











# DIRECTORY

TO THE

# IRON AND STEEL WORKS

OF THE

# UNITED STATES.

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EMBRACING THE

BLAST FURNACES, ROLLING MILLS, STEEL WORKS,  
FORGES, AND BLOOMARIES IN EVERY  
STATE AND TERRITORY.

— 7169 —  
PREPARED AND PUBLISHED BY

THE AMERICAN IRON AND STEEL ASSOCIATION.

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CORRECTED TO JULY 25, 1882.

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PHILADELPHIA:

No. 261 SOUTH FOURTH STREET.

1882.

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Directory to the iron and  
steel works of the United  
States  
Philadelphia, Pa. : The  
Association,

# PREFACE.

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WE present herewith a new and thoroughly-revised edition of our Directory to the Iron and Steel Works of the United States, corrected to July 25, 1882. This is the sixth edition of this work, the first having been issued in 1873. The greatest pains have been taken to make this edition absolutely correct, but the changes in ownership, etc., have been so many and so recent, and this country is so large, that entire freedom from errors and omissions is not claimed. Even since this edition has been put to press changes have occurred. These we give on the two pages preceding the Table of Contents.

A new and valuable feature of this edition of our Directory is the addition of a full index to the *names* of all the iron and steel works of the country. This index is arranged in alphabetical order. The alphabetical arrangement of the descriptions of the various works, which has been a feature of all previous editions, is also continued in this edition.

We present on the following page a complete summary of the number and capacity of the iron and steel works which are described in this edition of the Directory, compared with the summary which accompanied the fifth edition of the Directory, which was corrected to March 1, 1880.

In addition to the information contained in the summary it may be stated that the 686 blast furnaces which were completed on the 25th of July last were classified according to fuel as follows: 210 bituminous coal and coke, 225 anthracite, 250 charcoal, and one gas; and that the 697 completed furnaces on the 1st of March, 1880, were classified as follows: 203 bituminous, 228 anthracite, and 266 charcoal. It will be observed that there were eleven more furnaces on the 1st of March, 1880, than on the 25th of July last, but the capacity of all the furnaces had increased from 6,500,000 net tons in 1880 to 8,000,000 net tons in 1882, showing a very great improvement in furnace construction and management within the two dates mentioned.

PHILADELPHIA, August 15, 1882.

# SUMMARY.

IRON AND STEEL WORKS.	July 25, 1882.	March 1, 1880.
Number of completed Blast Furnaces, . . . . .	686	697
Number of Blast Furnaces building (on July 25, 1882—19 Bituminous; 6 Anthracite; 5 Charcoal;) total, . . . . .	30	44
Annual capacity of completed Blast Furnaces, in pig iron, net tons, . . . . .	8,000,000	6,500,000
Annual capacity of the Bituminous Furnaces, net tons, . . . . .	4,125,000	2,825,000
Annual capacity of the Anthracite Furnaces, net tons, . . . . .	2,750,000	2,600,000
Annual capacity of the Charcoal Furnaces, net tons, . . . . .	1,125,000	1,075,000
Number of completed Rolling Mills and Steel Works, . . . . .	393	382
Number of Rolling Mills and Steel Works building, . . . . .	16	10
Number of Rolling Mills making rails, . . . . .	80	87
Number of Rolling Mills making heavy rails, . . . . .	48	54
Number of Rolling Mills building to make heavy rails, . . . . .	2	2
Number of Single Puddling Furnaces (a double furnace counting as two single ones,) . . . . .	5,018	4,467
Number of Heating Furnaces, . . . . .	2,598	2,419
Number of Trains of Rolls, . . . . .	1,424	1,397
Annual capacity of Rolling Mills in finished iron and steel, net tons, . . . . .	7,000,000	5,250,000
Annual capacity of Rail Mills in heavy iron and steel rails, net tons, . . . . .	3,110,000	2,150,000
Number of Rolling Mills having Nail Factories, . . . . .	66	73
Number of Nail Machines, . . . . .	4,030	4,152
Number of Nail Factories building, . . . . .	2	..
Number of Nail Machines to be used, . . . . .	158	..
Number of completed Bessemer Steel Works, . . . . .	14	11
Number of Bessemer Steel Works building, . . . . .	1	2
Number of Bessemer Converters (on July 25, 1882—35 completed; 2 building;) total, . . . . .	38	32
Annual capacity in ingots (on July 25, 1882, net tons—completed converters, 2,150,000; new converters, 100,000;) total net tons, . . . . .	2,250,000	1,750,000
Number of completed Open-hearth Steel Works, . . . . .	27	22
Number of Open-hearth Steel Works building, . . . . .	5	3
Number of Open-hearth Furnaces (on July 25, 1882—51 completed; 10 building;) total, . . . . .	61	39
Annual capacity in ingots (on July 25, 1882, net tons—completed furnaces, 400,000; new furnaces, 100,000;) total net tons, . . . . .	500,000	275,000
Number of completed Crucible Cast-steel Works, . . . . .	35	35
Number of Steel-melting Pots, . . . . .	3,490	3,080
Annual capacity in ingots, net tons, . . . . .	105,000	90,000
Number of Miscellaneous Steel Works, . . . . .	6	9
Number of Steel Manipulating Works, . . . . .	47	31
Number of completed Forges, making wrought iron from ore, . . . . .	72	69
Annual capacity in blooms and billets, net tons, . . . . .	75,000	85,000
Number of completed Bloomaries (one building on July 25, 1882,) making blooms from pig iron, . . . . .	52	59
Annual capacity in blooms, net tons, . . . . .	70,000	80,000

RECEIVED TOO LATE FOR CORRECTION IN THE  
PROPER PLACE.

BLAST FURNACES.

Cedar Point Furnace No. 1 (page 12) is now 71 x 15, and T. F. With-  
erbee is Superintendent.

The annual capacity of Mabel Furnace (page 31) is 22,000 net tons.

The officers of the Manchester Iron and Steel Company (page 33) are,  
Charles W. Cass, President, and Henry Stanton, Treasurer, 2 Nassau  
st., New York, and C. H. Kloman, General Agent, Pittsburgh.

Cleversburg Furnace (page 38) should be described as follows: Shire-  
ley Run Mining and Iron Company, Cleversburg, Cumberland coun-  
ty, Pa. One stack, 28 x 8, built in 1881; cold blast; closed top;  
product, car-wheel pig iron. L. M. Gochenaur, Manager, Shippens-  
burg; R. Blickenderfer, Secretary and Treasurer, Lancaster.

The post-office of the Shenandoah Iron Works (pages 44 and 46) has  
been changed to Milnes.

The following description should form part of page 52: Bettie Fur-  
nace, Black Band Iron and Coal Company, Charleston, Kanawha  
county, West Va. One stack, 50 x 10½, building, to use coke and  
local blackband, block, and limonite ore; located at the mouth of  
Davis creek, on the Great Kanawha river, 4 miles below Charles-  
ton. John Wooldedge, President; F. A. Dearborn, Secretary; Wm.  
S. Denny, Treasurer; C. K. McDermott, Manager; J. H. Huling, Supt.

Cumberland Furnace (page 57) is now owned by the Drouillard Iron  
Company; J. P. Drouillard, President, and Edgar Jones, Secretary.

The Aetna Mining, Manufacturing, and Oil Company will soon begin  
the erection of a large modern cold-blast charcoal furnace, to make  
car-wheel pig iron, in Hickman county, Tennessee. Main office at  
Nashville; J. P. Drouillard, President; James L. Gaines, Secretary.

East Chattanooga Furnace (page 58) will be 65 x 15.

Maggie Furnace (page 61) is now named Ironton Furnace.

The annual capacity of Steubenville Furnace (page 66) is 20,000 net  
tons, and it makes foundry as well as mill pig iron.

The Joliet Steel Company's furnaces (page 68) are each 70 x 20; No. 2  
was first put in blast in February, 1882; No. 1 has 5 iron stoves;  
No. 2 has 3 Siemens-Cowper-Cochrane stoves; ore, Lake Superior.

The Harrison Steel Company proposes to erect 3 blast furnaces at  
Harrison, Jackson county, Illinois, each 80 x 21.

Hamtramck Furnace (page 72) has a closed top, with Lee Burt's pat-  
ent seal and charger.

Lee Burt is Manager of Vulcan Furnace (page 73).

The offices of the Duluth Iron Company (page 76) are, John L. Mer-  
riam, President; C. H. Graves, Secretary; James Seville, Manager.

## ROLLING MILLS AND STEEL WORKS.

- Reed Brothers' Rolling Mill (page 88) was first put in operation in February, 1882; 3 heating furnaces, one 16-inch tack-plate train, one 20-inch muck train, and 25 tack machines; water-power; product, tack and nail plate; annual capacity, 2,000 net tons. Proprietors, D. L. & F. S. Reed, Brockton, Plymouth county, Mass.
- D. M. Osborne & Co.'s Rolling Mill (page 94) has one 8 and one 10-inch train of rolls, and has an annual capacity of 6,000 net tons.
- The Poughkeepsie Iron Company has built works at Poughkeepsie, N. Y., to test the use of petroleum in manufacturing wrought iron.
- The Rockaway Rolling Mill (page 96) was built in 1822.
- The Delaware Rolling Mill (page 97) was built in 1865.
- The Dover Iron Works (page 97) were built about 1770.
- Dr. C. J. Eames, 26 Pine st., New York, is Manager of the Elizabethport Rolling Mill (page 97).
- The National Tube Works Company (page 119) has transferred its Pittsburgh mill to the Republic Iron Works Limited. The works at McKeesport, Pa., have added 11 Siemens single puddling furnaces, and have 9 Siemens heating furnaces in place of 7 coal heating furnaces; annual capacity, 26,000 net tons of boiler-tube and pipe iron. The Republic Iron Works have added a heating furnace and an 8-inch train of rolls; Horace Crosby, Treasurer.
- The Soho Iron Mills (page 121) now have 22 puddling furnaces.
- The Minquas Iron Works (page 127) have added 2 double puddling furnaces.
- The Youngstown Steel Castings Company, of Youngstown, Ohio, intends to build a 20-ton Siemens open-hearth steel furnace. The projectors are John Stambaugh, Joseph H. Brown, and others.
- The Aetna Iron and Nail Company (page 140) now has 32 puddling furnaces, 10 heating furnaces, and 9 trains of rolls, and its annual capacity is 18,000 net tons.
- The Alikanna Rolling Mill (page 140) is operated by the Alikanna Iron and Coal Company, (Sharpe & Daniels,) and has 12 puddling furnaces, and one 8 and one 16-inch train of rolls.
- The Cincinnati Rolling Mills (page 141) are now named Cincinnati Rolling Mills and Chain Works.
- The Harrison Steel Company's proposed works at Harrison, Jackson county, Ill., will have three 10-gross-ton Bessemer steel converters, especially arranged for the basic process; a double mill, with a set of 40-inch 3-high rolls and a set of 36-inch 2-high reversing rolls, to make heavy merchant bars and blooms; a 36-inch 2-high blooming mill, to make blooms, slabs, and billets; a billet mill, with 20-inch train; a plate mill, with rolls 30 in. x 108 in.; a 14-inch merchant mill; a "universal" mill, with rolls 24 in. x 48 in.; a 14-inch hoop mill; two rod mills; two 10-gross-ton Siemens open-hearth steel furnaces, and 20 Siemens heating furnaces.

# CONTENTS.

## BLAST FURNACES.

	PAGE		PAGE
MAINE, . . . . .	9	WEST VIRGINIA, . . . . .	52
VERMONT, . . . . .	9	KENTUCKY, . . . . .	53
MASSACHUSETTS, . . . . .	10	TENNESSEE, . . . . .	55
CONNECTICUT, . . . . .	10	OHIO—	
NEW YORK, . . . . .	11	Hanging Rock—Charcoal, .	58
NEW JERSEY, . . . . .	17	Hanging Rock—Bituminous	60
PENNSYLVANIA—		Mahoning Valley, . . . .	62
Lehigh Valley, . . . . .	18	Hocking Valley, . . . . .	63
Schuylkill Valley, . . . .	21	Miscellaneous—Bituminous,	65
Upper Susquehanna, . . . .	25	Northwestern—Charcoal, .	67
Lower Susquehanna, . . . .	27	INDIANA, . . . . .	67
Shenango Valley, . . . . .	31	ILLINOIS, . . . . .	68
Allegheny County, . . . . .	33	MISSOURI, . . . . .	68
Miscellaneous Bituminous,	34	MICHIGAN, . . . . .	70
Charcoal, . . . . .	37	WISCONSIN, . . . . .	74
MARYLAND, . . . . .	41	MINNESOTA, . . . . .	76
VIRGINIA, . . . . .	43	UTAH TERRITORY, . . . . .	76
NORTH CAROLINA, . . . . .	48	COLORADO, . . . . .	76
GEORGIA, . . . . .	48	CALIFORNIA, . . . . .	76
ALABAMA, . . . . .	49	OREGON, . . . . .	77
TEXAS, . . . . .	52	WASHINGTON TERRITORY, . .	77
		RECENTLY ABANDONED FURNACES, . . . . .	78

## ROLLING MILLS AND STEEL WORKS.

	PAGE		PAGE
MAINE, . . . . .	85	PENNSYLVANIA—	
NEW HAMPSHIRE, . . . . .	85	Philadelphia and Vicinity,	99
VERMONT, . . . . .	85	Eastern District, . . . .	101
MASSACHUSETTS, . . . . .	86	Central District, . . . . .	109
RHODE ISLAND, . . . . .	90	Allegheny County, . . . .	115
CONNECTICUT, . . . . .	90	Western District, . . . . .	122
NEW YORK, . . . . .	91	DELAWARE, . . . . .	126
NEW JERSEY, . . . . .	96	MARYLAND, . . . . .	127

ROLLING MILLS AND STEEL WORKS.—*Continued.*

	PAGE		PAGE
DISTRICT OF COLUMBIA, . . .	129	WISCONSIN, . . . . .	149
VIRGINIA, . . . . .	129	KANSAS, . . . . .	149
ALABAMA, . . . . .	130	NEBRASKA, . . . . .	150
WEST VIRGINIA, . . . . .	130	COLORADO, . . . . .	150
KENTUCKY, . . . . .	132	WYOMING TERRITORY, . . . .	150
TENNESSEE, . . . . .	133	UTAH TERRITORY, . . . . .	151
OHIO—		CALIFORNIA, . . . . .	151
Lake Counties, . . . . .	134	ABANDONED ROLLING MILLS, .	152
Mahoning Valley, . . . .	136	ABANDONED STEEL WORKS, .	155
Interior Counties, . . . .	138	RAIL MILLS, . . . . .	156
Ohio River Counties, . . .	140	BESSEMER STEEL WORKS, . .	160
INDIANA, . . . . .	143	CRUCIBLE CAST-STEEL WORKS,	162
ILLINOIS, . . . . .	144	OPEN-HEARTH STEEL WORKS,	163
MISSOURI, . . . . .	148	STEEL MANIPULATING WORKS,	165
MICHIGAN, . . . . .	149	MISCELLANEOUS STEEL WORKS,	168

## FORGES.

	PAGE		PAGE
VERMONT, . . . . .	169	VIRGINIA, . . . . .	172
NEW YORK, . . . . .	169	NORTH CAROLINA, . . . .	172
NEW JERSEY, . . . . .	171	TENNESSEE, *. . . . .	173
PENNSYLVANIA, . . . . .	171	MISSOURI, . . . . .	174

## BLOOMARIES.

	PAGE		PAGE
MASSACHUSETTS, . . . . .	175	VIRGINIA, . . . . .	179
CONNECTICUT, . . . . .	175	GEORGIA, . . . . .	180
NEW JERSEY, . . . . .	175	TENNESSEE, . . . . .	180
PENNSYLVANIA, . . . . .	176	OHIO, . . . . .	180
MARYLAND, . . . . .	179	MISSOURI, . . . . .	180

RECENTLY ABANDONED FORGES AND BLOOMARIES, . . 181

WIRE-ROD MILLS, . . . . . 183

CAR AXLE MANUFACTURERS, . . . . . 184

INDEX TO NAMES OF WORKS, . . . . . 187



# THE IRON AND STEEL WORKS

OF THE

# UNITED STATES.

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## BLAST FURNACES.

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NOTE.—In this book the names of establishments are given first, whenever they have distinctive names, followed by the names of owners and their post-office addresses. Where the kind of power is not mentioned, steam-power will be understood. The size of each furnace stack is indicated by two numbers connected by the character "x;" the first number being the height of the stack in feet, and the second number being its diameter in feet at the bosh. References to other iron works owned by the same parties are made in italics. The names of officers of incorporated companies are printed in connection with rolling mills when both furnaces and rolling mills are owned by them. This Association is not responsible for statements of the kind of product made, or for the capacity given.

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### MAINE.

#### CHARCOAL.

Katahdin Iron Company, Bangor. Furnace in Piscataquis county. One stack, 50 x 10, built in 1846, rebuilt in 1874, and enlarged in 1877; hot or cold blast; bell-and-hopper top; water and steam power; fuel, charcoal; ore, limonite, yielding from 50 to 55 per cent., obtained about a mile from the works, and roasted in a Davis & Colby calcining kiln; annual capacity, 6,000 net tons. Pig iron branded "Katahdin." Specialty, pig iron for car-wheels and Siemens-Martin steel furnaces. O. W. Davis, Jr., Treasurer and Manager.

Number of furnaces in Maine: 1 charcoal stack.

### VERMONT.

#### CHARCOAL.

Pittsford Furnace, Naylor & Co., 6 Oliver st., Boston, Mass. Works at Pittsford, Rutland county. One stack, 40 x 10, built in 1844; hot blast; steam and water power; fuel, charcoal; ore, Chateaugay self-fluxing magnetic; annual capacity, 4,000 net tons. Formerly owned by the Vermont Iron Company. Brands, "Titan" and "Don." *See Rolling Mills in Massachusetts.*

Number of furnaces in Vermont: 1 charcoal stack.

## MASSACHUSETTS.

## ANTHRACITE.

Pomeroy Iron Works, West Stockbridge, Berkshire county. One stack, 50 x 14, built in 1850; burned and rebuilt in 1872; product, foundry pig iron, made from a mixture of  $\frac{1}{3}$  magnetic ore from Witherbees, Sherman & Co.'s Port Henry mines, and  $\frac{2}{3}$  hematite ore from the neighborhood of the furnace; annual capacity, 10,250 net tons. Brand, "Pomeroy." W. M. Kniffin, Manager and Treasurer.

## CHARCOAL.

Lanesborough Furnace, John L. Colby, Lanesborough, Berkshire county. One stack, 33 x 9 $\frac{1}{2}$ , built in 1847; hot blast; open top; ore, local brown hematite; annual capacity, 3,500 net tons. Specialty, car-wheel pig iron. This furnace was burned June 25, 1882.

Richmond Iron Works, Richmond Furnace P. O., Berkshire county. Three stacks, all in Berkshire county: Richmond Furnace, at Richmond, 32 x 9, built in 1829 and rebuilt in 1863, run by steam-power; Van Deusenville Furnace, at Van Deusenville, 32 x 9, built in 1834, rebuilt in 1858, run by water-power; and Cheshire Furnace, at Cheshire, 32 x 9, built in 1850 and rebuilt in 1870, run by steam-power; all use warm blast; ore, brown hematite, from mines owned by the works; total annual capacity, 10,000 net tons of foundry pig iron for cannon, car-wheels, and machinery. Product known as "Richmond" iron. Main office at Richmond Furnace. John H. Coffing, President, Van Deusenville, Mass.; William H. Barnum, Treasurer, Lime Rock, Conn.; R. A. Burget, Manufacturing Agent, Richmond Furnace.

Number of furnaces in Massachusetts: 5 stacks, of which 1 uses anthracite and 4 use charcoal.

## CONNECTICUT.

## CHARCOAL.

Canaan Furnaces, Barnum Richardson Company, Lime Rock, Litchfield county. Main office at Lime Rock. Furnaces at East Canaan, Litchfield county. Three stacks: one, 32 x 9, built in 1840; one, 40 x 9, built in 1847; and one, 36 x 9, built in 1872; all use hot blast; water-power; ore, Salisbury brown hematite; product, pig iron for car-wheels and malleable purposes, known as "Salisbury" iron; total annual capacity, 12,500 net tons. Wm. H. Barnum, President and Treasurer; Milo B. Richardson, Assistant Treasurer; Charles W. Barnum, Secretary; Nathaniel C. Ward, General Manager at East Canaan. *See Chapinville Furnace.*

Chapinville Furnace, Barnum Richardson Company, lessee, Lime Rock, Litchfield county. Furnace at Chapinville. One stack, 40 x 9, built in 1825, burned in 1879, and rebuilt in 1881; hot blast; open top; water-power; ore, Salisbury; product, car-wheel pig iron; annual capacity, 3,500 net tons. *See Canaan Furnaces.*

Cornwall Bridge Iron Company, Cornwall Bridge, Litchfield county. One stack, 32 x 9, built in 1833; hot blast; water-power. Wm. H. Barnum, President, Lime Rock; James A. Bierce, Treasurer and Secretary.

Hunts Lyman Iron Company, Huntsville, Litchfield county. One stack, 32 x 9, built in 1847; cold blast; water-power; open top; ore, Salisbury; product, Salisbury car-wheel pig iron; annual capacity, 3,500 net tons. George Church, President; Samuel W. Bradley, Secretary; Wm. H. Barnum, Treasurer, and Charles W. Barnum, Assistant Treasurer, Lime Rock.

Kent Furnace, Kent Iron Company, Kent, Litchfield county. One stack, 31 x 9, built in 1849; warm blast; water-power; closed top; annual capacity, 4,000 net tons. Burrett Eaton, President; George R. Bull, Secretary; John Hopson, Treasurer and Manager.

Lime Rock Iron Company, Lime Rock, Litchfield county. Established in 1734; first incorporated in 1828; incorporated by the present company in 1863; present furnace, one stack, 32 x 9, built in 1864; warm blast; water-power; ore, Salisbury brown hematite; product, pig iron for car-wheels and malleable purposes; annual capacity, 4,000 net tons. Samuel S. Robbins, President; William H. Barnum, Treasurer; Milo B. Richardson, Secretary and Assistant Treasurer.

Sharon Valley Iron Company, Lime Rock. Furnace at Sharon Valley, Litchfield county. One stack, 31 x 9½; very old; rebuilt in 1863; hot blast; water-power; ore, Salisbury; product, Salisbury car-wheel pig iron; annual capacity, 3,500 net tons. Wm. H. Barnum, President; Charles W. Barnum, Treasurer; Milo B. Richardson, Secretary.

Number of furnaces in Connecticut: 9 charcoal stacks.

## NEW YORK.

### ANTHRACITE.

Albany and Rensselaer Iron and Steel Company, Troy. Two stacks: Columbia Furnace at Hudson, Columbia county, and Fort Edward Furnace at Fort Edward, Washington county. Columbia Furnace, 40 x 14, built about 1860. Fort Edward Furnace, 50 x 15, built in 1853, and run by water-power. Both use Lake Champlain, African, and Spanish ores; product, Bessemer pig iron; combined annual capacity, 21,000 net tons. *See Rolling Mills.*

Albany City Iron Company, Albany, Albany county. Two stacks, each 60 x 16, built in 1873-4; product of one furnace, foundry pig iron from Lake Champlain magnetites and Harlem hematites; product of the other furnace, Bessemer pig iron from Northern New York magnetites and foreign hematites; fuel, anthracite and coke; total annual capacity, 28,000 net tons. Brand, "Olcott." John F. Rathbone, President; William R. Hills, Secretary and Treasurer; Davis Keeley, Superintendent. Selling agents, Crocker Brothers, 32 Cliff st., New York.

Burden Iron Works, Burden Iron Company, Troy, Rensselaer county.

Two stacks, each 60 x 16, built in 1865 and 1867; closed tops; ores, magnetic from Northern New York, and hematite from Eastern New York; total annual capacity, 30,000 net tons. *See Rolling Mills.*

Cedar Point Furnace No. 1, Cedar Point Iron Company, Port Henry, Essex county. One stack, 70 x 17, built in 1872-3; first put in blast August 12, 1875; four 22-foot Whitwell stoves; bell-and-hopper top; fuel, anthracite and coke; ores, Old Bed Lake Champlain, New Bed Bessemer Lake Champlain, and Kearney from St. Lawrence county; annual capacity, 26,000 net tons. Brand, "Cedar Point." Silas H. Witherbee, President; George R. Sherman, Vice-President; Hosea B. Willard, Secretary and Treasurer. The furnace is situated on the bank of Lake Champlain.

Charlotte Furnace, Charlotte Iron Works, 15 Powers' Block, Rochester, Monroe county. Furnace at Charlotte, 7 miles from Rochester, at the mouth of the Genesee river. One stack, 50 x 14, built in 1868; closed top; annual capacity, 12,000 net tons. Specialty, foundry pig iron. H. C. Roberts, President; Charles E. Upton, Vice-President; George C. Hopkins, Secretary and Treasurer.

Clove Furnace, Parrott Iron Company, Greenwood Iron Works, Orange county. One stack, 55 x 16, built in 1854; closed top; steam and water-power; ore, magnetic, mined 8 to 20 miles from the furnace; product, foundry pig iron for fine hardware and stove work; annual capacity, 13,500 net tons. Brand, "Clove." Peter P. Parrott, President; Edward M. Parrott, Vice-President; R. D. A. Parrott, Secretary and Treasurer. Selling agents, Thomas J. Pope & Bro., 292 Pearl st., New York.

Cold Spring Furnace, West Point Furnace Company, Cold Spring, Putnam county. One stack, 60 x 15½, built in 1863; closed top; ores, magnetic and hematite, mined chiefly in New York; product, neutral forge and foundry and Bessemer pig iron; annual capacity, 12,000 net tons. Brand, "West Point." J. C. Kent, President, Phillipsburg, N. J.; J. Wesley Pullman, Secretary and Treasurer, 407 Walnut st., Philadelphia. Selling agents, Crocker Brothers, 32 Cliff st., New York.

Crown Point Furnaces, Crown Point Iron Company, Crown Point, Essex county. Two stacks situated on the bank of Lake Champlain, 60 x 17 and 70 x 18, built in 1873, and the second stack rebuilt in 1881; 6 Siemens-Cowper-Cochrane fire-brick stoves, three 15 x 45 and three 16 x 60; product, Bessemer pig iron, produced from Crown Point (or Penfield) and Chateaugay ore; total annual capacity, 45,000 net tons. John Hammond, President; C. L. Hammond, Secretary; A. L. Inman, General Manager; H. L. Reed, Cashier; C. H. Foote, Superintendent. *See Forges.*

Dutchess Furnace, Clove Spring Iron Works, Clove Valley P. O., Dutchess county. One stack, 50 x 12, built in 1873 for charcoal and changed to anthracite in 1877; open top, with "hat;" ores, ⅔ local hematite, and ⅓ magnetic from Morris county, New Jersey; product, No. 1

and No. 2 X foundry and chilling pig iron ; annual capacity, 7,000 net tons. Brand, "Dutchess Iron." John S. Schultze, President and Treasurer. Agents, Crocker Brothers, 32 Cliff st., New York. *See Clove Spring (charcoal) Furnace.*

Elmira Iron and Steel Rolling Mill Company, Elmira, Chemung county. Two stacks, each 56 x 16, built in 1872 ; one put in blast Oct. 5, 1872, and the other subsequently ; total annual capacity, 35,000 net tons. The ores used are hematites from Jefferson and Wayne counties, New York, and Centre county, Pa., and magnetic ores from Lake Superior and Canada. The pig iron produced is used principally at the mills of the company for bar iron, angles, and plates. *See Rolling Mills.*

Falkill Iron Company, A. Tower, Agent, Poughkeepsie, Dutchess county. Two stacks, each 60 x 16, built in 1860 ; ores,  $\frac{1}{2}$  Dutchess county brown hematite,  $\frac{1}{2}$  Lake Champlain magnetic, and  $\frac{1}{2}$  Forest of Dean, Orange county ; total annual capacity, 25,000 net tons.

Fletcher Furnace, Fletcher Furnace Company, lessee, Buffalo, Erie county. One stack, 65 x 13, built in 1863, and blown in April 8, 1864 ; closed top ; ores, Lake Superior and Lake Champlain, with a small percentage of native ; product, foundry pig iron ; annual capacity, 18,000 net tons. Brand, "Fletcher." Edmund Carpenter, Agent ; F. W. Carpenter, Treasurer.

Franklin Iron Works, Franklin Iron Manufacturing Company, Franklin Iron Works P. O., Oneida county. Two stacks, Franklin and De Wolf, each 54 x 14, built in 1870 and 1871 ; closed tops ; fuel, anthracite coal and coke ; ore, fossil, from Oneida county, obtained from 1 $\frac{1}{2}$  to 5 miles from the works ; product, pig iron for stove plates and small castings ; total annual capacity, 28,000 net tons. E. L. Hedstrom, President, Buffalo ; E. F. Holden, Treasurer, Syracuse ; C. H. Smyth, Secretary and Superintendent, at the works.

Furnaceville Iron Company, 37 Elwood Block, Rochester. Furnace, formerly called Ontario Furnace, situated at Furnaceville, Wayne county. One stack, 50 x 12, first put in blast in October, 1870 ; open top ; closed hearth ; annual capacity, 10,250 net tons. Present company organized March 10, 1880. E. H. Harriman, President ; W. M. Harriman, Vice President ; W. H. Averell, Secretary and Treasurer ; E. M. Parrott, Manager.

Hudson Iron Works, Hudson Iron Company, Hudson, Columbia county. Two stacks, each 49 x 15, built in 1851 ; closed tops ; ores, hematite from West Stockbridge, Mass., and Lake Champlain magnetic ; product, principally best quality of foundry iron, though it is also used for best grades of bar iron ; total annual capacity, 25,000 net tons. Brand, "Hudson." J. W. Hoysradt, President and General Agent ; S. Seymour, Secretary and Treasurer.

Jagger Iron Works, Jagger Iron Company, Albany. Works on Van Rensselaer island. Two stacks, each 60 x 16, built in 1871 ; ores, Lake Champlain magnetic, and hematite from Columbia county, New York, and Western Massachusetts ; total annual capacity, 25,000 net tons.

Specialty, pig iron for stove founders and machinists. Formerly called Corning Iron Works. James Hendrick, President.

Kirkland Furnace, Kirkland Iron Company, Kirkland, Oneida county. One stack, 65 x 13, built in 1873; reconstructed in 1882, and changed from water to steam power; ores, local hematite or fossiliferous and Lake Champlain and Canadian magnetic; annual capacity, 18,000 net tons. Specialty, No. 1 foundry pig iron. Theodore W. Dwight, President; I. A. Williams, Treasurer; Enoch Phillips, Superintendent.

Manhattan Iron Works, Manhattan Iron Works Company, Manhattanville, New York City. Two stacks, 49 x 12 and 49 x 13, built in 1851 and 1857; ores, magnetic from Lake Champlain and hematite from Sharon, on the New York and Harlem Railroad; product, neutral pig iron, suitable for foundry or mill purposes; total annual capacity, 18,000 net tons. B. W. Van Voorhis, President; William W. Van Voorhis, Treasurer.

Niagara River Iron Company, Buffalo. Furnace at Iron-ton, Niagara county. One stack, 60 x 16, built in 1873, and put in blast November 7, 1873; Ford hot-blast stoves; annual capacity, 12,000 net tons. Foundation laid for a second stack. Equipment of the best pattern and in complete order. Now idle and offered for sale. Josiah Jewett, Secretary and Treasurer.

Onondaga Iron Company, Syracuse. Works at Geddes, Onondaga county. Two stacks, each 65 x 15; No. 1 built in 1869-70, blown in June 17, 1870; No. 2 built in 1872, blown in November 14, 1872; fuel, Connellsville coke and anthracite coal; product known as "Onondaga" pig iron; total annual capacity, 36,000 net tons. Foundry and mill pig iron are produced; quality nearly neutral, cold short tendency, well adapted for boiler plate, hoops, and bands. J. J. Belden, President; R. N. Gere, Vice-President; A. J. Belden, Secretary and Treasurer; W. H. Larrabee, Sales Agent; W. H. H. Gere, Manager.

Peekskill Furnace, Peekskill Furnace Company, Peekskill, Westchester county. One stack, 60 x 16, built in 1853, and rebuilt in 1874; bell-and-hopper top; annual capacity, 12,000 net tons. Brand, "Peekskill." James L. Flint, General Manager, 33 Broadway, New York; W. H. Campbell, Superintendent, Peekskill.

Port Henry Furnaces, Bay State Iron Company, W. T. Foote, Agent, Port Henry, Essex county. General office, 2 Pemberton Square, Boston, Mass. Two stacks situated on the bank of Lake Champlain, each 66 x 16, built in 1853 and 1861; rebuilt in 1868 and 1871 respectively; ores, Lake Champlain, Chateaugay, and red ore from St. Lawrence county; product, forge and foundry pig iron; total annual capacity, 30,000 net tons. Brands, "Port Henry" and "Bay State." Selling agents, Crocker Brothers, 32 Cliff st., New York. *See Rolling Mills in Massachusetts.*

Poughkeepsie Iron Company, A. Tower, President and Agent, Poughkeepsie. Two stacks, 43 x 14 and 46 x 15, built in 1848 and 1854, respectively; ores,  $\frac{1}{2}$  Dutchess county brown hematite,  $\frac{1}{2}$  Lake Cham-

plain magnetic, and  $\frac{1}{2}$  Forest of Dean, Orange county; total annual capacity, 20,000 net tons.

Sterling Iron and Railway Company, 42 Pine st., P. O. Box 1,384, New York. Furnaces in Orange county. Two stacks: Southfield, 45 x 12, built as a charcoal furnace in 1806, converted to anthracite in 1868; and Sterling, 42 x 13, built as a charcoal furnace in 1848, converted to anthracite in 1866; ores, magnetic, mined on the company's property near the furnaces; product, foundry and mill pig iron; total annual capacity, 15,000 net tons. Iron called "Sterling." A. W. Humphreys, President.

Union Iron Works, Union Iron Company of Buffalo, Buffalo, Erie county. Three stacks: No. 1, Pioneer, 50 x 17, built in 1861; No. 2, Excelsior, 50 x 15, built in 1862; No. 3, Monitor, 50 x 14, built in 1865; all have closed tops; ores, hematite, specular, and magnetic, obtained from St. Lawrence county, New York, and from the Lake Superior region; total annual capacity, 28,000 net tons. Specialty, mill pig iron. Brand, "Union." *See Rolling Mills.*

Number of anthracite furnaces in New York: 41 stacks.

#### CHARCOAL.

Alpine Furnace, Z. H. Benton, Antwerp, Jefferson county. Furnace at Diana, Lewis county. One stack, 40 x 9, built from 1845 to 1850; hot blast; water-power; capacity, 20 net tons a day. Furnace lands comprise 40,000 acres.

Carthage Furnace, Carthage Iron Company, Carthage, Jefferson county. One stack, 49 x 9, built in 1818, and rebuilt in 1881; warm blast; bell-and-hopper top; water-power; ore, local hematite; product, car-wheel and foundry pig iron; annual capacity, 6,000 net tons. R. N. Gere, President; L. H. Mills, Vice-President; Robert W. Gere, Secretary and Treasurer.

Chateaugay Ore and Iron Company, Plattsburgh, Clinton county. One stack, 45 x 9, first blown in April 7, 1878; closed top; hot blast; annual capacity, 3,500 net tons. Brand, "Chateaugay." Andrew Williams, President; A. L. Inman, General Manager; H. M. Olmsted, Treasurer. *See Rolling Mills. See Forges.*

Chatham Furnace, J. J. Morehouse, lessee, Chatham, Columbia county. One stack, 32 x 9, built in 1873; put in blast in July, 1873; warm blast; ore, brown hematite from Columbia and Dutchess counties; product, pig iron for car-wheels; annual capacity, 4,500 net tons. Formerly called Beckley Iron Works.

Clove Spring Furnace, Clove Spring Iron Works, Clove Valley P. O., Dutchess county. One stack, 32 x 9, built in 1830; warm blast; water and steam power; annual capacity, 3,300 net tons. The ore used is Clove hematite from Clove Valley. Specialty, car-wheel chilling pig iron. Brand, "Clove Spring Iron." John S. Schultze, President and Treasurer. Agents, Crocker Brothers, 32 Cliff st., New York. *See Dutchess (anthracite) Furnace.*



- Copake Iron Works, Frederick Miles, Copake Iron Works, Columbia county. One stack, 32 x 9, built in 1872; warm blast; steam and water power; annual capacity, 4,500 net tons. Specialty, car-wheel iron.
- Fullerville Iron Works, George H. Clarke, Fullerville, St. Lawrence county. Selling agency, Crocker Brothers, 32 Cliff st., New York. One stack, 33 x 8½, built in 1833; water-power; ore, local red hematite; annual capacity, 2,000 net tons. Put in blast in 1877, after having been idle for many years.
- Gere Iron and Mining Company, Port Leyden, Lewis county. Two stacks, Gracie and Fannie, each 51 x 10½, built in 1864, rebuilt in 1880, and burned and rebuilt in 1881; warm blast; bell-and-hopper tops; closed fronts; four 4½-inch tuyeres; Black river water-power; ores, Jefferson county, Old Sterling, Salisbury, and Canadian; total annual capacity, 18,250 net tons. Product, pig iron specially adapted for car-wheels, chilled plows, rolls, and forge purposes. Brand, "Gere." Chill graded. W. H. H. Gere, President, Syracuse; Isaac Maynard, Vice-President, Utica; Chas. H. Hawley, Treasurer, Port Leyden; Geo. H. Gere, Secretary, Syracuse. The company has erected works for the distillation of wood, producing charcoal and converting pyroligneous acid into commercial products.
- Jefferson Iron Company, Antwerp, Jefferson county. Agents, Crocker Brothers, 32 Cliff st., New York. Two stacks: Sterlingbush Furnace, at Sterlingbush, Lewis county, 32 x 9, built in 1852, rebuilt in 1873; Sterlingville Furnace, at Sterlingville, Jefferson county, 30 x 9, built in 1866; cold blast; ore, red hematite, from old Sterling mine, on the property; water-power; total annual capacity, 4,000 net tons. Specialty, car-wheel pig iron.
- Millerton Iron Company, Irondale, Dutchess county. One stack, 32 x 9; very old; repaired in 1864; hot blast; ore, Salisbury; annual capacity, 4,500 net tons. Specialty, car-wheel pig iron. W. H. Barnum, President; George S. Frink, Secretary and Treasurer.
- Napanoch Furnace, operated by "Napanoch Furnace," Napanoch, Ulster county. One stack, 46 x 12, built prior to 1854; put in blast in July, 1873, anthracite coal being used as fuel; water-power; hot blast; annual capacity, 6,000 net tons. To be put in blast with charcoal in 1882.
- Phenix Furnace, C. S. Maltby, Millerton, Dutchess county. One stack, 32 x 9, built in 1840; hot blast; ore, Salisbury, from the old Salisbury mine at Ore Hill and neighboring mines; annual capacity, 4,500 net tons. Specialty, car-wheel pig iron. A. James Copp, Superintendent.
- Shaparoon Iron Works, South Boston Iron Company, Dover Furnace P. O., Dutchess county. One stack, 40 x 9½, first put in blast in October, 1881; hot blast; open top; ore, local hematite; annual capacity, 3,600 net tons. Brand, "Shaparoon." Wm. P. Hunt, President, Boston, Mass.; James Beckley, Manager, at the works.
- Wassaic Furnace, N. Gridley & Son, Wassaic, Dutchess county. One stack, 32 x 9½, built in 1826; warm blast; water-power; ores, Amenia hematite mined in the neighborhood, and ½ Pawling; product, pig



iron for car-wheels, chilled rolls, and malleable castings; annual capacity, 4,000 net tons. Brand, "Wassaic." Selling agents, Crocker Brothers, 32 Cliff st., New York.

Number of charcoal furnaces in New York: 16 stacks. Total number of furnaces in New York: 57 stacks.

## NEW JERSEY:

### ANTHRACITE.

Andover Iron Works, Andover Iron Company, Phillipsburg, Warren county. Three stacks: two 60 x 18, and one 75 x 18, built in 1848; ore, New Jersey magnetic, from the company's mines; product, all grades of pig iron, with special qualities for plates, sheets, wire, nails, and car-wheel chill; total annual capacity, 50,000 net tons. Brand, "Andover." Philadelphia office, 407 Walnut st.: Geo. F. Tyler, President; F. A. Comly, Secretary and Treasurer; J. Wesley Pullman, Agent. Superintendent of works, Joseph C. Kent, Phillipsburg, N. J.

Boonton Iron Works, Estate of J. Couper Lord, Boonton, Morris county. Agents, Crocker Brothers, 32 Cliff st., New York. Two stacks, 70 x 14 and 60 x 16, built in 1848 and 1868, respectively; bell-and-hopper tops; steam and water power; total annual capacity, 25,000 net tons.

Chester Furnace, W. J. Taylor & Co., lessees, Chester, Morris county. One stack, 60 x 13, built in 1878; Weimer suspended pipe stoves, Weimer tubular boilers, and Weimer high-speed blowing engine; product, extra red-short mill pig iron, made from Chester ores, roasted in the Taylor gas kiln; annual capacity, 12,000 net tons. Brand, "Jersey."

Franklin Iron Company, Franklin Furnace P. O., Sussex county. One stack, 67 x 20½, completed in October, 1873, and blown in January 1, 1874; closed top; fuel, anthracite and coke; ores, New Jersey, Tilly Foster, and foreign; product, Bessemer pig iron; annual capacity, 29,000 net tons. E. F. Hatfield, Jr., President, and N. W. H. Hix, Treasurer, 52 Wall st., New York; W. W. Pierce, Secretary, Franklin Furnace, N. J.

Musconetcong Iron Works, Stanhope, Sussex county. Selling agency, Crocker Brothers, 32 Cliff st., New York. Two stacks, 70 x 17 and 80 x 20, built in 1864 and 1869, and blown in in 1866 and 1871; closed tops; ores, magnetic and some limonite, mined in Morris, Sussex, and Warren counties; total annual capacity, 40,000 net tons. Specialty, No. 2 foundry and gray forge pig iron. Brand, "Musconetcong." President, A. Pardee, Hazleton, Pa.; Secretary and Treasurer, H. H. Wilson, 237 South Third st., Philadelphia; Superintendent, I. P. Pardee, Stanhope, N. J.

New Jersey Zinc and Iron Company, Newark, Essex county. Sales office, 61 Maiden Lane, New York. Three stacks, each 20 x 7, built in 1855, 1863, and 1871; open tops; product, spiegeleisen, from zinc residuum; combined annual capacity, 6,600 net tons. B. G. Clarke,

President, and Theodore Sturges, Treasurer, 52 Wall st., New York ; A. H. Farlin, Manager, Newark.

