3	67	234	79	60		1
11	474.9	48	294	104	22		6
18	486.2	101	318	62		x S 4	05
25	470.8	50	178	82	116	24 16	2
Aug 1	467.3	11	291	123	37		4
8	464.4	36	207	141	43	5	11
15	476.9	28	306	43	37	S 60	2

MEMORANDA

Date	Total	1	2	3	4	5	C.S
96 Aug 22	519.6	272	201	17		24	4
29	501.9	190	216	77	33		5
Sept 5	467.8	22	136	180	119		10
12	402.0	3	181	89	29	10	21 X
19	477.2		273	72	40	5	19 66
26	481.8	5	232	89	25	116	13
Dec 26	348.5	42	140	38	67	22	1. 36
97 Jan 2	574.6	46	278	39	8	186	2.8
9	525.3	105	358	46			15.1
16	577.3	198	342	21			9.8
23	581.7	191	244	87	28	22	8.9
30	561.0	276	179	25	50		6 X 23
Feb 6	560.0	162	356	13		18	9
13	548.6	191	309	40			9
20	591.1	408	135	41			6
27	173.0	34	124	15		High water 23rd	
Mar 6	366.2	60	178	23	50	X 50 " 28th	3.
13	532.1	98	368	40	12	x	13
20	537.	95	351	47	17	11	15
27	517.2	22	410	59	14	3	7.9 X
April 3	509.7	39	342	57	38	9	6 16
10	547.6	83	390	54	5		10 4
17	559.8	59	431	39	11	5	5 14
24	552.9	51	380	84	5	22	10
May 1	516.3	41	270	97	58	X 39	9
8	498.5	53	254	87	76	19	7
15	500.1	90	324	42	22	5	15
22	494.4	76	289	56	50	17	5
29	500.1	46	249	100	60	25	16
June 5	508.7	15	429	50	2		12
	507.6	99	295	78	26		8

MEMORANDA Hamilton

Date	Total	1	2	3	4	x	C.S.
97 June 19	493.7	39	243	133	44	27	5
26	433.7	81	269	64	5	5	8
July 3	432.8	10	359	48			14
10	345.5		172	100	55	2	16
17	538.5	101	310	57	53		15
24	550.7	30	314	116	70		18
31	538.3	90	252	105	48	21	19
Aug 7	494.3	2	155	73	184	74	3
14	475.0	13	283	34	66	77	2
21	503.0	95	328	40	26		13
28	487.9	42	248	76	85	29	7
Sept 4	461.3	67	237	64	70	20	3
11	461.4	92	257	39	35	27	9
18	472.2	83	328	32	26		3
25	483.8	69	372	34		5	8
Oct 2	476.1	37	220	122	80	3	7
9	398.		85	78	223	5	4
16	295	~~137~~	132	128	24	Stop 3 days	
23	531.5	63	357	70		12	28
Nov 6	568.	43	262	179	82		1
13	493.7	35	276	105	72		4
20	509.3		271	140	87		8
27	501.7	9	249	216	21		7
Dec 4	508.4	30	303	91	74		8
11	479.4	69	278	49	72		10
18	502.0	59	370	60			12
25	442.2	60	295	67	16		5
98 Jan 1	388.9		102	92	108	72	13
8	400.9		189	103	54	17	36
15	364.8		195	68	16	42	42
22	513.4	12	252	107	85	40	15