Oxford Iron Works, Oxford Iron Company, Oxford, Warren county. Two stacks, 36 x 10, and 50 x 18, built in 1742 and 1871, respectively ; ore, magnetic, mined near the works ; combined annual capacity, 17,000 net tons. Product is worked up into nails, etc., by the company, only a small quantity of foundry pig iron being made and sold. *See Rolling Mills.*

Pequest Furnace, Cooper & Hewitt, Oxford, Warren county. Office, 17 Burling Slip, New York. One stack, 58 x 16, built in 1874 ; blown in October 27, 1874 ; closed top ; ores, New Jersey magnetic and hematite ; product, foundry and gray forge pig iron ; estimated annual capacity, 14,500 net tons. Manager, Kenneth Robertson. *See Ringwood Furnaces. See Durham Iron Works, Lehigh Valley, Pennsylvania.*

Port Oram Furnace, Joseph Wharton, P. O. Box 2786, Philadelphia. Works at Port Oram, Morris county. One stack, 60 x 16, built in 1868, and first blown in in 1869 ; bought by Joseph Wharton in 1881, and by him put in thorough order ; closed top ; ores, local magnetites ; product, high grade mill pig iron ; annual capacity, 16,000 net tons. *See Warren Furnace. See Boonton Rolling Mills.*

Ringwood Furnaces, Cooper & Hewitt, Hewitt, Passaic county. Office, 17 Burling Slip, New York. One completed stack, 48 x 13, and one unfinished stack, 65 x 16 ; open tops ; water-power. The former was altered from charcoal to anthracite in 1872. Ore, magnetic, mined at Ringwood. Use the Cooper iron hot-blast arrangement. *See Pequest Furnace. See Durham Iron Works, Lehigh Valley, Pennsylvania.*

Secaucus Iron Company, Secaucus, Hudson county. One stack, 65 x 17, completed in 1877, and first blown in in June, 1879 ; ores,  $\frac{1}{2}$  foreign hematites, and  $\frac{1}{2}$  New York and New Jersey magnetites ; fuel, anthracite and coke ; product, Bessemer pig iron ; annual capacity, 23,000 net tons. A. Pardee, President, Hazleton, Pa. ; I. P. Pardee, Treasurer and Superintendent, Stanhope, N. J. Selling agents, Crocker Brothers, 32 Cliff st., New York.

Warren Furnace, Joseph Wharton, P. O. Box 2,786, Philadelphia. Furnace at Hackettstown, Warren county. Formerly called Hackettstown Furnace. One stack, 56 x 16, built in 1874-5, and put in blast in 1875 ; bought by Joseph Wharton in 1879 ; ores, mainly North Jersey magnetic, with mixture of hematite ; product, mostly mill pig iron ; annual capacity, 15,000 net tons. *See Port Oram Furnace. See Boonton Rolling Mills.*

Number of furnaces in New Jersey : 19 completed anthracite stacks and 1 unfinished stack.

## PENNSYLVANIA.

### LEHIGH VALLEY ANTHRACITE.

Allentown Iron Works, Allentown Iron Company, 222 and 224 South Third st., Philadelphia. Works at Allentown, Lehigh county. Five

stacks: No. 1,  $53\frac{1}{2} \times 14\frac{1}{2}$ , and No. 2,  $60 \times 15\frac{1}{2}$ , built and blown in in 1846; No. 3,  $53\frac{1}{2} \times 15$ , built in 1853 and blown in in 1854; No. 4,  $53\frac{1}{2} \times 16\frac{1}{2}$ , built in 1854 and blown in in 1855; No. 5,  $60 \times 17$ , built in 1872 and blown in in 1873; 4 open tops and 1 closed; ores, magnetic from New Jersey and hematite from Lehigh and Berks counties, Pa.; foundry pig iron is a specialty; total annual capacity, 60,000 net tons. Brand, "Allentown." Frederick Prime, Jr., President; H. Cabot, Vice-President; Frank R. Welsh, Secretary; Stephen B. Neumoyer, Manager of the works.

Allentown Rolling Mills, 237 South Third st., Philadelphia. Works at Allentown. Two stacks, each  $68 \times 15$ , built in 1864; open tops; total annual capacity, 20,000 net tons. Formerly owned by the Roberts Iron Company. *See Rolling Mills.*

Bethlehem Iron Company, Bethlehem, Northampton county. Eight stacks: No. 1,  $62 \times 16$ , built in 1863; No. 2,  $70 \times 16\frac{1}{2}$ , built in 1867; No. 3,  $50 \times 13$ , built in 1868; No. 4,  $70 \times 17\frac{1}{2}$ , built in 1874-5; No. 5,  $70 \times 18\frac{1}{2}$ , built in 1874-5; No. 6,  $70 \times 17\frac{1}{2}$ , built in 1881; all have closed tops. (Old No. 6,  $27 \times 7\frac{1}{2}$ , built in 1874-5, and sold and removed in 1881.) No. 7,  $65 \times 18$ , situated at Bingen, Northampton county, built in 1870; formerly called North Penn Furnace. Specialty, Bessemer pig iron, from local and foreign hematites and magnetic ores; total annual capacity, 100,000 net tons. This company also leases and operates the Northampton Furnace at Freemansburg, Northampton county, which consists of one stack,  $64 \times 16$ , first blown in July 17, 1873; closed top; annual capacity, 11,200 net tons. *See Rolling Mills.*

Carbon Iron Works, Carbon Iron and Pipe Company Limited, Mauch Chunk, Carbon county. Works at Parryville. Formerly owned by the Carbon Iron Company, but since 1879 by the present owner. Three stacks,  $52 \times 13$ ,  $52 \times 16$ , and  $65 \times 16$ , built in 1855, 1864, and 1869, respectively; 1 open and 2 closed tops; ores, hematite from Lehigh, Northampton, and Carbon counties, and magnetic from New Jersey and Lake Champlain; total annual capacity, 30,000 net tons. Product known as "Carbon" iron. A. A. Douglas, Chairman, Mauch Chunk; George Ruddle, Secretary and Treasurer, Mauch Chunk; John R. Leisenring, Sales Agent, Mauch Chunk; H. P. Cooper, Superintendent, Parryville.

Coleraine Iron Works, Wm. T. Carter & Co., 302 Walnut st., Philadelphia. Works at Redington, Northampton county. Two stacks, each  $60 \times 17$ , built in 1869 and 1872; ores,  $\frac{2}{3}$  hematite and  $\frac{1}{3}$  magnetic; product, foundry pig iron; total annual capacity, 26,000 net tons.

Coplay Iron Company Limited, Coplay, Lehigh county. Three stacks,  $60 \times 14$ ,  $55 \times 16$ , and  $55 \times 16$ , built in 1853, 1862, and 1868, respectively; ores, Lehigh county hematites and New Jersey magnetics; open tops; product, principally foundry pig iron; total annual capacity, 30,000 net tons. Formerly owned by the Lehigh Valley Iron Company. E. P. Wilbur, Chairman, Bethlehem; Wm. H. Ainey, Treasurer, Allentown; V. W. Weaver, Superintendent, Coplay.

- Crane Iron Works, Crane Iron Company, 224 South Fourth st., Philadelphia. Works at Catasauqua, Lehigh county. Five stacks: one 75 x 18, one 60 x 18, one 60 x 17, and two 60 x 17½. Present furnaces built in 1850, 1867, and 1881; original furnaces built in 1839, 1842, and 1846. All have closed tops; 2 have iron hot-blast stoves, and 3 have Whitwell fire-brick stoves; ores, New Jersey magnetic, and brown hematite from Lehigh, Berks, and Northampton counties in Pennsylvania; specialty, machinery, stove, foundry, and Bessemer pig iron. Brand, "Crane." Samuel Dickson, President; Geo. T. Barns, Secretary and Treasurer. Officers at the works are: Joseph Hunt, Assistant Superintendent; John Williams, Cashier.
- Durham Iron Works, Cooper & Hewitt, Riegelsville, Bucks county. New York office, 17 Burling Slip. One stack, 75 x 20, built in 1874, and blown in in February, 1876; closed top; ores, hematite and magnetic from Durham, Pa., and magnetic from Ringwood, Charlottensburg, and Chester, N. J.; specialty, gray forge pig iron; annual capacity, 30,000 net tons. Brand, "Durham." The two old stacks, built in 1848 and 1851, have been demolished. B. F. Fackenthal, Jr., Superintendent. *See Pequest and Ringwood Furnaces, New Jersey.*
- Emaus Furnace, Ormrod, Fisher & Co., lessees, Emaus, Lehigh county. One stack, 68 x 16, completed and first put in blast October 10, 1872; rebuilt in 1879-80; put in blast by lessees September 12, 1881; closed top; ores, local hematite and New Jersey magnetic; specialty, foundry pig iron; annual capacity, 15,000 net tons. Brand, "Emaus." Selling agents, Donaldson & Thomas, 138 Walnut st., Philadelphia.
- Glendon Iron Works, Glendon Iron Company, Easton, Northampton county. Five stacks: one 47 x 15, one 72 x 18, one 63 x 16, and two 81 x 18, built in 1852, 1869, 1874, 1880, and 1881, respectively. Original furnaces were built in 1843, 1844, 1850, 1852, and 1869. These furnaces are at Glendon, near Easton, except Furnace No. 4, which is situated at South Easton; No. 4 is blown by water-power; all closed tops except No. 4; ores, hematite from Northampton county, Pa., and magnetic from Morris county, N. J.; specialty, forge pig iron; total annual capacity, 80,000 net tons. Brand, "Glendon." Principal office at Boston, Mass. Augustus Lowell, President, Boston; Thomas T. Bouvé, Secretary and Treasurer, Boston; Frank Firmstone, Superintendent, Easton.
- Lehigh Iron Company, Allentown, Lehigh county. Two stacks, 55 x 16 and 60 x 17; No. 1, completed July 22, 1869, and No. 2, October 21, 1872; ores, Lehigh county hematite and New Jersey magnetic; specialty, foundry pig iron; total annual capacity, 21,000 net tons. Brand, "Lehigh." W. H. Ainey, President and Treasurer; H. Bortz, Secretary and Manager of the works.
- Lehigh Zinc and Iron Company Limited, Bethlehem, Northampton county. Main office, 212 Walnut st., Philadelphia. One stack, 27 x 8, first put in blast in February, 1882; closed top; ore, residuum from Franklinite ore, after the zinc has been extracted; product, spiegel-

eisen; annual capacity, 2,800 net tons. Richard Heckscher, President; S. P. Wetherill, Secretary; August Heckscher, Treasurer; J. Price Wetherill, Manager.

Lucy Furnace, Lucy Furnace Company, Glendon, Northampton county. Main office, South Bethlehem. One stack, 65 x 16, built and put in blast in 1872; bell-and-hopper top; ores, New Jersey magnetic and local hematite; annual capacity, 10,000 net tons. Formerly called Uhler Furnace. W. A. Wilbur, Superintendent. Owned by G. B. Linderman, E. P. Wilbur, and H. Green.

Macungie Furnace, Macungie Iron Company, Macungie, Lehigh county. One stack, 56 x 16, completed in 1874, and blown in September 14, 1874; ores,  $\frac{3}{4}$  native hematites and  $\frac{1}{4}$  New Jersey magnetic; specialty, foundry pig iron; annual capacity, 12,230 net tons. Formerly owned by the Millerstown Iron Company. J. T. Audenried, President, Philadelphia; R. R. Robb, Secretary, Philadelphia; Wm. L. Schaffer, Treasurer, Philadelphia; Wm. M. Weaver, Superintendent, Macungie. Selling agents, Audenried & Co., 123 Walnut st., Philadelphia.

Saucon Furnaces, Saucon Iron Company, Hellertown, Northampton county. Two stacks, 50 x 16 and 60 x 16; put in operation March 25, 1868, and May 25, 1870, respectively; one open and one closed top; ores, Saucon valley hematite and New Jersey magnetic; specialty, foundry pig iron; total annual capacity, 25,000 net tons. Brand, "Saucon." Joseph B. Altemus, President, 220 Chestnut st., Philadelphia; M. Fackenthall, Secretary and Superintendent, Hellertown; J. Tatnall Lea & Co., 230 South Third st., Philadelphia, exclusive sales agents.

Thomas Iron Works, Thomas Iron Company, Hokendauqua, Lehigh county. Nine stacks: six at Hokendauqua, two (Lock Ridge) at Alburtis, Lehigh county, and one (Keystone) at Glendon, Northampton county. At Hokendauqua there are 4 stacks 60 x 18, one 65 x 18, and one 55 x 18, of which two were built in 1855, two in 1863, and two in 1873. At Alburtis both stacks are 62 x 15, and were built in 1867 and 1869. At Glendon the stack is 65 x 16, and was first put in blast April 17, 1876. All use native hematite and New Jersey magnetic ores; product, foundry and forge pig iron; total annual capacity, 131,000 net tons. Samuel Thomas, President; J. T. Knight, Secretary and Treasurer, Easton; John Thomas, General Superintendent; David H. Thomas, Superintendent of Lock Ridge Furnaces.

Number of furnaces in the Lehigh region: 51 anthracite stacks.

#### SCHUYLKILL VALLEY ANTHRACITE.

Anvil Furnace, Pottstown Iron Company, Pottstown, Montgomery county. One stack, 65 x 16, built in 1867 and blown in in December, 1867; closed top; ores, magnetic and hematite, mined partly at Hope-well, Chester county; specialty, mill pig iron; annual capacity, 20,000 net tons. See *Bechtelsville Furnace*. See *Rolling Mills*.

Bechtelsville Furnace, Pottstown Iron Company, lessee, Pottstown. Fur-

- nace at Bechtelsville, Berks county. One stack, 63 x 16, built in 1875; annual capacity, 12,000 net tons. *See Anvil Furnace. See Rolling Mills.*
- Chester Rolling Mills, Chester, Delaware county. One stack, 70 x 18, first put in blast in November, 1881; stack at present lined up to 16 feet across the bosh; three 60 x 18 Whitwell stoves; ores, Lake Champlain, Northern New Jersey, Staten Island, North River, and Virginia; daily capacity, 100 net tons. *See Rolling Mills.*
- East Penn Furnaces, Philadelphia and Reading Coal and Iron Company, Lyons Station, Berks county. Office, 227 South Fourth st., Philadelphia. Two stacks, each 48 x 12, built in 1874-5; injured by fire in 1881, but to be rebuilt; closed tops; ores, hematite from Berks and Lehigh counties, and magnetic from New Jersey; product, gray forge and foundry pig iron; total annual capacity, 17,000 net tons. Brand, "East Penn."
- Edgehill Furnace, Edgehill Iron Company, 43 North Water st., Philadelphia. Works at Edgehill, Montgomery county. One stack, 63 x 17, built in 1869-72; first blown in in January, 1872; closed top and closed front; ores, hematite from Montgomery county, and magnetic from Berks county and New Jersey; annual capacity, 15,000 net tons. Specialty, gray forge pig iron. Brand, "Edgehill." Chester J. Buck, President; John M. Reeves, Secretary and Treasurer.
- Henry Clay Furnaces, Eckert & Brother, Reading, Berks county. Two stacks, each 45 x 12; one built in 1842 and blown in in August, 1844; the other built in 1855 and blown in in September, 1856; closed tops; ores, hematite and magnetic from Berks and Lebanon counties; gray forge pig iron is a specialty; total annual capacity, 16,000 net tons. Brand, "Henry Clay."
- Keystone Furnaces, E. and G. Brooke Iron Company, Birdsboro, Berks county. Three stacks: one, 50 x 12, built in 1853; one, 55 x 15, built in 1871; one, 60 x 16, built in 1873; ores, principally magnetic with a mixture of hematite. *See Charcoal Furnaces. See Rolling Mills.*
- Keystone Furnaces of Reading, Keystone Furnace Company, Reading, Berks county. Two stacks: one, 50 x 15, built in 1869; the other, 50 x 14, built in 1872-3, blown in during June, 1873; closed tops; total annual capacity, 20,500 net tons. Jacob Bushong, President; H. M. Bushong, Secretary and Treasurer; Henry Bushong, General Manager. Sales agents, Crocker Brothers, 32 Cliff st., New York.
- Leesport Furnace, Leesport Iron Company, Leesport, Berks county. One stack, 58 x 15, built in 1852, first blown in in 1853, and rebuilt in 1871; closed top; ores,  $\frac{2}{3}$  hematite from Moselem, Berks county, and  $\frac{1}{3}$  magnetic from Cornwall, Lebanon county; specialty, foundry pig iron; annual capacity, 12,000 net tons. Brand, "Leesport." John G. Kaufman, President; H. H. Muhlenberg, Secretary; L. M. Kaufman, Treasurer and Superintendent. J. J. Mohr, selling agent, 430 Walnut st., Philadelphia.
- Merion and Elizabeth Furnaces, J. B. Moorhead & Co., West Conshohocken, Montgomery county. Philadelphia office, 209 Walnut Place.



- Two stacks: Merion Furnace, 48 x 16, built in 1847 and enlarged in 1876; Elizabeth Furnace, 50 x 16, built in 1872, put in blast October 24, 1872; Merion has 3 'Payer' ovens and Elizabeth 5 Ford ovens, producing an average heat of 900 degrees; ores, New York and New Jersey magnetic and local hematite; product, foundry and forge pig iron; combined capacity, about 500 net tons per week. Brand, "Merion." Specialty, neutral gray forge pig iron for boiler plate and sheet iron.
- Minersville Furnace, Philadelphia and Reading Coal and Iron Company, Minersville, Schuylkill county. Office, 227 South Fourth st., Philadelphia. One stack, 55 x 15, built in 1872-3, first blown in September 5, 1873; rebuilt in 1880; bell-and-hopper top; weekly capacity, 200 net tons. Out of blast since 1875.
- Monocacy Furnace, Monocacy Furnace Company, Monocacy, Berks county. One stack, 50 x 13, built at Hopewell in 1852; removed to Monocacy in 1854; specialty, foundry pig iron; annual capacity, 10,000 net tons. Brand, "Monocacy." Formerly called Theresa Furnace. J. Barclay Hacker, President.
- Montgomery Furnace, Montgomery Iron Company, Port Kennedy, Montgomery county. One stack, 50 x 14, built in 1854, and first blown in in 1856; closed top; ores,  $\frac{3}{4}$  magnetic and  $\frac{1}{4}$  hematite; specialty, forge pig iron; annual capacity, 12,500 net tons. Brand, "Montgomery." Two roasters for magnetic ores were added in 1880. Abraham S. Patterson, President; Joseph Storm Patterson, Secretary and Treasurer; John W. Eckman, Manager.
- Moselem Furnace, Leibrandt & McDowell, Moselem, Berks county. Philadelphia office, 123 North Second st. One stack, 49 x 12, built in 1823 for charcoal, and rebuilt several times; closed top; ores,  $\frac{3}{4}$  Moselem hematite and  $\frac{1}{4}$  Cornwall magnetic; specialty, foundry pig iron; annual capacity, 8,000 net tons. Brand, "Moselem."
- Mt. Laurel Furnace, Clymer Iron Company, Temple, Berks county. Furnace at Mt. Laurel. One stack, 50 x 11, built in 1836, rebuilt in 1847; changed to anthracite in 1873, but not blown in afterward until February 1, 1880; closed top; annual capacity, 5,000 net tons. Wm. H. Clymer, President; Hiester Clymer, Secretary. *See Charcoal Furnaces.*
- Norristown Iron Works, James Hooven & Sons, Norristown, Montgomery county. One stack, 55 x 16, built in 1869; open top; annual capacity, 10,000 net tons. James Hooven, owner. *See Rolling Mills.*
- Philadelphia Furnace, S. Robbins & Son, Beach and Vienna sts., Kensington, Philadelphia. One stack, 58 x 14, built in 1873, and blown in December 5, 1873; closed top; ores, hematite and magnetic from Pennsylvania, New York, Delaware, and Spain; product, forge and foundry pig iron; annual capacity, 10,000 net tons. *See Rolling Mills.*
- Phoenix Iron Works, Phoenix Iron Company, Phoenixville, Chester county. Office, 410 Walnut st., Philadelphia. Three stacks: No. 1, 59 x 15, built in 1845, and rebuilt in 1871; No. 2, 58 $\frac{1}{2}$  x 15, built in

1845, and rebuilt in 1871; No. 3, 59 x 15, built in 1849; closed tops; ores, magnetics and hematites from Berks and Chester counties, and New Jersey and foreign; specialty, gray forge pig iron; total annual capacity, 45,000 net tons. Brand, "Phoenix." Charles I. Rader, Blast-furnace Manager. *See Rolling Mills.*

Pioneer Furnaces, Pottsville Iron and Steel Company, Pottsville, Schuylkill county. Three stacks: one, 50 x 12, rebuilt in 1853; one, 50 x 13½, built in 1866; and one, 55 x 15, built in 1872; closed tops; ores, magnetic and hematite from Lebanon and Berks counties, and from New York; product, Bessemer, forge, and foundry pig iron; specialty, forge iron; total annual capacity, 35,000 net tons. Brand, "Pioneer." *See Rolling Mills.*

Plymouth Rolling Mill Company, S. Fulton, General Superintendent, 261 South Fourth st., Philadelphia. Three stacks: Plymouth Furnaces at Conshohocken, and Lucinda Furnace at Norristown, all in Montgomery county. Plymouth Furnaces have two stacks, 55 x 15 and 56 x 13, built in 1845 and 1864, respectively; Lucinda Furnace is 40 x 13, built in 1856; closed tops; ores, Pennsylvania hematite and magnetic; product, foundry and forge pig iron; total annual capacity, 30,000 net tons. Brands, "Plymouth" and "Lucinda." *See Rolling Mills.*

Port Carbon Furnace, Philadelphia and Reading Coal and Iron Company, Port Carbon, Schuylkill county. Office, 227 South Fourth st., Philadelphia. One stack, 52 x 15, built in 1872, and put in blast in September, 1872; rebuilt in 1879 and 1881; closed top.

Reading Iron Works, Reading, Berks county. Office, 259 South Fourth st., Philadelphia. Two stacks, 55 x 15 and 55 x 16, built in 1854 and 1873, respectively; closed tops; ore, principally hematite from Lehigh and Lebanon counties; product, foundry and mill pig iron; total annual capacity, 20,000 net tons. *See Rolling Mills.*

Ringgold Furnace, Wm. M. Kaufman & Co., lessees, Reading. Furnace at New Ringgold, Schuylkill county. One stack, 55 x 14½, built in 1873; blown in February 28, 1874; specialty, gray forge pig iron; annual capacity, 7,000 net tons. Isaac Eckert, Manager. *See Sheridan and Topton Furnaces. See Mount Penn (charcoal) Furnace.*

Robesonia Furnace, Ferguson, White & Co., Robesonia Furnaces P. O., Berks county. One stack, 50 x 14, built in 1858; Cornwall ore is exclusively used; product, red-short pig iron for Bessemer steel and bar iron. Brand, "Robesonia." Selling agents, J. Tatnall Lea & Co., 230 South Third st., Philadelphia.

Sheridan Furnaces, Wm. M. Kaufman & Co., Reading. Furnaces at Sheridan, Lebanon county. Two stacks: one, 52 x 13, built in 1862 to use charcoal, and changed to anthracite in 1867; the other, 55 x 16, built in 1874-5; closed tops; Cornwall ore exclusively used; specialty, Bessemer pig iron; total annual capacity, 18,000 net tons. *See Ringgold and Topton Furnaces. See Mount Penn (charcoal) Furnace.*

Swede Furnaces, Philadelphia and Reading Coal and Iron Company,



- Swedeland, Montgomery county. Office, 227 South Fourth st., Philadelphia. One completed stack, 73 x 14, built in 1850, and rebuilt in 1881; closed top; Weimer suspended pipe stoves; annual capacity, 15,000 net tons. One stack partly constructed, 73 x 16.
- Temple Furnace, Temple Iron Company, Temple, Berks county. One stack, 55 x 14, built in 1867; ores, from Lehigh, Berks, and Lebanon counties; specialty, foundry pig iron; annual capacity, 11,000 net tons. Wm. H. Clymer, President; George F. Baer, Secretary; Edward T. Clymer, Treasurer.
- Topton Furnaces, Wm. M. Kaufman & Co., lessees, Reading. Two stacks: one stack located at Topton, Berks county, 55 x 16, built in 1873; the other stack, located at Kutztown, Berks county, 55 x 15½, built in 1875. Product, foundry pig iron. Isaac Eckert, Manager. *See Ringgold and Sheridan Furnaces. See Mount Penn (charcoal) Furnace.*
- Warwick Furnace, Warwick Iron Company, Pottstown, Montgomery county. One stack, 55 x 16, built in 1875, and first blown in in 1876; closed top; ores, magnetic from Boyertown and Seisholtzville, Berks county, and hematite from Flourtown, Montgomery county; specialty, mill pig iron; annual capacity, 21,000 net tons. Brand, "Warwick." Isaac Fegely, President; V. P. McCully, Secretary; Jacob Fegely, Jr., Treasurer; Edgar S. Cook, Manager.
- William Penn Furnaces, D. O. Hitner, William Penn P. O., Montgomery county. Three stacks, 35 x 12, 50 x 14, and 40 x 12½, built in 1844, 1845, and 1854, respectively; open tops; ores, New York magnetic and local brown hematite; product, foundry and forge pig iron; the largest stack has not been in blast for a number of years; estimated annual capacity of the two furnaces in blast, 12,000 net tons.
- Number of furnaces in the Schuylkill region: 47 completed anthracite stacks, and 1 unfinished stack.

## UPPER SUSQUEHANNA ANTHRACITE.

- Bloom Furnace, Wm. Neal & Sons, Bloomsburg, Columbia county. One stack, 48 x 14, built in 1853-4, and blown in April 14, 1854; open top; ore, fossil, mined in the vicinity; product, foundry and forge pig iron of extra quality; annual capacity, 9,000 net tons. Brand, "Bloom."
- Chulasky Furnace, Creveling, Miles & Co. Limited, Chulasky, Northumberland county. Office, Danville, Montour county. One stack, 42 x 14, built in 1846; ores mined on the property; specialty, gray forge pig iron; annual capacity, 6,500 net tons.
- Columbia Furnaces, Grove Brothers, Danville, Montour county. Two stacks, 39 x 14 and 50 x 14, built in 1840 and 1860, respectively; open tops; ores, native fossil and hematite; product, foundry pig iron; total annual capacity, 15,200 net tons. Brand, "Columbia."
- Danville Furnaces, William Painter, Box 2,116, Philadelphia. Furnaces at Danville, Montour county. Two stacks, 39 x 14 and 61 x 16, built in 1867 and 1869, respectively; one open and one closed top; ores,

magnetic, hematite, and fossil, mined in Berks, Cumberland, Snyder, and Montour counties; specialty, neutral pig iron; total annual capacity, 21,000 net tons. James D. Kase, Superintendent.

Duncannon Furnace, Duncannon Iron Company, Duncannon, Perry county. Office, 122 Race st., Philadelphia. One stack, 60 x 15, built in 1853, and rebuilt in 1880; closed top; ores, Cornwall magnetic from Lebanon county, African or Spanish hematite, and some mill cinder; specialty, mill pig iron; annual capacity, 20,000 net tons. Brand, "Duncannon." *See Rolling Mills.*

Frances Iron Works, James S. Marsh, Northumberland, Northumberland county. One stack, 60 x 18, built in 1872; put in blast for the first time in February, 1880.

Glamorgan Furnaces, Glamorgan Iron Company, Lewistown, Mifflin county. Two stacks, 46 x 13½ and 54 x 14½; one built in 1868; one built in 1872, put in blast in December, 1872; fuel, anthracite and coke mixed; ores, native fossil and hematite; product, principally gray forge pig iron, neutral, inclining to red short; total annual capacity, 16,000 net tons. Percival Roberts, President; J. W. Davis, Treasurer; William Willis, Manager. Philadelphia office, 261 South Fourth st.

Irondale Furnaces, Bloomsburg Iron Company, Bloomsburg, Columbia county. Two stacks, 36 x 12 and 36 x 14, built in 1844 and 1845; open tops; water-power; ores, native fossil; "A No. 1" foundry pig iron is very soft, open-grained, and strong; No. 1 foundry is much the same; No. 2 is much used in the manufacture of car-wheels; gray forge is nearly neutral, and has great tensile strength; total annual capacity, 13,500 net tons. Brand, "Irondale." Charles R. Paxton, President, Bloomsburg; Wm. E. S. Baker, Treasurer, 122 Race st., Philadelphia.

Lackawanna Furnaces, Lackawanna Iron and Coal Company, Scranton, Lackawanna county. Five stacks: two built in 1849, one in 1852, one in 1854, and one in 1872; sizes, 67 x 20½, 65 x 17, 65 x 17, 70 x 17½, and 70 x 19; ores, New Jersey, Lake Champlain, Tilly Foster, and foreign; product, Bessemer, foundry, and forge pig iron; total annual capacity, 150,000 net tons. Brand, "Lackawanna." E. S. Moffatt, Superintendent, Scranton, Pa. New York office, 52 Wall st. *See Rolling Mills.*

Lycoming Furnace, David A. Jones & Co., Pottsville, Schuylkill county. Furnace at Ralston, Lycoming county. One stack, 42 x 12½, first put in operation in August, 1874, but only in operation for a short time; closed top; annual capacity, 6,000 net tons.

Mansfield Furnace, Shaaber, Johnston & Co., Reading, Pa. Furnace at Mansfield, Tioga county. One stack, 36 x 10, built in 1854; fuel, half coke and half anthracite. I. M. Phelps, Superintendent.

Marshall Furnace, Marshall Bros. & Co., Newport, Perry county. Philadelphia office, Front st. and Girard avenue. One stack, 60 x 13, built in 1872, and blown in in July, 1872; closed top; fuel, half coke and half anthracite; ores, magnetic, fossil, and hematite, from York, Cum-

- berland, Perry, and Juniata counties; specialty, pig iron for foundry use and for sheet-iron blooms; annual capacity, 9,500 net tons. Brand, "Marshall." P. Hiestand, Superintendent. *See Rolling Mills.*
- Montour Iron and Steel Works, Montour Iron and Steel Company, Danville, Montour county. Two stacks, each 50 x 15, built in 1842; ores, local fossil; total annual capacity, 24,000 net tons. *See Rolling Mills.*
- Rockhill Furnaces, Rockhill Iron and Coal Company, Orbisonia, Huntingdon county. Office, 320 Walnut st., Philadelphia. Two stacks, 65 x 17½ and 65 x 17, built in 1875, and blown in January 1, 1876; fuel, coke and anthracite coal; ores, ½ soft fossil, ½ hematite, and ½ hard fossil; soft fossil ore mainly from the company's mines, hematite from the company's mines and Spruce Creek valley, and hard fossil from Frankstown and Bedford; closed tops; specialty, gray forge pig iron; total annual capacity, 30,000 net tons. Brand, "Rockhill." Wm. A. Ingham, President; Edward Roberts, Jr., Vice-President; Wm. Boyd Jacobs, Secretary and Treasurer; A. W. Sims, Manager.
- Union Furnace, Beaver, Marsh & Co., Winfield, Union county. One stack, 50 x 15, built in 1854; open top; ores, fossil; product, principally foundry pig iron; annual capacity, 7,000 net tons. Dr. L. Rooke, Manager.
- Number of furnaces in the Upper Susquehanna region: 25 anthracite stacks.

#### LOWER SUSQUEHANNA ANTHRACITE.

- Aurora Furnace, Wrightsville Iron Company, Wrightsville, York county. One stack, 50 x 12, built in 1867, rebuilt in 1874; iron shell; bell-and-hopper top; ores, ½ York county and Maryland hematite, and ½ specular and magnetic; product, neutral gray forge and foundry pig iron; annual capacity, 7,500 net tons. Michael Schall, President; H. Wilton, Treasurer and Manager.
- Bird Coleman, Donaghmore, and North Cornwall Furnaces, W. C. Freeman, General Superintendent, Cornwall, Lebanon county. Four completed stacks, and 1 stack building. Bird Coleman Furnaces, owned by R. W. Coleman's Heirs; No. 1, 65 x 15, built in 1872-3; No. 2, 52 x 15, built in 1879-80. Donaghmore Furnace, owned by R. W. Coleman's Heirs; one stack, 44 x 14, built in 1855. North Cornwall Furnaces, owned by Mrs. M. C. Freeman; No. 1, 52 x 15, built in 1872-4; No. 2, 65 x 15, building. Use Cornwall ore exclusively. *See Charcoal Furnaces.*
- Cameron Furnace, Cameron Furnace Company, Middletown, Dauphin county. One stack, 47½ x 13½, built in 1857; 3 tuyeres; bell-and-hopper top; ores, York and Cumberland hematite; product, principally forge pig iron; annual capacity, 9,000 net tons. Brand, "Cameron." James Young, President; J. H. Landis, Treasurer.
- Carlisle Iron Works, C. W. Ahl & Son, Carlisle, Cumberland county. Works at Boiling Springs. One stack, 50 x 11, built in 1881-2; to be put in blast in September, 1882; iron jacket; Weimer hot blast; ore,

local brown hematite ; product, forge pig iron. *See Charcoal Furnaces. See Bloomaries.*

Chestnut Hill Furnaces, Chestnut Hill Iron Ore Company, Columbia, Lancaster county. Two stacks: one, 61 x 13½, built in 1854, remodeled in 1881, and one, 45 x 17, built in 1868 ; a third stack (No. 1), now abandoned, was built in 1845 ; closed tops ; ores, Chestnut Hill and Ebbvale (Maryland) hematite, with ½ red short magnetite ; specialty, foundry pig iron ; total annual capacity, 20,000 net tons. Brands, "Chestnut Hill 2" and "Chestnut Hill 3." A large new modern furnace is contemplated, to take the place of the abandoned No. 1. Main office, 52 Wall st., New York ; B. G. Clarke, President, and N. W. H. Hix, Treasurer. Works at Columbia ; Jerome L. Boyer, Superintendent. *See Rolling Mills.*

Chickies Furnaces, Chickies Iron Company, (successors to E. Haldeman & Co.), Chickies, Lancaster county. Two stacks: No. 1, 45 x 11½, built in 1845 ; No. 2, 45 x 12, built in 1854 ; closed tops ; ores, magnetic from Cornwall, Lebanon county, Chestnut Hill brown hematite from Silver Spring, Lancaster county, and specular ; product, foundry and mill pig iron. Brand, "Chickies." Paris Haldeman, President ; Horace L. Haldeman, Secretary and Treasurer. Selling agents, Justice Cox, Jr. & Co., Philadelphia ; R. C. Hoffman & Co., Baltimore ; J. Reamer, Pittsburgh ; and John H. Thompson & Co., New York.

Colebrook and Cornwall Anthracite Furnaces, Robert H. Coleman, Lebanon, Lebanon county. Two completed stacks, and 2 stacks building. Colebrook Furnaces, at Lebanon ; No. 1, 55 x 16, completed in November, 1881, has made 450 gross tons of pig iron per week on all Cornwall ore ; No. 2, 80 x 16, building. Cornwall Anthracite Furnace, at Cornwall, Hugh M. Maxwell, Manager ; one stack, 38 x 12, built in 1854. Use Cornwall ore exclusively. An entirely new plant of two large stacks is contemplated at Cornwall, and one of the stacks is partly under way.

Conestoga Furnace, Peacock & Thomas, Lancaster, Lancaster county. Philadelphia office, 242 South Third st. One stack, 38 x 10, built in 1846 ; ores, Lancaster county ; specialty, neutral foundry pig iron, known as "Conestoga" iron ; annual capacity, 6,500 net tons. Selling agents, J. W. Porter, 98 Water st., Pittsburgh, and C. W. Matthews, 212 South Third st., Philadelphia.

Conewago Furnace, Conewago Iron Company, Middletown, Dauphin county. Formerly called Middletown Furnace. One stack, 45 x 13, built in 1853, and enlarged since then ; makes "Chickies" brand of pig iron exclusively for the Chickies Iron Company. Paris Haldeman, President ; Henry B. Grubb, Vice-President ; Horace L. Haldeman, Treasurer. Selling agents, Justice Cox, Jr., & Co., Philadelphia ; J. Reamer, Pittsburgh ; R. C. Hoffman & Co., Baltimore ; John H. Thompson & Co., New York.

Cordelia Furnace, Cordelia Iron Company, 520 Washington st., Reading, Berks county. Furnace at Cordelia station, near Columbia, Lancaster

- county. Formerly called Kauffman Furnace. One stack, 38 x 14, built in 1848; open top; ore, hematite, from York county; annual capacity, 8,000 net tons. Specialty, fine foundry pig iron for hardware, known as "Cordelia" iron. H. A. Muhlenberg, President; A. A. McHose, Secretary; Isaac McHose, Treasurer and General Manager.
- Dauphin Furnace, H. R. Knotwell, lessee, Dauphin, Dauphin county. One stack, 40 x 11, built in 1854, and remodeled in 1872 for anthracite; bonnet on top; ores, from Cumberland, York, and Juniata counties; product, foundry and forge pig iron; annual capacity, 5,000 net tons.
- Donegal Furnace, Benson & Cottrell, Columbia, Lancaster county. Furnace at Vesta, near Marietta. One stack, 36 x 12, built in 1848; open top; annual capacity, 6,500 net tons.
- Harrisburg Furnace, Harrisburg Car Manufacturing Company, Harrisburg, Dauphin county. Formerly called Porter Furnace. Built in 1844, but torn down in 1881 to be rebuilt. W. T. Hildrup, Superintendent.
- Lebanon Furnaces, Arthur and Horace Brock, Lebanon, Lebanon county. Two stacks: one, 50 x 14, built in 1846, reconstructed in 1868; the other, 65 x 15, built in 1872-3, put in blast in August, 1873; ore, Cornwall; a third stack, 36 x 12, built in 1847, was torn down to rebuild, but work on it has been discontinued. The combined capacity of the two furnaces in operation is about 600 net tons a week.
- Lebanon Valley Furnace, J. & R. Meily, Lebanon, Lebanon county. One stack, 44 x 13, built in 1867; blown in December 23, 1867; bell-and-hopper top; ores, Cornwall and hematite; specialty, gray forge red-short pig iron; annual capacity, 6,000 net tons. Brand, "Lebanon Valley." *See Bloomaries.*
- Lochiel Furnace, Lochiel Rolling Mill Company, Harrisburg, Dauphin county. One stack, 52 x 14, built in 1873; put in blast in April, 1873; closed top; annual capacity, 7,500 net tons. *See Rolling Mills.*
- Louise Furnace, Woodward & King, Pine Grove Furnace, Cumberland county. Furnace at Steelton, Dauphin county. Formerly called Dock Iron Works and Starling Furnace. One stack, 46 x 9½, built in 1873-4; blown in for the first time in 1880; closed top; product, neutral foundry and mill pig iron; annual capacity, 5,000 net tons.
- Marietta Furnaces, Henry M. Watts & Son, Marietta, Lancaster county. Two stacks: one, 50 x 12½, built in 1847, and remodeled in 1880; and one, 38 x 12, built in 1849; closed tops, with bell and hopper; fuel, anthracite coal and Connellsville coke; ores, Cornwall and limonite of superior quality; special product, neutral gray forge pig iron, extensively used for boiler and flange iron; total annual capacity, 12,000 net tons.
- Paxton Furnaces, McCormick & Co., Harrisburg, Dauphin county. Two stacks, 50 x 14 and 60 x 14, built in 1855 and 1872, respectively; Whitwell fire-brick stoves; total annual capacity, 28,000 net tons.

Pennsylvania Steel Company, Steelton, Dauphin county. Office, 208 South Fourth st., Philadelphia. Two completed stacks: No. 1, 60 x 14, built in 1872-3; put in blast in October, 1873. No. 2, 75 x 20, built in 1874-6; put in blast in June, 1876; remodeled in 1877 and supplied with three Whitwell stoves. Fuel, coke and anthracite coal mixed; ores, foreign and domestic, of various kinds; specialty, Bessemer pig iron; total annual capacity, 60,000 net tons. Two stacks building, each 65 x 17, supplied with Whitwell stoves. *See Rolling Mills.*

Richmond Furnace, Southern Pennsylvania Railroad and Iron and Mining Company, Richmond Furnace, Franklin county. Formerly called Mount Pleasant Iron Works. One stack, 36 x 9½, built in 1865 and rebuilt in 1875; open top; fuel, anthracite and coke; ores, from the Richmond mines, 2 miles from the furnace; annual capacity, 5,500 net tons. T. B. Kennedy, Manager, Chambersburg.

South Mountain Mining and Iron Company, Pine Grove Furnace, Cumberland county. Building one stack, 60 x 14, to be completed in 1882. *See Charcoal Furnaces for names of officers. See Bloomaries.*

Stanhope Furnace, Francis H. Garrett, lessee, Pottsville. Furnace at Pine Grove, Schuylkill county. One stack, 33 x 10, built in 1825; bell-and-hopper top; annual capacity, 5,200 net tons.

St. Charles Furnaces, C. B. Grubb & Son, Lancaster, Lancaster county. Works at Columbia. Two stacks: one, 53 x 14, built in 1853; the other, formerly known as the Henry Clay, 56 x 12, built in 1845, is now the St. Charles Furnace No. 2; ores, Cornwall, Chestnut Hill, and Conestoga; product, pig iron which is well known as exceptional for its quality for boiler plate, bars, nails, or foundry work; total annual capacity, 20,000 net tons. Brand, "Grubb."

Swatara Furnace, Denney, Watts & Co. Limited, Harrisburg. Furnace at Union Deposit, Dauphin county. One stack, 50 x 11, built in 1854; annual capacity, 8,000 net tons. Formerly called Union Deposit Furnace.

Vesta Furnace, Watts, Twells & Co. Limited, Vesta, Lancaster county. Formerly called Musselman Furnace. One stack, 60 x 14, built in 1868; rebuilt in 1881; iron stack on iron pillars; ores, Carroll county, (Maryland,) Shenandoah valley, (West Virginia,) and Cumberland county and Cornwall, (Pennsylvania;) special products, neutral forge metal and superior foundry iron; annual capacity, 15,000 net tons. Ethelbert Watts, Manager. Philadelphia office, 326 Walnut st.

Wister Furnace, J. & J. Wister, Harrisburg, Dauphin county. One stack, 60 x 14, built in 1867, and first blown in February 15, 1868; bell-and-hopper top; ores, magnetic from Cornwall, Lebanon county, local hematites, and some foreign Bessemer; specialty, mill pig iron; annual capacity, 13,000 net tons. Brand, "Wister." Manager, Jones Wister.

Number of furnaces in the Lower Susquehanna region: 36 completed anthracite stacks, and 6 stacks building.



## SHENANGO VALLEY—BITUMINOUS COAL OR COKE.

- Clara Furnace, Raney & Berger, New Castle, Lawrence county. One stack, 60 x 16, built in 1872; put in blast in May, 1872; closed top; fuel, coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 32,000 net tons.
- Douglas Furnaces, Pierce, Kelly & Co., Sharpsville, Mercer county. Two stacks: one stack, 60 x 15, built in 1870, and put in blast in March, 1871; rebuilt and enlarged in 1879; the other stack, 60 x 16, built in 1872, put in blast in February, 1873, and enlarged in 1881; closed tops; fuel, Mercer county block coal and coke; ore, Lake Superior; specialty, pig iron for Bessemer and Siemens-Martin steel; combined annual capacity, 50,000 net tons. Brand, "Douglas."
- Ella Furnace, Boyce, Wheeler & Co., Sharon, Mercer county. Furnace at West Middlesex, occupying the site of the two Shenango Furnaces, which were built in 1859 and torn down in 1882. One stack, 70 x 15, building; will use Lake Superior ores, Connellsville coke, and Mercer county block coal.
- Etna Furnaces, Etna Iron Works Limited, New Castle, Lawrence county. Two stacks, each 54 x 14, built in 1868; fuel, raw coal and coke; ores, Lake Superior and native; specialty, gray forge pig iron; combined annual capacity, 30,000 net tons. *See Rolling Mills.*
- Fannie Furnace, Wheeler Iron Company, Sharon. Works at West Middlesex, Mercer county. One stack, 51½ x 13½, built in 1873; put in blast October 13, 1873; fuel, raw coal and coke; ore, Lake Superior; product, principally Bessemer pig iron; annual capacity, 14,000 net tons. Brand, "Fannie." E. A. Wheeler, Manager. *See Rolling Mills.*
- Henderson Furnace, Henderson, Forker & Co., Sharpsville, Mercer county. One stack, 60 x 12, built in 1868; put in operation in October, 1868; remodeled in 1882; ore, Lake Superior; product, Bessemer, foundry, and mill pig iron; annual capacity, 15,000 net tons. Formerly called Allen Furnace.
- Keel Ridge Furnace, Kimberly, Carnes & Co., Sharon, Mercer county. One stack, 55 x 13½, built in 1869; fuel, raw coal and coke; ore, Lake Superior; product, principally No. 1 mill iron; annual capacity, 12,000 net tons. *See Rolling Mills.*
- Mabel Furnace, Perkins & Co. Limited, Sharpsville, Mercer county. One stack, 50 x 14, built in 1872; blown in in February, 1873; closed top; fuel, block coal and coke; annual capacity, 18,000 net tons. Formerly called Ormsby Furnace. A duplicate stack, 50 x 14, built in 1880. Have only machinery and hot blast ovens for one stack. S. Perkins, Jr., Manager.
- Mount Hickory Iron Company Limited, Erie. Works at Sharpsville, Mercer county. Two stacks, each 50 x 12, built in 1869; closed tops; ore, Lake Superior; product, foundry and forge pig iron; combined annual capacity, 30,000 net tons. *See Rolling Mills.*

- Neshannock Furnace, Reis Brothers, New Castle, Lawrence county. One stack, 60 x 16, built in 1872; first put in operation December 1, 1872; closed top; three Whitwell stoves, each 60 x 17; fuel, coke; ore, Lake Superior; product, mill pig iron; annual capacity, 40,000 net tons. *See Rolling Mills.*
  - Rosena, Sophia, and Little Pet Furnaces, estate of William H. Brown, New Castle, Lawrence county. Three stacks: Rosena Furnace, 77 x 20, built in 1872, and first put in blast in June, 1873; Sophia Furnace, 65 x 16, built in 1872; Little Pet Furnace, 40 x 9, built in 1853; fuel, coke; combined annual capacity, 40,000 net tons. *See Rolling Mills.*
  - Sharon Furnace, Boyce, Rawle & Co., Sharon, Mercer county. One stack, 46 x 11, built in 1845; annual capacity, 10,000 net tons.
  - Sharpville Furnace, Sharpville Iron Company, Sharpville, Mercer county. One stack, 50 x 11, built in 1847; ore, Lake Superior; product, Bessemer, foundry, and red-short mill pig iron; annual capacity, 9,000 net tons. Brand, "Sharpville." Jonas J. Pierce, Manager.
  - Spearman Furnaces, Spearman Iron Company, Sharpville, Mercer county. Two stacks, each 50 x 14, built in 1872; blown in January 15, 1873, and September 20, 1875; closed tops; fuel, raw coal and coke; ore, Lake Superior; product, Bessemer, foundry, and red-short mill pig iron; combined annual capacity, 36,000 net tons. Brand, "Spearman." J. J. Spearman, Manager.
  - Stewart Furnaces, Stewart Iron Company Limited, Sharon, Mercer county. Two stacks: one, 66 x 13, built in 1870, and enlarged in 1882; and one, 55 x 14, built in 1872; closed tops; block coal and Connellsville coke; ore, Lake Superior; product, strictly Bessemer pig iron; combined annual capacity, 50,000 net tons. Formerly called Valley Furnaces. S. McClure, Agent. *See Rolling Mills.*
  - Wampum Furnace, Wampum Iron Company Limited, Wampum, Lawrence county. One stack, 50 x 12, built in 1856; bell-and-hopper top; fuel, coke, half of which is made from coal mined near the furnace; ores, Lake Superior native red limestone, and mill cinder; product, neutral gray forge pig iron; annual capacity, 7,000 net tons. F. H. Oliphant, Chairman; S. D. Oliphant, Secretary and Treasurer.
  - Westerman Furnaces, Buhl & Son, Sharon, Mercer county. Two stacks, each 48 x 14, built in 1865 and 1866; closed tops; fuel, raw coal and Connellsville coke; ore, Lake Superior; specialty, No. 1 mill pig iron; combined annual capacity, 24,000 net tons. Brand, "Westerman." *See Rolling Mills.*
  - Wheatland Furnaces, Wheatland Bessemer Steel Company, Wheatland, Mercer county. Four stacks, built from 1860 to 1865; one, 46 x 9, and three, 46 x 12; combined annual capacity, 30,000 net tons. Out of blast since September, 1875. *See Rolling Mills.*
- Number of furnaces in the Shenango region: 28 completed raw coal or coke stacks, and 1 stack building.



## ALLEGHENY COUNTY—COKE.

Clinton Furnace, Graff, Bennett & Co., Pittsburgh. One stack, 45 x 12, built in 1859; ores, principally Lake Superior, and remainder native; annual product, 12,000 net tons. *See Rolling Mills.*

Edgar Thomson Furnaces, Carnegie Brothers & Co. Limited, Bessemer Station, Allegheny county. Branch office and post-office address, 48 Fifth avenue, Pittsburgh. Five stacks. Furnace A, 65 x 13, built in 1879, has 3 Siemens-Cowper-Cochrane stoves, each 55 x 15, and 1 Whitwell stove, 65 x 15. Furnaces B and C, each 80 x 20, built in 1880, have 6 Siemens-Cowper-Cochrane stoves, each 60 x 20, and 2 Whitwell stoves, each 75 x 21. These three furnaces have 8 cut-off condensing engines, of the Mackintosh, Hemphill & Co. type, with blowing cylinders 84 in. x 48 in., and steam cylinders 32 in. x 48 in. Furnaces D and E, each 80 x 20, built in 1881, have 6 Siemens-Cowper-Cochrane stoves of an improved type, each 72 x 21, and 6 cut-off condensing engines, built by Robinson, Rea & Co., with blowing cylinders 35 in. x 48 in., with an additional engine building. There are also 6 Worthington pumping engines, of 20,000,000 gallons daily capacity, 6 Worthington duplex pumps, 44 steel boilers, and 2 pneumatic and 3 Otis steam hoists. Product, Bessemer pig iron; combined annual capacity, about 250,000 net tons. Julian Kennedy, Superintendent of furnaces. *See Pennsylvania Furnace in Miscellaneous Bituminous.* *See Rolling Mills.*

Eliza Furnaces, Laughlin & Co., Pittsburgh. Two stacks, built in 1861; originally, 45 x 12, but in 1873 and 1874 they were enlarged, and No. 1 is now 61 x 16, while No. 2 is 61 x 14; fuel, coke; ore, Lake Superior; specialty, mill pig iron; total annual capacity, 55,000 net tons. Brand, "Eliza."

Isabella Furnaces, Isabella Furnace Company, Etna, Allegheny county. Two stacks, each 75 x 20, built in 1872; each stack supplied with three 70 x 21 Whitwell stoves; closed tops; ore, Lake Superior; product, foundry and mill pig iron; total annual capacity, about 150,000 net tons. Hugh Kennedy, Manager.

Lucy Furnaces, Lucy Furnace Company Limited, Pittsburgh. Two stacks, each 75 x 20; No. 1 first put in blast in May, 1872, is now provided with 2 Siemens-Cowper-Cochrane fire-brick stoves, each 58 x 20, and 2 Whitwell fire-brick stoves, each 70 x 20; No. 2 first put in blast September 27, 1877, is now provided with 5 iron pipe stoves; blowing equipment, 6 vertical engines, with blowing cylinders 48 in. x 84 in.; fuel, Connellsville coke; ores, principally from Michigan; product, Bessemer, forge, and foundry pig iron; aggregate annual capacity, about 95,000 net tons. Brand, "Lucy." James R. Wilson, Chairman; John Walker, Secretary and Treasurer; F. G. Fricke, Manager and Chemist; E. J. Bird, Jr., Assistant Manager.

Manchester Iron and Steel Company, Pittsburgh. One stack, 70 x 16, building on the site of the two stacks built in 1862-3. Formerly called

Superior Iron Company. A. Nimick, President; J. F. Scott, Treasurer. Shoenberger Furnaces, Shoenberger, Blair & Co., Pittsburgh. Two stacks, each 62 x 13½, built in 1865; closed tops; fuel, coke; ores, Lake Superior, native, and foreign; product, Bessemer, foundry, and gray forge pig iron; total annual capacity, 45,000 net tons.

Soho Furnace, Moorhead, McCleane & Co., Pittsburgh. One stack, 67 x 18, built in 1872; put in blast November 22, 1872; fuel, coke; ore, Lake Superior; specialty, Bessemer pig iron; annual capacity, 45,000 net tons. Brand, "Soho."

Number of furnaces in Allegheny county: 15 completed coke stacks, and 1 stack building.

#### RAW BITUMINOUS COAL OR COKE—MISCELLANEOUS.

Allegheny Furnace, S. C. Baker, Altoona, Blair county. One stack, 32 x 9, built in 1811; fuel, coke.

Atlas Furnace, Red Run Coal Company, C. S. Green, Secretary, Roaring Branch, Lycoming county. One stack, 40 x 11, built in 1855, and first blown in in 1874; fuel, coke; open top; local ore; annual capacity, 4,000 net tons. Formerly called Carterville Furnace.

Blair Iron and Coal Company, Hollidaysburg, Blair county. General office, 218 South Fourth st., Philadelphia. Four stacks, all in Blair county: Bennington Furnace, at Bennington, 41 x 9½, built in 1856; No. 1 and No. 2, at Hollidaysburg, 59 x 12 and 51 x 11, respectively, built in 1856; and Frankstown Furnace, at Frankstown, 45 x 10, built in 1836, rebuilt in 1872. All use coke; closed tops; the Bennington and Hollidaysburg furnaces make Bessemer pig iron, and Frankstown makes foundry and mill pig iron; ores, local hematite from Springfield and Bloomfield, Lake Superior, and foreign ores for Bessemer pig iron; combined annual capacity, 40,000 net tons. Dr. Charles Stewart Wurts, President, Philadelphia; W. S. Robinson, Secretary and Treasurer, Philadelphia; E. R. Baldrige, Superintendent, Hollidaysburg; D. J. Morrell, General Manager, Johnstown. *See Rolling Mills.*

Cambria Iron Works, Cambria Iron Company, Johnstown, Cambria county. Office, 218 South Fourth st., Philadelphia. Seven stacks; fuel, coke. Six of these stacks are at Johnstown, and one is at East Conemaugh, two miles from Johnstown. Of the stacks at Johnstown, four were built in 1853 and 1854, being respectively 70 x 15, 48 x 13½, 68½ x 13½, and 68½ x 13½; the fifth, 78 x 19½, called Centennial Furnace, was built in 1873-6, and blown in December 22, 1876; the sixth is 78 x 19½, and was blown in July 20, 1879. Ores used are brown hematite from Blair county, Pa.; specular from Lake Superior; Spanish and African ores, and New Jersey magnetic ores. Specialty, Bessemer pig iron. The stack at East Conemaugh is 50 x 11½, was built in 1857, and is now making spiegeleisen from a mixture of foreign and domestic ores. Total annual capacity, 145,000 net tons. The furnaces of the Blair Iron and Coal Company and the Rodman Furnaces, which are

x 1  
1850

7.

practically under the same management, add 66,000 net tons to this capacity, making the total 211,000 net tons. *See Rolling Mills.*

Charlotte Furnace Company, Everson, Macrum & Co., Scottsdale, Westmoreland county. General office at Pennsylvania Iron Works, Second avenue, Pittsburgh, or P. O. Box 1026. One stack, 65 x 16½, built in 1872-3; put in blast October 14, 1873; fuel, coke; ores, ½ Lake Superior and ¾ native hematite from Blair, Huntingdon, and Fayette counties; specialty, mill pig iron; annual capacity, 19,000 net tons. Brand, "Charlotte." *See Rolling Mills.*

1880 Dunbar Furnaces, Dunbar Furnace Company, Dunbar, Fayette county. Two stacks. Furnace No. 1, 77 x 19½, built in 1790, rebuilt in 1870, rebuilt in 1876, and rebuilt to present size in 1880; 4 Whitwell hot-blast stoves—three 40 x 18, and one 40 x 22. Furnace No. 2, 78 x 19½, first put in blast in May, 1880; banked down June 1, 1881, and blast again put on without blowing out on October 26, 1881; 2 Whitwell stoves, 60 x 18. Fuel, Connellsville coke; ores, a mixture of native ore mined on the property, mill cinder, foreign ores, Cornwall ores, Centre and Blair county ores, and Chester magnetite; specialty, mill pig iron; total annual capacity, 52,000 net tons. Old stack was called "Union." Charles Parrish, President, Wilkesbarre; Arthur B. De Saulles, Vice-President and Superintendent, Dunbar; Theodore P. Farrell, Secretary and Treasurer, Philadelphia; Charles H. Kimball, Cashier, Dunbar; A. H. Childs, Agent, Pittsburgh.

Elizabeth Furnace, John Whitehead, Sabbath Rest, Blair county. One stack, 32 x 9, built in 1832; fuel, coke.

Emma Furnace, Logan Iron and Steel Company, Lewistown, Mifflin county. Philadelphia office, 218 South Fourth st. One stack, 42 x 9, built in 1867; formerly operated with charcoal, but enlarged in 1879 to be run with coke; ores, brown hematite and red fossiliferous; product, gray forge pig iron; annual production, 4,400 net tons. *See Greenwood (charcoal) Furnaces. See Rolling Mills.*

Erie Furnace, Rawle, Noble & Co., Erie, Erie county. One stack, 55 x 13½, built in 1869, enlarged in 1879.

Everett Iron Company, Everett, Bedford county. Building one stack. J. B. Williams, General Manager.

Fairchance Furnace, Fairchance Furnace Company, Fairchance, Fayette county. One stack, 44 x 12, built in 1794, and rebuilt in 1871; fuel, coke; ores, native carbonates, varying from 30 to 50 per cent.; all stock mined on the property; annual capacity, 10,000 net tons. J. D. Lyon, President; W. H. DeForest, Jr., Secretary and Treasurer, 466 Broome st., New York; R. L. Martin, General Superintendent, Fairchance, Pa. *See Charcoal Furnaces.*

Fairmount Coal and Iron Company, Fairmount City, Clarion county. Building one stack. B. K. Jamison, President, Third and Chestnut sts., Philadelphia.

Gap Furnace, Hollidaysburg and Gap Iron Company, Hollidaysburg. Furnace at McKee, Blair county. One stack, 46½ x 10, built in 1840,

and remodeled in 1877; fuel, coke; closed top; annual capacity, 5,000 net tons. James Denniston, President; James M. Hewit, Secretary and Treasurer.

X Juniata Furnace, James M. Kinkead, Williamsburg, Blair county. One stack, 28 x 8½, built in 1857. Property for sale or lease.

Kemble Furnaces, Kemble Coal and Iron Company, Riddlesburg, Bedford county. General office, 20 Nassau st., P. O. Box 157, New York. Two stacks, 60 x 14 and 60 x 15, built in 1869 and 1870; the first was put in blast July 4, 1869, and the second March 4, 1871; closed tops; fuel, coke from washed coal; ores, local fossil and hematite; product, principally a soft, strong, fluid, foundry pig iron, with special capacity for absorbing scrap; total annual capacity, 25,000 net tons. Brand, "Kemble." Peter P. Parrott, President, New York; R. A. Wight, Secretary and Treasurer, New York; William Lauder, General Superintendent, Riddlesburg.

Lemont Furnace, Hogsett, Hanna & Co., Uniontown, Fayette county. One stack, 65 x 15, built in 1875; put in blast in January, 1876; fuel is Connellsville coke, and ores are native, all obtained on the furnace land; product, forge and foundry pig iron; annual capacity, 14,000 net tons. Brand, "Lemont."

Lucy Furnace, Whitehead & Swoope, Mount Union, Huntingdon county. Formerly called Matilda Furnace. One stack, 42½ x 10, built in 1837; ores, fossil and Juniata valley hematite; annual capacity, 3,500 net tons.

1837  
Mahoning Furnace, Wesley Wilson & Co., lessees, Mahoning Furnace, Armstrong county. One stack, 40 x 11, built in 1845; closed top; fuel, coke; ore, local limonite; annual capacity, 5,000 net tons. The ore, coal for coking, and limestone are all obtained in the immediate vicinity of the furnace. The pig iron produced is No. 1 gray forge, of cold-short tendency, yet very strong. Some extra quality No. 1 foundry pig iron is also produced.

Oliphant Furnace, Fayette Coke and Furnace Company, Oliphant Furnace, Fayette county. One stack, 50 x 11, built in 1875-6; fuel, coke; ores, local carbonate, mill cinder, Cornwall, Blair county, and foreign; annual capacity, 9,000 net tons. A. W. Bliss, President, Uniontown; A. B. de Saulles, Superintendent, Oliphant Furnace; A. H. Childs, selling agent, Pittsburgh.

1881  
Pennsylvania Furnace, Carnegie Brothers & Co. Limited, Pittsburgh: Furnace at Graysville, Huntingdon county. One stack, 43 x 11, built in 1813; changed from charcoal to coke in 1881. See *Furnaces in Allegheny county*. See *Rolling Mills*.

Powelton Furnace, Robert Hare Powel, 424 Walnut st., Philadelphia. Furnace at Saxton, Bedford county. One stack, 70 x 18, built in 1880-1; to be blown in in 1882; fuel, Broad Top coke; three 70 x 18 Whitwell fire-brick stoves.

Rebecca Furnace, Kittanning Iron Company Limited, Kittanning, Armstrong county. One stack, 65 x 16, first put in blast June 20, 1880;

fuel, coke; closed top; ores, native and Lake Superior; product, forge and foundry pig iron; annual capacity, 25,000 net tons. Brand, "Rebecca." *See Rolling Mills.*

Red Bank Furnace, Alex. Reynolds' Sons, Red Bank Furnace, Clarion county. One stack, 42 x 11½, built in 1859; closed top; fuel, coke; ore, limestone, mined on the furnace land; specialty, cold-short mill pig iron; annual capacity, 7,800 net tons. David Reynolds, Manager. 1. 31

Rodman Furnaces, J. King McLanahan, lessee, Hollidaysburg, Blair county. Furnaces at Roaring Springs, Blair county. Two stacks, 61 x 14, and 43 x 10, built in 1846, and rebuilt in 1879-80; fuel, coke; ores, ½ foreign and ½ Bloomfield brown hematite; total annual capacity, 26,000 net tons. Controlled by the Blair Iron and Coal Company. 2. 33

~~Roland~~ Furnace, Austin Curtin, Mill Hall, Clinton county. One stack, 32 x 10, built in 1830, abandoned in 1857, and revived in 1880. Formerly called Mill Hall Furnace. 1

Stewardson Furnace, F. B. & A. Laughlin, P. O. Box 259, Pittsburgh. Furnace at Mahoning, Armstrong county. One stack, 43½ x 11, built in 1851; open top; fuel, coke; ores, native blue and red limestone; product, cold-short pig iron; annual capacity, 4,000 net tons. 1

Number of raw coal or coke furnaces in Pennsylvania, outside of Allegheny county and the Shenango region: 36 completed stacks, and 2 stacks building. 2

#### CHARCOAL—STATE.

Barree Furnace, J. W. Mumper & Co., Barree Forge, Huntingdon county. One stack, 33 x 9, built in 1863; hot blast; bell-and-hopper top; water-power; specialty, forge pig iron; annual capacity, 3,600 net tons. *See Bloomaries.*

Berlin Iron Works, Jackson Iron Company, Berwick, Columbia county. Furnace at Laurelton, Union county. One stack, 35 x 8, built in 1827; abandoned in 1856; revived in July, 1880. Garrick Mallery, Treasurer.

Carlisle Iron Works, C. W. Ahl & Son, Carlisle. Works at Boiling Springs, Cumberland county. One stack, 28 x 8½, built in 1798 and rebuilt in 1815; hot blast; closed top; water-power; limestone and mountain ore; specialties, neutral forge pig iron and car-wheel iron; annual capacity, 4,800 net tons. Brand, "Carlisle." *See Lower Susquehanna Furnaces. See Bloomaries.*

Carrick Furnace, Bland & Spang, Carrick Furnace, Franklin county. One stack, 37 x 9, built in 1828; ore, local hematite; product, first-class car-wheel pig iron; annual capacity, 2,800 net tons.

Chestnut Grove Furnace, operated by "Chestnut Grove Furnace," Idaville, Adams county. One stack, 32 x 8½, built in 1830; cold blast; open top; ores, Cumberland county hematite and York county magnetic; product, car-wheel pig iron; annual capacity, 1,600 net tons. Owners, James Rick and E. D. Weitzell, of Reading, and H. D. Markley, of Idaville.

- Cleversburg Furnace, George Clever & Sons, Cleversburg, Cumberland county. One stack, built in 1880.
- Cornwall Charcoal Furnace, R. W. Coleman's Heirs, Cornwall, Lebanon county. One stack, 31 x 8, built in 1742; cold blast. W. C. Freeman, General Manager. *See Lower Susquehanna Furnaces.*
- Eagle Furnace, Curtins & Co., Roland, Centre county. One stack, 28 x 8, built in 1848; open top, open hearth, and closed tuyere; ore, Nittany valley brown hematite; cold blast; water-power; annual capacity, 2,200 net tons. All the pig iron made is turned into billets for rods, shovels, sheet iron, and boiler plate. The original furnace was built in 1817, half a mile south of the present site. In 1836 another furnace was built 16 miles west; in 1848 it was abandoned and the present furnace was built. *See Rolling Mills. See Bloomeries.*
- East Penn Furnace, John Balliet, Parryville, Carbon county. One stack, 28 x 7½, built in 1837; cold blast; water-power.
- Falling Spring Furnace, C. Burkhart & Co., Chambersburg, Franklin county. One stack, 40 x 9, built in 1880; closed top; cold blast; ore, local hematite; specialty, car-wheel pig iron; annual capacity, 3,000 net tons. Brand, "Falling Spring."
- Franklin Furnace, Hunter & Springer, Chambersburg. Furnace at St. Thomas, Franklin county. One stack, 32 x 7½, built in 1828; cold blast; ore, Cumberland valley brown hematite; product, car-wheel pig iron; annual capacity, 1,500 net tons. Brand, "Franklin."
- Greenwood Furnaces, Logan Iron and Steel Company, Lewistown, Mifflin county. Works at Greenwood, Huntingdon county. Philadelphia office, 218 South Fourth st. Two stacks, each 32 x 9, built in 1833 and 1864 respectively; cold blast; red fossiliferous ore, obtained in the vicinity of the furnaces; pig iron used for car-wheels and chilled rolls; total annual capacity, 5,000 net tons. *See Emma (coke) Furnace. See Rolling Mills.*
- Hampton Furnace, E. and G. Brooke Iron Company, Birdsboro, Berks county. One stack, 30 x 8, built in 1846, and rebuilt in 1872. *See Schuylkill Valley Furnaces. See Rolling Mills.*
- Hecla Furnace, McCoy & Linn, Milesburg, Centre county. One stack, 32 x 8½, built in 1864; cold blast; water-power; open top; ore, hematite from Nittany valley; specialty, forge pig iron; entire product used in forge and rolling mill of the firm; annual capacity, 2,000 net tons. Old Hecla Furnace, built in 1820, was abandoned in 1864. *See Rolling Mills. See Bloomeries.*
- Hope Furnace, A. F. Frew, lessee, Rose Point, Lawrence county. One stack, 28 x 8, built in 1868; cold blast. The ore and limestone are mined only 200 yards from the furnace.
- Hopewell Furnace, Edward S. Buckley, 209 South Third st., Philadelphia. Furnace in Berks county. One stack, 30 x 7, built in 1759; cold blast; water-power; ores used are principally magnetic, obtained in the neighborhood; annual capacity, 1,000 net tons. *See Rolling Mills in Philadelphia.*



- Hopewell Furnace, James Eichelberger & Co., Hopewell, Bedford county. Heberton & Co., agents, 333 Walnut st., Philadelphia. One stack, 30 x 8½, built in 1800; warm blast; open top; water-power; ores, hematite and fossil; specialty, car-wheel pig iron; annual capacity, 1,600 net tons. Put in blast in 1881 after several years' idleness. *See Bloomaries.*
- Howard Furnaces, Bernard Lauth, Howard, Centre county. Two stacks: one, 31 x 8½, built in 1833; the other, 33 x 8, built in 1830 and rebuilt in 1872; cold blast; water-power; total weekly capacity, 150 net tons. *See Rolling Mills. See Bloomaries.*
- Isabella Furnace, Joseph D. Potts, Barneston, Chester county. Philadelphia office, 234 South Fourth st. One stack, 35 x 7½, built in 1835 and rebuilt in 1864 and 1881; cold blast; product, car-wheel pig iron, made from magnetic and hematite ores, mined from ½ to 8 miles from the furnace.
- Jefferson Furnace, J. M. & H. Y. Kaufman, Auburn, Schuylkill county. Furnace at Jefferson Station. One iron stack, 33 x 8, first put in blast May 20, 1880; cold blast; ores, hematites from Berks and Lehigh counties; specialty, pig iron for car-wheels and heavy rolls; weekly capacity, 50 net tons. Old Jefferson Furnace at Auburn, about half a mile from the site of the new furnace, which was built in 1864, was abandoned in 1879.
- Joanna Furnace, L. Heber Smith, Joanna Furnace, Berks county. One stack, 30 x 8, built in 1792, and rebuilt in 1847; cold blast; water and steam power; open top; ores, local magnetic and hematite; specialty, car-wheel pig iron; annual capacity, 1,200 net tons. Brand, "Joanna."
- Logan Furnace, Valentines & Co., Bellefonte, Centre county. One stack 32 x 8, built in 1815, and rebuilt 3 miles from original site; cold blast; water-power; open top; ores, strictly neutral brown hematite; specialty, car-wheel pig iron; annual capacity, 4,000 net tons. *See Rolling Mills. See Bloomaries.*
- Maiden Creek Furnace, Jacob K. Spang, Lenhartsville, Berks county. One stack, 33 x 9, built in 1854; cold and warm blast; water and steam power; open top; annual capacity, 1,600 net tons.
- Mont Alto Furnace, Mont Alto Iron Company, Mont Alto, Franklin county. One stack, 45 x 9½, built in 1808, and height increased in 1881; cold and warm blast; open top; ore, exclusively neutral brown hematite, from the furnace property, which consists of 20,000 acres of land; the pig iron is used for car-wheels and blooms; annual capacity, 8,000 net tons. Brand, "Mont Alto." I. S. Waterman, President, 407 Library st., Philadelphia; George B. Wiestling, Superintendent, Mont Alto. General office at the works. All sales made by the superintendent. *See Bloomaries.*
- Mount Etna Furnace, Samuel Isett, Yellow Springs, Blair county. One stack, 31 x 8, built in 1808; cold blast; brown hematite ore; pig iron made into blooms for boiler-plate and steel. Not in blast since 1877,

- the abandonment of the Pennsylvania Canal having deprived the works for the present of means of transportation. *See Bloomaries.*
- Mount Hope Furnace, A. Bates Grubb, Mount Hope, Lancaster county. One stack, 44 x 9, built in 1784; hot blast; closed top; Cornwall ore; specialty, car-wheel pig iron; annual capacity, 3,000 net tons.
- Mount Penn Furnace, Wm. M. Kaufman & Co., Reading, Berks county. One stack, 30 x 8½, built in 1830. *See Schuylkill Valley Furnaces.*
- Oley Furnace, Clymer Iron Company, Temple, Berks county. Furnace in Oley township. One stack, 30 x 8, built in 1772; cold blast; steam and water power; ores, ¾ hematite and ¼ primitive; specialty, No. 1 dead gray iron; annual capacity, 2,000 net tons. Wm. H. Clymer, President; Hiester Clymer, Secretary. *See Schuylkill Valley Furnaces.*
- Pine Grove Furnace, South Mountain Mining and Iron Company, Pine Grove Furnace, Cumberland county. One stack, 45 x 9½, built in 1770; remodeled in 1877; hot blast; bell-and-hopper top; ores, hematite, procured on the furnace property, which comprises 27,000 acres of land. Pig iron is used for blooms; annual capacity, 5,000 net tons. J. C. Fuller, President; W. H. Woodward, Treasurer; Daniel King, Superintendent; H. A. Keefer, Assistant Superintendent. *See Lower Susquehanna Furnaces. See Bloomaries.*
- Rebecca Furnace, Dr. S. M. Royer, Martinsburg, Blair county. One stack, 30 x 8½, built in 1817, and rebuilt by Dr. Peter Shoenberger in 1839; ore, native brown hematite; warm and cold blast; product, car-wheel pig iron; annual capacity, 2,000 net tons.
- Springfield Furnace, John Royer, Royer P. O., Blair county. One stack, 31 x 8½, built in 1814 and blown in in 1815; warm blast; water-power; open top; ore, brown hematite, mined near the furnace; specialty, gun iron; annual capacity, 2,000 net tons. This furnace has only stopped for repairs since it was first blown in. A. McAllister, Manager. *See Bloomaries.*
- Spring Hill Furnace, Fairchance Furnace Company, Fairchance P. O. Furnace at Smithfield, Fayette county. One stack, 35 x 8, built in 1805, and rebuilt several times; cold blast. *See Bituminous Furnaces.*
- Washington Iron Works, Lamar, Clinton county. Tatlow Jackson, Agent, 520 Walnut st., Philadelphia. One stack, 30 x 7, built in 1809. *See Bloomaries.*
- Windsor Furnace, Daniel B. Fisher, Leesport, Berks county. One stack, 28 x 9, built about 1830; cold blast; open top; water and steam power; ores, mainly native hematite, with some New Jersey magnetic; annual capacity, 2,000 net tons. Blown in September 13, 1877, after a long rest.
- Number of charcoal furnaces in Pennsylvania: 36 stacks.

## GAS.

- Alpha Furnace, Schuylkill Iron Company, Norristown, Montgomery county. One stack, 45 x 13, built in 1881 to smelt iron ore with gas fuel.



Total number of furnaces in Pennsylvania: 275 completed stacks, and 10 stacks building.

## MARYLAND.

### ANTHRACITE.

Ashland Iron Company, Ashland, Baltimore county. Three stacks: No. 1, 32 x 12, built in 1844; No. 2, 32 x 12, built in 1844; No. 3, 53 x 15, built in 1870, and blown in in 1871; No. 3 has the only closed top; Nos. 1 and 2 are blown by steam and water power, No. 3 by steam; ore, hematite from Baltimore and Carroll counties, Md., and York county, Pa.; specialty, foundry pig iron; total annual capacity, 25,000 net tons. Brand, "Ashland." George Small, President and selling agent, Baltimore; Walter S. Franklin, Secretary and Manager, Ashland; T. C. Blair, Assistant Manager.

Catoctin Anthracite Furnace, J. B. Kunkel, Catoctin Furnaces, Frederick county. One stack, 50 x 11½, built in 1873-4; bell-and-hopper top; fuel, coke and anthracite; annual capacity, 6,000 net tons. *See Charcoal Furnaces.*

Cedar Point Anthracite Furnace, Baltimore Iron Company, Baltimore. One stack, 44 x 12, built in 1873; closed top; fuel, anthracite and coke; ores, Baltimore county, Spanish, and Irish; product, foundry, forge, and Bessemer pig iron; annual capacity, 6,000 net tons. *See Charcoal Furnaces for names of officers.*

Number of anthracite furnaces in Maryland: 5 stacks.

### BITUMINOUS COAL OR COKE.

Antietam Furnace, P. A. Ahl & Brother, Sharpsburgh, Washington county. One stack, 50 x 11, built in 1845; water-power; fuel, coke; ore, brown hematite, from the vicinity of Harper's Ferry; product, principally No. 3 mill pig iron. Brand, "Antietam." This is the third stack built on this site; the first one was built about 1775.

Bowery Furnace, Cumberland Coal and Iron Company, Frostburg, Alleghany county. One stack, 57 x 16, built in 1868; rebuilt in 1873. General office, 52 Broadway, New York: E. L. Brown, President and General Manager; H. Redfield, Secretary.

Number of raw coal or coke furnaces in Maryland: 2 stacks.

### CHARCOAL.

Catoctin Charcoal Furnaces, J. B. Kunkel, Catoctin Furnaces, Frederick county. Two stacks, 32 x 8½ and 32 x 9, built in 1775 and 1856; open tops; warm and cold blast; steam and water power; ores, ¾ brown hematite and ¼ magnetic; total annual capacity, 5,000 net tons. The pig iron made here is strong, chills well, and has much affinity for other irons. *See Anthracite Furnaces.*

Cedar Point Charcoal Furnace, Baltimore Iron Company, Baltimore, Baltimore county. One stack, 40 x 9½, built in 1843; hot blast; closed top; ore, exclusively from Baltimore county, most of which is a carbonate; charcoal made in retorts; product, car-wheel and malleable

pig iron; annual capacity, 4,500 net tons. Horace L. Brooke, President and Treasurer; G. W. P. Coates, Secretary. *See Anthracite Furnaces.*

Chesapeake Furnaces, D. M. Reese & Sons, Locust Point, Baltimore. Works at Canton, Baltimore. Two stacks, each 32 x 8, built in 1846 and 1853; warm blast; ores, white hone and brown hematite, mined from 3 to 20 miles from furnaces; specialty, car-wheel and malleable pig iron; total annual capacity, 5,500 net tons. Brand, "Chesapeake." Selling agents, R. C. Hoffman & Co., 23 South Frederick st., Baltimore. *See Laurel Furnace.*

Green Spring Furnace, J. B. Haines & Co., Green Spring Furnace, Washington county. One stack, 35 x 8½, built in 1848, rebuilt in 1865; warm blast; water-power; open top; ore, red hematite, mined one mile from furnace, yielding 55 per cent.; specialty, gray pig iron; annual capacity, 1,200 net tons. Works for sale or lease. They are located within one mile of the Chesapeake and Ohio Canal and three miles from the Baltimore and Ohio Railroad.

Harford Furnace, Harford Furnace P. O., Harford county. One stack, 28 x 6½, built in 1828; hot blast; steam and water power. Owned by Henry W. Archer, James Farnandis, and Dr. E. Hall Richardson. For sale; address Edwin H. Webster, Belair, Md.

La Grange Furnace, estate of E. S. Rogers, "The Rocks" P. O., Harford county. One stack, 32 x 7½, built in 1836; warm blast; water-power; product, car-wheel pig iron.

Laurel Furnace, D. M. Reese & Sons, Locust Point, Baltimore. One stack, 52 x 10½, built in 1856, rebuilt in 1873; warm blast; closed top; brown and white carbonate ore, obtained between Baltimore and Washington, yielding 35 per cent.; product, pig iron for car-wheels, steel, and malleable purposes, known as "Laurel wheel iron," and noted for its high chilling properties; annual capacity, 4,500 net tons. The original Laurel Furnace was built in 1846; the South Baltimore Anthracite Furnace was added in 1856; both were afterwards burned, and the South Baltimore Furnace only was rebuilt and called Laurel. Selling agents, R. C. Hoffman & Co., 23 South Frederick st., Baltimore. *See Chesapeake Furnaces.*

Locust Grove Furnace, Furstenburg & Adler, Rossville, Baltimore county. One stack, 30 x 7½, built in 1849; hot blast; open top; ore mined at the furnace; product, car-wheel and malleable pig iron; annual capacity, 2,600 net tons. Brand, "Locust Grove."

Maryland Furnaces, H. W. Ellicott & Son, Baltimore. Two stacks, each 50 x 9, built in 1853 and 1870; hot blast; closed tops; argillaceous ore, mined near Baltimore; specialty, car-wheel and malleable pig iron; total annual capacity, 12,000 net tons. Brand, "Maryland."

Muirkirk Furnace, Charles E. Coffin, Muirkirk, Prince George's county. One stack, 29 x 8½, built in 1847; open top; Raymond & Campbell hot oven; oak and pine charcoal; ores mined in the neighborhood, roasted and crushed before using; pig iron used for car-wheels, guns,

flange iron, shot and shell; annual capacity, 4,200 net tons. Average tensile strength of six specimens of No. 4 pig, 41,329 lbs. Brand, "Muirkirk." Selling agents, Caughey & Robinson, Pittsburgh; Wm. E. Coffin & Co., Boston.

Principio Furnace, George P. Whitaker Company, Principio, Cecil county. One stack, 35 x 9, built in 1715, and rebuilt in 1836; warm blast; water-power; ores, equal proportions of Baltimore hone and Iron Hill (Delaware) magnetic, brought from mines belonging to same owner in Baltimore county, Maryland, and Newcastle county, Delaware; specialty, car-wheel pig iron. Brand, "Principio."

Stickney Iron Company, 11 South Gay st., Baltimore. Two stacks. Furnace A, 50 x 9½, built in 1854, rebuilt in 1871; hot blast; closed top; Baltimore ore exclusively used. Brand, "Stickney Iron Co." Furnace B, 48 x 11, completed and put in blast May 15, 1882; hot blast; bell-and-hopper top; ores, a mixture of Baltimore and foreign. The pig iron produced at both furnaces is specially adapted to malleable castings and car-wheels; annual capacity of A, 5,000 net tons, B, 10,000 net tons. Geo. H. Stickney, President; Wm. Harvey, Secretary; Wm. Gerhauser, Manager; Reed, Stickney & Co., agents.

Number of charcoal furnaces in Maryland: 16 stacks. Total number of furnaces in Maryland: 23 stacks.

## VIRGINIA.

### COKE.

Augusta Furnace, Augusta Iron Company, Ferrol P. O., Augusta county. One stack, 45 x 11, built in 1864, rebuilt in 1878; closed top; fuel, New river coke; annual capacity, 7,000 net tons. General office, 915 Walnut st., Philadelphia: R. N. Pool, President; Samuel E. Griscom, Secretary and Treasurer.

Buffalo Gap Furnaces, New York and Virginia Iron and Coal Company, lessee, Buffalo Gap, Augusta county. New York office, 54 Broad st. Two stacks, 35 x 9 and 40 x 10½, built in 1869 and 1873, respectively; closed tops; ore, brown hematite, mined on the property; product, neutral pig iron; total annual capacity, 9,000 net tons. Brand, "Buffalo Gap." H. R. Baltzer, President; Henry J. Rogers, Vice-President; H. W. Howell, Secretary and Treasurer.

Callie Furnace, Hileman, Waring & Co., Clifton Forge, Alleghany county. Furnace in Botetourt county. One stack, 43 x 10, built in 1873-4 for charcoal, but since enlarged and changed to coke; ores, half neutral hematite and half Bessemer, from the furnace property; product, foundry and mill pig iron. Brand, "Callie." Selling agents, E. L. Harper & Co., Cincinnati.

Crozer Iron and Steel Company, D. F. Houston, General Manager, Thurlow, Delaware county, Pa. Building one stack, 70 x 16, with three 60 x 18 Whitwell stoves, at Roanoke, Roanoke county.

Harmer, Randle & Co., Luray, Page county. Building one stack. A. C. Harmer, President; William Glading, Vice-President; O. C. Broth-

ers, Treasurer; Arthur E. Randle, Secretary; A. C. Harmer, Jr., Manager.

Longdale Iron Company, Longdale, Alleghany county. Two stacks: one stack, (Lucy Selina,) 60 x 11, built in 1827, rebuilt in 1873, and raised to 60 feet in 1876; the other stack, 60 x 14, first put in blast in February, 1881; closed tops; water and steam power; ore, brown hematite, mined near the furnace; product, principally gray forge pig iron; total annual-capacity, 26,000 net tons. Brand, "Longdale." F. A. Comly, President, 407 Walnut st., Philadelphia; J. E. Johnson, Manager. E. L. Harper & Co., Cincinnati, sole Western sales agents.

Low Moor Iron Company of Virginia, Low Moor, Alleghany county. One stack, 75 x 19, built in 1880; Whitwell fire-brick stoves; uses New river coke and Virginia ores exclusively. John Means, President; H. M. Bell, Vice-President; Jno. F. Winslow, Chairman Ex. Com.; A. A. Low, Treasurer; E. A. Low, Assistant Treasurer, 31 Burling Slip, New York City; H. W. Goodwin, General Manager. Western sales agent, Thomas A. Mack, Cincinnati.

Lynchburg Furnace, Lynchburg Iron Company, Lynchburg, Campbell county. One stack, 60 x 12½, first put in blast in December, 1880; bell-and-hopper top; ores, local brown hematite and magnetic; annual capacity, 9,000 net tons. Philadelphia office, 235 Dock st. *See Rolling Mills.*

Powhatan Furnace, Philadelphia and Reading Coal and Iron Company, 227 South Fourth st., Philadelphia. Furnace in Henrico county, on Richmond and Alleghany Railroad, 5 miles above Richmond. One stack, 50 x 13½, built for coke in 1860, called Westham Furnace, and rebuilt for anthracite in 1872-3; open top; water-power; annual capacity, 9,000 net tons.