MEMORANDA

Date	Total	1	2	3	A	S	X-ray
98 Jan 29	483.3	39	205	56	55	112	15
Feb 5	487.0	33	338	60	31	7	20
" 12	463.7	42	261	103	30	14	13
19	437.1	33	194	156	37		16
26	443.4	20	145	127	145		5
Mar 12	557.0	37	382	78		107	11
19	318.8		20	27	156	55	60
	Furnace Blew out Friday 25 Mar						
	"	"	In	Midvale		15 June	
June 18	142.4	8	22	9	5	8	88
25	491.3	96	359	25	4	56	6
July 2	443.5	146	143	40	49	56	6
9	501.9	175	195	75	11	36	8
16	566.1	96	304	50	19	81	6
23	474.3	82	217	53	87	28	5
30	460.7	137	146	82	10	69	15
Aug 6	437.2	86	201	57	17	59	15
13	423.2	59	182	79	18	18	6
20	432.3	76	210	61	25	53	7
27	407.4	92	86	106		123	
Sept 3	436.3	7	264	105	46	11	1
10	427.7		58	66	153	149	
17	249.9	25	108	76	40	stopped to clean stone	
24	571.7	149	222	96	37	56	10
Oct 1	633.3	326	281	19	5		
8	590.9	27	212	63	196	64	26
15	556.2	61	251	130	85	22	6
22	560.1	132	382	40			5
29	587.4	239	315	24			8
Nov 5	583.1	69	314	100	37	60	
12	650.1	228	216	72	131		1

MEMORANDA Hamilton

Date	Total	1	2	3	4		O.S.
98 Nov 19	780.2	119	627	29			4
26	790.1	182	572	33			1
Dec 3	785.3	86	475	198	19	Williams Ten Along	5
10	829.3	77	659	82			11
17	822.9	44	457	260	56		5
24	754.7		468	249	19		17.5
31	779.6	3	691	69			15.8
99 Jan 7	552.9		337	169	28	Stopt 3 hours	17.8
14	793.4	10	698	70			15.
21	838.3	12	729	81			15
28	837.9	67	727	39			4
Feb 4	803.	25	653	72	47		6
11	677.5	32	580	23	39	Stop 2 days	3
18	724.3	28	557	56	77		5
25	795.8	182	546	55	7		5
Mar 4	734.8	108	340	130	24	78	18
11	446.9	58	212	93	52	Stop 5 1/2 hours 2 3	7 nights
18	807.0	142	488	119	51		6
25	741.5		492	202	39		7
April 1	829.7	105	649	68			7
8	845.2	95	730	15			4
15	835.8	179	647	9			
22	871.1	135	612	116			5
29	778.4	75	459	150	84		8
May 6	787.1	150	549	80	3		4
13	795.	113	639	38			5
20	756.6	178	497	60	14		5
27	722.5	187	391	130	8		5
June 3	775.2	134	599	41			6
10	699.1	40	345	239	73		1
17	621.8	54	361	177	25		4

99

Date
June 2
July 1
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Aug 5
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Dec
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1900 Jan

MEMORANDA

Date	Total	1	2	3	4		
June 24	683 4	70	224	350	386	{ Ingersoll Millard	
July 1	788 4	150	192 64	299	83	Malleable	
8	767.8	26	508 46	102	85		
15	785.9	189	592	4			
22	764.1	217	534	12			
29	721.1	136	450	43	53	30	
Aug 5	433.3	2	285	77	35	32	
12	847.9	145	316 51	195	60		
19	772.4	150 71	160	113	133		
26	765.9	212 150	169 21	59 106	48		
Sept 2	661.2	134	449 52	3			
9	498.2	32	386	78	1		
16	657.2	566	84	6		Malleable	Bessemer
23	756.5	71	5			58	620
30	731.0	28	18	4	31		649
Oct 7	696.2	63	520	23		25	63
14	575.8	42	370	163			
24	524.5	20	394	129			
28	677.4	221	451	4			
Nov 4	663.6	377	266	2		18	
11	791.9		146			773	
18	753.1	101	426	21		213	
25	774.	216	555	2			
Dec 2	817.8	141	673	3			
9	729.2	126	578	25			
16	625.7	379	243	3			
23	800.0	257	525	17			
1901 30	487.8	293	139	46	8		
Jan 6	686.7	23	549	76	38		
13	765.1		722	37	5		
20	869.5		211	7		1414	501