Shenandoah Iron, Lumber, Mining, and Manufacturing Company, Shenandoah Iron Works, Page county. Building one stack, 70 x 15. *See Charcoal Furnaces for list of officers. See Bloomaries.*

Victoria Furnace, Iron and Steel Works Association of Virginia Limited, Goshen, Rockbridge county. Building one stack, 85 x 20, to have three 60 x 25 Siemens-Cowper-Cochrane stoves, and to be completed about November, 1882. Wm. N. Page, Agent.

Number of coke furnaces in Virginia: 9 completed stacks, and 4 stacks building.

#### CHARCOAL.

Amherst Furnace, Wm. H. Jordan, (executor of estate of S. F. Jordan,) Big Island, Bedford county. Furnace in Amherst county. One stack, 36 x 9, built in 1863; warm blast; water-power. Selling agents, R. C. Hoffman & Co., Baltimore.

Barren Springs Furnace, J. W. McGavock & Co., Reed Island, Wythe county. One stack, 35 x 8, built in 1853, and rebuilt in 1873; cold blast. J. W. Robinson, Graham's Forge, part owner and General Manager. Selling agents, R. C. Hoffman & Co., Baltimore.

- Beverly Furnace, Crockett & Co., Crockett's Depot, Wythe county. One stack, 33 x 9, built in 1880; cold blast; water-power; product, car-wheel pig iron; daily capacity, 10 net tons. J. W. Robinson, Graham's Forge, part owner and General Manager. Selling agents, R. C. Hoffman & Co., Baltimore. *See Eagle, Raven Cliff, and Speedwell Furnaces.*
- Brown Hill Furnace, Lobdell Car-wheel Company, Wilmington, Del. Furnace at Brown Hill, Wythe county. One stack, 40 x 8½, built from 1870 to 1874, and rebuilt in 1882; cold blast; daily capacity, 10 net tons. George G. Lobdell, President; Wm. W. Lobdell, Secretary; P. N. Brennan, Treasurer. *See Walton and White Rock Furnaces.*
- Cave Hill Furnace, Robert Sayers & Co., Kyle, Wythe county. One stack, 47 x 10, built in 1881-2; cold blast; Weimer blower; native ore; product, car-wheel pig iron; daily capacity, 10 net tons.
- Cedar Run Furnace, Graham & Robinson, Graham's Forge, Wythe county. One stack, 32 x 9, built in 1832; cold blast; water-power; ore mined on the furnace property; specialty, car-wheel pig iron. Selling agents, R. C. Hoffman & Co., Baltimore. J. W. Robinson, part owner and General Manager. *See Rolling Mills. See Bloomaries.*
- Columbia Furnace, John Wissler & Son, Columbia Furnace, Shenandoah county. One stack, 32 x 10, built in 1809, rebuilt in 1829; cold blast; water-power; ore, brown hematite; specialty, car-wheel pig iron. Brand, "Columbia." *See Virginia Furnace.*
- Eagle Furnace, Crockett & Co., Crockett's Depot, Wythe county. One stack, 34 x 9, built in 1863, rebuilt in 1881; cold blast; water-power; ore, local brown hematite; specialty, car-wheel pig iron; daily capacity, 6 net tons. J. W. Robinson, Graham's Forge, part owner and General Manager. *See Beverly, Raven Cliff, and Speedwell Furnaces.*
- Glenwood Furnace, F. T. Anderson, Glenwood, Rockbridge county. One stack, 35 x 8½, rebuilt in 1874; open top; warm blast; water-power; annual capacity, 2,000 net tons.
- Grace Furnace, Tredegar Company, Richmond. Furnace at Craig's Creek, Botetourt county. One stack, 33 x 9½, built in 1850, burned in 1864, and rebuilt in 1873; cold blast; closed top; annual capacity, 1,600 net tons. *See Rolling Mills.*
- Irondale Furnace, Slaughter, Dunn & Co., Crockett's Depot, Wythe county. One stack, 33 x 9, built in 1881.
- Ivanhoe Furnace, New River Mineral Company, Van Liew, Wythe county. One stack, 42 x 12, built in 1881-2, and first put in blast in March, 1882; cold blast; bell-and-hopper top; ore, local brown hematite; product, car-wheel pig iron; annual capacity, 5,000 net tons. Joshua Hendricks, President, and J. T. Pearson, Secretary and Treasurer, 49 Cliff st., New York; C. S. Van Liew, Superintendent and Agent, at the works.
- Liberty Furnace, Wissler, Armstrong & Stone, Liberty Furnace, Shenandoah county. One stack, 30 x 8½, built in 1821; cold blast; specialty, car-wheel pig iron. *See Bloomaries.*

- Mine Run Furnace, Powell's Fort Mining Company, Mine Run Furnace, Shenandoah county. One stack, 32 x 6½, built in 1872; cold blast; water-power; ore, brown hematite, mined on the property; product, gray car-wheel and white mill pig iron. Brand, "Mine Run, Va." Alfred Earnshaw, President, 203 Walnut Place, Philadelphia. Selling agents, Keyser Brothers & Co., Baltimore.
- Mount Vernon Furnace, Abbott Iron Company, Baltimore, Md. Furnace near Weyer's Cave, Rockingham county. One stack, 35 x 8½, built in 1848, and rebuilt in 1874; cold blast; steam and water power; closed top; ores, neutral hematites. Brand, "Mount Vernon." *See Rolling Mills in Maryland. See Bloomaries.*
- New River Furnace, New River Iron Company, Peirce's Falls, Max Meadows P. O., Wythe county. One stack, 35 x 8, built in 1881. J. W. Robinson, Graham's Forge, part owner and General Manager.
- Panther Gap Furnace, R. H. Bell, Agent, Staunton. Furnace near Goshen, Rockbridge county. One stack, 38 x 9, completed in December, 1874; cold blast. Has made but one blast. Owned by Samuel Coit and the Charter Oak Life Insurance Company, of Hartford, Conn., and Echols, Bell & Catlett, of Staunton, Va.
- Radford Furnace, J. J. Culbertson, lessee, Radford Furnace, Pulaski county. One stack, 35 x 10, built in 1868; warm blast; product, car-wheel pig iron, for the Car-wheel Iron Company Limited, Richard Wood, President, 400 Chestnut st., Philadelphia.
- Raven Cliff Furnace, Crockett & Co., Crockett's Depot, Wythe county. One completed stack, 29 x 9, built in 1810, and rebuilt in 1876; cold blast; water-power. J. W. Robinson, Graham's Forge, part owner and General Manager. Selling agents, R. C. Hoffman & Co., Baltimore. *See Beverly, Eagle, and Speedwell Furnaces.*
- Reed Island (Tipton) Furnace, Reed Island Iron Company, Reed Island, Wythe county. Furnace in Pulaski county. One stack, 33 x 9, first put in blast April 28, 1881; cold blast; open top; water-power; ore, local hematite; product, car-wheel pig iron; annual capacity, 2,000 net tons. J. W. Robinson, Graham's Forge, part owner and General Agent.
- Salisbury Furnace, Salisbury Iron Manufacturing Company, Salisbury Furnace, Botetourt county. New York office, 45 Exchange Place. One stack, 32 x 10, built in 1869; hot and cold blast; open top; water-power; ore, hematite, mined on the furnace property; product, car-wheel pig iron; annual capacity, 3,000 net tons. Brand, "Virginia Salisbury." H. S. Dakin, Superintendent.
- Shenandoah Iron Works, Shenandoah Iron, Lumber, Mining, and Manufacturing Company, Shenandoah Iron Works, Page county. Two stacks, each 33 x 9, built in 1836 and 1857; hot blast; ore, Fox mountain brown hematite; product, forge pig iron, all used for blooms. One of these stacks, called Catharine, built in 1836, has not been in blast for several years. The other, called Furnace No. 2, has an annual capacity of 3,000 net tons. Wm. Milnes, Jr., President and General Manager; A. Creveling, Vice-President; L. S. Boyer, Secretary

- and Assistant Manager; C. H. Price, Assistant Secretary; John Milnes, Treasurer. *See Coke Furnaces. See Bloomaries.*
- Sinking Creek Iron Works, J. Willcox Brown, Newport, Giles county. One stack, 35 x 9½, built in 1873; warm blast; water-power. E. P. Williams, Superintendent.
- Speedwell Furnace, Crockett & Co., Kyle, Wythe county. One stack, 32 x 9, built in 1873-4; cold blast; water-power; open top. J. W. Robinson, Graham's Forge, part owner and General Agent. *See Beverly, Eagle, and Raven Cliff Furnaces.*
- Van Buren Furnace, Dr. Frank King, Van Buren Furnace, Shenandoah county. One stack, 37½ x 9½, built in 1850, rebuilt in 1870; closed top; cold blast, but arranged for hot; ore, local hematite; product, car-wheel pig iron; annual capacity, 2,500 net tons. Brand, "King."
- Virginia Furnace, John Wissler & Son, Waynesboro, Augusta county. One stack, 32 x 9, built in 1804; hot blast; ores, honey-combed and red and black hematite; product, foundry pig iron, very soft and strong. Brand, "Virginia." Formerly called Mount Torrey Furnace. *See Columbia Furnace.*
- Walton Furnace, Lobdell Car-wheel Company, Wilmington, Del. Furnace at Max Meadows, Wythe county. One stack, 33 x 8½, built in 1872; cold blast; open top; annual capacity, 1,600 net tons. *See Brown Hill and White Rock Furnaces.*
- White Rock Furnace, Lobdell Car-wheel Company, Wilmington, Del. Furnace in Smyth county, 5 miles from Rural Retreat Station, Wythe county. One stack, 38 x 9½, built in 1875, and blown in August 9, 1875; cold blast; capacity, 8 net tons per day. Formerly called Panic Furnace. *See Brown Hill and Walton Furnaces.*
- Wythe Furnace, Crockett, Oglesby & Co., Crockett's Depot, Wythe county. One stack, built in 1873; cold blast; water-power. J. W. Robinson, Graham's Forge, part owner and General Agent. Selling agents, R. C. Hoffman & Co., Baltimore.
- Number of charcoal furnaces in Virginia: 30 stacks. Total number of furnaces in Virginia: 39 completed stacks, and 4 stacks building.

## PROJECTED.

- Arcadia Iron Works Company, Buchanan, Botetourt county. One stack contemplated. Incorporators, Geo. M. Bartholomew, of Hartford, Conn., Walter N. Johnston, of Buchanan, Va., and others.
- Central Iron Company of Virginia, Riversville, Amherst county. One stack contemplated.
- Chipman, W. W., 64 Cedar st., New York. One stack contemplated at Marion, Smyth county, Va.
- Haines, Henry R., New York. Furnace projected ten miles west of Fredericksburg in Spotsylvania county, Va., on the Catharine Furnace property.
- Holston Iron and Steel Company, John Leisenring, President, Mauch Chunk, Pa. One stack contemplated in Scott county, Va.



New River and Southwest Virginia Mining and Manufacturing Company, Wytheville, Wythe county. Incorporators, J. T. Hamlett, W. W. Lobdell, J. H. Fulton, J. A. Walker, Robert E. Withers, and others.

Van Vorhis, Stetson & Co., New York. One stack contemplated near Roanoke.

Virginia Coal and Iron Company, Bristol, Tenn. One stack contemplated at Big Stone Gap, Wise county, Va. Pittsburgh organization.

## NORTH CAROLINA.

### CHARCOAL.

Buckhorn Furnace, American Iron and Steel Company, Lockville, Chatham county. One stack, 54 x 10, built in 1873; hot blast; water-power; closed top; annual capacity, 4,500 net tons. George G. Lobdell, President; George G. Lobdell, Jr., Secretary; W. W. Lobdell, Treasurer; J. H. Wissler, Superintendent. *See Endor Furnace.*

Endor Furnace, American Iron and Steel Company, Lockville, Chatham county. One stack, 39 x 8, remodeled in 1872-3; hot blast; closed top; annual capacity, 2,500 net tons. *See Buckhorn Furnace.*

Madison Furnace, Jonas W. Derr, Lincolnton, Lincoln county. One stack, 32 x 6, built in 1810; cold blast; water-power. *See Bloomaries.*

Ore Hill Furnace, S. H. Wiley, Salisbury. Works at Ore Hill, Chatham county. One stack, 30 x 8, built in 1862; hot blast; daily capacity, 10 net tons. Not in blast since 1873.

Rehoboth Furnace, John Leonard & Co., Iron Station, Lincoln county. One stack, 38 x 9½, built in 1810; cold blast; water-power; annual capacity, 1,200 net tons. Selling agent, Wm. C. Benedict, at the works.

Number of furnaces in North Carolina: 5 charcoal stacks.

### PROJECTED.

A furnace is projected near Goldsboro, by Gen. Hoke, R. R. Bridgers, and others.

## GEORGIA.

### COKE.

Rising Fawn Furnace, Walker Iron and Coal Company, Rising Fawn, Dade county. One stack, 63 x 16, built in 1873-5; put in blast June 18, 1875; 3 Whitwell hot-blast stoves; open top; ore, fossiliferous, mined near the furnace; annual capacity, 20,000 net tons. Joseph E. Brown, President, Atlanta; Julius L. Brown, Vice-President and Secretary, Atlanta; James C. Warner, General Agent, Nashville; Louis S. Colyar, General Manager, Rising Fawn.

Number of coke furnaces in Georgia: 1 stack.

### CHARCOAL.

Bear Mountain Furnace, Hayth, Bush & Co., Cartersville, Bartow county. One stack, 30 x 7, built in 1852; cold blast; water-power; open top; daily capacity, 5 net tons. Put in blast in 1882 after a long rest.



Cherokee Iron Works, Cherokee Iron Company, Cedartown, Polk county. One stack, 60 x 12 $\frac{3}{4}$ , built in 1874-5; blown in March 22, 1877; closed top; hot blast; ore, brown hematite, mined near the works; annual capacity, 11,000 net tons. Intend to build an additional stack. A. G. West, President and Superintendent; John H. Browning, of New York, Treasurer; J. R. Barber, Secretary. Selling agents, E. L. Harper & Co. and Rogers, Brown & Co., Cincinnati; George H. Hull & Co., Louisville; and Millard & Combs and Coleman & Brother, St. Louis.

Diamond Furnace, R. H. Couper, Manager, Cartersville, Bartow county. One stack, 33 x 8, built in 1856; cold blast; Weimer blowing engine; ore, brown hematite, mined on the property; product, car-wheel pig iron, marketed in Louisville and St. Louis; daily capacity, 5 $\frac{1}{2}$  net tons. Brand, "Diamond Iron." Ran on spiegeleisen and ferro-manganese in 1875.

Etna Furnace, C. M. Pennington, lessee, Prior's Station, Polk county. One stack, 41 x 8, built in 1870; product, strictly cold blast car-wheel pig iron; daily capacity, 10 to 12 net tons. Brand, "Etna." John E. Stillwell, Superintendent.

Hermitage Furnace, Hermitage, Floyd county. Located eight miles north of Rome, on Selma Division of East Tennessee, Virginia, and Georgia Railroad. One stack, 60 x 10, built in 1874; product, car-wheel pig iron; annual capacity, 5,000 net tons. Brand, "Hermitage." Edward Nichols, President and General Manager.

Number of charcoal furnaces in Georgia: 5 stacks. Total number of furnaces in Georgia: 6 stacks.

## ALABAMA.

### COKE.

Alice Furnace, Alice Furnace Company, Birmingham, Jefferson county. One completed stack, 63 x 15, built in 1879-80, and put in blast November 23, 1880; closed top; three 48-pipe iron hot-blast stoves; ores, brown and red hematite from the company's mines; specialty, No. 1 foundry pig iron; annual capacity, 20,000 net tons. Brand, "Alice." A second stack building, 75 x 18, with 3 Whitwell stoves. T. T. Hillman, President and General Manager; F. L. Wadsworth, Secretary and Treasurer; J. J. Gray, general sales agent. Selling agents, Matthew Addy & Co., Cincinnati; and Coleman & Brother, St. Louis.

De Bardeleben Furnace, H. F. De Bardeleben, Birmingham, Jefferson county. Building one stack, 75 x 20; 3 Whitwell stoves, each 70 x 21; ores, brown and red fossiliferous; annual capacity, 55,000 net tons. F. L. Wadsworth, Manager.

Edwards Iron Company, Woodstock, Bibb county. One stack, 55 x 12, blown in June 10, 1880. The furnace was begun by Giles Edwards in 1873, and intended to be a charcoal furnace, but work was discontinued until 1879, when the present company was organized to com-

plete the furnace, and at the same time to enlarge it to use coke; ore, local brown hematite; product, foundry and mill pig iron; annual capacity, 11,000 net tons. Giles Edwards, President; F. L. Wadsworth, Treasurer; J. A. Edwards, Secretary; T. J. Edwards, Superintendent. Selling agents, Rogers, Brown & Co., Cincinnati; and Millard & Combs, St. Louis.

Eureka Company, Oxmoor, Jefferson county. Two stacks: No. 1, 60 x 16, completed in July, 1877; No. 2, 60 x 14, completed in March, 1876; closed tops; total annual capacity, 30,000 net tons. D. B. Miller, President, Cincinnati (Ohio) and Oxmoor; B. F. Gunthrie, Vice-President and General Sales Agent, Louisville, Ky.; W. J. Breed, Secretary and Treasurer, Cincinnati; John M. Norton, Superintendent, at the works.

Sloss Furnace No. 1, Sloss Furnace Company, Birmingham, Jefferson county. One completed stack, 65 x 16, built in 1881-2, and put in blast April 12, 1882; closed top; Whitwell hot-blast stoves; ores, mined on the company's property in Central Alabama; product, foundry pig iron; annual capacity, 30,000 net tons. A second stack, 70 x 17, building. Officers at the works: J. W. Sloss, President; Fred. Sloss, Secretary and Treasurer; Henry W. Hargraves, Superintendent; Maclin Sloss, General Purchasing Agent. B. F. Gunthrie, Louisville, Ky., Vice-President and General Sales Agent.

Woodward Iron Company, near Birmingham, Jefferson county. Building one stack, 75 x 17; closed top; 3 Whitwell hot-blast stoves, each 70 x 18; local red and brown hematite ores will be used; specialty, foundry pig iron; annual capacity, 40,000 net tons. W. H. Woodward, President; J. H. Woodward, Secretary.

Number of coke furnaces in Alabama: 5 completed stacks, and 4 stacks building.

#### CHARCOAL.

Alabama Furnace, Clifton Iron Company, Alabama Furnace, Talladega county. One stack, 55 x 10, built in 1873; hot blast; ore, brown hematite; closed top; product, strictly neutral car-wheel pig iron; annual capacity, 7,500 net tons. Samuel Noble, President; John E. Ware, Treasurer; Stephen N. Noble, Superintendent.

Bibb Furnace, Bibb Furnace Company, Bibb Furnace, Bibb county. One stack, 50 x 10½, built in 1864, and rebuilt in 1881; closed top; cold blast; ore, brown hematite, mined in the immediate vicinity; product, strong car-wheel pig iron; annual capacity, 4,500 net tons. Brand, "Bibb Iron." W. D. Carter, President; Kearsley Carter, Jr., Secretary and Treasurer; Frank Fitch, General Manager.

Coosa Furnace Company, Gadsden, Etowah county. Building one stack with material formerly composing the Vigo Iron Company's No. 1 Furnace at Terre Haute, Indiana.

Cornwall Iron Works, Hugh McCulloch, Cedar Bluff, Cherokee county. One stack, 44 x 9, built in 1862; cold blast; water-power. Agent, Thomas McCulloch, Rome, Georgia. Idle for several years.

Mary Pratt Furnace, De Bardeleben & Underwood, Birmingham, Jefferson county. Building one stack, 55 x 11; 2 Whitwell stoves; cold, warm, or hot blast; ore, brown and red fossiliferous; annual capacity, 15,000 net tons. W. T. Underwood, Superintendent.

Rock Run Furnace, Bass Furnace Company, Pleasant Gap, Cherokee county. One stack, 38 x 9, built in 1873-4, and rebuilt and enlarged to 47 x 9 in 1881; hot blast; bell-and-hopper top; product, car-wheel pig iron; daily capacity, 30 net tons. J. H. Bass, President, Fort Wayne, Indiana; A. D. Guild, Secretary, Fort Wayne; J. I. White, Treasurer, Fort Wayne; J. F. R. Evans, Manager, at the furnace.

Round Mountain Iron Works, R. P. Sibley, lessee, Round Mountain, Cherokee county. One stack, 45 x 8½, built in 1853; rebuilt and put in blast in June, 1874, after a long rest; cold blast; closed top; ore, red fossiliferous, yielding 58 per cent.; specialty, car-wheel pig iron; annual capacity, 2,500 net tons. Brand, "Round Mountain."

Shelby Furnaces, Shelby Iron Company, Shelby Iron Works, Shelby county. Two stacks, 56 x 12 and 60 x 14, built in 1863 and 1873, respectively; warm blast; closed tops; ore, brown hematite, obtained on the furnace property; product, car-wheel pig iron; total annual capacity, 13,000 net tons. Brand, "Shelby." Newton Case, President and Treasurer, Hartford, Conn.; Robert E. Day, Vice-President; Charles J. Hazard, Secretary; E. T. Witherby, Assistant Secretary; J. F. Black, Superintendent. Selling agent, L. E. Warner, 13 Johnston Building, Cincinnati, Ohio.

Stonewall Iron Works, William E. Jackson, Jr., lessee, Stonewall, Cherokee county. One stack, 40 x 10½, built in 1873; hot blast; closed top; ore, brown hematite; specialty, foundry pig iron; annual capacity, 6,000 net tons. J. H. Jackson, Superintendent. Out of blast at present.

Tecumseh Furnace, Tecumseh Iron Company, Tecumseh, Cherokee county. One stack, 60 x 12, built in 1873, and put in blast February 19, 1874, making but one stop since, which was from April 5 to June 19, 1875, to put in a new hearth; hot blast; closed top; ore, brown hematite; product, foundry, mill, and chilling irons; annual capacity, 8,000 net tons. Brand, "Tecumseh." Willard Warner, President and Manager; Willard Warner, Jr., Assistant Manager.

Woodstock Furnaces, Woodstock Iron Company, Anniston, Calhoun county. Two stacks: one, 43 x 12, first blown in April 13, 1873, rebuilt to 50 x 10 and blown in February 12, 1880; and one, 50 x 10, first blown in August 27, 1879; hot and cold blast; closed tops; product, car-wheel pig iron and spiegeleisen; total annual capacity, 15,000 net tons. Brand, "Woodstock." President, Alfred L. Tyler; Secretary and Treasurer, Samuel Noble.

Number of charcoal furnaces in Alabama: 11 completed stacks, and 2 stacks building. Total number of furnaces in Alabama: 16 completed stacks, and 6 stacks building.

## PROJECTED.

The Brierfield Iron and Coal Company contemplates the erection of a coke furnace in connection with the old Brierfield Rolling Mill, at Brierfield, Bibb county. Thomas J. Peter, President; A. A. Southwick, Treasurer and Manager.

The Pioneer Iron Mining and Manufacturing Company, B. E. Grace, Agent, Birmingham, contemplates the erection of a coke furnace. Samuel Thomas, President, Hokendauqua, Pa.

Furnaces are also projected in Central Alabama by the Tuscaloosa Iron Company and the Alabama Central Iron Company.

## TEXAS.

## CHARCOAL.

Marshall Car and Foundry Company, J. F. Dickson, General Manager, Marshall, Harrison county. Building one stack, 55 x 9½.

Rusk, Cherokee county. The State of Texas is building one stack, 55 x 9½; hot blast; closed top; to use local hematite and make foundry pig iron, and to be operated by the lessees of the penitentiary.

Ware Furnace, Jefferson, Marion county. One stack, 46 x 8½, built in 1869, rebuilt in 1873-4 and 1882; warm or cold blast; ore, local brown hematite; product, car-wheel pig iron. Formerly called Kelly Furnace. Horace Ware, President and proprietor; George W. Brown, General Manager; W. C. Denson, Secretary and Treasurer.

Number of furnaces in Texas: 1 completed charcoal stack, and 2 stacks building.

## WEST VIRGINIA.

## COKE.

Belmont Furnace, Belmont Nail Company, Wheeling. One stack, 60 x 16, first blown in September 4, 1875; closed top; fuel, Connellsville coke; ores, Lake Superior and Missouri; specialty, No. 1 mill pig iron, strictly red-short; annual capacity, 18,000 net tons. Brand, "Belmont." *See Rolling Mills.*

Irondale Furnace, F. Nemegyei, Racoon, Preston county. New York office, 43 New st. One stack, 62 x 13, built in 1861, and rebuilt in 1878-9; fuel, coke manufactured from coal mined on the property; ores, a mixture of half and half limonite and hematite, also obtained on the property; product, slightly cold-short pig iron; annual capacity, 10,000 net tons. Brand, "F. N." Alex. Strausz, General Manager.

Quinnimont Furnace, J. F. Lewis, Manager, Quinnimont, Fayette county. One stack, 60 x 16, built in 1874; ore, from Virginia; product is principally foundry pig iron for machine shops and mixtures for car-wheels; annual capacity, 10,000 net tons.

Riverside Furnace, Riverside Iron Works, Wheeling. Furnace in Marshall county. One stack, 75 x 18, built in 1872 and remodeled in 1876; closed top; ores, best grades of Lake Superior and Missouri;

annual capacity, 26,000 net tons. Brand, "Riverside." *See Rolling Mills.*

Top Mill Furnace, Wheeling Iron and Nail Company, Wheeling. One stack, 65 x 17, built in 1873-4; first blown in October 3, 1878; at present lined to 16½ feet across bosh; closed top; fuel, Connellsville coke; ores, Lake Superior and Iron mountain; annual capacity, 25,000 net tons. *See Rolling Mills.*

Waldorf Furnace, A. J. Ulman, 35 South Gay st., Baltimore. Furnace at Irontown, Taylor county. One stack, 50 x 12, built in 1873; fuel, coke; ore, local limestone; closed top; annual capacity, 6,000 net tons. Formerly called Lancaster Furnace.

Number of coke furnaces in West Virginia: 6 stacks.

#### CHARCOAL.

Bloomery Furnace, Bloomery Furnace Company, Bloomery P. O., Hampshire county. One stack, 40 x 9, built in 1844, rebuilt in 1880; closed top; cold blast; product, car-wheel and mill pig iron; weekly capacity, 60 net tons. Property for sale. John Birkinbine, 144 South Fourth st., Philadelphia.

Capon Iron Works, Keller & Co., Capon Iron Works, Hardy county. One stack, 32 x 7, built in 1822 by James Sterrett, and run by him for some time, then sold to Geo. F. Hupp, and in 1856 bought by J. J. Keller, who has since run the works; annual capacity, 1,500 net tons.

Elk River Furnace, Elk River Iron Company, Strange Creek, Braxton county. One stack, 42 x 11½, built in 1874-6; cold blast; ores, mixture of limestone, spathic, and hematite, all mined on the property; product, car-wheel pig iron; annual capacity, 5,000 net tons. B. J. Jordan, President; A. R. Lake, Treasurer; M. T. Frame, Secretary.

Gladeville Furnace, Charles E. Laverty, Gladeville, Preston county. One stack, 36 x 7½, built in 1872; warm blast; ore, mined on the property; daily capacity, 9 net tons.

Kanawha Iron Company, Coal Valley, Fayette county. One stack, 48 x 13, begun in 1875, but not yet completed; closed top; Whitwell hot-blast; daily capacity to be 40 net tons. N. I. Bigley, President; G. L. Drouillard, Secretary.

Virginia Furnace, R. W. Monroe, trustee, Kingwood, Preston county. Furnace at "Falls of Muddy Creek." One stack, 30 x 6, built in 1855, and first blown in in 1856; water-power; cold blast; brown hematite ore; product, foundry and forge pig iron; daily capacity, 6 net tons.

Number of charcoal furnaces in West Virginia: 5 completed stacks, and 1 unfinished stack. Total number of furnaces in West Virginia: 11 completed stacks, and 1 unfinished stack.

#### KENTUCKY.

##### BITUMINOUS COAL OR COKE.

Ashland Furnace, Ashland Coal and Iron Railway Company, Douglas Putnam, Jr., General Superintendent, Ashland, Boyd county. One

stack, 62 x 16, built in 1869; 4 Whitwell hot-blast stoves, each 52 x 16, added in 1877; closed top; fuel, raw coal; ores, Missouri and native; annual capacity, 20,000 net tons. Brand, "Ashland." John Means, President; John G. Peebles, Vice-President; Robert Peebles, Secretary and Treasurer.

Licking Furnace, Swift's Iron and Steel Works, 26 West Third st., Cincinnati, O. Works at Newport, Ky. One stack, 65 x 16, built in 1859, enlarged in 1869; closed top; fuel, coke; annual capacity, 17,000 net tons. Sales agents, E. L. Harper & Co., Cincinnati. *See Rolling Mills.*

Norton Iron Works, Ashland, Boyd county. One stack, 68 x 18, built in 1873; blown in February 16, 1874; remodeled and improved in 1877 by the addition of the Ferrie coking and calcining principle and the erection of 4 Whitwell hot-blast stoves, each 50 x 16; specialty, forge pig iron. *See Rolling Mills.*

Number of bituminous furnaces in Kentucky: 3 stacks.

#### HANGING ROCK DISTRICT—CHARCOAL.

Bellefonte Furnace, Means, Russell & Means, Ashland, Boyd county. Furnace in Greenup county. One stack, 33 x 10½, built in 1826; hot blast; open top; annual capacity, 3,000 net tons. John Russell, Manager.

Boone Furnace, Boone Furnace Company, Boone Furnace P. O., Carter county. One stack, 46 x 10, built in 1855; hot blast; open top; annual capacity, 4,500 net tons. Idle since 1871. Owned by the German Bank, Cincinnati. R. D. Davis, Grayson, Ky., agent. For sale.

Charlotte Furnace, Grayson, Carter county. One stack, 50 x 11, built in 1873; iron shell; warm blast; closed top; native ores; annual capacity, 4,000 net tons. Formerly called Iron Hills Furnace. Not in blast. Owners are Edward Avery, of Boston, and H. W. Brum, of New York. For sale.

Hunnewell Furnace, Eastern Kentucky Railway Company, Hunnewell, Greenup county. One stack, 46½ x 11½, built in 1852; hot blast; open top; limestone and kidney ores; specialty, foundry pig iron; annual capacity, 6,000 net tons. Brand, "Hunnewell." Nathaniel Thayer, President, Boston; H. W. Bates, Vice-President, Hunnewell, Ky.; R. Sullivan, Treasurer, Boston. Agency, 10 West Third st., Cincinnati.

Mount Savage Furnace, Joseph S. Woolfolk, lessee, Mount Savage, Carter county. One stack, 40 x 11, built in 1848; hot blast; open top; limestone, kidney, block, and slate ores; specialty, No. 1 foundry pig iron; annual capacity, 4,000 net tons. Brand, "Mount Savage XXX." Selling agents, Jacob Traber & Co., Cincinnati.

Pine Grove Furnace, Spriggs & Sanders, Quincy, Lewis county. Furnace in Greenup county. One stack, 17 x 6, built in 1881, and blown in October 15, 1881; cold blast; open top; ore, local red limestone; product, car-wheel pig iron; annual capacity, 700 net tons. Brand, "Hanging Rock." Joseph Spriggs, Manager.

Raccoon Furnace, Raccoon Mining and Manufacturing Company, Green-

upsburg, Greenup county. One stack,  $35 \times 10\frac{1}{2}$ , built in 1831; open top; ores, limestone, kidney, and block, mixed in equal quantities; cold and hot blast; annual capacity, 4,000 net tons. There are 10,000 acres of land in connection with this furnace, comprising fine timber land, an abundance of ore, and three veins of workable coal. Not in blast. E. F. Dulin, President; W. J. Worthington, Secretary. Number of charcoal furnaces in Hanging Rock region of Kentucky: 7 stacks.

## MISCELLANEOUS—CHARCOAL.

Bath Furnace, Olympian Springs, Bath county. One stack,  $40 \times 10\frac{1}{2}$ , built in 1839, rebuilt in 1872-3; cold blast; product, car-wheel pig iron.

Cottage Furnace, Joel McKinney, Irvine, Estill county. One stack,  $38 \times 10\frac{1}{2}$ , built in 1855; cold blast.

Estill Furnace, Kentucky River Iron Manufacturing Company, Estill Furnace, Estill county. One stack,  $32 \times 10$ , built in 1830; cold blast; native ores; specialty, car-wheel pig iron; daily capacity, 6 net tons. Brand, "Red River, Ky." Morris K. Jessop, President; E. K. Goodnow, Vice-President; Benjamin Strong, of New York, Secretary and Treasurer; C. W. Russell, Superintendent, Red River Iron Works, Powell county. *See Red River Furnaces.*

Hematite Furnace, J. H. Hillman, Hematite P. O., Trigg county. Formerly called Centre Furnace. One stack,  $36 \times 11$ , built in 1852 and remodeled in 1880; cold blast; product, car-wheel pig iron; daily capacity, 16 net tons.

Laura Furnace, C. Beringer, 106 Fourth avenue, Pittsburgh, Pa. Works at Laura Furnace P. O., Trigg county. One stack,  $36 \times 9$ , built in 1851; cold blast; product, pig iron suited for boiler plate and car-wheels. This furnace has not been in blast since 1874; the property comprises 20,000 acres; offered for sale.

Red River Furnaces, Kentucky River Iron Manufacturing Company, Fitchburg, Estill county. Two stacks, each  $50 \times 14$ , built in 1869; cold blast; open tops; native ores. Brand, "Red River, Ky." Not in blast since 1874. C. W. Russell, Agent, Red River Iron Works, Powell county. *See Estill Furnace.*

Trigg Furnace, Trigg Furnace P. O., Trigg county. One stack,  $48 \times 12$ , built in 1871; hot and cold blast; daily capacity, 18 net tons. Has not been in blast since 1876. Thomas H. Grinter, Commissioner, Cadiz, Ky. For sale to close partnership of D. Hillman & Sons.

Number of charcoal furnaces in Kentucky outside of Hanging Rock region: 8 stacks. Total number of furnaces in Kentucky: 18 stacks.

## TENNESSEE.

## BITUMINOUS COAL OR COKE.

Chattanooga Iron Company, Chattanooga, Hamilton county. One stack,  $61 \times 13\frac{1}{2}$ , completed in 1874; blown in in September, 1874; closed top;



ores, native fossiliferous and hematite; annual capacity, 16,500 net tons. Specialty, neutral gray forge pig iron. B. E. Wells, President; Leslie Warner, Secretary and Treasurer, Nashville; Lyman Wells, Vice-President and Superintendent.

Oakdale Iron Works, Jenks, Roane county. One stack, 64 x 16, first put in blast November 11, 1873; bought by present company in 1879; situated on the line of the Walden's Ridge Railroad; closed top; iron pipe hot blast; ores, fossil, and red and brown hematite; fuel, coke, made in bee-hive ovens from the company's Poplar creek coal; product, foundry pig iron; annual capacity, 21,000 net tons. John G. Scott, President and Manager; Pierre Chouteau, Vice-President; E. C. Lackland, Secretary and Treasurer.

Rockwood Furnaces, Roane Iron Company, Rockwood, Roane county. Office at Chattanooga. Two stacks, 65 x 16 and 65 x 14, built in 1867 and 1872; fuel, raw coal and coke; closed tops; total annual capacity, 40,000 net tons. B. F. Shelow, Furnace Superintendent. *See Rolling Mills.*

Tennessee Coal, Iron, and Railroad Company, Nashville. Three stacks: Sewanee A Furnace and South Pittsburg Furnaces, No. 1 and No. 2. The Sewanee A Furnace, at Cowan, Franklin county, is 65 x 15, first put in blast in June, 1880; 3 Whitwell stoves; closed top; fuel, coke; ores, from Alabama, Georgia, and Tennessee; product, neutral gray forge pig iron; annual capacity, 22,500 net tons. Brand, "Sewanee." The erection of another stack at Cowan in 1882 is contemplated. The South Pittsburg Furnaces were built by the Southern States Coal, Iron, and Land Company Limited, at South Pittsburg, Marion county; No. 1, 70 x 18, first blown in May 2, 1879; No. 2, 70 x 18, completed in 1881; 6 Whitwell hot blast stoves; ores, red and brown hematites, from Alabama, Georgia, and East Tennessee; product, foundry and mill pig iron; combined annual capacity, 56,000 net tons. James C. Warner, President; N. Baxter, Jr., Vice-President; James Bowron, Secretary and Treasurer; all at Nashville. A. M. Shook, General Manager, Tracy City.

Number of bituminous coal or coke furnaces in Tennessee: 7 stacks.

#### EASTERN OR UNAKA REGION—CHARCOAL.

Butler Furnace, R. R. Butler, Taylorsville, Johnson county. One stack, 35 x 8, built in 1881, and first blown in in October, 1881; cold blast; product, car-wheel pig iron.

Knoxville Car-wheel Company, Knoxville. Furnaces in Carter county. Two stacks: Carter Furnace, 32 x 8, built in 1840, and Maxwell Furnace, 41 x 9, built in 1880; cold blast; water-power; ores, local red and brown hematite; product, car-wheel pig iron; annual capacity, 5,000 net tons. Brand, "Carter county iron." D. A. Carpenter, President; W. P. Washburn, Vice-President; Charles H. Brown, Secretary and Treasurer. *See Bloomaries.*

Sullivan County Furnace, Jenkins, Hodge & Co., Union Depot, Sullivan



county. One stack, 35 x 8, first put in blast in 1881; cold blast; open top; water-power; ore, local brown hematite; product, hollow-ware; daily capacity, 4 net tons.

Number of charcoal furnaces in Eastern region of Tennessee: 4 stacks.

#### WESTERN REGION—CHARCOAL.

Bear Spring Furnace, Cumberland Iron Works Company, Nashville. Works at Cumberland Iron Works, Stewart county. One stack, 38 x 11½, built in 1832, abandoned in 1854, and rebuilt in 1873; open top; cold blast; ore, native brown hematite; specialty, car-wheel pig iron; annual capacity, 5,000 net tons. Brand, "Dover." J. P. Drouillard, President; Joseph Vaulx, Vice-President; Albert W. Harris, Secretary.

Brownsport Furnace, Charles B. Young, Nashville. Works at Brownsport Furnace, Decatur county. One stack, 42 x 9, built in 1850; hot blast; ore, brown hematite; product, soft pig iron for foundry purposes. For sale.

Cumberland Furnace, J. P. Drouillard, Nashville. Works at Cumberland Furnace, Dickson county. One stack, 35 x 10½, built in 1825; hot blast; open top; ore, local brown hematite; specialty, No. 1 foundry pig iron; annual capacity, 4,000 net tons.

La Grange Iron Company, Danville, Houston county. Furnaces in Stewart county. Two stacks: Clark Furnace, 42 x 9½, built in 1854 and burned and rebuilt in 1881; La Grange Furnace, 52 x 9½, built in 1832 and rebuilt in 1880; hot blast; closed tops; ore, local brown hematite; specialty, foundry and malleable pig iron. Brand, "La Grange." Main office, 411 Olive st., St. Louis: E. C. Sterling, President; H. W. Eliot, Secretary and Treasurer. Geo. K. Hosford, Manager, at the works.

Napier Furnace, Napier Iron Company, Columbia, Maury county. Furnace at Chief P. O., Lawrence county. One stack, 32 x 9, built in 1860, and repaired in 1873; cold blast; ore, brown hematite; product, car-wheel and boiler-plate pig iron; daily capacity, 13 net tons. W. C. Whitthorne, President; W. P. Ingram, Secretary and Treasurer; J. E. R. Carpenter, Superintendent and Manager.

Rough and Ready Iron Works, Rough and Ready Furnace P. O., Stewart county. One stack, 45 x 9, built in 1850; rebuilt in 1868; ore, brown hematite, mined on the property; hot blast. D. Theobald, President, Youngstown, Ohio; Isaac Wertheimer, Secretary and Treasurer, Pittsburgh, Pa. Main office with A. Guckenheimer & Bros., Pittsburgh.

Warner Furnace, Warner Iron Company, Nashville. Furnace at Warner, Hickman county. One stack, 55 x 11, first put in blast November 12, 1881; hot or cold blast; closed top; ore, local brown hematite; product, car-wheel pig iron; annual capacity, 8,000 net tons. James C. Warner, President; Leslie Warner, Secretary and Treasurer; L. S. Goodrich, Superintendent; Percy Warner, Assistant Superintendent.

Number of charcoal furnaces in Western region of Tennessee: 8 stacks.  
Total number of furnaces in Tennessee: 19 stacks.

#### PROJECTED.

East Chattanooga Coal and Iron Company, Chattanooga. Incorporators, S. M. Winchester, J. A. Hart, Hugh McNeal, J. W. Adams, and J. T. Hill.

### OHIO.

#### HANGING ROCK—CHARCOAL.

Bloom Furnace, J. D. Clare & Co., Bloom Switch, Scioto county. One stack, 33 x 11, built in 1832, and rebuilt in 1846; hot blast; open top; annual capacity, 3,000 net tons. Furnace building lighted at night by natural gas from an 800-foot well.

Buckeye Furnace, Buckeye Furnace Company, Berlin X Roads, Jackson county. One stack, 40½ x 10, built in 1851; open top; ore, red limestone, mined on the property; hot and cold blast; specialty, No. 1 foundry pig iron; annual capacity, 5,000 net tons. Eben Jones, Superintendent and Agent; T. J. Williams, Secretary and Treasurer.

Buckhorn and Olive Furnaces, Campbell, McGugin & Co., Ironton, Lawrence county. Two stacks: Buckhorn Furnace, 38 x 10½, built in 1833; cold and warm blast; open top; annual capacity, 3,000 net tons. Brand, "B. H." Olive Furnace, 37 x 10½, built in 1846; hot and warm blast; open top; annual capacity, 4,000 net tons. Brand, "O." Native limestone ore is used.

Centre and Grant Furnaces, W. D. Kelly & Sons, Ironton, Lawrence county. Two stacks: Centre Furnace, 40 x 10½, built in 1837; cold and warm blast. Grant Furnace, 43 x 11, built in 1869; warm blast. Both have open tops; ore, native limestone; product, car-wheel and extra strong machinery iron; total annual capacity, 9,000 net tons.

Cornelia Furnace, Cornelia Furnace Company, Jackson, Jackson county. One stack, 37 x 10½, built in 1853 and first put in blast in 1854; open top; hot and cold blast; ore, principally local limestone; product, mainly No. 2 foundry pig iron; annual capacity, 4,000 net tons. Hot blast iron brand, "Cornelia;" cold blast, "Lincoln." First called Iron Valley Furnace and then Lincoln Furnace. J. M. McGhee, Agent. Selling agents, Matthew Addy & Co., Cincinnati.

Eagle Furnace, Eagle Iron Company, Oreton, Vinton county. One stack, 32½ x 11, built in 1852; open top; hot blast; annual capacity, 4,500 net tons.

Etna Iron Works, Ironton, Lawrence county. Two stacks: Etna Furnace, 32 x 10, built in 1832; Vesuvius Furnace, 32 x 9, built in 1833; open tops; cold blast; ore, local limestone; specialty, car-wheel pig iron; total annual capacity, 7,000 net tons. Vesuvius Furnace has not been in blast since 1877. Brand, "Etna C. B." See *Hanging Rock Bituminous Furnaces*.

Gallia Furnace, Norton, Campbell & Co., Portsmouth, Scioto county. Furnace in Gallia county. One stack, 36 x 10, built in 1847; open top;

hot blast; product, pig iron for foundry and machine purposes; annual capacity, 4,000 net tons.

**Hamden Furnace**, Damarin & Co., Portsmouth, Scioto county. Furnace at Hamden Junction P. O., Vinton county. One stack, 34 x 11, built in 1854; hot blast; open top; limestone ore from furnace lands; product, strong foundry pig iron, especially adapted for machinery; annual capacity, 4,000 net tons.

**Hecla Furnace**, Hecla Iron and Mining Company, Ironton, Lawrence county. Principal office at Hecla Furnace. One stack, 32½ x 11, built in 1833; cold blast; open top; product, car-wheel pig iron; annual capacity, 3,500 net tons. Brand, "Hecla." John Campbell, President; Charles Campbell, Secretary and Treasurer. Sales agents, Collard & Martin, Pittsburgh; J. J. McDowell & Co., St. Louis; Geo. S. Moore & Co., Louisville; Rogers, Brown & Co., Cincinnati.

**Howard Furnace**, John Campbell, Ironton, Lawrence county. Furnace in Scioto county. One stack, 36 x 10½, built in 1853; open top; hot blast; annual capacity, 3,500 net tons. Brand, "Howard."

**Jefferson Furnace**, Jefferson Furnace Company, Oak Hill, Jackson county. One stack, 40 x 11½, built in 1854; open top; cold blast; ore, limestone; product, pig iron suitable for car-wheels and machinery; annual capacity, 3,000 net tons. J. D. Davis, Superintendent.

**Keystone Furnace**, Bundy Iron and Coal Company, Keystone Furnace, Jackson county. One stack, 36 x 10½, built in 1849; open top; hot blast; annual capacity, 4,000 net tons. E. L. Harper & Co., Cincinnati, sole sales agents. H. S. Bundy, President; William Nutt, Secretary. *See Latrobe Furnace.*

**Latrobe Furnace**, Bundy Iron and Coal Company, Berlin X Roads, Jackson county. One stack, 35 x 10, built in 1854; open top; hot blast; ore, native limestone; product, foundry pig iron; annual capacity, 4,000 net tons. E. L. Harper & Co., Cincinnati, sole sales agents. *See Keystone Furnace.*

**Lawrence Furnace**, Lawrence Furnace Company, Ironton, Lawrence county. One stack, 34 x 10, built in 1834; cold blast; open top; product, car-wheel pig iron; annual capacity, 4,500 net tons. George Peters, President and Manager; Charles Peters, Secretary; W. H. Peters, Vice-President.

**Logan Furnace**, Logan Iron Company, Logan, Hocking county. One stack, 29 x 9, built in 1852; open top; cold blast; product, car-wheel pig iron; annual capacity, 3,000 net tons. W. H. Woodruff, President; W. N. England, Treasurer; S. H. Bright, Secretary; A. Magoon, General Manager.

**Madison Furnace**, Clare, Duduit & Co., Rempel, Jackson county. One stack, 37 x 9½, built in 1854; hot blast; open top; native limestone red ore; product, No. 1 foundry pig iron; annual capacity, 3,500 net tons.

**Monitor Furnace**, Car-wheel Iron Company, Ironton, Lawrence county. Furnace at Petersburg. One stack, 35 x 9½, built in 1868; open top;

cold blast; annual capacity, 3,500 net tons. Charles Peters, Secretary; John Peters, Jr., Manager.

Monroe Furnace, Union Iron Company, Portsmouth, Scioto county. Furnace at Monroe Furnace P. O., Jackson county. One stack, 40 x 12, built in 1856; hot blast; open top; ore, native limonite; product, principally foundry pig iron; annual capacity, 5,000 net tons. John Campbell, President; Wm. M. Bolles, Secretary. Selling agents, Matthew Addy & Co., Cincinnati. *See Hanging Rock Bituminous Furnaces.*

Mount Vernon Furnace, H. Campbell & Sons, Ironton, Lawrence county. One stack, 32 x 10, built in 1833; open top; ore, native hematite; product, warm blast car-wheel iron; annual capacity, 4,400 net tons. John W. Campbell, Manager. *See Hanging Rock Bituminous Furnaces.*

Ohio and Pine Grove Furnaces, Means, Kyle & Co., Hanging Rock, Lawrence county. Two stacks: Ohio Furnace, in Scioto county, 36 x 11½, built in 1845; Pine Grove Furnace, in Lawrence county, 36 x 12, built in 1829; open tops; hot blast; product, principally foundry pig iron; total annual capacity, 8,500 net tons. Thomas W. Means, President; E. B. Willard, Secretary and Treasurer. *See Hanging Rock Bituminous Furnaces.*

Richland Furnace, Richland Furnace Company, Richland, Vinton county. One stack, 40 x 10½, built in 1854; open top; hot blast; annual capacity, 4,000 net tons. Formerly called Cincinnati Furnace. I. Lord, President; Wm. Poland, Treasurer, Chillicothe; A. J. Smart, Secretary, Greenfield.

Scioto Furnace, L. C. Robinson & Co., Portsmouth, Scioto county. One stack, 32 x 10½, built in 1844; open top; hot blast; annual capacity, 4,000 net tons.

Union Furnace, B. C. & R. D. McManigal, Union Furnace P. O., Hocking county. One stack, 32 x 10, built in 1853; open top; hot blast; ore, native; annual capacity, 3,500 net tons. Formerly called Five-mile Furnace.

Total number of charcoal furnaces in Hanging Rock region of Ohio: 28 stacks. The Hanging Rock charcoal furnaces generally stop on Sunday, as also do some of the bituminous furnaces.

#### HANGING ROCK—BITUMINOUS COAL OR COKE.

Belfont Furnace, Belfont Iron Works Company, Ironton, Lawrence county. One stack, 66 x 16, built in 1868; closed top; fuel, Connellsville coke and Kanawha coal; ores, Missouri and native; product, forge pig iron, for nails; annual capacity, 15,000 net tons. *See Rolling Mills.*

Eliza Furnace, Eliza Coal and Iron Company, Wellston, Jackson county. One stack, 46 x 12, built in 1877, from material of the abandoned Ophir Furnace, and blown in October 30, 1877, rebuilt in 1881; closed top; fuel, raw coal; ores, native (block and limestone); product,

- foundry pig iron; annual capacity, 6,000 net tons. H. S. Bundy, President. E. L. Harper & Co., sales agents, Cincinnati.
- Etna Iron Works, Ironton. Two stacks: Alice, 86 x 18, first blown in September 13, 1875; closed top; Whitwell hot-blast stoves; ore, Lawrence county limestone; product, foundry and forge pig iron; annual capacity, 20,000 net tons. Blanche, 86 x 18, nearly finished to mate the Alice, needs only to be lined to be ready for blast. Brand, "H. R. Alice." Cyrus Ellison, President; E. Bixby, Vice-President; Thomas McGovney, Secretary, Treasurer, and Superintendent. *See Hanging Rock Charcoal Furnaces.*
- Fulton Furnace, Globe Iron Company, Jackson, Jackson county. One stack, 50 x 11½, built in 1868; closed top; fuel, raw coal; ore, native; annual capacity, 4,000 net tons.
- Huron Furnace, Huron Iron Company, Jackson, Jackson county. One stack, 49 x 13, first blown in April 19, 1875; closed top; annual capacity, 5,000 net tons. Lot Davies, President; John L. Davies, Superintendent and Secretary. Principal sales agents, Matthew Addy & Co., Cincinnati.
- Maggie Furnace, New York and Ohio Iron and Steel Company, Ironton, Lawrence county. One stack, 58 x 16, built in 1873-4; closed top; fuel, coke from New river, Virginia; ores, native; product, mill pig iron; daily capacity, 50 net tons. *See Rolling Mills.*
- Means, Kyle & Co., Hanging Rock, Lawrence county. Building one stack. *See Hanging Rock Charcoal Furnaces.*
- Milton Furnace, Milton Furnace and Coal Company, Wellston, Jackson county. One stack, 60 x 13½, built in 1873-4; put in blast June 6, 1874; Whitwell hot-blast stoves; closed top; fuel, raw coal; ore, Hanging Rock limestone; product, soft, open-grained foundry pig iron, known as "American Scotch;" annual capacity, 8,000 net tons. H. S. Willard, President and Superintendent; J. E. Ferree, Secretary.
- Sarah Furnace, H. Campbell & Sons, Ironton, Lawrence county. One stack, 50 x 14, built in 1877; blown in March 18, 1878; Whitwell hot-blast stoves; ore, native hematite; product, foundry and mill pig iron; specialty, No. 1 "Sarah" foundry; annual capacity, 10,000 net tons. J. H. Campbell, Manager. *See Hanging Rock Charcoal Furnaces.*
- Star Furnace, Star Furnace Company, Jackson, Jackson county. One stack, 54 x 14, built in 1866, rebuilt in 1879; bell-and-hopper top; fuel, raw coal; ores, native limonite, block, blackband, and ¼ Lake Superior; product, No. 1 and 2 strong foundry and gray mill irons; annual capacity, 9,125 net tons. Isaac Brown, President; B. Kahn, Secretary.
- Tropic Furnace, Tropic Furnace Company, Jackson, Jackson county. One stack, 47 x 11½, built in 1872-3; closed top; fuel, raw coal; annual capacity, 5,500 net tons. E. T. Jones, President; D. D. Morgan, Secretary.
- Vinton Furnace, Vinton Coal and Iron Company, Vinton Station, Vinton county. One stack, 50 x 11, built in 1854; closed top; annual

capacity, 6,000 net tons. For lease; address S. R. Snyder, 525 Market st., Philadelphia.

Washington Furnace, Union Iron Company, Portsmouth, Scioto county. Furnace in Lawrence county. Furnace post-office address is Samsonville, Jackson county. One stack, 50 x 13, built in 1853; altered from charcoal to bituminous coal in 1877; closed top; annual capacity, 5,000 net tons. *See Hanging Rock Charcoal Furnaces.*

Wellston Furnaces, Wellston Coal and Iron Company, Wellston, Jackson county. One stack, 52 x 13, built in 1874-5, remodeled in 1879; bell top; ores,  $\frac{2}{3}$  native and  $\frac{1}{3}$  Lake Superior; product, neutral foundry pig iron; annual capacity, 7,300 net tons. Allen Hegler, President; I. S. Willett, Secretary.

Number of bituminous furnaces in Hanging Rock region of Ohio: 14 completed stacks, and 1 stack building.

#### MAHONING VALLEY—BITUMINOUS COAL OR COKE.

Brier Hill Iron and Coal Company, Youngstown, Mahoning county. Four stacks. Brier Hill Furnace, 66 x 14 $\frac{1}{2}$ , built in 1846, and rebuilt in 1879; product, Bessemer and strong foundry pig iron. Grace Furnace No. 1, 80 x 18, built in 1860, torn down in 1873, and rebuilt in 1882; Grace Furnace No. 2, 57 x 17 $\frac{1}{2}$ , built in 1861; specialty, Bessemer pig iron. Spiegel Furnace, 45 x 10 $\frac{1}{2}$ , built in 1880; product, spiegel and foundry pig iron. All have closed tops; fuel, coke and raw coal; ore, Lake Superior, with a mixture of Spanish in Spiegel Furnace; total annual capacity, 90,000 net tons. Brands, "Brier Hill" for Bessemer, and "Grace" and "Tod" for foundry. John Stambaugh, President; H. C. Marshall, Secretary; N. Crandall, Treasurer; J. G. Butler, Jr., General Manager.

Brown, Bonnell & Co., Youngstown, Mahoning county. Three stacks: Falcon and Phoenix Furnaces at Youngstown, and Anna Furnace at Struthers Station. Falcon Furnace, 55 x 12 $\frac{3}{4}$ , built about 1850; Phoenix Furnace, 60 x 15, built in 1854; and Anna Furnace, 74 $\frac{1}{2}$  x 16, built in 1869, rebuilt in 1881; closed tops; ore, Lake Superior; fuel, block coal and Connellsville coke; product, foundry and mill pig iron; total annual capacity, 64,000 net tons. *See Rolling Mills.*

Eagle Furnace, Eagle Furnace Company, Youngstown, Mahoning county. One stack, 51 x 14, built in 1846; closed top; fuel, raw coal and Connellsville coke; ore, Lake Superior; product, principally mill pig iron for Cartwright, McCurdy & Co.; annual capacity, 17,000 net tons. W. H. McCurdy, President; W. B. Hazeltine, Vice-President; W. E. Taylor, Secretary and Treasurer.

Girard Furnace, Girard Iron Company, Girard, Trumbull county. One stack, 66 x 16, built in 1866, and remodeled in 1879; closed top; fuel, raw coal and coke; ore, Lake Superior; product, Bessemer and forge pig iron; annual capacity, 20,000 net tons. Brand, "Girard." Henry B. Shields, Manager.

Hannah Furnace, Mahoning Valley Iron Company, Youngstown. One

stack, 65 x 16, first put in blast June 14, 1880; built mainly of material composing Elizabeth Furnace, erected at Niles, in 1859; ores, Lake Superior and Menominee; product, mill pig iron, all used in the company's mill; annual capacity, 30,000 net tons. *See Rolling Mills.*

**Haselton Furnaces**, Andrews Brothers & Co., Haselton, Mahoning county. Branch office at Youngstown. Two stacks, 75 x 18 and 56 x 13½, built in 1867 and 1868; the larger one was rebuilt in 1880 and 1881; fuel, block coal and coke; closed tops; product, foundry and mill pig iron from Lake Superior ores, and "American Scotch" pig iron from a blackband ore obtained at Mineral ridge, 12 miles from the furnaces; total annual capacity, 36,000 net tons. Brand, "Haselton."

**Himrod Furnaces**, Himrod Furnace Company, Youngstown, Mahoning county. Two stacks, 70 x 15 and 70 x 18, built in 1859 and 1860, rebuilt in 1876; fuel, mainly raw coal; ores from Menominee district, Lake Superior, and from Lawrence county, Pa., making soft foundry and neutral mill iron; closed tops; annual capacity, No. 1, 20,000 net tons; No. 2, 25,000 net tons. Another stack, 48 x 13, built in 1868, has been virtually abandoned until it can be rebuilt. Brand, "Himrod." R. A. Wight, President, and Robert Kelly, Secretary, P. O. Box 157, New York; A. B. Cornell, Treasurer and Manager, Youngstown, Ohio.

**Hubbard Furnaces**, Andrews & Hitchcock, Youngstown, Mahoning county. Works at Hubbard, Trumbull county. Two stacks, each 60 x 16, built in 1867 and 1872; fuel, ½ Connellsville coke and ½ block coal; product, principally foundry pig iron; "Hubbard strong foundry" is made of a mixture of Lake Superior specular and magnetic ores; "Hubbard Scotch" is made from ¾ Trumbull county blackband ores and ¼ Lake Superior ore, and sells in place of Scotch pig iron; total annual capacity, 45,000 net tons.

**Mary Furnace**, Ohio Iron and Steel Company, Lowellville, Mahoning county. One stack, 56 x 15, built in 1845; rebuilt of iron in 1872; ore, Lake Superior; product, strong neutral foundry pig iron. Brand, "The Mary." Formerly called Ada Furnace. To be greatly improved in 1882; stack to be enlarged to 75 x 18; new engine, etc.; daily capacity to be 100 tons. Thomas H. Wells, President; Henry Wick, Vice-President; Robert Bentley, Secretary and Treasurer.

**Thomas Furnace**, Arnold Furnace Company, lessee, Niles, Trumbull county. One stack, 56 x 14½, built in 1870; closed top; fuel, block coal and coke; ores, Mineral ridge blackband and Lake Superior; annual capacity, 16,000 net tons. W. R. Drake, Manager.

Number of bituminous furnaces in the Mahoning valley: 18 stacks.

#### HOCKING VALLEY—BITUMINOUS COAL OR COKE.

**Akron Furnace**, Akron Iron Company, Akron, Summit county. Furnace at Buchtel, Athens county. One stack, 60 x 16, built at Akron in 1872; removed to Buchtel in 1877, and blown in November 30,



1877; closed top; fuel, raw coal; ore, native, mined near the furnace; product, principally No. 1 foundry pig iron; annual capacity, 12,000 net tons. Brands, "Akron" and "Buchtel." J. R. Buchtel, Superintendent and General Manager. *See Rolling Mills.*

Baird Furnace, Baird Iron Company, Gore, Hocking county. Furnace in Perry county. One stack, 44 x 11½, built in 1874-5, and blown in October 9, 1875; closed top; fuel, raw splint coal; ore, native limestone; annual capacity, 5,600 net tons. Brand, "Baird." Walter Crafts, President; C. F. Eisele, Secretary and Manager.

Bessie Furnace, Moss & Marshall, New Straitsville, Perry county. One stack, 60 x 14, built in 1877-8, and blown in January 21, 1878; 4 Whitwell hot-blast stoves, each 36 x 15; fuel, raw coal; ores, native limestone, with ¼ Lake Superior; product, strong and soft foundry and gray forge pig iron; annual capacity, 12,000 net tons. Brand, "Bessie." B. Marshall, Manager.

Crafts Iron Company, Greendale, Hocking county. One stack, 58 x 15, first put in blast November 8, 1879; closed top; fuel, raw coal; ore, native limestone. The machinery of this furnace was formerly used for Kenton Furnace at Newport, Kentucky, dismantled in 1877. Larz Anderson, President; Walter Crafts, Treasurer; Grove Stoddard, Secretary. Matthew Addy & Co., Cincinnati, selling agents.

Fannie Furnaces, Licking Iron Company, Newark, Licking county. Furnaces at Shawnee, Perry county. Two stacks: No. 1, 50 x 12, built in 1874-5 at Newark, removed to Shawnee in 1876, and blown in on September 15, 1876; No. 2, 50 x 13, first put in blast October 10, 1877; closed tops; combined annual capacity, 13,000 net tons. Coal, lime, and blackband iron ore are found near the furnaces. Product, "American Scotch" foundry pig iron. J. C. Hamilton, President; Wm. Shields, Jr., Secretary; E. Snowden, Treasurer; Jacob H. Opperman, Superintendent. E. L. Harper & Co., Cincinnati, sole sales agents.

Franklin Furnace, Franklin Iron Works, Columbus, Franklin county. One stack, 62 x 17, completed in November, 1873; fuel, raw coal and coke; closed top; annual capacity, 12,000 net tons. Isaac Eberly, President; Lewis Moss, Secretary and Treasurer.

Standard Coal and Iron Company, Columbus. Five completed stacks, and two stacks building. Buchtel Furnaces, at Floodwood, Athens county, two stacks, each 60 x 16, building. Helen Furnace, at Orbiston, Hocking county, one stack, 52 x 15, built in 1877, and blown in in December, 1877. Lee Furnace, at Monday, Hocking county, one stack, 52½ x 14, built in 1877-8, and blown in in March, 1878. Mollie Furnace, at Shawnee, Perry county, one stack, 50 x 14½, built in 1877, and blown in November 10, 1877. Moxahala Furnace, at Moxahala, Perry county, one stack, 55½ x 15, built in 1877-8, and blown in January 5, 1878. XX Furnace, at Shawnee, Perry county, one stack, 50 x 14, built in 1876-7, and blown in January 18, 1877. Fuel used is mainly raw coal, mixed with some coke; ores,

native limestone, with some Lake Superior; product, principally foundry pig iron; annual capacity, about 75,000 net tons. Contracts have been made for the purchase of other furnaces by this company, but they have not yet been transferred to it. Samuel Thomas, President, Columbus; Wm. D. Lee, Vice-President, Newark; Walter Crafts, General Manager, Columbus.

Thomas Iron Works, Gore, Hocking county. One stack, 47 x 12½, built in 1876, blown in December 8, 1876; fuel, raw coal; ores, Baird or Hanging Rock limestone, with ½ Lake Superior; product, superior foundry pig iron; annual capacity, 7,500 net tons. S. Churchill, President; C. H. Rippey, Secretary; V. Ferguson, Superintendent.

Winona Furnace, Winona Iron Company, Winona Furnace P. O., Hocking county. One stack, 50 x 12½, completed and blown in February 20, 1878; Whitwell hot-blast stoves; fuel, raw coal; ores, native, Lake Superior, and mill cinder; closed top; specialty, foundry pig iron; annual capacity, 6,000 net tons. Brand, "Winona." S. Churchill, President; C. D. Greene, Secretary; E. B. Greene, Treasurer. Churchill, Thomas & Co., Columbus, Agents.

Number of bituminous furnaces in the Hocking valley: 14 completed stacks, and 2 stacks building.

#### MISCELLANEOUS BITUMINOUS—EASTERN OHIO AND CLEVELAND.

Bellaire Nail Works, Bellaire, Belmont county. One stack, 65 x 14, built in 1873; put in blast September 18, 1875; closed top; fuel, coke; annual capacity, 15,000 net tons; specialty, forge pig iron, mostly consumed in the manufacture of nails. *See Rolling Mills.*

Benwood Iron Works, Wheeling, West Virginia. Furnace at Martinsville, Belmont county, Ohio. One stack, 51 x 14, built in 1866; fuel, Connellsville coke; ore, Lake Superior; product, mill pig iron; annual capacity, 20,000 net tons. *See West Virginia Rolling Mills.*

Cherry Valley Furnaces, Cherry Valley Iron Works, Leetonia, Columbiana county. Two stacks, each 55 x 14, built in 1867, and blown in in January, 1868; closed tops; fuel, coke and raw coal; ores, native and Lake Superior mixed; specialty, "American Scotch" foundry pig iron; total annual capacity, 24,000 net tons. Brand, "Cherry Valley." J. H. King, President; C. N. Schmick, Secretary and Treasurer; J. G. Chamberlain, Superintendent. *See Rolling Mills.*

Cleveland Rolling Mill Company, Cleveland, Cuyahoga county. Five completed stacks. Newburgh Furnaces have two stacks: one, 60 x 16, built in 1864; the other, 60 x 16½, first put in blast in October, 1872; closed tops. Proton Furnace, formerly operated by the Cleveland Iron Company, 60 x 16, built in 1869, and rebuilt in 1878. The fourth stack, 70 x 17, built near Proton Furnace in 1879, and blown in October 15, 1879. Central Furnace, 75 x 20, built in 1881-2, and to be put in blast in August, 1882; Whitwell stoves. Fuel, raw coal and coke; ore, Lake Superior; product, No. 1 Bessemer pig iron; total annual

capacity, 175,000 net tons. Building three more stacks. *See Rolling Mills.*

Dover Furnace, Penn Iron and Coal Company, Canal Dover, Tuscarawas county. One stack, 65 x 16, built in 1878-9; closed top; fuel, raw coal and coke; ores, native, analyzing 40 per cent., with mixture of Lake Superior; annual capacity, 15,000 net tons. This furnace was built to take the place of Fairfield Furnace, 45 x 14, built in 1854, torn down in 1878. J. P. Burton, President, Massillon, Ohio; E. M. Davis, Vice-President, Philadelphia; S. W. Croxton, Treasurer and General Manager, Canal Dover; George H. Hopkins, Secretary; George Pugh, Furnace Manager.

Emma Furnace, Newburgh Furnace Company, 122 Water st., Cleveland, Cuyahoga county. One stack, 65 x 16, built in 1872; closed top; fuel, raw coal and coke; ore, Lake Superior; estimated daily production, 60 net tons. Geo. D. Wick, President; J. H. Dalliba, Vice-President; W. G. Pollock, Treasurer; Dudley Baldwin, Jr., Secretary.

Graffton Furnaces, Graffton Iron Company, Leetonia, Columbiana county. Two stacks, 53 x 13 and 53 x 15, built in 1866 and 1872; fuel, coke; ore, Lake Superior; product, foundry and forge pig iron. Office, 97 Water st., Pittsburgh; John Graff, President.

Jefferson Iron Works, Steubenville, Jefferson county. Two stacks, each 56 x 13, built in 1863 and 1865, and rebuilt in 1877; closed tops; ores, Missouri and Lake Superior; specialty, gray forge pig iron; total annual capacity, 28,000 net tons. Brand, "Jefferson." Pig iron generally sold by the company or used at the mill; some sold by Nimick & Co., Pittsburgh, and King, Gilbert & Warner, Columbus. *See Rolling Mills.*

Mingo Furnaces, Junction Iron Company, Mingo Junction, Jefferson county. Two stacks: No. 1, 60 x 14, built in 1871; No. 2, called Estella Furnace, 60 x 16½, was built in 1872 and first put in blast in May, 1873; closed tops; fuel, Connellsville and native coke; ores, Lake Superior and Missouri; product, foundry and forge pig iron; total annual capacity, 36,000 net tons. Brands, "Mingo" and "Stella." Alexander Laughlin, President; Mason W. Burt, General Manager; George A. Dean, Secretary and Foundryman. *See Rolling Mills.*

Steubenville Furnace, Cleveland Furnace Company, lessee, Cleveland. Furnace at Steubenville, Jefferson county. One stack, 60 x 16, built in 1872, and blown in in December, 1872; closed top; fuel, native and Connellsville coke; ore, Lake Superior; specialty, mill pig iron; annual capacity, 15,000 net tons. F. A. Bates, President.

Volcano Furnace, Volcano Furnace Company, Massillon, Stark county. One stack, 44 x 14, built in 1855; closed top; ore, blackband, mined in Tuscarawas county; specialty, "American Scotch" pig iron; annual capacity, 6,000 net tons. James Lee, President; Anthony Howells, Treasurer and Manager.

Zanesville Furnace, Ohio Iron Company, Zanesville, Muskingum county. One stack, 59 x 13, built in 1870-1; blown in September 7, 1871;

fuel, raw coal and coke; ores,  $\frac{1}{2}$  Lake Superior and  $\frac{2}{3}$  native; in 1881 the iron stoves were supplanted by 3 Whitwell fire-brick stoves, 65 x 17; product, forge and foundry pig iron; annual capacity, 18,000 net tons. *See Rolling Mills.*

Number of bituminous coal or coke furnaces in Ohio outside of the Hanging Rock, Mahoning valley, and Hocking valley districts: 20 completed stacks, and 3 stacks building.

#### NORTHWESTERN—CHARCOAL.

Manhattan Furnace, Toledo Iron Company, Toledo, Lucas county. Furnace at Ironville, in Toledo. One stack, 40 x 9, built in 1866; warm blast; ore, Lake Superior; daily capacity, 14 net tons. Brand, "Manhattan." E. Sinnet, President, Granville, Ohio. For sale.

Maumee Furnace, Fitzsimons Furnace Company, 18 National Bank Building, Cleveland. Furnace at Antwerp, Paulding county. One stack, 42 x 8 $\frac{1}{2}$ , built in 1865; ore, Lake Superior; product, principally car-wheel pig iron. Wm. Fitzsimons, President; Thomas Fitzsimons, General Manager; W. U. Masters, Secretary and Treasurer.

Paulding Furnace, Paulding Iron Company Limited, lessees, Cecil, Paulding county. One stack, 42 x 10, built in 1865; hot blast; closed top; ore, Lake Superior; specialty, car-wheel pig iron; annual capacity, 10,000 net tons. James I. Bennett, Chairman; J. H. King, Treasurer; S. Frank Eagle, Secretary and Superintendent. *See Bloomaries.*

Number of charcoal furnaces in Ohio, outside of Hanging Rock region: 3 stacks. Total number of furnaces in Ohio: 97 completed stacks and 6 stacks building.

### INDIANA.

#### RAW BITUMINOUS BLOCK COAL.

Brazil Furnace, Central Iron and Steel Company, Brazil, Clay county. One stack, 61 x 14, built in 1867, and blown in in December, 1867; closed top; ore, Lake Superior; specialty, Bessemer pig iron; annual capacity, 10,000 net tons. Brand, "Brazil." Major Collins, President; W. C. Hall, Secretary and Treasurer. *See Rolling Mills.*

Vigo Furnace, Vigo Iron Company, Terre Haute, Vigo county. One stack, 52 x 12, built in 1872, and blown in in 1873; closed top; fuel, raw coal; ore, Missouri; specialty, forge pig iron; annual capacity, 8,000 net tons. Brand, "Vigo." The No. 1 furnace, built in 1869, was torn down in 1882 and removed to Alabama. A. L. Crawford, President; A. J. Crawford, Secretary, Treasurer, and Manager.

Number of bituminous furnaces in Indiana: 2 stacks.

#### CHARCOAL.

Nelson Furnace, Nelson Fordice, Shoals, Martin county. One stack, 60 x 13, built in 1872; hot blast; closed top; ores,  $\frac{2}{3}$  native to  $\frac{1}{3}$  Missouri; annual capacity, 7,000 net tons.

Number of charcoal furnaces in Indiana: 1 stack. Total number of furnaces in Indiana: 3 stacks.

## ILLINOIS.

## BITUMINOUS COAL OR COKE.

Big Muddy Furnace, Lewis Iron Company, 217 Olive st., St. Louis, Mo. Furnace at Grand Tower, Jackson county. One stack, 69 x 17, built in 1871; weekly capacity, 315 net tons. B. W. Lewis, President; William Spear, Secretary and Treasurer.

Calumet Iron and Steel Company, 57 Dearborn st., Chicago. Works at Cummings, Cook county. One stack, 75 x 18, built in 1880; closed top; 3 Siemens-Cowper-Cochrane fire-brick stoves; Lake Superior and Menominee ores; daily capacity, 130 net tons, mostly foundry pig iron. Brand, "Calumet." Works formerly owned by Joseph H. Brown Iron and Steel Company. *See Rolling Mills.*

Joliet Steel Company, Honore Building, Chicago. Works at Joliet, Will county. Two stacks, each 72 x 20, built in 1873; No. 1 first put in blast in June, 1880, and No. 2 first put in blast in January, 1882; closed tops; 3 Siemens-Cowper-Cochrane fire-brick stoves; fuel, coke; ores, Lake Superior and Missouri; product, Bessemer pig iron; total annual capacity, 100,000 net tons. *See Rolling Mills.*

Meier Furnaces, Missouri Furnace Company, lessee, 509 Olive st., St. Louis. Furnaces at Bessemer Station, near East Carondelet, St. Clair county. Two stacks, each 60 x 17, built in 1873-5, but blown in for the first time in 1880; Whitwell hot-blast stoves; closed tops; total annual capacity, 56,000 net tons. *See Missouri Furnaces.*

North Chicago Rolling Mill Company, 17 Metropolitan Block, Chicago, Cook county. Six stacks in Illinois: Chicago Furnaces, located at Chicago, on north branch of Chicago river, at the foot of Waubansia avenue, have two stacks, (Nos. 1 and 2,) each 66 x 17, built in 1869. South Chicago Furnaces, located at South Chicago, have four stacks, (Nos. 5, 6, 7, and 8,) each 75 x 21, built in 1880-1, two of which were put in blast in 1881, and two were put in blast in 1882. All have closed tops; fuel, coke; ore, Lake Superior; product, Bessemer and mill pig iron; annual capacity of Chicago Furnaces 55,000 net tons, and of South Chicago Furnaces 224,000 net tons. *See Wisconsin Furnaces. See Rolling Mills in Illinois and Wisconsin.*

Union Iron and Steel Company, northeast corner Dearborn and Madison sts., Chicago. Four stacks: two, 60 x 14½, built in 1869, and two, 74 x 16, built in 1881; Whitwell fire-brick stoves; closed tops; fuel, Connellsville coke and Indiana coal; ore, Lake Superior; specialty, Bessemer pig iron; total annual capacity, 105,000 net tons. *See Rolling Mills.*

Total number of furnaces in Illinois: 16 bituminous stacks.

## MISSOURI.

## BITUMINOUS COAL OR COKE.

Jupiter Iron Works, St. Louis Ore and Steel Company, lessee, 409 North Sixth st., St. Louis, St. Louis county. Works at South St. Louis. One

stack, 75 x 20, finished in 1873; blown in for the first time in 1880; fuel, coke; ores, Iron mountain and Pilot Knob and about  $\frac{1}{2}$  red hematite; annual capacity, 33,000 net tons. *See St. Louis Ore and Steel Company's Furnaces. See Pilot Knob Furnace. See Rolling Mills.*

Missouri Furnaces, Missouri Furnace Company, 509 Olive st., St. Louis. Two stacks, each 56 x 15, built in 1870; closed tops; fuel, Connellsville coke; ores, Iron mountain, Shephard mountain, Pilot Knob, and Southwest; product, mainly Bessemer pig iron; total annual capacity, 40,000 net tons. Brand, "Missouri." Oliver B. Filley, President; Edwin C. Cushman, Vice-President and General Manager; Charles A. McNair, Secretary. *See South St. Louis Furnaces. See Meier Furnaces in Illinois.*

South St. Louis Furnaces, Missouri Furnace Company, lessee, 509 Olive st., St. Louis. Two stacks, each 56 x 15, built in 1870 and 1872; closed tops; fuel, Connellsville coke; specialty, Bessemer pig iron; total annual capacity, 40,000 net tons. *See Missouri Furnaces. See Meier Furnaces in Illinois.*

St. Louis Ore and Steel Company, 409 North Sixth st., St. Louis. Works at South St. Louis. Three stacks: two, 60 x 14 and 60 x 15, built in 1869; one, 65 x 16, finished in 1872; closed tops; fuel, coke; ores, Iron mountain and Pilot Knob and about  $\frac{1}{2}$  red hematite; product, Bessemer pig iron; total annual capacity, 55,000 net tons. *See Jupiter Iron Works. See Pilot Knob Furnace. See Rolling Mills.*

Number of bituminous furnaces in Missouri: 8 stacks.

#### CHARCOAL.

Hamilton Furnace, Henry R. Tracy, Portsmouth, Ohio. Furnace at Sullivan, Franklin county. One stack, 40 x 9 $\frac{1}{2}$ , built in 1873; put in blast October 22, 1873; open top; ores mined on the furnace property, consisting of 7,000 acres of good timber; hot blast; daily capacity, 25 net tons of Bessemer or malleable pig iron. For sale.

Irondale Furnace, E. Harrison & Co., Irondale, Washington county. Office, 941 North Second st., St. Louis. One stack, 38 x 10, built in 1859; hot blast; open top; ore, Iron mountain specular; product, soft gray pig iron; annual capacity, 9,500 net tons. Brand, "Irondale." Edwin Harrison, General Manager, St. Louis. For sale, with 10,500 acres of land, half of which is well timbered, also 600 acres of meadow and pasture land under fence. A copious supply of water from springs higher than the furnace gives a natural head of water. Selling agents, Nimick & Co., Pittsburgh.

Maramec Iron Works, Maramec Iron Company, Maramec Iron Works P. O., Phelps county. One stack, 34 x 9 $\frac{1}{2}$ , built in 1826, and rebuilt in 1851; open top; cold blast, water-power; ores, blue specular and red oxide, mined near the furnace; specialty, car-wheel pig iron; annual capacity, 5,000 net tons. Brand, "Maramec." Out of blast since 1876. Wm. James, Agent, St. James. *See Bloomaries.*

Midland Furnace, Midland Blast-Furnace Company, Midland, Crawford

county. Main office, 411 Olive st., St. Louis. One stack, 50 x 10, built in 1874-5; blown in April 10, 1875; closed top; either cold or hot blast; ore, red hematite; specialty, Bessemer pig iron; annual capacity, 14,000 net tons. This furnace stack is wholly built of fire brick, 22½ inches thick. Brand, "Midland." Wm. H. Lee, President; George F. Baker, Secretary; B. B. Reagan, Superintendent.

Moselle Furnace, Moselle Iron Company, Moselle, Franklin county. One stack, 39 x 9½, built in 1867; warm and hot blast; open top; ores, red hematite and blue specular, with a small mixture of brown hematite; product, soft and strong foundry and Bessemer pig iron; annual capacity, 6,000 net tons. Has not been in blast since 1876. Joseph H. Brown, Vice-President, and H. O. Bonnell, Secretary, Youngstown, Ohio; J. Craig Smith, Manager and Treasurer, 130 Water st., Cleveland, Ohio; J. G. Leitch, Assistant Manager, Moselle, Mo. For sale.

Nova Scotia Furnace, Nova Scotia Iron Company, Salem, Dent county. One stack, 55 x 11, built in 1880; hot blast; closed top; annual capacity, 15,000 net tons; specialty, Bessemer pig iron. Frederick Shickle, President; John W. Harrison, Vice-President; E. R. Lackland, Secretary and Treasurer; Thomas J. Scott, Manager.

Ozark Iron Works, Lackland Furnace Company, Ozark Iron Works, Phelps county. One stack, 40½ x 9½, built in 1873-4, and blown in June 10, 1874; hot blast; open top; ores, blue specular and red hematite from mines in the neighborhood; annual capacity, 10,000 net tons. Out of blast since 1877. C. B. Burnham, President, St. Louis; Wm. James, Agent, St. James.

Pilot Knob Furnace, St. Louis Ore and Steel Company, 409 North Sixth st., St. Louis. Furnace at Pilot Knob, Iron county. One stack, 60 x 11, built in 1848, remodeled in 1879; ores, ¼ Shephard mountain and ¾ Pilot Knob; product, Bessemer pig iron; daily capacity, 35 net tons. *See Jupiter Iron Works. See St. Louis Ore and Steel Company's Furnaces. See Rolling Mills.*

Sligo Furnace Company, Sligo Furnace P. O., Dent county. General office, 411 North Third st., St. Louis. One stack, 55 x 11, built in 1880, and first put in blast in October, 1880; closed top; hot blast; ores, blue specular and red oxide, mined near the furnace; specialty, Bessemer pig iron; annual capacity, 18,000 net tons. Brand, "Sligo." Furnace lands comprise 20,000 acres of timber land with several good deposits of ore and limestone. A. L. Crawford, President, New Castle, Pa.; H. A. Crawford, Vice-President, Secretary, and Treasurer, St. Louis; David Carson, Superintendent, Sligo.

Number of charcoal furnaces in Missouri: 9 stacks. Total number of furnaces in Missouri: 17 stacks.

## MICHIGAN.

### CHARCOAL.

Bangor Furnace, Bangor Furnace Company, Bangor, Van Buren county.



One stack, 43 x 10, first blown in October 29, 1872; hot blast; bell-and-hopper top; ore, Lake Superior; product, Bessemer, car-wheel, and malleable pig iron; annual capacity, 15,000 net tons. The charcoal for this furnace is made with Mathieu's retorts, and chemical works are connected with them. Charles D. Rhodes, President, 57 Dearborn st., Chicago; H. D. Oakley, Treasurer, Chicago; H. S. Pickands, Secretary and General Manager, Bangor, Michigan.

Carp River Furnace, Carp River Iron Company, lessee, Marquette, Marquette county. One stack, 45 x 10, built in 1872-3; hot or cold blast; closed top; Marquette county (Lake Superior) ores exclusively used; specialty, car-wheel and malleable pig iron; annual capacity, 6,000 net tons. John Burt, President; W. A. Burt, Secretary; H. A. Burt, Treasurer and Manager. *See Excelsior Furnace. See Rolling Mill Furnace.*

Deer Lake Furnaces, Deer Lake Company, Ishpeming, Marquette county. Two stacks: one, 47 x 8, built in 1868; the other, 47 x 9, built in 1873, and put in blast in October, 1873; hot blast; steam and water power; ore, Lake Superior,  $\frac{1}{2}$  hard specular and  $\frac{3}{4}$  hematite; product, car-wheel, malleable, and foundry pig iron; total annual capacity, 10,000 net tons. Brand, "Deer Lake." W. H. Rood, President; E. R. Hall, Secretary and Treasurer.

Detroit and Lake Superior Iron Manufacturing Company, Detroit, Wayne county. One stone stack, 42 x 9 $\frac{1}{2}$ , built in 1857; warm blast; closed top; ores, Lake Superior specular, magnetic, and hematite; the pig iron is specially adapted to malleable castings; annual capacity, 9,000 net tons. C. A. Kent, President; Wm. H. Barnum, Vice-President; Wm. M. Gaylord, Secretary and Treasurer.

Elk Rapids Furnace, Elk Rapids Iron Company, Elk Rapids, Antrim county. Chicago office, 59 Wabash avenue. One stack, 47 x 11 $\frac{1}{2}$ , first put in blast in July, 1873; hot blast; four 4-inch tuyeres; ore, Lake Superior entirely; specialty, Nos. 3 and 4 pig iron for car-wheels and malleable castings; daily average production, 46 net tons. The charcoal for this furnace is made with Mathieu's retorts, and chemical works are connected with them. Selling agent, F. H. Head, 59 Wabash avenue, Chicago.

Eureka Furnaces, Eureka Iron Company, Detroit. Two stacks at Wyandotte: Furnace No. 1, 45 x 9, built in 1855; hot blast; bell-and-hopper top; annual capacity, 13,000 net tons. Furnace No. 2, 45 x 9 $\frac{1}{2}$ , built in 1862; formerly called Ward Furnace; hot blast; bell-and-hopper top; annual capacity, 13,000 net tons. Ores, a mixture of Lake Superior specular, hematite, magnetic, and Menominee. Charcoal made in Mathieu's patent retorts. Product, Bessemer, car-wheel, and malleable pig iron. *See Rolling Mills.*

Excelsior Furnace, Carp River Iron Company, Marquette. Furnace at Ishpeming, formerly known as the Peat Furnace, built in 1872, now changed into a charcoal furnace. One stack, 50 x 9, rebuilt in 1879; hot or cold blast; product, Bessemer and foundry pig iron; annual

capacity, 5,000 net tons. *See Carp River Furnace. See Rolling Mill Furnace.*

Frankfort Furnace Company, 32 and 34 Woodward avenue, Detroit. Furnaces at South Frankfort, Benzie county. Two stacks, each  $42 \times 9\frac{1}{2}$ , built in 1870 and 1873; hot blast; bell-and-hopper tops; ore, Lake Superior; product, foundry, car-wheel and malleable pig iron; total annual capacity, 27,000 net tons. W. H. Tefft, President and Treasurer; M. I. Mills, Vice-President; W. H. Irvine, Secretary. Selling agents, R. P. Elmore & Co., Milwaukee, Wis. New company organized in 1879, and the works were put in operation in 1880.