MEMORANDA Hamilton

Date	Total	#1	#2	#3	R	X	
1900 Jan 27	1063			21			Bessemer
Feb 3	775	73	536	113	8	23	
10	607	166	322	117	9		
17	748	215	398	56	51	26	
24	872	5	198				195 Mall 471 Carlton 33 " " 146 Stall
Mar 3	777	24	469		89		
10	705		696	8			
17	725	154	339	1			114 Mall 115 Bessem
24	849						Bessemer

1906 Covington Jail

	Total	#1	#2	3	G.T.	Pipe	Silver Wed
Feb	2912	8	477	19			2408
Mar	3219		1102	81		122	1914
Apl	3318		2140	345	117	94	245 377
May	3583		3235	311		137	

1906 MEMORANDA

Mark Ebbing

Covington Fee

June 2nd.	Yeild	Ore	Lime	Coke	Tons
2	46.1	2.17	.896	2646	798
9	46.	2.17	.892	2652	769
2 3	47.7	2.09	.853	2631	757

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MEMORANDA

Estimate of Coal in Sight Mar 31st 95

Mine No 6-

15000	Simpson
36000	Adams
37000	Fitch + Artis
26000	Farmer
40000	Hammonds
19000	Hellwig No 2
60000	McKnight
30000	Hellwig No 3
36000	Hall
20000	Cazell
319000	tons

Mine No 7-

15000	Lacey
30000	Dealbo
10000	Alexander
13000	Bates
68000	tons

MEMORANDA

January 1st 1895

Mine N & E

Simpson	1300 ft	P & L	
Adams	2706	~~2600~~	" "
Fitch & Artis	2673	~~2950~~	" "
Kellwig		Worked out	
Davidson		"	
Farmer	1560	~~1650~~	P & S
Hammonds	2487		"
Kellwig No 2	460		P & S
	230		Rooms End
McKnight	1914	1950	Rooms
Kellwig No 3		1150	"
Hall	1089	1100	Solid
Cozell	972	850	"

MEMORANDA

1000 Tons

For Mar 31st 1894 Length of Entries

Mine No 6 — Rush — Main Entry 3750

25	Simpson	1500	ft Pillars & Stumps	
5	Kitchen	350	"	"
40	Adams	2500	"	"
50	Fitch & Artis	3000	"	"
10	Davidson	600	"	"
5	Hellwig	350	"	"
26	Farmer	1560	"	"
50	Hammonds	2480	Left "	"
	"	"	Right Rooms	
15	Hellwig No 2	690	Pillars & Stumps	
60	McKnight	1800	Left 25 Rooms	
	"	"	Right Solid	
30	Hellwig No 3	950	Solid	
36	Hall	1100	"	
20	Cazell	850	"	

372.000 Tons in sight Mar 31st 1894

MEMORANDA

Mine № 7 - Grant Mar 31st 94

Main Entry		675 ft	
№ 1 Locey	10	245 "	Rooms
№ 3 Deaton	15	350 "	Solid
№ 2 Alexander	10	260 "	"
№ 4 Bates	5	120 "	"
	40.000 tons		

Mine № 7 - Grant. April 30th 94

Main Entry	792 ft	
Locey " 8 400	466 "	Rooms
Deaton "	489 "	"
air Course	430 "	"
Bates Entry	266 "	Solid
air Course	235 "	"
Short Entry	150 "	
ditto		125 ft to Room
Alexander	258 "	

MEMORANDA

No 6 Mine
Rooms on McKnight entry are
46½ ft from centre to centre

Helling No 3 begins at Sta 55 on Main

Rib of 18 ft between Cross Entry & Air course
" " 28 " " Main " " "

Hall or No 14 begins at Sta 62+30' on Main

No 15 " " " 64+18' " "

Cozell No 16 " " " 72+12' " "

Ft - 1405

McClelland House

Clintontown P.

56M301