Hamtramck Furnace, Detroit Iron Furnace Company, Newberry and McMillan Building, Detroit. One stack,  $52 \times 10\frac{1}{2}$ , built in 1870, and remodeled in 1880; open top; hot blast; changed from bituminous coal to charcoal in 1879; ore, Lake Superior; product, car-wheel and malleable pig iron; daily capacity, 45 net tons. James McMillan, President; Hugh McMillan, Vice-President and Treasurer; E. C. Wetmore, Secretary; Lee Burt, Manager.

Iron Cliffs Company, Negaunee, Marquette county. Two stacks: Pioneer Furnace No. 1,  $47 \times 9\frac{1}{2}$ , built in 1858; Pioneer Furnace No. 2,  $47 \times 9\frac{1}{2}$ , built in 1859; both stacks burnt and rebuilt in 1877; Cliffs Furnace has been abandoned; ore, Lake Superior,  $\frac{1}{2}$  red specular and  $\frac{1}{2}$  soft hematite; product, Bessemer pig iron; total annual capacity, 20,000 net tons. Brand, "Pioneer." Wm. H. Barnum, President; Charles J. Canda, Treasurer, 52 William st., New York; A. W. Maitland, General Manager; James Rood, Agent.

Jackson Furnaces, Jackson Iron Company, Fayette, Delta county. Two stacks, each  $40 \times 9\frac{1}{2}$ , built in 1867 and 1869, and enlarged to  $54 \times 10\frac{1}{2}$  in 1881; hot blast; bell-and-hopper tops; ores, Jackson specular and South Side manganiferous hematite; product, Bessemer pig iron; total annual capacity, 22,000 net tons. Iron is known as "Fayette." These furnaces are 100 miles from the company's mines, at Negaunee, and were built at Fayette on account of the abundance of timber. There are 64 charcoal kilns. Fayette Brown, General Agent, Cleveland, Ohio; H. H. Brown, Assistant General Agent, Cleveland; J. B. Kitchen, Agent, Fayette, Mich.

Lake Huron Furnace, Lake Huron Iron Company, Caseville, Huron county. One stack,  $45 \times 9\frac{1}{2}$ , built in 1873, and enlarged to  $54 \times 9\frac{1}{2}$  in 1881; hot blast; ores, Lake Superior; daily capacity, 35 net tons. A. G. Stone, Vice-President and Treasurer, Cleveland; D. E. Stone, Secretary, Cleveland.

Lawton Furnace, Michigan Central Iron Company, Lawton, Van Buren county. New York address, P. O. Box 1,741. One stack,  $40 \times 9\frac{1}{2}$ , built in 1867; blown in in December, 1867; hot blast; open top; ore, Lake Superior; product, foundry, malleable, and car-wheel pig iron; annual capacity, 11,000 net tons. Brand, "Lawton." Idle since 1873. For sale or lease. Gen. Q. A. Gillmore, President; D. Van-  
Nostrand, Secretary and Treasurer; Henry Ford, Agent and Manager.

- Leland Furnace, Leland Iron Company, 35, 36, and 37 Moffat Building, Detroit. Furnace at Leland, Leelenaw county. One stack, 48 x 10, rebuilt in 1872; hot blast; bell-and-hopper top; water-power; ore, Lake Superior; annual capacity, 9,000 net tons. V. K. Moore, President; George W. Moore, Secretary and Treasurer.
- Martel Furnace, Davenport, Fairbairn & Co., Erie, Pa. Furnace at St. Ignace, Mackinac county. One stack, 53 x 10½, first put in blast August 15, 1881; hot blast; closed top; 2 Whitwell stoves, each 60 x 15; ore, Lake Superior; product, car-wheel pig iron; daily capacity, 55 net tons. The furnace does not run on Sunday. The charcoal for this furnace is made with Mathieu's retorts, and chemical works are connected with them. H. E. Burt, Manager.
- Menominee Furnace, Menominee Furnace Company, Menominee, Menominee county. One stack, 45 x 9½, built in 1872-3; blown in in August, 1873; hot blast; closed top; ore, Lake Superior; specialty, Bessemer pig iron; annual capacity, 10,000 net tons. A. B. Meeker & Co., agents, Chicago.
- Peninsular Furnace, Peninsular Iron Company, Detroit, Wayne county. One stack, 42 x 9½, built in 1863, put in blast in February, 1864; warm blast; open top, covered by a plate when not filling; ore, exclusively Lake Superior; specialty, Nos. 2, 3, and 4 pig iron; annual capacity, 10,000 net tons. Brand, "P. I. Co., Det." John Burt, President; Solon Burt, Secretary and Treasurer.
- Pine Lake Furnace, Pine Lake Iron Company, Ironton, Charlevoix county. General office, 90 and 92 Dearborn st., Chicago. One stack, 52 x 10½, built in 1880-1, and put in blast in February, 1881; hot blast; closed top; ore, Lake Superior; specialty, malleable car-wheel pig iron; estimated annual capacity, 15,000 net tons. Brand, "Champion." R. M. Cherrie, President, and H. C. Dolph, Secretary and Treasurer, 92 Dearborn st., Chicago; W. A. Lovelace, Superintendent, Ironton. Sales agents, Cherrie & Co., 92 Dearborn st., Chicago.
- Spring Lake Iron Company, Fruitport, Muskegon county. One stack, 46 x 11, built in 1879-80; first blown in March 2, 1880; 4 tuyeres; ore, Lake Superior; product, Bessemer pig iron. Principal office at Milwaukee, Wis.: Samuel Marshall, President; E. H. Brodhead, Vice-President; Irving M. Bean, Secretary and Treasurer. H. S. Pickands, Manager, Fruitport. Agent, Charles D. Rhodes, 57 Dearborn st., Chicago.
- Union Iron Company, Detroit, Wayne county. One stack, 50 x 10½, built in 1871-2, and blown in in July, 1872; warm blast; closed top; ore, Lake Superior; specialty, malleable and car-wheel pig iron; annual capacity, 10,000 net tons. Brand, "U. I. Co., Det." Wells Burt, President; Austin Burt, Secretary, Treasurer, and Manager.
- Vulcan Furnace Company, James McMillan, President, Detroit. Building one stack, 53 x 10½, at Newberry, 80 miles west of St. Ignace, which is to have 56 Mathieu's patent charcoal retorts; hot blast; closed top.

Number of charcoal furnaces in Michigan : 25 completed stacks, and 1 stack building.

#### ANTHRACITE AND BITUMINOUS COAL OR COKE.

Grace Furnace, Lake Superior Iron Company, Marquette, Marquette county. One stack, 60 x 17, built in 1872; closed top; fuel, mixed anthracite and bituminous coal; annual capacity, 15,000 net tons. Not in blast for several years. C. H. Hall, Agent, Ishpeming.

Rolling Mill Furnace, Carp River Iron Company, Marquette, Marquette county. One stack, 60 x 15, built in 1868, rebuilt in 1873; closed top; fuel, anthracite and bituminous coal or coke; annual capacity, 14,000 net tons. *See Carp River Furnace. See Excelsior Furnace.*

Number of anthracite and bituminous coal and coke furnaces in Michigan : 2 stacks. Total number of furnaces in Michigan : 27 completed stacks, and 1 stack building.

#### PROJECTED.

C. J. L. Meyer, of Fond du Lac, Wisconsin, contemplates the erection of two charcoal furnaces, each 60 x 12, at Hermansville, Menominee county, Michigan.

### WISCONSIN.

#### CHARCOAL.

Appleton Furnace Company, Appleton, Outagamie county. Two stacks, each 40 x 8½, built in 1871 and 1872; open tops; hot blast; water-power; ore, Lake Superior; product, Bessemer, car-wheel, and foundry pig iron; total annual capacity, 14,000 net tons. Augustus Ledyard Smith, President; Henry A. Foster, Vice-President; Henry D. Smith, Secretary, Treasurer, and General Manager.

Florence Furnace, C. Sprong & Co., Florence, Marinette county. One stack, 40 x 8, commenced June 2, 1881, and completed and blown in November 13, 1881; hot blast; bell-and-hopper top; Menominee range ores; specialty, car-wheel pig iron. C. Sprong, Manager.

Fond du Lac Furnace, Fond du Lac Iron Company, Fond du Lac, Fond du Lac county. One stack, 50 x 10½, built in 1873-4; hot blast; closed top; estimated annual capacity, 10,000 net tons. Built to use Lake Superior ores, and will be put in blast in 1882 for the first time. E. A. Carey, Manager.

Fox River Iron Company, West Depere, Brown county. Two stacks, 40 x 9½ and 50 x 10; one built in 1869; the other built in 1872, put in blast in January, 1873; hot blast; closed tops; ores, from Lake Superior and Menominee range; product, Bessemer and foundry pig iron; total annual capacity, 18,500 net tons. Only one furnace is run at a time. D. W. Blanchard, President and Treasurer; D. D. Kellogg, Secretary; S. D. Arnold, Vice-President and Manager.

Green Bay Furnace, National Furnace Company, Depere, Brown county. Furnace at Green Bay. One stack, 39 x 9, built in 1870, and put in blast in the spring of 1871; closed top; hot blast; annual

capacity, 8,000 net tons. H. D. Smith, President; W. L. Brown, Treasurer; M. R. Hunt, Secretary and General Manager. Product called "National Iron." Sole agents, A. B. Meeker & Co., 93 Dearborn st., Chicago. *See National Furnaces.*

Iron Mountain Furnace, North Chicago Rolling Mill Company, 17 Metropolitan Block, Chicago, and 37 Mitchell Block, Milwaukee. Furnace at Iron Mountain, Dodge county. One stack, (called No. 10,) 40 x 9½, built in 1865; hot blast; open top; ore, Iron ridge; product, mill pig iron; annual capacity, 6,000 net tons. *See Illinois Furnaces. See Bay View Furnaces. See Illinois and Wisconsin Rolling Mills.*

Iron Mountain Furnace Company, Ironton, Sauk county. One stack, 27 x 7½, built in 1857; warm blast; open top; steam and water power; ore, native brown hematite; specialty, car-wheel pig iron; annual capacity, 3,500 net tons. Brand, "Sauk." George B. Burrows, President; H. W. Cannon, Secretary and Treasurer; S. Brownell, General Manager.

National Furnaces, National Furnace Company, Depere, Brown county. Two stacks; one, 45 x 10, built in 1869, and put in blast in February, 1870; the other, 48 x 12, built in 1872, put in blast in March, 1873, blown out in 1875, and has not been in operation since; hot blast; bell-and-hopper tops; annual capacity of active stack, 12,000 net tons. Product called "National Iron." *See Green Bay Furnace.*

North Western Iron Company, Mayville, Dodge county. Office, 406 Milwaukee st., Milwaukee. One stack, 40 x 9½, built in 1848, and rebuilt in 1872; ore, Iron ridge, a red hematite containing 50 per cent. of metallic iron, from the company's mines located near the furnace; product, foundry and mill pig iron; weekly capacity, 100 net tons. Brand, "Rock River." Irving M. Bean, President; Samuel Marshall, Vice-President; James C. Spencer, Secretary; Charles F. Ilsley, Treasurer.

Number of charcoal furnaces in Wisconsin: 12 stacks.

#### HALF ANTHRACITE COAL AND HALF COKE.

Bay View Furnaces, North Chicago Rolling Mill Company, 17 Metropolitan Block, Chicago, and 37 Mitchell Block, Milwaukee. Works at Bay View, Milwaukee county, near Milwaukee. Two stacks, (Nos. 3 and 4,) each 66 x 17, built in 1870 and 1871; ores, ⅓ Lake Superior and ⅔ Iron ridge; product, Bessemer and mill pig iron; total annual capacity, 55,000 net tons. Formerly belonged to Milwaukee Iron Company. *See Illinois Furnaces. See Iron Mountain Furnace. See Rolling Mills of Illinois and Wisconsin.*

Minerva Furnace, Minerva Furnace Company, Milwaukee. One stack, 55 x 15, built and put in blast in the summer of 1873; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 22,000 net tons. Formerly operated by the North Chicago Rolling Mill Company.

Number of anthracite coal and coke furnaces in Wisconsin: 3 stacks.

Total number of furnaces in Wisconsin: 15 stacks.

## MINNESOTA.

## CHARCOAL.

Duluth Furnace, Duluth Iron Company, Duluth, St. Louis county. One stack, 45 x 9½, built in 1873-4, and first put in blast July 12, 1880; hot blast; bell-and-hopper top; fuel, charcoal; ores, specular and hematite, from Marquette, Michigan; product is principally used for car-wheels and foundry and machine gearing; estimated annual capacity, 9,000 net tons. Brand, "Duluth." D. M. Sabin, President, Stillwater, Minn.; C. H. Graves, Secretary, Duluth; John I. Porter, Treasurer; Samuel C. Miller, Superintendent.

Number of furnaces in Minnesota: 1 charcoal stack.

## UTAH TERRITORY.

## CHARCOAL.

Ogden Iron Works, R. L. Jones, lessee, Ogden. One stack, 45 x 8, begun in 1875, and completed in 1882; hot blast; bell-and-hopper top; annual capacity, 7,000 net tons. Hematite and magnetic ores mined within 10 miles of the furnace. *See Rolling Mills.*

Number of furnaces in Utah: 1 charcoal stack.

## PROJECTED.

Norway Blast Furnace, Norway Iron Mining and Manufacturing Company, Salt Lake City. John T. Lynch, President; Charles Popper, Vice-President; Frederick G. Lynberg, Treasurer; B. A. M. Froiseth, Secretary and Manager.

## COLORADO.

## COKE.

Colorado Coal and Iron Company, South Pueblo, Pueblo county. New York office, 47 William st. One completed stack, 65 x 15, built in 1880-1, and blown in September 7, 1881; Siemens-Cowper-Cochrane fire-brick stoves; fuel, coke; ores, native magnetic and red hematite; product, Bessemer and foundry pig iron. Another stack of the same size is in course of erection. *See Rolling Mills.*

Number of furnaces in Colorado: 1 completed coke stack, and 1 stack building.

## PROJECTED.

Denver Furnace and Rolling Mill Company, Room F, Clifford Block, Lawrence st., Denver. Incorporators, Frank Hall, Arthur E. Pierce, J. S. White & Co., James Henshall, Bullick & Baxter, Henry Apple, and others.

## CALIFORNIA.

## CHARCOAL.

California Iron and Steel Company, Hotaling, Placer county. One stack, 47 x 10, built in 1879-80, and first blown in April 24, 1881; hot

blast; closed top; fuel, charcoal; ore, magnetic, mined at the furnace; product, foundry pig iron, very strong; annual capacity, 12,000 net tons. Owners, Egbert Judson, A. P. Hotaling, and Irving M. Scott. Irving M. Scott, Manager.

Number of furnaces in California: 1 charcoal stack.

## OREGON.

### CHARCOAL.

Oswego Furnace, Oswego Iron Company, Oswego, Clackamas county. One stone stack, 42 x 10, built in 1866; stack raised in 1879; open top; hot blast; water-power; fuel, charcoal, made exclusively from fir; ore, brown hematite, 40 per cent., worked raw, and costs but 70 cents per ton in stock house; annual capacity, 8,000 net tons. L. B. Seeley, President and Agent, corner Main and Folsom sts., San Francisco, Cal.; E. W. Crichton, Secretary and Superintendent, Oswego. Brand, "Oregon Iron."

Number of furnaces in Oregon: 1 charcoal stack.

## WASHINGTON TERRITORY.

### CHARCOAL.

Irondale Furnace, Puget Sound Iron Company, Irondale, Jefferson county. One stack, 38 x 9, built in 1880-1, and blown in January 27, 1881; hot blast; open top; fuel, charcoal; ores, bog and magnetic, mined in Jefferson county and also on Texada Island, British Columbia; annual capacity, 4,000 net tons. Main office at 328 Montgomery st., San Francisco, Cal.: John A. Paxton, President; John H. Redington, Vice-President; Charles H. Simpkins, Treasurer; A. Halsey, Secretary.

Number of furnaces in Washington Territory: 1 charcoal stack.

### PROJECTED.

New Tacoma Iron Company, New Tacoma.

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## UNITED STATES.

Total number of furnaces in the United States on July 25, 1882: 686 completed stacks, 30 stacks building, and 4 stacks partly built on which work has been suspended. There are 250 completed charcoal furnaces, 225 anthracite furnaces, 210 furnaces using coke chiefly, and 1 blast furnace using gas. Of the 30 furnaces under construction, 19 are coke, 6 are anthracite, and 5 are charcoal. Of the 4 unfinished furnaces, 3 are anthracite and 1 is charcoal.



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## RECENTLY ABANDONED FURNACES.

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NOTE.—Some of the furnaces named in this list have been standing for many years with good machinery, and at some time may again be put in operation.

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### NEW HAMPSHIRE.

New Hampshire Iron Company, Franconia, Grafton county. Fuel, charcoal. Abandoned in 1865.

### VERMONT.

Shaftsbury Iron Works, South Shaftsbury, Bennington county. Built in 1863. Fuel, charcoal. Last blast ended in March, 1876.

### MASSACHUSETTS.

Lenox Iron Works, Lenox Furnace, Berkshire county. Fuel, charcoal. One stack, 32 x 9, built in 1765 and rebuilt in 1837. Torn down in 1880.

### CONNECTICUT.

Shepaug Iron Company, Roxbury, Litchfield county. Fuel, charcoal. One stack, built in 1866; has made no iron since 1872.

### NEW YORK.

#### CHARCOAL.

Cooper's Falls Furnace, Union Iron Company of Buffalo, De Kalb, St. Lawrence county. Built in 1864; abandoned in 1868.

Dutchess County Iron Works, N. S. Simpkins, Jr., 32 Pine st., New York. Furnace at Dover, Dutchess county. One stack, built in 1834; abandoned in 1870.

Fletcherville Furnace, Witherbees & Fletcher, Mineville, Essex county. Built in 1863-4; abandoned in 1875.

Greenwood Furnace, Parrott Iron Company, Greenwood Iron Works, Orange county. One stack, 42 x 9, built in 1813; warm blast; water-power; not in blast since September, 1871.

Myers Steel and Iron Company, Clifton, St. Lawrence county. One stack, abandoned in 1870.

Norwich Furnace, Norwich, Chenango county. Built in 1856 and repaired in 1873; abandoned in 1880.

Rossie Iron Works, Ogdensburg, St. Lawrence county. One stack, built in 1843; abandoned in 1868.

## NEW JERSEY.

Wawayanda Furnace, Wawayanda, Sussex county. Built in 1845; fuel, charcoal. Thomas Iron Company, owner, Hokendauqua, Pa.  
Stephens Furnace, Rustic, Morris county. Built in 1877; fuel, anthracite.

## PENNSYLVANIA.

## ANTHRACITE.

Chestnut Hill Iron Ore Company, Columbia, Lancaster county. Abandoned one stack in 1881.  
Montour Iron and Steel Company, Danville, Montour county. Abandoned one stack in 1880.  
Robesonia Furnace, Berks county. Built in 1845; abandoned in 1880.  
Safe Harbor Furnace, Safe Harbor, Lancaster county. One stack, 45 x 14, built in 1848, abandoned in 1865. Owned by the Phoenix Iron Company, Phoenixville, Pa.  
Shamokin Furnace, David Longenecker, Shamokin, Northumberland county. Built in 1841; abandoned in 1869.  
St. Clair Furnace, St. Clair, Schuylkill county. Built in 1845; abandoned in 1880.

## BITUMINOUS COAL AND COKE.

Brady's Bend Iron Company, F. W. Rhoades, Agent, Brady's Bend, Armstrong county. Four stacks, 44 x 9, 44 x 10½, 50 x 14, and 50 x 13½, built from 1842 to 1845, abandoned and dismantled in 1878-9.  
Enterprise Furnace, Hite's Station, Allegheny county. Built in 1871-2; torn down in 1872, and not rebuilt.  
Lawrence Furnace, Foltz & Jordan, New Castle, Lawrence county. Built in 1846; fuel, coke and charcoal; open top; abandoned in 1873.  
Middlesex Furnace, West Middlesex, Mercer county. Built about 1855; abandoned in 1875.  
Monticello Furnace, William Acheson, Monticello, Armstrong county. Built in 1859; abandoned in 1876.  
Pine Creek Furnace, Brown & Mosgrove, Kittanning, Armstrong county. Built in 1846; abandoned in 1879.  
Sligo Furnace, Wetter & Lyon, Sligo, Clarion county. Built in 1845; abandoned in 1873.

## CHARCOAL.

Augusta Furnace, Harrisburg and Potomac Railroad Company, Daniel V. Ahl, President, Newville, Cumberland county. Furnace near Shippensburg.  
Big Pond Furnace, Newville, Cumberland county. Built in 1836; burnt in 1880.  
Caledonia Furnace, estate of Thaddeus Stevens, Graeffenberg, Adams county. Built in 1837. Furnace in Franklin county.  
Forest Iron Works, White Deer Mills, Union county. Built in 1846. Owned by A. Pardee, Hazleton, Pa.

- Huntingdon Furnace, G. & J. H. Shoenberger, Spruce Creek, Huntingdon county. Built in 1796; abandoned in 1870.
- Laura Furnace, Perry Kreamer, assignee of W. A. Taylor & Co., Millers-town, Perry county. Built in 1873; cold blast.
- Madison Furnace, Wetter & Lyon, Sligo, Clarion county. Built in 1836; abandoned in 1874.
- Manada Furnace, Grubbs & Bland, Swatara Station, Dauphin county. Built in 1836; abandoned in 1874.
- Mary Ann Furnace, Horatio Trexler, Long Swamp, Berks county. Built in 1793; out of blast since 1869.
- Mill Creek Furnace, E. A. Green & Co., Mill Creek, Huntingdon county. Built in 1838; out of blast since 1869.
- Montebello Furnace, Fisher & Morgan, Duncannon, Perry county. One stack, 42 x 12; water-power.
- Rockhill Furnace, Rockhill Iron and Coal Company, Orbisonia, Huntingdon county. Built in 1830; abandoned in 1873.
- Rockland Furnace, Berks county. Built in 1791, rebuilt in 1879, and burned in 1881. Formerly called Sally Ann Furnace.
- Sarah Furnace, Sarah, Blair county. Built in 1824; not in blast since 1874.
- York Furnace, York county. Built in 1830; made its last blast in 1874.

## MARYLAND.

### BITUMINOUS COAL.

- Elk Ridge Furnace, Elk Ridge Landing, Howard county. Rebuilt in 1855; not in blast since 1874.
- Knoxville Furnace, Knoxville, Frederick county. Built in 1837; not in blast since 1874. Formerly called Longacoming Furnace.

## VIRGINIA.

### CHARCOAL.

- Laurel Furnace, Lee county. Rebuilt in 1873, but only made a short blast.
- Oxford Iron Works, Mount Athos, Campbell county. One stack, built prior to 1837; not in operation for many years.
- Victoria Furnace, Tolersville, Louisa county. Built in 1835; out of blast since 1873.

## NORTH CAROLINA.

### CHARCOAL.

- Long Creek Furnace, Admiral Wilkes, High Shoals, Gaston county. One stack; daily capacity, 4 tons.
- Maratoc Iron Works, Danbury, Stokes county. Owned by parties in Richmond, Va. Though ore is plenty, this furnace has not been in blast for many years.
- Stonewall Furnace, Iron Station, Lincoln county. Built in 1863; not in blast for several years.

Vesuvius Furnace, Iron Station, Lincoln county. Built in 1780; not in blast for several years.

## COKE.

Gulf Furnace, S. H. Wiley, Salisbury. Works at Ore Hill, Chatham county. One stack, begun in 1873, but not completed.

## GEORGIA.

## CHARCOAL.

Pool Furnace, Cartersville, Bartow county. Built in 1855; not in blast since 1874.

Rogers Furnace, Cartersville, Bartow county. One stack, 36 x 9, built in 1873; cold blast; open top.

## BITUMINOUS COAL.

Bartow Iron Works, Bartow county. Two stacks, built in 1871 and 1873; one stack torn down in 1881, and its machinery will probably be taken to Chattanooga, Tennessee.

## ALABAMA.

## CHARCOAL.

Hale & Murdoch, Columbus, Miss. Furnace in Sanford county, Alabama. Built in 1861; abandoned in 1870; cause, 25 miles from railroad. The ore found here is brown hematite, yielding from 60 to 67 per cent.

McKee Furnace, Jefferson Iron Company, Irondale Furnace P. O., Jefferson county. One stack, 46 x 10½, hot blast.

## KENTUCKY.

## CHARCOAL.

Belmont Furnace, Bank of Louisville, Louisville. Furnace in Bullitt county. Built in 1844; daily capacity, 12 net tons; not in blast since 1870.

Buena Vista Furnace, Means & Co., Ashland, Boyd county. Built in 1848; hot blast; open top; dismantled in 1876.

Buffalo Furnace, John Armstrong, Hayes, Douglas county, Illinois. Furnace at Argillite, Greenup county. One stack, 40 x 10½, built in 1851; hot and cold blast. Not in blast since 1875, and for sale.

Kenton Furnace, Damarin & Co., Quincy, Lewis county. Furnace in Greenup county. Office at Portsmouth, Ohio. One stack, 36 x 11, built in 1856; open top; hot blast.

Laurel Furnace, Joshua Kelley, Riverton, Greenup county. One stack, 39 x 11, built in 1849; open top; cold and hot blast.

Mammoth Furnace, Morris, Machen & Co., Eddyville, Lyon county. Built in 1845; daily capacity, 16 net tons.

Nelson Furnace, Bank of Louisville, Louisville. Furnace in Nelson county. Built in 1834; daily capacity, 11 net tons; not in blast since 1871.

Pennsylvania Furnace, Greenup county. Built in 1848; discontinued in 1881.

Pioneer Furnace, Northup, Cummings & Peck, Louisa, Lawrence county. One stack, 18 x 4½, built in 1881, and first put in blast in 1882; cold blast.

#### BITUMINOUS COAL.

Kenton Furnace, Gaylord Iron and Pipe Company, Cincinnati, Ohio. Works at Newport, Campbell county. Built in 1869; closed top; annual capacity, 14,000 net tons. Abandoned in 1877 and machinery removed to the Hocking valley, Ohio, by the Crafts Iron Company.

Princess Furnace, Thomas W. Means, Hanging Rock, Ohio. Furnace at Ashland, Boyd county. One stack, 50 x 12, first blown in in May, 1877; closed top; fuel, raw coal; 3 Whitwell hot-blast stoves. Built to take the place of Buena Vista (charcoal) Furnace.

### TENNESSEE.

#### CHARCOAL.

Cedar Grove Furnaces, Perry county. Two stacks, built prior to 1857; abandoned for several years.

Dover Furnace, Cumberland Iron Works, Stewart county. Built in 1828; not in blast for several years.

Dougherty's Furnace, Baker's Gap, Johnson county. Built in 1878; made a short blast.

Eagle Furnace, Riley Stone, Bristol, Sullivan county. Built in 1838; not in blast since 1875.

Embreeville Furnace, Jonesboro, Washington county. Built in 1846; out of blast since 1874.

Great Western Furnace, Dover, Stewart county. Built in 1854; recently sold to new parties with a slight probability that it may be repaired and started up.

Pottdale Furnace, Greeneville, Greene county. Built in 1862; out of blast since 1874.

Rose and Crockett Iron Works, Cumberland Gap, Claiborne county. One stack, built in 1823; out of blast for several years.

Speedwell Furnace, Speedwell, Claiborne county. Built in 1825; out of blast for several years.

Unaka Furnace, Unaka, Greene county. Built in 1868; out of blast since 1874.

Vernon Furnace, Montgomery county. Built in 1833; not in blast for several years.

Wayne Furnace, Wayne county. Built in 1856; out of blast since 1875.

Worley Furnace, Dickson, Dickson county. Built in 1847; made a blast on coke in 1879.

### OHIO.

#### CHARCOAL.

Cambria Furnace, Samsonville, Jackson county. Built in 1854; out of blast since 1875.

- Clinton Furnace, Wheelersburg, Scioto county. Built in 1832; out of blast since 1873.
- Hope Furnace, W. D. Lee, Newark. Works at Hope Furnace P. O., Vinton county. One stack, 36 x 10½, built in 1854; open top; hot blast. Formerly called Big Sand Furnace. Not in blast since 1874.
- Jackson Furnace, Union Iron Company, Portsmouth, Scioto county. Furnace in Jackson county. Built in 1839.
- Zanesville Furnace, Ohio Iron Company, Zanesville, Muskingum county.

## BITUMINOUS COAL AND COKE.

- Ashland Furnace, Jonathan Warner, Mineral Ridge, Trumbull county. Built in 1859; abandoned several years ago.
- Glasgow-Port-Washington Iron and Coal Company Limited, Port Washington, Tuscarawas county. Two stacks, each 70 x 17½, built in 1873-4; No. 1 stack first blown in in August, 1874, and No. 2 December 1, 1879; closed tops. Purchased in 1882 by the Pittsburgh Furnace Company, of Pittsburgh, Pa., to be removed to Pittsburgh.
- Globe Furnace, Jackson, Jackson county. Built in 1872; burned and abandoned.
- Massillon Furnace, Massillon, Stark county. Built in 1854; abandoned in 1880.
- Morgan Furnace, Irondale, Jefferson county. Built in 1870; out of blast for several years.
- Orange Furnace, Jackson, Jackson county. Built in 1864; out of blast since 1874.
- Porter Furnace, Jonathan Warner, Mineral Ridge, Trumbull county. Built in 1860; made its last blast in 1873.
- Warren Furnace, Wm. Richards & Sons, Warren, Trumbull county. Built in 1870; burned in 1878.
- Wellston Furnace No. 1, Wellston, Jackson county. Built in 1874-5; abandoned in 1881.

## INDIANA.

## BITUMINOUS COAL.

- Lafayette Furnace, Otter Creek, Clay county. Built in 1868; torn down in 1879.
- Planet Furnace, Indianapolis Rolling Mill Company, Harmony, Clay county. Built in 1867; torn down in 1877.
- Western Furnaces, Knightsville, Clay county. Two stacks, built in 1867 and 1868; torn down in 1879.

## ILLINOIS.

## BITUMINOUS COAL OR COKE.

- Grand Tower Furnaces, Grand Tower, Jackson county. Two stacks, built in 1868; not in blast since March, 1876.
- Illinois Furnace, Elizabethtown, Hardin county. Rebuilt in 1873, but not put in blast.

## MICHIGAN.

## CHARCOAL.

- Bancroft Furnace, Bancroft Iron Company, Marquette, Marquette county. Built in 1859, and rebuilt in 1871; water-power.
- Bay Furnaces, Bay Furnace Company, Onoto, Schoolcraft county. Two stacks: one, 45 x 9, built in 1870; the other, 45 x 9½, built in 1872; burned in 1877. E. P. Williams, Secretary, Marquette.
- Collins Furnace, Collins Iron Company, Marquette, Marquette county. Built in 1858; abandoned in 1873.
- Cliffs Furnace, Negaunee, Marquette county. Built in 1867; out of blast for several years.
- Escanaba Furnace, Escanaba, Delta county. Built in 1872-3; torn down in 1879 and machinery removed to the Edgar Thomson Steel Works, Pa.
- Harvey Furnace, Northern Iron Company, Harvey, Marquette county. Built in 1860 and rebuilt in 1873.
- Michigan Iron Company, Marquette. Furnaces at Clarksburgh, Marquette county. Two stacks: Greenwood, 42 x 9, built in 1865; and Michigan, 42 x 9, built in 1867.
- Morgan Furnace, Morgan Iron Company, Marquette. Furnace at Morgan, Marquette county. Two stacks: Morgan, 45 x 9, built in 1863; Champion, 45 x 9, built in 1867 and burned in 1874.
- Munising Furnace, Munising, Schoolcraft county. Built in 1867; out of blast for several years.

## WISCONSIN.

## CHARCOAL.

- Richland Furnace, Cazenovia, Richland county. Built in 1876, and torn down in 1879.

## MISSOURI.

## CHARCOAL.

- Iron Mountain Furnaces, St. Francois county. Two stacks, built in 1846 and 1854; not in blast for several years.
- Osage Furnace, J. A. Quealy, Osage Iron Works, Camden county. Built in 1873, and in blast a very short time.
- Scotia Iron Furnace, Leesburg, Crawford county. Built in 1870; abandoned in 1879.

## UTAH TERRITORY.

## CHARCOAL.

- Great Western Iron Works, Iron City, Iron county. Two stacks, built in 1873-5; made but little iron.



# ROLLING MILLS AND STEEL WORKS.

## MAINE.

Pembroke Iron Works, Pembroke Iron Company, Pembroke, Washington county. Agents, Wm. E. Coffin & Co., 8 Oliver st., Boston. Built prior to 1854; 9 double puddling furnaces, 1 single and 3 double heating furnaces, 30 nail machines, and 4 trains of rolls (one 8, one 14, and two 16-inch); steam and water power; product, bars, bands, nails, and skelp iron; annual capacity, 10,000 net tons.

Portland Rolling Mills, Portland. Built in 1866; 4 double puddling furnaces, 8 heating furnaces, and 2 trains of rolls; product, rails and bar iron; annual capacity, 15,000 net tons. C. R. Milliken, President; John W. Leavitt, Secretary and Treasurer.

Number of rolling mills in Maine: 2, of which 1 is a rail mill.

## NEW HAMPSHIRE.

Nashua Iron and Steel Company, Nashua, Hillsborough county. M. A. Herrick, Treasurer and Agent, 40 Water st., Boston. Built in 1848; steel-tire mill added in 1868; 19 heating furnaces, one 10-gross-ton Siemens open-hearth steel furnace, 3 trains of rolls, and 11 hammers; machine shop built in 1863, and rebuilt and enlarged in 1872, for manufacturing rolling-mill and steam machinery; product, steel and iron forgings for railroads and machine shops, homogeneous steel and iron plates, steel plates, and steel locomotive and car tires, bar steel, bar iron, and hardened-steel-tired car, truck, and tender wheels. Brand, an Indian head. John D. Swain, Superintendent, Nashua.

Number of rolling mills and open-hearth steel works in New Hampshire: 1.

## PROJECTED.

Franconia Iron Company, Franconia, Grafton county. Offices at 78 North Main st., Concord, N. H., and 31 Milk st., Boston, Mass. Contemplate the erection of a plant to convert iron ore by direct process into steel, with vapor fuel. Sylvester Marsh, President, Concord; L. D. Stevens, Treasurer, Concord.

## VERMONT.

St. Albans Iron and Steel Works, St. Albans, Franklin county. Put in operation May 10, 1873; 5 double and 5 single puddling furnaces, 8 heating furnaces, 2 hammers, and 2 trains of rolls (one 19 and one

21-inch); one 10-gross-ton Siemens open-hearth steel furnace added in 1877; product, iron and open-hearth steel rails; also roll Bessemer steel rails from purchased blooms; annual capacity, 49,500 net tons of iron rails, and 66,000 net tons of steel rails. A. O. Brainerd, President; E. A. Smith, Vice-President; Herbert Brainerd, Secretary and Treasurer.

Number of rail mills and open-hearth steel works in Vermont: 1.

## MASSACHUSETTS.

Bay State Iron Works, Bay State Iron Company, 2 Pemberton Square, Boston, Suffolk county. Puddle mill built in 1847; 16 double puddling furnaces and 2 trains of rolls. Plate mill No. 1 built in 1863; 2 trains of rolls and 5 heating furnaces; product, tank plate and boiler tube and pipe strips; annual capacity, 6,500 net tons. Plate mill No. 2 built in 1873; two trains of rolls, 6 heating furnaces, and 1 annealing furnace; product, steel plates, flange, boiler, and tank plates; annual capacity, 8,500 net tons. One 6-gross-ton Siemens open-hearth steel furnace; annual capacity, 2,800 net tons of ingots. Sheet mill built in 1879; 2 trains of rolls, 2 single and 1 double puddling furnace, 4 knobbling fires, 2 heating furnaces, 2 pair furnaces, 2 sheet furnaces, and 2 annealing furnaces; product, fine sheet iron; annual capacity, 4,500 net tons. Brand of iron and steel plates and sheet iron made, "Bay State." J. Avery Richards, Treasurer and General Manager. The other officers are as follows: Charles O. Whitmore, President; F. Gordon Dexter, Silas H. Witherbee, Thornton K. Lothrop, and Edward W. Hooper, Directors. *See New York Furnaces.*

Bridgewater Iron Company, Bridgewater, Plymouth county. Built in 1785 and 1874; 5 scrap furnaces, 3 heating furnaces, 6 forge fires, 8 trains of rolls, and 10 hammers; use scrap iron and scrap steel exclusively; product, bar iron and tack plate, sheet zinc and sheet copper, and iron and steel forgings; product of rolled iron, about 6,000 net tons yearly. Nahum Stetson, Treasurer. *See Parker Mills.*

Cambridge Rolling Mills, Gilmore & Eustis, lessees, Cambridgeport, Middlesex county. Built in 1868; 5 heating furnaces and 3 trains of rolls; product, merchant bar and shafting iron to 2½ inches in diameter, frog, switch, and scythe-back steel, axe iron, rerolled Norway and Swedish shapes, bolt, nail, rivet and wire rods, scrap wire and rivet rods, scrap rods, scrolls, tires, and horse-shoe iron; annual capacity, 10,000 net tons. Stamp for best refined is "B. R. M." Special stamps are used on other kinds of iron. Formerly called Boston Rolling Mills.

Danvers Iron Works, Arthur G. Tompkins & Co., 8 Oliver st., Boston. Works at Danversport, Essex county. Built in 1831; 3 heating furnaces and 2 trains of rolls; product, merchant bar iron, bolt iron, scrap rods, and rerolled Norway and Swedish shapes; annual capacity, 5,000 net tons.

East Bridgewater Iron Company, Rogers & Sheldon, 81 Water st., Boston. Works at East Bridgewater, Plymouth county. Built in 1837; 2 single puddling furnaces, 4 heating furnaces, 2 charcoal fires, 1 train of rolls, 26 nail machines, and 1 hammer; water-power; product, cut nails, clinch nails, tack plate and shovel plate; annual capacity, 2,500 net tons.

Fall River Iron Works, Fall River Iron Works Company, Fall River, Bristol county. Built in 1822 and rebuilt in 1842; 3 buildings—rolling mill, nail mill, and machine shop; 9 double and 5 single puddling furnaces, 11 heating furnaces, 105 nail machines, 2 hammers, and 9 trains of rolls (two 8, three 9, and four 18-inch); product, nails, hoops, bands, and merchant bar iron to 3 inches round, square, and flat; annual capacity, 11,000 net tons. Jefferson Borden, President; R. C. Brown, Agent and Treasurer.

Franconia Iron and Steel Works, James C. Warr, lessee, Wareham, Plymouth county. Built in 1866; 6 double puddling furnaces, 6 heating furnaces, and 3 trains of rolls (one 8, one 16, and one 18-inch); product, bar iron, of all kinds and sizes; specialties, axle and axe iron and shafting; daily capacity, 30 net tons.

Globe Nail Company, Station "A," Boston. Built in 1877; 2 heating furnaces and 2 trains of rolls (one 12 and one 9-inch); use Swedish iron; product, horse-nail plate, tack plate, and other special rolling; annual capacity, about 5,000 net tons. Aretas Blood, President; J. T. Bailey, Treasurer; W. B. Crocker, Secretary; W. W. Miner, Superintendent.

Gosnold Mills, New Bedford, Bristol county. Built in 1857; 7 heating furnaces and 5 trains of rolls; use best wrought scrap and charcoal ore blooms; product, hoops, bands, scrolls, tires, rods, chains of every description, and horse-shoe and hame iron; annual capacity, single turn, 4,500 net tons. Brand, "Gosnold." Leading products are hoops and wire rods. Joseph H. Cornell, President and Treasurer; John A. Bates, Secretary; Henry Howard, Superintendent.

Kinsley Iron and Machine Works, Kinsley Iron and Machine Company, Canton, Norfolk county. Established in 1787 by Leonard & Kinsley, who manufactured steel by the German process until about 1821, when the firm was dissolved, Adam Kinsley continuing the business. In 1855 a stock company was formed. Works burned down January 14, 1875, and were rebuilt, enlarged, and started by May 24, 1875; 4 double puddling and 6 heating furnaces, 1 busheling and 1 scrap furnace, 8 hammers, and 3 trains of rolls (one 8, one 14, and one 19-inch); steam and water power; product, merchant bar iron, shapes, splice bars, track bolts, and railroad supplies; annual capacity, single turn, 6,000 net tons. Brands of bar iron, "Kinsley" and "G. K." Forge connected with the works for the production of car and locomotive forgings, wagon axles, etc. F. L. Ames, President; Edw. R. Eager, Treasurer; Frank M. Ames, Agent.

Mount Hope Iron Works, Old Colony Iron Company, Taunton. Works

at Somerset, Bristol county. Built in 1875; 1 single and 3 double puddling furnaces, 5 heating furnaces, 65 nail machines, and two 18-inch trains of rolls; product, nails, tack plate, skelp iron, shovel plate, etc.; annual capacity, 4,500 net tons. Machine shop in addition, with tools complete for building nail machines and flax and hemp dressing machinery. *See Old Colony Iron Company. See Somerset Iron Works. See Bloomaries.*

Norway Steel and Iron Works, Naylor & Co., 6 Oliver st., Boston. Works at 363 Dorchester avenue, South Boston. Built in 1854; 9 single puddling furnaces, 14 heating furnaces, 10 trains of rolls, three 10-gross-ton Siemens open-hearth steel furnaces, and 3 hammers; steel products, bars, rods, boiler and other plates, machinery, spring, tire, toe-calk, and sleigh-shoe steel; iron products, bars, rods, plates, and shapes; total annual capacity, 27,000 net tons. Brands, "Benzon," "Vasa," "Malar," "Norway," "N. I. W.," a five-point star, S with a crown over it, and N with a crown over it. *See Charcoal Furnaces in Vermont.*

Old Colony Iron Company, Taunton, Bristol county. Built in 1825; 8 double and 1 single puddling furnace, 20 heating furnaces, 7 trains of rolls, and 5 hammers; steam and water power; product, tack plate and shovels. The nail factory was destroyed by fire in August, 1881, but will not be rebuilt. Charles Robinson, Treasurer; O. A. Washburn, Jr., Agent. *See Mount Hope Iron Works. See Somerset Iron Works. See Bloomaries.*

Parker Mills, Bridgewater Iron Company, Bridgewater. Works at Wareham, Plymouth county. Built in 1815; 6 double puddling furnaces, 4 heating furnaces, 75 nail machines, 2 trains of rolls, and 1 hammer; water-power; product, nails. *See Bridgewater Iron Company.*

Reed Brothers, Matfield, Plymouth county. Built in 1881-2; product, tack plate.

Robinson Iron Company, Plymouth, Plymouth county. Built about 1800; 1 double puddling furnace, 6 heating furnaces, 2 trains of rolls, 18 nail machines, and 1 squeezer; steam and water power; product, nails and tack plate; average yearly production, 3,000 net tons. Increase Robinson, President; James Millar, Treasurer.

Somerset Iron Works, Old Colony Iron Company, Taunton. Works at Somerset, Bristol county. Built in 1855; 7 double puddling furnaces, 6 heating furnaces, 70 nail machines, and two 12-inch trains of rolls; product, nails, shovel plate, nail machines, castings, mill machinery, hoisting engines, etc.; annual capacity of rolled iron, 5,000 net tons. *See Mount Hope Iron Works. See Old Colony Iron Company. See Bloomaries.*

Tisdale Nail Works, Wm. E. Coffin & Co., 8 Oliver st., Boston. Works at East Wareham, Plymouth county. Built in 1836; 5 double puddling furnaces, 7 heating furnaces, 3 trains of rolls, and 80 nail machines; water-power; product, bar iron, nails, and tack plate; annual

capacity, 70,000 kegs of nails. This includes Glen Rolling Mill, belonging to the same property, situated  $2\frac{1}{2}$  miles from the Tisdale Works.

Tremont Nail Works, Tremont Nail Company, West Wareham, Plymouth county. Built about 1820; 6 double puddling furnaces, 1 Siemens gas and 4 coal heating furnaces, 3 trains of rolls, and 75 nail machines; steam and water power; product, nails; annual capacity, 6,000 net tons. Nails are branded "Gas Worked." Horace P. Tobey, Treasurer.

United States Navy Yard, Charlestown, Middlesex county. Mill built in 1868; 42 forge fires, 6 heating furnaces, 8 hammers, and 2 trains of rolls (one 18 and one 10-inch); product, bar iron; annual capacity, single turn, 3,000 net tons.

Wareham Nail Company, South Wareham, Plymouth county. Built in 1836; 1 double puddling furnace, 3 heating furnaces, 32 nail machines, and 2 trains of rolls; steam and water power; product, nails; annual capacity, 2,500 net tons.

Washburn and Moen Manufacturing Company, Worcester, Worcester county. Two mills: Quinsigamond Rolling Mill, built in 1846; 7 heating furnaces and 2 trains of rolls; product, iron and steel screw, rivet, and wire rods; annual capacity, 10,000 net tons. Grove Mill, built in 1868; 4 heating furnaces and 3 trains of rolls; product, patent continuous wire rods of long lengths and small size for telegraph and rope wire; annual capacity, 33,000 net tons. Philip L. Moen, President and Treasurer; Chas. F. Washburn, Secretary; Chas. H. Morgan, Superintendent.

Washburn Car-wheel Company, Hartford, Conn. Steel works at Worcester; erected in 1864; twelve 4-pot steel furnaces, 3 heating furnaces, 1 train of tire rolls, and 1 hammer; 48 pots can be used in the steel works at each heat; product, crucible cast steel car-wheel tires; annual capacity, 1,100 net tons. Brand, "Washburn Car-wheel." W. A. Healy, President; Wm. H. Barnum, Vice-President and Manager; Salisbury Hyde, Secretary and Treasurer.

Washburn Iron Company, Worcester. Built in 1857, and remodeled in 1882 to roll steel rails; 9 heating furnaces and 2 trains of rolls; product, Bessemer steel rails, rolled from purchased blooms; annual capacity, 30,000 net tons. The company also makes car-wheels. George M. Rice, President; George H. Ball, Treasurer; Samuel D. Nye, Agent.

Weymouth Iron Company, East Weymouth, Norfolk county. Built in 1836; 6 double puddling furnaces, 5 heating furnaces, 82 nail machines, and 3 trains of rolls; steam and water power; product, nails and spikes; annual capacity, 5,600 net tons. Isaac Pratt, Jr., President; Nahum Stetson, Treasurer and Manager.

Number of rolling mills and steel works in Massachusetts: 25. Of these, 1 is a rail mill, 2 are open-hearth steel works, and 1 is a crucible steel works.

## RHODE ISLAND.

Rhode Island Horse Shoe Works, Rhode Island Horse Shoe Company, Providence. Works at Valley Falls, 6 miles from Providence. Built in 1867 and 1874; 6 scrap and 5 heating furnaces, 7 trains of rolls, and 24 horse-shoe machines; product, bars for the horse-shoe machines; annual capacity, single turn, 11,000 net tons. Brand, "Perkins' United States Standard Horse and Mule Shoes." F. W. Carpenter, President; C. H. Perkins, General Manager; R. W. Comstock, Secretary.

Rumford Chemical Works, G. F. Wilson, Box 1,565, 42 Weybosset st., Providence. One 6-gross-ton Siemens open-hearth steel furnace. Not in operation for several years.

Number of rolling mills and steel works in Rhode Island: 2, of which 1 is an open-hearth steel works.

## CONNECTICUT.

Etna Nut Company, Southington, Hartford county. Built in 1873; 1 single puddling furnace, 3 scrap and 2 heating furnaces, and 3 trains of rolls; product, squares, rounds, nut shapes, bolt rods, and butt iron; annual capacity, 5,500 net tons. Geo. B. Finch, Treasurer.

Birmingham Rolling Mill, Peck, Stow and Wilcox Company, Birmingham, New Haven county. Principal office at Southington. Salesroom, 43 Chambers st., New York. Built in 1843; 2 busheling furnaces, 3 single puddling furnaces, 5 heating furnaces, and 5 trains of rolls; steam and water power; product, bar iron, nut and bolt rods, nuts, washers, lag screws, and machine and carriage bolts; annual capacity, 600 net tons.

Cold Spring Iron Works, Mitchell Brothers, Norwich, New London county. Built in 1845; 4 heating furnaces and 2 trains of rolls (one 9 and one 20-inch); product, ovals, half ovals, half rounds, rods, and bands; annual capacity, 2,200 net tons.

Collins Company, Collinsville, Hartford county. Established in 1826; 2 single scrapping furnaces on cinder bottom, 8 heating furnaces, 1 18-inch train of rolls, one 12-inch train, 2 Sellers steam hammers, 1 20-ton steel cementing furnace, and 30 steel-melting holes; 180 pots can be used at each turn in steel works; water and steam power; product, bar iron and cast steel, consumed wholly in these works in the production of "Hartford" edge tools, steel plows, etc.; annual capacity of finished iron, 2,000 net tons, and of steel, 750 net tons. E. B. Watkinson, President and Treasurer; William J. Wood, Vice-President, Secretary, and Manager; Edward H. Sears, Agent; Charles H. Blair, Superintendent. Treasurer's and transfer office, Hartford. General selling agents, Collins & Co., 212 Water st., New York.

Farist and Windsor Company, Bridgeport. Works at Windsor Locks, Hartford county. Built in 1860; 4 heating furnaces and 3 trains of rolls; water-power; product, rolled and hammered cast steel, and rolled Siemens-Martin and Bessemer steel; annual capacity, 3,000

net tons. John B. Windsor, President; W. Minor Smith, Secretary and Treasurer.

Farist Steel Works, Farist Steel Company, Bridgeport, Fairfield county. Built in 1868; 2 single puddling and 4 heating furnaces, 2 trains of rolls (one 12 and one 15-inch), 6 hammers, and 18 4-pot steel-melting holes; can use 72 pots at each heat in steel works; product, cast steel, rolled and hammered; annual capacity, 1,800 net tons. Joel Farist, President; John B. Windsor, Treasurer.

Greenwich Iron Works, Pettes, Ayres & Davenport, Mianus, Fairfield county. Built in 1835; 2 single puddling furnaces, 1 heating furnace, and 2 trains of rolls; water-power; product, round and square rods,  $\frac{1}{4}$  to  $\frac{3}{4}$ ; annual capacity, 1,500 net tons.

New Haven Rolling Mill, New Haven Rolling Mill Company, New Haven. Completed in August, 1871; 6 charcoal forge fires, 5 heating furnaces, 2 trains of rolls (one 8 and one 18-inch), and 1 hammer; use only scrap iron; product, small rounds and flats, and refined and charcoal wire rods; annual capacity, 5,000 net tons. H. M. Welch, President; E. S. Wheeler, Secretary; Pierce N. Welch, Treasurer.

Stillwater Iron Works, Stillwater Company, Stamford, Fairfield county. Built in 1835; 1 single puddling furnace, 2 heating furnaces, and 3 trains of rolls; steam and water power; product, round and square rods,  $\frac{1}{4}$  to  $\frac{3}{4}$ ; annual capacity, 2,000 net tons.

Thames Iron Works, Norwich, New London county. Built in 1863; 4 double puddling furnaces, 2 heating furnaces, 2 trains of rolls, and 1 rotary squeezer; product, common bar iron; spike rods a specialty; annual capacity, 3,000 net tons. John Mitchell, President; James Greenwood, Secretary and Treasurer.

Number of rolling mills and steel works in Connecticut: 10, of which 2 are crucible steel works.

## NEW YORK.

Albany and Rensselaer Iron and Steel Company, Troy, Rensselaer county. Comprises two establishments, consolidated in 1875: Albany Iron Works, established in 1819; 7 double and 14 single puddling furnaces, 18 heating furnaces, 7 trains of rolls, 3 steam and 4 trip hammers, 45 nail machines, 2 bolt, 6 rivet, 2 nut, and 6 spike machines; steam and water power; product, bars, angles, car axles, bands, finger-bars, crow-bars, railroad and boat spikes, fish plates, bolts and nuts, cut nails, and boiler rivets; annual capacity, 37,000 net tons. Brands of iron, "A. I. W.," "Corning's Best Best," and "Troy." Rensselaer Iron Works, established in 1846; three-high iron and steel rail mill and merchant mill built in 1866 and 1867; new merchant mill built in 1877 and 1878; 26 heating furnaces, 5 trains of rolls, and 3 steam hammers; product, rails, bar iron, steel shapes and sheets, and special and agricultural steels; annual capacity of rail mill, 135,000 net tons; capacity of merchant mill, 25,000 tons. Brands of steel, "XX Gun," "XX Special Dead Soft," and "XX



- Gun Barrel," besides an infinite variety of other special grades. Bessemer steel works, built in 1864; made their first blow on February 15, 1865; 2 converters, each of 7 gross tons capacity; 4 cupolas and 2 spiegel furnaces; annual capacity, 180,000 net tons ingots; blooming department contains 4 heating furnaces and an adjustable train of 31½-inch rolls; capacity to roll full product of converting department; foundry with 2 cupolas; steam-power with auxiliary water-wheel. Erastus Corning, President; Chester Griswold, Vice-President, 56 Broadway, New York; Selden E. Marvin, Secretary and Treasurer; Robert W. Hunt, General Superintendent. *See Furnaces.*
- Anchor Brand Axle Works, Sheldon & Co., Auburn, Cayuga county. Built in 1874; 2 heating furnaces, one 16-inch train of rolls, and 1 hammer; water and steam power; use scrap iron only; product, bar iron, all used in the manufacture of axles; annual capacity, 6,000 net tons.
- Auburn Iron Works, Tuttle & Reed, Auburn, Cayuga county. Built in 1853; 1 heating furnace, one 9-inch train of rolls, and 1 Kirk steam hammer; use scrap iron only; product, merchant bar of all sizes and shapes; annual capacity, 1,800 net tons.
- Auburn Rolling Mill, E. D. Clapp Manufacturing Company, Auburn, Cayuga county. Built in 1880; 1 heating furnace and 2 trains of rolls (one 9 and one 16-inch); use scrap iron, and reroll Norway iron; product, merchant bar of all sizes and shapes, all used by the company in the manufacture of carriage hardware and farm wagons and other vehicles; annual capacity, 2,200 net tons. E. D. Clapp, President and Treasurer; J. G. Knapp, Vice-President; D. E. Clapp, Secretary; F. Van Patten, Superintendent.
- Ausable Horse Nail Works, Ausable Horse Nail Company, Keeseville, Clinton county. Built in 1869; 2 heating furnaces, 1 train of rolls, and 1 hammer; water-power; product, nail rods only, all worked into horse nails by this company; annual capacity, 2,000 net tons. E. Kingsland, President; N. Kingsland, Vice-President; J. R. Romeyn and Abraham Bussing, Secretaries; E. K. Baber, Treasurer. Sole Agent, A. Bussing, 4 Warren st., New York.
- Burden Iron Works, Burden Iron Company, Troy. Founded in 1813; 9 double and 56 single puddling furnaces, 13 heating furnaces, and 13 trains of rolls; steam and water power; product, bar and other merchant iron, horse shoes, and boiler rivets; specialties, Burden's horse shoes and boiler rivets; annual capacity, 42,000 net tons. Brands of merchant iron, "H. B. & S." and "Burden Best." James A. Burden, President; I. Townsend Burden, Vice-President; John L. Arts, General Manager. *See Furnaces.*
- Chrome Steel Works, corner Kent avenue and Keap st., Brooklyn. Built in 1869; 7 heating furnaces, 7 hammers, 24 steel-melting holes, and 2 trains of rolls (one 9 and one 18-inch); 96 pots can be used at each heat in steel works; product, tool steel; annual capacity, 2,000 net tons. S. H. Kohn, Proprietor; C. P. Haughian, Superintendent.

Cohoes Rolling Mill, Morrison, Colwell & Page, 259 River st., Troy. Works at Cohoes, Albany county. Built in 1864; 12 double puddling furnaces, 3 scrap and 4 heating furnaces, and 4 trains of rolls; water-power; product, band and bar iron, and patent punched axe-polls; specialty, high-grade iron for edge tools and butts and hinges; annual capacity, 9,000 net tons.

Elmira Iron and Steel Rolling Mills, Elmira Iron and Steel Rolling Mill Company, Elmira, Chemung county. Rail mill built in 1860; puddle mill rebuilt in 1874 and 1877; 12 single and 4 double puddling furnaces, 6 heating furnaces, 2 trains of rolls, 1 hammer, and 1 rotary squeezer. Bar mill added in 1865; 6 heating furnaces, 1 scrap furnace, 1 hammer, and 5 trains of rolls and a "universal" plate mill. Product, silicon steel rails, merchant bar iron, band, angle, and plate iron; annual capacity of rail mill, 18,000 net tons; annual capacity of bar mill, 12,000 net tons. H. W. Rathbone, President; Jesse L. Cooley, Secretary and Treasurer. *See Furnaces.*

Hudson River Iron Company, Poughkeepsie. Built in 1873; 6 single puddling furnaces, 4 heating furnaces, and 3 trains of rolls; product, merchant bar iron, axles, spikes, chairs, fish bars and bolts, car forgings, bridge bolts and irons, and railway materials generally; annual capacity, 8,000 net tons. Idle for several years. W. S. Johnston, Trustee.

Manhattan Rolling Mill, John Leonard, 445 and 451 West st., and 177 and 179 Bank st., New York. Built in 1881; 1 heating furnace and 1 train of rolls; product, horse-shoe iron, toe-calk steel, rods, ovals, half ovals, and flats; annual capacity, 2,000 net tons.

Monhagen Steel Works, Wheeler, Madden and Clemson Manufacturing Company, Middletown, Orange county. Built in 1862-3; 48 2-pot steel-melting holes, 4 heating furnaces, 1 train of rolls, and 1 hammer; 96 pots can be used at each heat in steel works; product, saw cast steel; annual capacity, 2,500 net tons. Edward M. Madden, President; Wm. Clemson, Vice-President; Wm. Millspaugh, Secretary; Charles I. Humphrey, Treasurer.

Napanoch Rolling Mill, Napanoch Rolling Mill Company, Napanoch, Ulster county. Originally a forge; converted into a rolling mill; started up in February, 1880, after 8 years' idleness; daily capacity, 15 net tons of bar iron. Idle since May, 1881.

New York Steam Forge Company, 54 Wall st., New York. Works on West Sixteenth st. Built in 1880; 3 heating furnaces, 2 steam hammers, and 1 train of 18-inch rolls; product, car axles and forgings. A. H. King, President.

Onondaga Steel Works, Sweet's Manufacturing Company, Syracuse, Onondaga county. Built in 1864; 10 heating furnaces, 3 hammers, 4 trains of rolls (one 9, one 10, and two 12-inch), and 5 steel-cementing furnaces; manipulators of old Bessemer steel rails and locomotive tires, and converters of iron into blister steel; product, bar steel, steel crow-bars, seat springs, tire and spring steel, and steel for various

other purposes; annual capacity, 6,000 net tons. Special brands, "Sweet's Excelsior" tire steel, "Sweet's" seat springs, and "Sweet's" steel crow-bars. Wm. A. Sweet, President and Manager; Fred. B. Chapman, Secretary; J. M. Schermerhorn, Jr., Treasurer. Agents: Parkhurst & Wilkinson, Chicago; H. D. Morris, San Francisco; R. M. Brinton, Philadelphia.

Osborne (D. M.) & Co., Auburn, Cayuga county. Built in 1881; 3 heating furnaces, 2 trains of rolls (one 10 and one 16-inch), and 1 Morgan and Williams steam hammer; use scrap iron only; product, merchant bar of all sizes and shapes, used by the firm in the manufacture of agricultural machinery; annual capacity, 4,500 net tons. D. M. Osborne, President; J. H. Osborne, Secretary; G. W. Allen, Treasurer.

Peru Steel and Iron Company, F. J. Dominick, Receiver, 115 Broadway, New York. Main office and works at Clintonville, Clinton county. Built in 1824; 2 heating furnaces and 3 trains of rolls, operated in connection with a forge; water-power; product, bar iron, known as "Peru" iron, and largely used for conversion into best grades of cast steel; annual capacity, 4,500 net tons. Was not in operation in 1881, and probably will not be in operation in 1882. *See Forges.*

Plattsburgh Iron Works, Chateaugay Ore and Iron Company, Plattsburgh, Clinton county. Built in 1878; 1 heating furnace, 2 sets 16-inch rolls, 2 sets 9-inch rolls, and 1 set planishing rolls, operated in connection with a forge; product, horse-nail rods, tack plate, etc. Idle since May 1, 1881. *See Charcoal Furnaces. See Forges.*

Rome Iron Works, Rome Iron Works Company, Rome, Oneida county. Built in 1866 to make rails; changed in 1882 to a merchant mill; 5 double puddling furnaces, 3 heating furnaces, and 3 trains of rolls (one 20, one 12, and one 8-inch); product, skelp and angle iron, girders, and large bars; annual capacity, 10,000 net tons. Addison Day, President; J. S. Haselton, Treasurer; J. S. Longland, Superintendent.

Rome Merchant-Iron Mill, Rome, Oneida county. Built in 1869; 4 double and 4 single puddling furnaces, 4 heating furnaces, 1 hammer, and 3 trains of rolls (one 8, one 12 and one 18-inch); product, best grades of merchant bar iron, horse-shoe, scroll, hoop, and band iron, and a superior quality of iron from charcoal pig branded "J. G.," annual capacity, 8,000 net tons. G. V. Selden, President; B. J. Beach, Vice-President; J. B. Jervis, Secretary; A. R. Rand, Treasurer; John Groves, Superintendent; Jay Hildreth, Agent.

Sable Iron Works, J. & J. Rogers Iron Company, Ausable Forks, Essex county. Built in 1834; operated in connection with a forge; 2 heating furnaces, 2 trains of rolls (one 8 and one 12-inch), and 10 nail machines; water-power; product, bars for conversion into cast steel, Peru horse-shoe iron, round and square iron, and Sable cut nails; annual capacity, 7,000 net tons. Brands, "Peru iron," "Rogers," or R in

a circle. H. D. Graves, President; H. W. Stetson, Vice-President; Benjamin E. Wells, Secretary. *See Forges.*

Samsondale Iron Works, John Peck, Haverstraw, Rockland county. Built in 1832; 4 single puddling furnaces, 5 heating furnaces, and 3 trains of rolls (one 8-inch guide, one 16-inch bar, and one 20-inch sheet); steam and water power; product, rods, sheets, and plates; annual capacity, 4,000 net tons.

Sanderson Bros. Steel Company, Syracuse. New York office, 11 Gold st. Established in 1876; 5 heating furnaces, 8 hammers, 2 trains of rolls (9 and 12-inch), 4 steel-cementing furnaces, and 5 steel-melting holes; 80 pots can be used at each heat in steel works; use clay pots made by themselves; product, bar cast steel; annual capacity, 3,000 net tons. Brand, "Sanderson Bros. & Co." Earl B. Alvord, President; Samuel Wm. Johnson, Secretary; Wm. A. Sweet, Treasurer and General Manager.

Spuyten Duyvil Rolling Mill, Welch & Barnum, Spuyten Duyvil, New York City. Rail mill built in 1863; 4 double puddling and 10 heating furnaces and 2 trains of 3-high 18-inch rolls. Bar and guide mill added in 1872; 4 heating furnaces and 2 trains of rolls (one 9 and one 16-inch). Product, rails, fish plates with bolts and nuts complete, railroad and dock spikes, rivets, and all sizes of merchant and guide mill iron; also, Bessemer steel rails from purchased blooms; annual capacity, 20,000 net tons. Started up in September, 1879, after several years' idleness. Wm. Lewis, Superintendent.

Star Iron Works, Bowen & Signor, Saranac, Clinton county. Built in 1878; 2 trains of rolls, operated in connection with a forge; product, nail rods, bolt and rivet rods, bars for crucible steel, etc. *See Forges.*

Syracuse Iron Works, Syracuse, Onondaga county. Built in 1861; 1 single and 7 double puddling and 6 heating furnaces, 3 trains of rolls (one 8, one 9, and one 19-inch), and 2 steam hammers; product, best grades of merchant bar, wire-rod, band, and hoop iron, railroad and boat spikes, fish bolts, and horse-shoe and bridge iron; also, horse shoes (Farmer's patent), cotton ties (Wright's patent), and steel tire and wire rods; annual capacity, 8,000 net tons. Brand, "S. I. W." A superior quality of iron from charcoal pig is branded "E. B. B." R. N. Gere, President; Charles E. Hubbell, Secretary and Treasurer.

Ulster Iron Works, Tuckerman, Mulligan & Co., Saugerties, Ulster county. Built in 1827; 1 single and 8 double puddling furnaces, 4 heating furnaces, 6 trains of rolls, and 1 hammer; water-power; product, bar, rod, and hoop iron; annual capacity, 6,700 net tons. Product called "Ulster" iron.

Union Iron Works, Union Iron Company of Buffalo, Buffalo, Erie county. Built in 1862, and enlarged in 1864, 1865, and 1874; 16 double puddling and 18 heating furnaces, and 6 trains of rolls (one 8, one 12, one 19, two 21, and one 31-inch), all 3-high; the 8 and 12-inch are for merchant bar, the 19-inch for puddle bar, one 21-inch for beams, channels, large angles, and flats, and the others are for rails. The

plate mill, 90 feet by 160 feet, contains one set 2-high roughing rolls, 31 in. x 96 in., and one set 3-high finishing rolls, 31 in. x 96 in.; weight of each roll, 24,000 lbs.; total weight of train, 170 tons; engine, 36-in. cylinder, 7½-foot stroke; weight of fly-wheel, 54 tons. Product, rails, beams, channels, angles, shafting, bars, and plates; annual capacity, 35,000 net tons. Trade-mark, a buffalo. A. Pardee, President, Hazleton, Pa.; E. P. Wilbur, Vice-President, South Bethlehem, Pa.; George Beals, Treasurer, Buffalo; T. Guilford Smith, Secretary, Buffalo. Selling agents, J. W. Hoffman & Co., 208 South Fourth st., Philadelphia, and W. H. Wallace & Co., 131 Washington st., New York. *See Furnaces.*

Westerman Rolling Mill, Westerman, Bruce & Co., Lockport, Niagara county. Built in 1870; 2 heating furnaces and 2 trains of rolls; water-power; use scrap iron only; product, hoops, bands, wire rods, horse-shoe iron, rounds, and squares; annual capacity, 3,000 net tons.

Wm. W. Wood, Wood's Falls, Clinton county. Rolling mill built in 1879-80; one 10-inch train of rolls, operated in connection with a forge; product, car axles and bar iron. *See Forges.*

Number of rolling mills and steel works in New York: 30. Of these 4 are rail mills, 1 is a Bessemer steel works, 3 are crucible steel works, and 1 is a cemented steel works.

## NEW JERSEY.

Adirondac Steel Works, Andrew Williams, Jersey City. Originally built in 1848, and enlarged from 1863 to 1866; 2 forge fires, 7 heating furnaces, 6 hammers, 40 4-pot steel-melting holes, and 3 trains of rolls (one 9, one 12, and one 18-inch); 160 pots can be used at each heat in steel works; use Swedish and Northern New York charcoal wrought irons for melting; also reroll about 1,300 net tons of Siemens-Martin billets annually; product, cast steel; annual capacity, 3,000 net tons. Steel brand, "Adirondac." H. J. Hopper, Manager.

American Sheet Iron Works, American Sheet Iron Company, Phillipsburg, Warren county. Built in 1867; enlarged in 1870, 1873, and 1882; 3 double puddling furnaces, 2 heating furnaces, 3 sheet-finishing furnaces, 3 annealing furnaces, 5 trains of 22-inch rolls, 1 hammer, and 1 rotary squeezer; product, black and galvanized sheet iron; annual capacity, 3,000 net tons. Brand, "American R. G." Joseph C. Kent, President; George Danby, Secretary and Treasurer; Wm. E. Rees, Superintendent. *See Bloomaries.*

American Swedes Iron Company, Rockaway, Morris county. New York office, 44 Murray st. Operates the old Rockaway Rolling Mill, built in 1826; has 1 Wilson deoxidizer, to use ore in puddling furnaces by the Wilson direct process; 3 puddling furnaces, 1 heating furnace, 1 train of muck rolls, and 2 trains of finishing rolls; product, bars for steel purposes, made from black sand ore, mined at Block Island, R. I.; weekly capacity, 40 net tons. C. T. Reynolds, Presi-

dent; G. W. Thompson, Secretary; H. K. Reynolds, Treasurer. *See Forges.*

Boonton Iron Works, Tooke Straker, General Superintendent, Boonton, Morris county. Built in 1825; 12 double puddling furnaces, 3 heating furnaces, and 4 trains of rolls; steam and water power; product, muck bar and merchant bar iron; weekly capacity, 280 net tons of merchant bar iron or 340 net tons of muck bar. Joseph Wharton, lessee. This does not include the nail department, which is now idle. *See Furnaces.*

Cumberland Nail and Iron Company, Bridgeton, Cumberland county. Branch office, 43 North Water st., Philadelphia. Built in 1814; 10 double puddling furnaces, 4 heating furnaces, two 18-inch trains of rolls, and 84 nail machines; steam and water power; product, nails and gas tube; annual capacity, 10,000 net tons. Robert J. Buck, President; Chester J. Buck, Vice-President; John M. Reeves, Secretary and Treasurer, 43 North Water st., Philadelphia. Agents for the sale of gas tubes, Getze & Reeves, 7 and 9 North Fifth st., Philadelphia.

Delaware Rolling Mill, W. A. Leavitt, Phillipsburg, Warren county. Philadelphia office, 436 Walnut st. Fifteen double puddling furnaces, 6 heating furnaces, 3 trains of rolls (one 9, one 15, and one 18-inch), and 3 hammers; product, bar, guide, and angle iron; daily capacity, 50 to 60 net tons. R. W. Elliott, Superintendent.

Dover Iron Works, Dover Iron Company of New Jersey, Dover, Morris county. Built about 1870, and rebuilt several times since; 4 double puddling furnaces, 1 heating furnace, and 2 trains of rolls (one 10 and one 18-inch); steam and water power; product, merchant bar, boiler rivets, socket bolts, and brace jaws; annual capacity, 3,500 net tons merchant bar. Brand of merchant bar, "Dover Iron Co.;" brand of rivets, "Star." George Richards, President; Charles A. Covert, Secretary and Treasurer.

Elizabethport Rolling Mill, Eames Petroleum Iron Company, Elizabethport, Union county. Office, 21 and 23 Nassau st., New York. Built about 1870; 4 heating furnaces and 2 trains of rolls (one 9 and one 16-inch); product, bar and angle iron, fish plates, and spikes; annual capacity, 10,000 net tons.

Jersey City Spike and Bolt Works, W. Ames & Co., Washington, Morgan, and Steuben sts., Jersey City, Hudson county. Built in 1859; 2 heating furnaces and 1 train of rolls; use scrap iron only; product, spikes, splice joints, bolts, rivets, and round, flat, and square bar iron; annual capacity, 8,500 net tons.

Jersey City Steel Works, James R. Thompson & Co., Jersey City. Commenced operations August 1, 1862; 2 single and 2 double puddling furnaces, 22 heating furnaces, 5 trains of rolls (two 9, one 12, one 16, and one 18-inch), 12 steam hammers, and 56 4-pot steel-melting holes; 224 pots can be used at each heat in steel works; product, cast steel solely; annual capacity, 10,000 net tons.

John A. Roebling's Sons Company, Trenton. Old mill built in 1852,



new mill in 1873; 8 charcoal bloom fires, 5 heating furnaces, 4 trains of rolls, and one 3-ton steam hammer; product, wire rope and merchant rods; annual capacity, 9,000 net tons. Charles G. Roebling, President; F. W. Roebling, Secretary and Treasurer.

Newark Steel Works, Benjamin Atha & Co., Newark, Essex county. Began business in 1864; 36 4-pot steel-melting holes, one 7-gross-ton Siemens open-hearth steel furnace, 12 steam hammers, and 5 trains of rolls (two 8, one 9, one 12, and one 16-inch); 144 pots can be used at each heat in steel works; product, every kind of cast steel, except sheet; total annual capacity, 10,000 net tons. Brand, "Newark."

New Jersey Steel and Iron Company, Trenton, Mercer county. Built in 1845; 14 double puddling and 12 heating furnaces, 1 squeezer, 7 trains of rolls, and 1 hammer; steam and water power; product, iron rails, beams, channels, angles, tees, merchant bars, shapes, and horse shoes; also, bridges, and chains of all sizes; annual capacity, 25,000 net tons. Specialty, shapes. Brand, "Trenton." These works formerly belonged to the Trenton Iron Company, the present company having been formed in 1866. Edward Cooper, President; Edwin F. Bedell, Secretary, New York; Frederick J. Slade, Treasurer; Joseph Stokes, Superintendent, Trenton. Represented in New York by Cooper, Hewitt & Co., 17 Burling Slip.

Oxford Iron Company, (B. G. Clarke, Receiver, 52 Wall st., New York,) Oxford, Warren county. Built in 1866; 27 puddling furnaces, 5 heating furnaces, 4 spike furnaces, 103 nail machines, and 4 trains of rolls (one 10, one 12, and two 23-inch); product, nails; annual capacity, 16,000 net tons. W. H. Scranton, General Manager. Sales agent, J. S. Scranton, 81, 83, and 85 Washington st., New York. *See Furnaces.*

Passaic Rolling Mills, Passaic Rolling Mill Company, Paterson, Passaic county. New York office, Room 45, Astor House. Built in 1867, and incorporated in 1869; 8 double puddling furnaces, 6 heating furnaces, 3 trains of rolls, 1 hammer, and 1 squeezer; product, beams, channels, angles, tees, and other shapes for buildings and bridges, merchant bars, rivets, nuts, etc.; annual capacity, 15,000 net tons. Specialty, shapes. Brand, "Passaic." Watts Cooke, President; W. O. Fayerweather, Secretary and Treasurer. The company are also bridge-builders and contractors.

Pompton Steel and Iron Company, Pompton, Passaic county. Built in 1863; owned by James Horner & Co. previous to 1877; 5 single puddling furnaces, 6 heating furnaces, 42 steel-melting furnaces, 2 trains of rolls, and 5 hammers; water and steam power; 160 pots can be used at each heat in steel works; product, crucible cast steel and railway car springs; annual capacity, 3,000 net tons. James Ludlum, President and Treasurer; Richard Wright, Secretary; Joseph W. McElroy, Superintendent.

Powerville Iron Works, B. F. Howell, Morristown. Works at Powerville, Morris county. Built in 1845; 1 heating furnace and 2 trains of rolls; water-power; product, hoops, rods, and small bars to 2 inches



in width; annual capacity, 1,000 net tons merchant iron. *See Bloomaries.*

Trenton Iron Company, Trenton. Built in 1845; 2 run-out fires, 12 forge fires, one double puddling furnace, 7 heating furnaces, 2 hammers, and 4 trains of rolls (one 8, one 10, one 12, and one 20-inch); wire works, with 850 blocks; product, bar iron, rods, and iron and steel wire. Abram S. Hewitt, President; Wm. Hewitt, Vice-President; James Hall, Treasurer; E. Hanson, Secretary. New York office, Cooper, Hewitt & Co., 17 Burling Slip. Philadelphia office, 21 North Fourth st.

West Bergen Steel Works, Spaulding, Jennings & Co., West Bergen, Hudson county. Built in 1880; 8 heating furnaces, 2 trains of rolls (10 and 18-inch), 2 hammers, and 24 4-pot steel-melting holes; 96 pots can be used at each heat; product, crucible cast steel; annual capacity, 2,500 net tons.

Number of rolling mills and steel works in New Jersey: 19. Of these 1 is a rail mill, 5 are crucible steel works, and 1 is an open-hearth steel works.

## PENNSYLVANIA.

### PHILADELPHIA AND VICINITY.

Delaware Rolling Mills, Hughes & Patterson, Richmond and Otis sts., Kensington, Philadelphia. Built in 1870; 8 single puddling furnaces, 4 heating furnaces, and 3 trains of rolls; product, all kinds of merchant bar iron; special shapes and sizes to order; annual capacity, 8,000 net tons. Brand, "H. & P. Best."

Fair Hill Forge and Rolling Mill, Gaulbert, McFadden & Caskey, York and America sts., Philadelphia. Built in 1854; 2 single and 2 double puddling furnaces, 4 heating furnaces, 3 trains of rolls, and 1 hammer; product, merchant bar; annual capacity, 7,500 net tons.

Fairmount Steel Works, Alexander Foster & Co., 2325 Spring Garden st., Philadelphia. Built in 1866; 3 heating furnaces, six 4-pot melting furnaces, and 3 steam hammers; 24 pots can be used at each heat in steel works; product, machinery and spring steel, frog plates and points, and all kinds of steel forgings; annual capacity, 482 net tons.

Gray's Ferry Iron Works, Edward S. Buckley, 209 South Third st., Philadelphia. Built in 1858 by the present owner; 3 double puddling furnaces, 4 charcoal forge fires, 3 heating furnaces, 2 trains of rolls, and 2 hammers; product, plate iron of all kinds and charcoal blooms; annual capacity, 4,000 net tons plates and 600 tons blooms. *See Charcoal Furnaces.*

Kensington Iron and Steel Works, James Rowland & Co., 920 North Delaware avenue, Philadelphia. Built in 1845; 11 double puddling furnaces, 8 heating furnaces, 7 trains of rolls, and 32 nail machines; product, nails, horse shoes, merchant bar, band, hoop, and skelp iron, and steel plow, cultivator, and shovel plate; annual capacity, 11,000 net tons. Brand, "Anvil."

Keystone Horse Shoe Company, Seventeenth and Clearfield sts., Philadelphia. Put in operation January 1, 1873; 2 double puddling furnaces, 1 heating furnace, 2 trains of rolls (one 10-inch and one 16-inch three-high), 1 hammer, 1 Burden squeezer, and 18 machines for making patent solid steel-calk horse shoes; also, a machine shop complete; annual capacity, 3,300 net tons of finished horse shoes. Formerly called the Tioga Rolling Mill. George H. Boker, President; Wm. Gerhard, Managing Director; James Hopkins, Secretary and Treasurer.

Keystone Saw, Tool, Steel, and File Works, Henry Disston & Sons, Front and Laurel sts., Philadelphia. Branch works at Tacony, Phila. Founded in 1840, and commenced the manufacture of steel in 1854; now running 66 melting furnaces, 3 trains of rolls, 10 heating furnaces, and 1 hammer; 132 pots can be used at each heat in steel works; product, principally saw steel of every description; also, tool steel, homogeneous steel, steel for engravers' plates, etc.; annual capacity, 3,900 net tons. A 24-pot Siemens gas steel-melting furnace and a large plate mill are in course of erection. Brand, "Disston."

Midvale Steel Company, Nicetown P. O., Philadelphia. Built in 1866; one 12 and one 7-gross-ton Siemens open-hearth steel furnace; one 30-pot Siemens gas steel-melting furnace, 16 four-pot steel-melting coal fires, 20 bituminous and 4 anthracite gas producer fires, 11 coal and 5 gas heating furnaces, 7 hammers (from 9 tons to 300 pounds weight), one tire mill with monthly capacity of 1,200 tires, and 2 trains of rolls (one 23 and one 12-inch). The crucible steel department can use 94 pots at each heat. A well-equipped machine shop is attached, as well as moulding and annealing shops. The product is of open-hearth and crucible steel, consisting of locomotive tires, axles, miscellaneous forgings, and castings; also, tool, spring, machinery, and frog steel, rolled steel shapes, etc. Daily capacity, 50 net tons; annual capacity, 15,000 net tons. William Sellers, President; Marriott C. Smyth, Secretary and Treasurer; Charles A. Brinley, Superintendent.

Oxford Iron and Steel Works, William & Harvey Rowland, Frankford, Philadelphia. Built in 1842 on Frankford creek; began to make steel in 1845; removed to present location, 2 miles distant, in 1849; much enlarged in later years, especially in 1873; 5 heating furnaces, 3 trains of rolls (one 12, one 14, and one 16-inch), 2 hammers, 2 converting furnaces using wood exclusively, 2 converting furnaces using coal, and 24 2-pot crucible steel-melting furnaces; 48 pots can be used at each heat in steel works; convert Swedish iron into steel, reroll Norway iron, slit Norway nail rods, roll purchased Bessemer and Siemens-Martin steel, and make elliptic springs, sheet cast steel, cast spring steel, machinery and plow steel, and tire and sleigh steel; annual capacity, 4,500 net tons.

Pencoyd Iron Works, A. & P. Roberts & Co., 261 South Fourth st., Philadelphia. Works in Montgomery county, opposite Manayunk. Built

in 1852; 15 double puddling furnaces, 11 heating furnaces, rotary squeezer, and 4 trains of rolls (one 12, one 18, one 20, and one 23-inch); product, channel bars from 2 to 15 inches, beams from 4 to 15 inches, tees, angle iron from 1 to 6 inches, hammered and rolled axles, bar and bridge iron, and shafting from 1 to 7 inches; the forge has 3 hammers; annual capacity, 20,000 net tons. Specialties, structural shapes, axles, shafting, and bridge iron. Brand, "Pencoyd." Percival Roberts, G. Theodore Roberts, and Percival Roberts, Jr.

Penn Treaty Iron Works, Marshall Brothers & Co., 24 Girard avenue, Philadelphia. Works at 1201 Beach st. Built in 1856; 6 single puddling furnaces, 6 heating furnaces, and 4 trains of rolls; product, sheet and bar iron; annual capacity, 4,000 net tons. See *Upper Susquehanna Furnaces*.

Philadelphia Iron and Steel Company, 939 North Delaware avenue, Philadelphia. Built in 1845; 1 single and 2 double puddling furnaces, 1 rotary squeezer, 7 heating furnaces, and 5 trains of rolls (two 8, one 12, and two 18-inch); product, bar, angle, and tee iron, fish plates, beams, and peculiar shapes; average annual capacity, 10,000 net tons. John P. Verree, President; John H. Bringhurst, Secretary and Treasurer.

Philadelphia Rolling Mill, S. Robbins & Son, Beach and Vienna sts., Kensington, Philadelphia. Built in 1857; 9 double puddling furnaces, 6 heating furnaces, and 4 trains of rolls (two 9, one 17, and one 22-inch); product, all sizes and shapes of merchant bar, band, and skelp iron, and plates; annual capacity, 12,000 net tons. Brand, "S. R. Best." See *Schuylkill Valley Furnaces*.

Philadelphia Steel Forge, Adam Tindel, Frankford, Philadelphia. Built in 1865, by Baldwin, Banes & Co., and put into operation under present management in February, 1880; 4 heating furnaces, 5 steam hammers from 2 tons to 600 pounds in weight, 1 cementing furnace, 7 forge fires for bar steel, and 20 2-pot steel-melting holes; 40 pots can be used at each heat in steel works; product, "Anvil" and "Nonpareil" brands of tool steel, and steel forgings of all kinds; annual melting capacity, 2,000 net tons. All classes of railroad work a specialty. Selling agents, Henry G. Nichols, 14 Platt st., New York; C. I. Wickersham & Co., 232 Lake st., Chicago; and Southern Railway Supply Company, Richmond, Va.

Winch's Rolling Mill, Spike, and Bolt Works, Corydon Winch, Canal st. and Germantown avenue, Philadelphia. Built in 1874; 4 heating furnaces, 4 trains of rolls, 12 spike machines, and 4 rivet machines; product, merchant bar, spike, and rivet iron; average annual product, 3,500 net tons.

Number of rolling mills and steel works in Philadelphia and vicinity: 15.

Of these 5 are crucible steel works and 1 is an open-hearth steel works.

#### EASTERN PENNSYLVANIA, EXCEPT PHILADELPHIA.

Allentown Rolling Mills, 237 South Third st., Philadelphia. Works

at Allentown, Lehigh county. Built in 1860; 2 single and 23 double puddling furnaces, 12 heating furnaces, and 8 trains of rolls; product, T and street rails from 16 lbs. upwards, fish plates, merchant bars, spikes, bolts, nuts, rivets, axles, machinery, bridge work, and mine and flat cars. A. Pardee, Jr., President; H. W. Allison, Secretary and Treasurer; C. H. Nimson, Superintendent. *See Glen Iron Works. See Lehigh Valley Furnaces.*

Bethlehem Iron Company, Bethlehem, Northampton county. Established in 1863. Mill No. 1, started in 1863; 1 single and 12 double puddling furnaces, 9 heating furnaces, one 21-inch train of rolls for steel rails and billets, one 12-inch train for steel billets and small shapes, and one 21-inch train for puddled iron; product, steel rails and billets and muck bar; annual capacity, 45,000 net tons. Mill No. 2, started in 1873; four 7-gross-ton Bessemer steel converters; first blow made on October 4, 1873; first steel rail rolled October 18, 1873; 8 iron cupolas and 4 spiegel cupolas; 10 Siemens heating furnaces; one 48 and two 32-inch trains of blooming rolls; one 24-inch train for steel rails; product, steel rails and blooms; annual capacity, 135,000 net tons. In course of erection in mill No. 2: Siemens-Pernot open-hearth steel plant, consisting of two 15-gross-ton furnaces, 1 Siemens heating furnace, 12 gas producers, 2 hydraulic hoists, cranes, etc. Machine shop, blacksmith shop, and foundry connected with the works. G. B. Linderman, General Manager; Alfred Hunt, President; Wm. W. Thurston, Vice-President; Abraham S. Schropp, Secretary; C. O. Brunner, Treasurer; John Fritz, Superintendent. *See Lehigh Valley Furnaces.*

Birdsboro Nail Works, E. and G. Brooke Iron Company, Birdsboro, Berks county. Built in 1848; 13 double puddling furnaces, 2 scrap and 4 heating furnaces, 109 nail machines, and 3 trains of rolls; steam and water power; product, nails. George Brooke, President; George W. Harrison, Treasurer. *See Schuylkill Valley Furnaces. See Charcoal Furnaces.*

Blandon Iron Works, Maiden Creek Iron Company, Blandon, Berks county. Office, 40 North Sixth st., Reading, Pa. Built in 1867; 11 single puddling furnaces, 2 heating furnaces, and 3 trains of rolls; product, round, square, flat, hoop, band, and skelp iron; annual capacity, 8,000 net tons. H. A. Kaufman, Manager; Z. H. Maurer, Treasurer.

Brandywine Rolling Mills, Worth Brothers, Coatesville, Chester county. Built in 1881, and put in operation in February, 1882; 2 double puddling furnaces, 2 heating furnaces, 2 trains of rolls (one 28 x 90-inch plate, and one 20-inch muck train to make 4 x 6 inch bars); product, boiler, tank, bridge, boat, and skelp iron; annual capacity, 4,000 net tons.

Bristol Rolling Mill, Nevegold, Scheide & Co., Bristol, Bucks county. Built in 1875-6; 2 heating furnaces, 2 trains of rolls (one 8 and one 12-inch), and 1 "continuous" hoop train; product, hoop, scroll, and

band iron; annual capacity, 4,000 net tons. Brand, "Bristol Mills." *See Hamburg Rolling Mill.*

Carbon Rolling Mill Company Limited, Mauch Chunk. Works at Weissport, Carbon county. Built in 1860-4 and rebuilt in 1872; 1 single and 4 double puddling furnaces, 2 heating furnaces, 1 squeezer, and 3 trains of rolls (16-inch muck, 10-inch bar, and 8-inch bar); product, round, square, flat, and oval bar iron; annual capacity, 8,000 net tons. William Lilly, Chairman; J. M. Dreisbach, Secretary and Treasurer. Sales agents Justice Cox, Jr., & Co., 333 Walnut st., Philadelphia.

Catasauqua Manufacturing Company, Catasauqua, Lehigh county. Company organized in 1864. Two mills: Catasauqua Mill at Catasauqua, and Ferndale Mill at Ferndale; 30 single puddling furnaces, 11 heating furnaces, 9 trains of rolls (one 8, two 10, one 15, three 18, one 21-inch, and one 22-inch plate train), and one 10-ton hammer; product, highest grades of bar, tank, and boiler iron, rolled car axles, skelp iron, steel boiler and shovel plate, steel tire, and merchant bar steel; annual capacity, 30,000 net tons. Specialty, rolled fibrous steel railway car axles, stronger than iron, more reliable than steel. Brands of iron, "Catasauqua," "Catasauqua Rivet," and "Catasauqua Stay-bolt;" brand of steel, "Catasauqua Fibrous Steel." Oliver Williams, President; John Williams, Secretary; Henry Davis, Treasurer. Philadelphia office, Justice Cox, Jr., & Co., agents, 333-Walnut st.; New York office, E. T. Day, agent, 95 Liberty st.

Chester Rolling Mills, Chester, Delaware county. Built in 1874-5; 11 double puddling furnaces, 5 heating furnaces, of which 2 are Siemens heating furnaces, and 7 trains of rolls (one 18-inch puddle, one 24-inch puddle, one "universal" train, two 20-inch plate or groove, and two 30-inch plate, one of the latter being 72 inches long and the other 108 inches long); product, plate iron of all kinds; annual capacity, 20,000 net tons. Open-hearth steel plant added in 1881-2, consisting of two 10-gross-ton Siemens furnaces; daily capacity, 60 gross tons. John Roach, President; D. F. Houston, Secretary; C. B. Houston, Treasurer; T. J. Houston, General Manager. *See Schuylkill Valley Furnaces.*

Chester Steel Castings Company, 407 Library st., Philadelphia. Works at Chester, Delaware county. Built in 1871; 2 cupolas and 8 annealing furnaces; product, steel castings by the McHaffey process. E. P. Dwight, President and Treasurer; W. W. Wood, Secretary; J. J. Deemer, Superintendent.

Coatesville Iron Company, Coatesville, Chester county. New York office, 130 Cedar st. Built in 1838; 4 double and 3 single puddling and 6 heating furnaces, 4 trains of rolls, and 1 hammer; product, all kinds of boiler, fire-box, boat, tank, tube, and flue iron; annual capacity, 11,000 net tons. Formerly called Viaduct Iron Works. Andrew Williams, President; George Brooke, Vice-President; W. J. Car-

Chester

michael, Treasurer and General Manager, New York; Edgar W. Emmens, Secretary, New York.

Combination Steel and Iron Company, Chester, Delaware county. Built in 1881; 10 heating furnaces and 3 trains of rolls; product, iron-clad steel bars, plates, rails, etc.; also, Bessemer steel rails from purchased blooms. John Roach, President; S. F. Chalfin, Treasurer; C. A. Weed, General Manager.

Conshohocken, Pennsylvania, and Corliss Iron Works, J. Wood & Brothers, Conshohocken, Montgomery county. Office, 223 North Second st., Philadelphia. Built in 1832, 1852, and 1864, respectively; 6 double puddling furnaces, 7 heating furnaces, and seven 20-inch trains of rolls; steam and water power; product, plate and sheet iron, embracing flue, boiler, tank, gasometer, nail, tack, shovel, and safe iron; annual capacity, 6,000 net tons.

Easton Sheet Iron Works, Oliver & Co., Easton, Northampton county. Built by Samuel Oliver, deceased, and started February 1, 1872; have been in constant operation since; 1 double and 1 single puddling furnace, 1 heating furnace, 1 anthracite-coal sheet furnace, 1 bituminous-coal annealing furnace, and 1 train of 22-inch rolls; product, bloom and refined sheet iron; annual capacity, 1,000 net tons. Production sold by Marshall Lefferts & Co., 90 Beekman st., New York.

Eureka Cast Steel Company, 307 Walnut st., Philadelphia. Works at Lamokin, one mile south of Chester, Delaware county. Built in 1877; product, steel castings of all kinds; specialty, steel propellers. W. B. Reaney, President; W. H. Dickson, Treasurer; H. B. Faunce, Secretary; Frederick Baldt, Manager.

Gibraltar Iron Works, S. Seyfert & Co., Reading. Built in 1846; 1 heating furnace and one 16-inch train of rolls; water-power; product, boiler plate and boiler tube iron; annual capacity, 1,500 net tons. *See Bloomaries.*

Glasgow Iron Works, Glasgow Iron Company, Pottstown, Montgomery county. Puddle mill built in 1874; 6 double puddling furnaces and 1 train of muck rolls; water-power; annual capacity, 8,000 net tons. Plate mill added in March, 1876; steam-power; 3 heating furnaces, and 1 train of rolls 96 inches long; annual capacity, 8,000 net tons of boiler plate. Specialties, "S. B. F." and "S. B. F. B." Joseph L. Bailey, President; Comly B. Shoemaker, Treasurer; G. W. Nicolls, Secretary; Edward Bailey, General Manager.

Glendale Rolling Mill, Bailey & Shoemaker, Pine Iron Works, Berks county. Works at Manatawny Station, Berks county. Built in 1881-2; 2 heating furnaces and 1 train of rolls; product, plate iron; annual capacity, 3,500 net tons. *See Pine Iron Works.*

Glen Iron Works, Allentown Rolling Mills, lessee, Allentown. First put in operation in 1870; 8 double puddling furnaces, 3 heating furnaces, and 3 trains of rolls (one 8½ and two 15-inch); product, puddled bar; annual capacity, 7,500 net tons. *See Allentown Rolling Mills. See Lehigh Valley Furnaces.*



- Greenwood Rolling Mill, Greenwood Rolling Mill Company, Tamaqua, Schuylkill county. Philadelphia office, 224 South Third st. Built in 1865; 5 single puddling furnaces, 2 heating furnaces, and 2 trains of rolls (8½ and 16-inch); product, bar iron and light rails; annual capacity, 4,500 net tons. C. F. Shoener, President; H. S. Godshall, Treasurer; H. S. Watt, Clerk; John Ralston, Superintendent.
- Hamburg Rolling Mill, Nevegold, Scheide & Co., lessees, Bristol, Bucks county. Works at Hamburg, Berks county. Built in 1865; 5 double and 2 single puddling furnaces, 1 cupola furnace, 2 heating furnaces, 1 rotary squeezer, one 3-ton steam hammer, and 2 trains of rolls (10 and 18-inch); product, bar iron, muck and scrap bars, scrap blooms, etc.; annual capacity, 4,000 net tons. *See Bristol Rolling Mill.*
- Keystone Iron Works, Reading, Berks county. Built in 1857; 1 double and 5 single puddling furnaces, 2 heating furnaces, and one 18-inch train of rolls; product, boiler plate, tank, chute, stack, pipe, boat and car iron, and muck bars; annual capacity, 3,600 net tons. Owners, J. V. Craig, Jacob Snell, and J. H. Craig.
- Laurel Iron Works, Carmichael & Emmens, 130 Cedar st., New York. Works at Coatesville, Chester county. Built in 1825; 1 annealing furnace, 3 heating furnaces, and 2 trains of rolls; water and steam power; product, flue and tube iron; annual capacity, 6,000 net tons.
- Lehigh and Franklin Wire Mills, Stewart & Co., Easton, Northampton county. Built in 1837; 4 heating furnaces and 3 trains of rolls; product, wire rods, drawn into wire at the same establishment; annual capacity, 6,000 net tons.
- Lukens, Jawood, Conshohocken, Montgomery county. Building a rolling mill to make muck bar, to contain 4 double puddling furnaces and 1 train of 20-inch rolls; annual capacity, 5,000 net tons.
- Lukens Rolling Mills, Charles Huston & Sons, Coatesville. Built in 1810; 3 double puddling furnaces, 5 heating furnaces, 2 trains of rolls, and 1 hammer; steam and water power; product, all kinds of boiler and ship plates, flue and bridge iron, and homogeneous steel plates; annual capacity, 11,000 net tons. The puddle mill, operated by steam and water power, occupies the site of the first plate mill built in the United States.
- McIlvain (Wm.) & Sons' Boiler Plate Mill, Wm. McIlvain & Sons, Reading. First put in operation in 1857; 2 double and 4 single puddling furnaces, 3 heating furnaces, 2 trains of rolls, (break-down rolls, 52 in. x 25 in., and finishing rolls, 81 in. x 25 in.,) and one 3-ton hammer; product, every variety of plate iron; annual capacity, 5,000 net tons. *See Bloomaries.*
- Milldale Iron Company, Port Clinton, Schuylkill county. Built in 1868; 1 single and 2 double puddling furnaces, 2 heating furnaces, and 3 trains of rolls (one 10, one 16, and one 18-inch); water and steam power; product, merchant bar, guide iron, tee, channel, and angle iron; annual capacity, 2,500 net tons. Formerly called Little Schuylkill Rolling Mill. Leased by W. L. McDowell and J. Barclay Hacker.



Norristown Iron Works, James Hooven & Sons, Norristown, Montgomery county. Built in 1846; 6 double puddling furnaces, 3 heating furnaces, 3 trains of rolls, and 1 hammer; product, skelp iron, part of which is made by the firm into butt-welded pipes, and the remainder sold; annual capacity, 5,000 net tons. James Hooven, owner. *See Schuylkill Valley Furnaces.*

Palo Alto Rolling Mill, estate of Benjamin Haywood, deceased, Pottsville, Schuylkill county. Built in 1854; 12 double and 5 single puddling furnaces, 9 heating furnaces, and 5 trains of rolls (one 8, two 16, and two 18-inch); product, light and heavy T and street rails, fish bars, chairs, and merchant bar iron; annual capacity, 15,000 net tons. Brand, "P. A."

Parkesburg Iron Works, Parkesburg Iron Company, Parkesburg, Chester county. First started in April, 1873; 4 double puddling furnaces, 5 charcoal finery fires, 3 heating furnaces, 1 train of rolls, and 1 hammer; product, boiler plate and tube skelp; annual capacity, 4,000 net tons. Horace A. Beale, President; Samuel R. Parke, Treasurer.

Philadelphia and Reading Rolling Mill, Philadelphia and Reading Coal and Iron Company, W. E. C. Coxe, Superintendent, Reading. Built in 1868; 12 single puddling furnaces, 10 heating furnaces, and 3 trains of rolls (one 12, one 23, and one 24-inch); product, iron and steel rails and splice bars; annual capacity, 25,000 net tons. Specialty, reheated iron rails. Bessemer steel rails are rolled from purchased blooms. Brand, "P. & R."

Phoenix Iron Works, Phoenix Iron Company, Phoenixville, Chester county. Office, 410 Walnut st., Philadelphia. Built in 1808; 21 double puddling furnaces, 23 heating furnaces, and 6 trains of rolls, (one 9, one 12, one 16, one 17, and two 18-inch); product, bar iron, beams, angles, tee iron, other shapes, and rails. New mill built in 1873; now working two 20, one 13, and one 9-inch trains on bar and structural iron, 4 small and 5 large double Siemens heating furnaces, and 24 Siemens gas producers using anthracite coal, and 20 Wilson gas producers using anthracite coal; present annual capacity, 35,000 net tons. David Reeves, President; John Griffen, Superintendent; W. H. Reeves, Assistant Superintendent; Geo. Gerry White, Secretary; James O. Pease, Treasurer. *See Schuylkill Valley Furnaces. See Safe Harbor Rolling Mill.*

Pine Iron Works, Bailey & Shoemaker, Pine Iron Works, Berks county. Built in 1845; 2 heating furnaces and 1 train of rolls; water-power; product, boiler plate; annual capacity, 2,600 net tons. Sole manufacturers of the "Pine" brands of extra flange and fire-box iron. *See Glendale Rolling Mill.*

Plymouth Rolling Mill Company, S. Fulton, General Superintendent, 261 South Fourth st., Philadelphia. Works at Conshohocken, Montgomery county. Built in 1881-2; product, muck bar. *See Schuylkill Valley Furnaces.*

Port Carbon Iron Works, Pottsville Iron and Steel Company, lessee,

Pottsville. Works at Port Carbon, Schuylkill county. Eight double puddling furnaces, 1 large heating furnace, 2 small heating furnaces, 2 spike machines, and 2 trains of rolls (16-inch puddle train and 10-inch merchant train); annual capacity, puddled bar, 9,500 net tons; merchant bar, 2,500 net tons; spikes, 1,500 net tons; product, puddled iron only at present. Foundry and machine shop attached. *See Pottsville Rolling Mills. See Schuylkill Valley Furnaces.*

Pottsgrove Iron Works, Potts Brothers Iron Company Limited, Pottstown, Montgomery county. Built by Henry Potts & Co. in 1846; 6 double puddling furnaces, 3 heating furnaces, and 2 trains of rolls (muck train and plate train); product, plate iron, comprising boiler, tank, pipe, and flue iron; annual capacity, 8,000 net tons. Specialties, pipe and flue iron. George H. Potts, Chairman; H. C. Hitner, Secretary and Treasurer.

Pottstown Iron Company, Pottstown, Montgomery county. Built in 1863 and extended in 1867; 29 double puddling furnaces, 10 heating furnaces, 6 forge fires, 79 nail machines, 1 hammer, 3 squeezers, and 7 trains of rolls (one 18-inch muck, one 21-inch muck, two 23-inch muck, one 23-inch nail plate, and two 25-inch plate); product, charcoal blooms, muck bar, nails, and boiler, ship, and tank plate iron; annual capacity, 35,000 net tons muck bar, 2,500 tons blooms, 16,000 tons nails, and 24,000 tons plate iron. Theo. H. Morris, President; Andrew Wheeler, Vice-President; Joseph K. Wheeler, Secretary; Wm. H. Morris, Treasurer and General Manager. *See Schuylkill Valley Furnaces.*

Pottsville Rolling Mills, Pottsville Iron and Steel Company, Pottsville. Old mill built in 1852, and rebuilt in 1863; 14 double and 4 single puddling furnaces, 8 heating furnaces, 1 hammer, and 3 trains of rolls; product, T rails of both light and heavy sections, street rails, and beams, channels, and angles; annual capacity, 20,000 net tons. Built originally to make rails, and altered to roll shapes also in 1877. New mill built in 1879, containing a 23-inch train of rolls for rolling heavy and long beams, channels, and angles; annual capacity, 10,000 net tons. C. M. Atkins, President; William Atkins, Treasurer; C. H. Dengler, Secretary. *See Schuylkill Valley Furnaces. See Port Carbon Iron Works.*

Reading Bolt and Nut Works, J. H. Sternbergh, Reading. Established in 1865; enlarged in 1872 and 1881; 4 heating furnaces, 3 trains of rolls (one 9, one 10, and one 12-inch), and 1 hammer; product, refined merchant bar, band, and skelp iron; also, bolts, nuts, washers, rivets, etc.; annual capacity, about 8,000 net tons.

Reading Iron Works, Reading. Office, 259 South Fourth st., Philadelphia. Flue-iron mill built in 1836; 12 single puddling furnaces, 4 heating furnaces, 1 rotary squeezer, 3 trains of rolls, 28 nail machines, and 1 spike machine; product, cut nails, bar, band, hoop, and skelp iron; annual capacity, 7,000 net tons. Plate mill built in 1863; 8 double puddling furnaces, 4 heating furnaces, 1 hammer, and 4 trains

of rolls; product, sheet, plate, and bar iron; annual capacity, 10,000 net tons. Edward W. Coit, President; Thomas R. Elcock, Vice-President; F. W. Ralston, Treasurer; Henry M. Keim, Clerk. *See Schuylkill Valley Furnaces.*

Schuylkill Haven Rolling Mill, Schuylkill Haven Iron Company, Pottsville. Mill at Schuylkill Haven, Schuylkill county. Put in operation October 1, 1873; 2 heating furnaces, 2 trains of rolls (one 10 and one 16-inch), and 1 railroad spike, bolt, and rivet machine; product, merchant bar iron, small T rails for mining purposes, railroad spikes, bolts, and rivets; specialty, refined merchant bar iron; annual capacity, 6,000 net tons. Also, chain works with 24 hearths, testing machine, etc. L. W. Weissinger, President; C. F. Rahn, Treasurer.

Schuylkill Iron Works, Alan Wood & Co., Conshohocken, Montgomery county. Office, 519 Arch st., Philadelphia. Built in 1858; 15 double puddling furnaces, 12 heating and 4 grate furnaces, 7 trains of rolls, 1 hammer, and 2 rotary squeezers; product, sheet and plate iron; annual capacity, 15,000 net tons. *See Rolling Mills in Delaware.*

Seyfert Rolling Mills, Samuel R. Seyfert, Reading, Berks county. Works at Seyfert Station, W. & N. R. R. Built in 1880-1, and started in March, 1881; 2 heating furnaces and 1 train of rolls, 22 x 66 inches; product, boiler-plate, boiler-tube iron, and pipe iron; annual capacity, 3,500 net tons. Puddle mill in course of erection, to contain 4 double puddling furnaces, 1 stock furnace, one 24-inch train of rolls, one 4-ton hammer, and 4 charcoal forge fires.

Standard Iron Company Limited, Norristown, Montgomery county. Built by Wm. Schall in 1857; 11 double puddling furnaces, 1 rotary squeezer, and 2 trains 18-inch puddle rolls; product, puddled bar; annual capacity, 14,000 net tons. Walter H. Cooke, Chairman; John Slingluff, Secretary and Treasurer.

Stony Creek Rolling Mill, J. H. Boone, Norristown. Built in 1849, and rebuilt in 1879; 4 double puddling and 3 heating furnaces, and 2 trains of rolls; product, plate iron.

Thorndale Iron Works, Thorndale Iron Works Company, Wm. L. Bailey, Secretary and Treasurer, Thorndale P. O., Chester county. Built in 1847; 4 double puddling furnaces, 2 heating furnaces, 2 trains of rolls (plate train 73 inches long), and 1 hammer; product, boiler and tank iron, and ship plates; annual capacity, 4,000 net tons. Charles L. Bailey, President; Abraham S. Patterson, Vice-President.

Valley Iron Works, C. E. Pennock & Co., Coatesville, Chester county. Built in 1837; 4 double puddling and 4 heating furnaces, one 4-ton hammer, and 4 trains of rolls (one 18, one 24, and two 30-inch); product, plate iron; annual capacity, 7,000 net tons. *See Bloomaries.*

Number of rolling mills and steel works in Eastern Pennsylvania, except Philadelphia: 47 completed, and 1 building. Of these 9 are rail mills, 2 making only light T rails; 1 makes Bessemer steel, and 1 open-hearth steel; 1 open-hearth steel works building; 2 make cast steel castings solely.

## CENTRAL DISTRICT.

- Altoona Iron Company, Altoona, Blair county. Built in 1872-3; put in operation in April, 1873; additions made in 1878, 1879, and 1881; 11 double and 6 single puddling furnaces, 4 heating furnaces, 4 trains of rolls (two 8, one 16, and one 18-inch), 1 rotary squeezer, and one 3-ton steam hammer; product, bar, band, hoop, ovals, half ovals, half round, and scroll iron; annual capacity, 15,000 net tons. Light irons a specialty. Brand, "Altoona." James Gardner, President; T. S. Gardner, Treasurer; S. C. Baker, General Manager.
- Bellefonte Iron Works, Valentines & Co., Bellefonte, Centre county. Built in 1800; 1 heating furnace and 1 train of rolls; steam and water power; product, covers for boiler-plate piles, billets for wire rods, scythe and shovel bars, etc.; annual capacity, 3,600 net tons. *See Charcoal Furnaces. See Bloomaries.*
- Bellefonte Rolling Mills and Nail Factory, Bellefonte Nail Company Limited, Bellefonte, Centre county. Built in 1881-2; put in operation March 1, 1882; 11 single puddling furnaces, 2 heating furnaces, 3 trains of rolls (one 9 and one 15-inch bar train and one 16-inch nail-plate train), and 15 nail machines; product, bar iron and nails; annual capacity, 10,000 net tons. James A. Beaver, Chairman; William V. Emery, Secretary and Treasurer; Samuel Achenbach, General Superintendent.
- Berwick Rolling Mill, Berwick Rolling Mill Company, Berwick, Columbia county. Built in 1872; 11 single puddling furnaces, 3 heating furnaces, and 3 trains of rolls; product, bar iron; annual capacity, 7,000 net tons. C. R. Woodin, President; Garrick Mallery, Treasurer; H. F. Glenn, General Manager.
- Central Iron Works, Harrisburg, Dauphin county. Old mill built in 1853 by Charles L. Bailey & Bro., and changed and enlarged in 1879; new mill built in 1877-8 and enlarged in 1881; 1 single and 6 double puddling furnaces, 1 squeezer, 5 heating furnaces, and 5 trains of rolls (1 muck, one 31-inch and one 25-inch roughing, one Lauth 3-high 31-inch and one Lauth 3-high 25-inch chilled finishing), with shears, cranes, etc.; product, boiler plate and tank iron; annual capacity, about 13,000 net tons. Charles L. Bailey, President; Abraham S. Patterson, Secretary; G. M. McCauley, Treasurer.
- Chesapeake Nail Works, Chas. L. Bailey & Co., Harrisburg, Dauphin county. Built in 1867; 18 single puddling furnaces, 3 heating furnaces, 2 trains of rolls (20-inch puddle and 16-inch plate), and 81 nail machines; product, nails; annual capacity, 11,000 net tons.
- Chickies Rolling Mill, Becker & Reinhold, Chickies, Lancaster county. Built in 1865; 1 single and 3 double puddling furnaces, and 2 trains of rolls (9 and 16-inch); product, muck bar; annual capacity, 4,000 net tons.
- Co-operative Iron and Steel Works, Danville, Montour county. Puddle mill built in 1871, with 8 single puddling furnaces and 1 train of 18-inch rolls; furnaces removed in 1882, and the erection begun

of two 20-gross-ton Siemens open-hearth steel furnaces and 1 train of 28-inch Lauth 3-high chilled rolls, with shears, hydraulic cranes, etc.; product to be steel boiler, tank, and boat plates. Rail mill built in 1873, with 6 heating furnaces and 1 train of 18-inch rolls; annual capacity, 21,000 net tons of iron T and street rails, the latter a specialty; remodeled in 1881 for rolling Bessemer steel blooms into rails, and annual capacity increased to 56,000 net tons. Peter Baldy, President; L. K. Rishel, Secretary, Treasurer, and Manager.

Duncannon Iron Company, Duncannon, Perry county. Office, 122 Race st., Philadelphia. Built in 1836; 16 single puddling furnaces, 6 heating furnaces, 4 trains of rolls, and 54 nail machines; steam-power; product, bar iron and nails; annual capacity, 11,000 net tons. Specialty, bar iron. John Wister, Jr., President and Treasurer; William E. S. Baker, Secretary and Assistant Treasurer. *See Upper Susquehanna Furnaces.*

Eagle Iron Works, Curtins & Co., Roland, Centre county. Built in 1825 by Roland Curtin & Sons, and in possession of the Curtins alone ever since; 1 single puddling furnace, 1 heating furnace, 2 trains of rolls, and 1 squeezer; water-power; product, wire billets, boiler-plate pile covers, and assorted bar iron from  $\frac{1}{2}$ -inch round and square to 4-inch tire; annual capacity, 3,000 net tons. *See Charcoal Furnaces. See Bloomaries.*

Glendower Iron Works, Danville, Montour county. Built in 1847; 14 single puddling furnaces, 8 heating furnaces, and 4 trains of rolls; product, railroad iron, street rails, and merchant and muck-bar iron; specialty, merchant bar iron; annual capacity, 20,000 net tons. Formerly owned by the National Iron Company. Alfred Creveling, President, 234 South Fourth st., Philadelphia; Henry Levis, Treasurer, Philadelphia; George W. Miles, Secretary and General Manager, Danville.

Green Ridge Iron Works, A. L. Spencer, Scranton, Lackawanna county. Built at Providence, Pa., in 1876; removed to Green Ridge, Scranton, in 1879; 1 heating furnace and 2 trains of rolls; product, bar iron and car axles; annual capacity, 1,000 net tons. Formerly called Capouse Merchant Iron Mill.

Harrisburg Nail Works, McCormick estate, Harrisburg. Works at Fairview, Cumberland county, on the Northern Central Railway. Built in 1810; 9 double puddling furnaces, 3 heating furnaces, 2 trains of rolls, and 75 nail machines; steam and water power; product, nails and muck bar; annual capacity, 7,500 net tons of nails, and 2,000 tons of muck bar. Henry McCormick, Treasurer.

Harrisburg Steel and Iron Works Limited, Hummel, Fendrich & Co., Harrisburg. First put in operation October 16, 1881; 2 heating furnaces and 2 trains of rolls (one 9 and one 18-inch); product, horse-shoe steel and iron, wagon and carriage tire, nut, bolt, and rivet iron, and other specialties; annual capacity of finished iron, 4,000 net tons, and of semi-steel, 1,000 net tons. V. Hummel, President; R.

H. Hummel, Secretary; J. L. Fendrich, Treasurer; E. B. Edwards, Superintendent.

Hollidaysburg Iron Works, Hollidaysburg Iron and Nail Company, Hollidaysburg, Blair county. Built in 1860; 8 single puddling furnaces, 3 heating furnaces, 3 trains of rolls, and 20 nail machines; product, merchant bar, pipe iron, 12 to 16-lb. T rails, "I. X. L." bolt rods, and cut nails and spikes; annual capacity, 6,000 net tons. J. D. Hemphill, President; J. W. Bracken, Treasurer and General Manager; Thomas F. Johnston, Secretary.

Howard Iron Works, Bernard Lauth, Howard, Centre county. Built in 1840; 6 single puddling furnaces, 2 heating furnaces, and 3 trains of rolls (one 16-inch, one 12-inch, and one rod mill), and 1 rotary squeezer; water-power; product, carriage bolts. *See Charcoal Furnaces. See Bloomaries.*

Juniata Rolling Mill, McLanahan, Smith & Co. Limited, lessees, Hollidaysburg. Built in 1866; 16 single puddling and 3 heating furnaces, 2 trains of rolls, 30 nail machines, and 1 hammer; product, bar and pipe iron, and cut nails and spikes; annual capacity, 9,000 net tons. J. King McLanahan, President; Charles H. Smith, General Manager.

Lackawanna Iron and Steel Works, Lackawanna Iron and Coal Company, Scranton, Lackawanna county. Commenced in 1840; 77 single puddling furnaces, 33 heating furnaces, and 12 trains of rolls (one 31, three 23½, two 22, two 20, three 18, and one 12-inch), and 2 hammers; steam and water power; product, light and heavy railroad rails, merchant bar iron, and car axles; annual capacity, 185,000 net tons of steel and iron rails, and 15,000 tons of merchant bar iron and car axles. Bessemer steel works added in 1875; two 5-gross-ton converters, 4 cupolas, and 4 spiegel furnaces; annual capacity, 168,000 net tons ingots; first blow made October 23, 1875; first steel rail rolled December 29, 1875. Brand, "Scranton." E. F. Hatfield, Jr., President, 52 Wall st., New York; Edward C. Lynde, Secretary, Scranton, Pa.; Charles F. Mattes, General Manager; Theodore G. Wolf, Superintendent of steel rolling mill; Charles F. Manness, Superintendent of steel converting works. *See Upper Susquehanna Furnaces.*

Lancaster Rolling Mill, Manuel McShain & Co., Hempfield, Lancaster county. Office and works at Rohrerstown. Bought by present parties and enlarged in June, 1872; 1 double and 5 single puddling furnaces, 2 heating furnaces, 2 trains of rolls, and 1 hammer; product, merchant bar and guide iron; annual capacity, 3,000 net tons.

Lebanon Rolling Mill, Ephraim Light, Lebanon. Built in 1867; 5 double puddling furnaces, 2 heating furnaces, 2 trains of rolls, and 1 hammer; product, plate, sheet, and flue iron; annual capacity, 5,000 net tons.

Lochiel Rolling Mill Company, Harrisburg. Built in 1865; merchant mill completed in November, 1871. Puddle mill contains 10 double puddling furnaces and one 3-high set of 19-inch puddle rolls. Bar mill contains 4 heating furnaces and 2 trains of rolls (9 and 16-inch);



annual capacity, 10,000 net tons of merchant bar. Rail mill contains one 3-high 19½-inch rail train for rolling steel rails from cold blooms; annual capacity, 50,000 net tons of rails, from 40 lbs. per yard upward. Henry McCormick, President; N. R. Miller, Secretary; J. H. Landis, Superintendent. *See Lower Susquehanna Furnaces.*

Logan Works, Logan Iron and Steel Company, Lewistown, Mifflin county. Office, 218 South Fourth st., Philadelphia. Built in 1869, 1877, and 1879; 1 single and 5 double puddling furnaces, 3 heating furnaces, 3 steam hammers, and 3 trains of rolls (one 8, one 12, and one 16-inch); steam and water power; product, rolled charcoal and refined bar iron, bent truck sides, coupling links, and pins. The company is now adding an 18-inch puddle train, an 18-inch bar train, 5 double puddling furnaces, and 2 heating furnaces. A part of the establishment, comprising a 10-ton hammer and a tire mill, is rented to the Standard Steel Works. H. T. Townsend, President; C. Weston, Jr., Secretary; R. F. Kennedy, Treasurer; R. H. Lee, Superintendent. *See Charcoal Furnaces. See Coke Furnaces.*

Milesburg Iron Works, McCoy & Linn, Milesburg, Centre county. Built in 1830; 3 single puddling furnaces, 2 heating furnaces, 3 trains of rolls, and 2 hammers; steam and water power; product, all sizes bar iron, spring and soft wire rods, galvanized spring wire, and blooms for boiler plate; annual capacity, 3,000 net tons. *See Charcoal Furnaces. See Bloomaries.*

Milton Nail Works, C. A. Godcharles & Co., Milton, Northumberland county. Built in 1875; 10 single puddling and 2 heating furnaces, one 20-inch train of rolls, and 50 nail machines; product, nails.

Milton Rolling Mill, Milton Iron Company, Milton, Northumberland county. Put in operation December 1, 1872; 8 puddling furnaces, 2 heating furnaces, and 3 trains of rolls; product, round, square, and flat bar iron; annual capacity, 4,000 net tons. Brand, "Milton." W. A. Schreyer, President; P. C. Johnson, Treasurer; John Jenkins, Superintendent. *See Williamsport Rolling Mill and Iron Works.*

Montour Iron and Steel Works, Montour Iron and Steel Company, Danville. Built in 1845; 6 double and 32 single puddling furnaces, 19 heating furnaces, 4 trains of rolls (three 20 and one 18-inch), and 1 hammer; product, iron rails and car axles; annual capacity, 50,000 net tons. W. E. C. Coxe, President, Reading; F. P. Howe, General Superintendent, Danville; S. W. Ingersoll, Treasurer, 208 South Fourth st., Philadelphia. *See Upper Susquehanna Furnaces.*

Northumberland Iron and Nail Works, Van Alen & Co., Northumberland, Northumberland county. Built in 1867; 9 single puddling furnaces, 1 heating furnace, 1 train of rolls, 1 rotary squeezer, and 30 nail machines, having Coyne's patent automatic nail assorters and Morrison's spike rejecter attached; product, nails, nail plate, muck and scrap bars; annual capacity, 6,000 net tons muck bar, 4,000 tons nail plate, and 3,600 tons nails. Foundry and machine shop in connection. Paxton Rolling Mills, McCormick estate, Harrisburg. Built in 1869;



5 double puddling furnaces, 5 heating furnaces, 3 trains of rolls, and 1 hammer; product, boiler, skelp, and tank iron; annual capacity, 8,750 net tons. John Q. Denney, Manager.

Penn Iron Company Limited, Lancaster, Lancaster county. First put in operation in April, 1873; 8 single and 2 double puddling furnaces, 7 heating furnaces, and 4 trains of rolls (one 18-inch puddle, one 16-inch bar, one 9-inch guide, and one 8-inch guide); product, merchant bar iron, hammered and rolled axles, car forgings, bridge work, fish joints, bolts, railroad spikes, bolt ends, etc.; annual capacity, 15,000 net tons. A. J. Steinman, Chairman; W. G. Mendinhall, Secretary; C. S. Foltz, Treasurer; W. B. Middleton, Superintendent.

Pennsylvania Bolt and Nut Company, Lebanon. Building a rolling mill to make stock for bolt and nut works.

Pennsylvania Steel Works, Pennsylvania Steel Company, Steelton, Dauphin county. Office, 208 South Fourth st., Philadelphia. Bessemer steel works built in 1865-7; made their first blow in June, 1867; two 7-gross-ton and three 8-ton converters. Rolling mill built in 1867-8; blooming mill added to the rolling mill in 1875-6, and put in operation in December, 1876. Hammer mill contains 4, 6, and 12-ton hammers. Open-hearth steel plant, erected in 1875, contains two 15-gross-ton Siemens open-hearth steel furnaces in operation and two 30-ton furnaces in course of construction. There are also machine shops and the necessary repair shops connected with the works. Product, steel ingots, forgings, rails of heavy sections, street rails, and railroad axles, crossings, frogs, and switches. Annual capacity, 250,000 net tons ingots. A merchant mill is in course of construction, to contain one 12 and one 20-inch train. S. M. Felton, President; E. F. Barker, Secretary; H. C. Spackman, Treasurer; C. S. Hinchman, Sales Agent; Luther S. Bent, Superintendent. *See Lower Susquehanna Furnaces.*

Portage Iron Company Limited, Duncansville, Blair county. Built in 1839; 8 single puddling and 5 heating furnaces, 3 trains of rolls, (one 18, one 14, and one 8-inch,) and 37 nail machines; product, bar, band, and hoop iron and nails; annual capacity, 4,800 net tons. Trade-mark, W in a circle. Wm. M. Wheatley, President, Duncansville; J. P. Meday, Secretary, and D. A. Nesbit, Treasurer, 56 Hudson st., New York.

Safe Harbor Rolling Mill, Phoenix Iron Company, Safe Harbor, Lancaster county. Office, 410 Walnut st., Philadelphia. Built in 1848; 1 single and 18 double puddling furnaces, 8 heating furnaces, and 2 trains of rolls; built to make rails, but has made no rails since 1861, and was entirely idle from 1865 to February, 1880; product, at present, puddled bar. Also, working over mill cinder by the DuPuy process. T. F. Patterson, General Manager. *See Phoenix Iron Works. See Schuylkill Valley Furnaces.*

Scranton Steel Company, Scranton, Lackawanna county. Building Bessemer steel works, to contain two 4-gross-ton converters, 4 pig-melting cupolas, 3 spiegel cupolas, 4 heating furnaces, and 3 trains

of 32-inch rolls; product to be steel rails and billets. W. W. Scranton, President and Manager; Walter Scranton, Vice-President; E. T. Kingsbury, Secretary and Treasurer.

Shawnee Rolling Mill, Chestnut Hill Iron Ore Company, Columbia, Lancaster county. New York office, 52 Wall st. Built in 1854; 16 single puddling furnaces, 4 heating furnaces, and 4 trains of rolls; product, ship and boiler plate, and skelp iron; annual capacity, 15,000 net tons. Formerly called Columbia Steel and Iron Works. B. G. Clarke, President, and N. W. H. Hix, Treasurer, New York; Jerome L. Boyer, Supt., Columbia. *See Lower Susquehanna Furnaces.*

Standard Nail and Iron Company, Williamsport, Lycoming county. Works at Crescent. Built in 1842; 2 single puddling furnaces, 1 heating furnace, 1 train of rolls, and 7 nail machines; product, nails and bar iron. Brand, "Standard." J. Corcoran, Treasurer; Samuel Achenebach, Mill Superintendent.

Standard Steel Works, 220 South Fourth st., Philadelphia. Works at Logan, near Lewistown, Mifflin county. Built in 1869; 9 heating furnaces, 3 hammers (one 10-ton Tannet & Walker, one 7-ton Sellers, and one 30-cwt. Morris), and 1 tire mill; product, steel locomotive and car tires, axles, and forgings. Specialty, locomotive and car-wheel tires. Ingots are obtained from the Otis Iron and Steel Company, and are worked here. Brand, the word "Standard" between two anchors. Wm. Burnham, Secretary and Treasurer; Wm. G. Neilson, Manager; M. L. Brosius, Superintendent.

Susquehanna Iron Works, Susquehanna Iron Company, Columbia, Lancaster county. Built in 1860; 12 single puddling furnaces, 3 heating furnaces, and 3 trains of rolls; product, bar iron; annual capacity, 8,000 net tons. M. Schall, President; Vernon Ellis, Secretary and Treasurer; Wm. Patton, General Manager; John Paine, Supt.

Towanda Nail Works, R. A. Bostley & Co., Towanda, Bradford county. First started in November, 1872; 3 double puddling furnaces, 3 heating furnaces, 24 nail machines, and 2 trains of rolls (15-inch puddle and 15-inch plate); product, nails; annual capacity, 1,500 net tons.

Van de Sand & Capp, Lebanon. Three single puddling furnaces, 1 heating furnace, and 2 trains of rolls; product, bar iron; annual capacity, 2,000 net tons.

Williamsport Rolling Mill and Iron Works, Milton Iron Company, Williamsport, Lycoming county. Built in 1873-4; 1 single and 5 double puddling furnaces, 1 rotary squeezer, one 6-tuyere run-out fire, 8 forge fires, 2 heating furnaces, 1 hammer, and 3 trains of rolls (one 8 and two 15-inch); product, charcoal blooms, bars, and wire rods; annual capacity, 5,000 net tons. *See Milton Rolling Mill.*

York Rolling Mill, Schall, Steacy & Denné, York, York county. Built in 1869; rebuilt in 1881-2; 6 double puddling furnaces, 4 heating furnaces, 3 trains of rolls (two 22 and one 18-inch), and 1 hammer; product, plate and skelp iron; annual capacity, 9,000 net tons. Formerly known as the Codorus Steel Works.

Number of rolling mills and steel works in Central Pennsylvania: 40 completed, and 2 building. Of these 7 are rail mills, 1 making only light T rails; 2 are Bessemer steel works, with 1 Bessemer steel works building; and 1 is an open-hearth steel works, with 1 open-hearth steel works building.

## PROJECTED.

Muck bar mill at Lebanon, by the Lebanon Iron Company.

## PITTSBURGH AND ALLEGHENY COUNTY.

Allegheny, Monongahela and Birmingham Iron Works, Oliver Brothers & Phillips, Pittsburgh, Allegheny county. Lower mills situated at Wood's Run Station, Allegheny City; upper mills situated on Tenth and Fifteenth sts., South Side, Pittsburgh. Built in 1866, 1864, and 1836, respectively; 107 single puddling furnaces, 23 heating furnaces, 3 rotary squeezers, and 14 trains of rolls; product, bar iron, plate iron, skelp iron, light T rails, etc., part of which is used in the production of wrought-iron hardware, consisting of bolts, nuts, washers, hinges, etc.; annual capacity, 97,500 net tons.

American Iron Works, Jones & Laughlins, Pittsburgh. Built in 1852; 76 single puddling and 3 scrap furnaces, 30 heating furnaces, 21 trains of rolls, and 63 nail machines; product, bars, nails, hoops, railroad spikes, plates, sheets, cold-rolled shafting, and 8 to 40-lb. T rails; annual capacity, 65,000 net tons.

Anchor Nail and Tack Works, Chess, Cook & Co., Pittsburgh. Built in 1842; 24 single puddling furnaces, 6 heating furnaces, 4 trains of rolls, 96 nail machines, 65 tack machines, and 2 hammers; product, spikes, nails, tacks, and American and Swedish plates; annual capacity, 15,000 net tons.

Black Diamond Steel Works, Park, Brother & Co., Pittsburgh. Established in May, 1862; 1 double Swindell gas puddling and 6 single puddling furnaces, 1 Siemens gas rotator for making iron directly from the ore, 3 forge fires, 56 heating and annealing furnaces, 10 trains of rolls (one 8, one 9, one 10, one 12, one 14, three 16, one 18, and one 26-inch), 32 steam hammers (smallest, 4 cwt., largest, 17 tons), 1 helve hammer, 7 steel-cementing furnaces, and two 42-pot, two 24-pot, one 30-pot, and three 48-pot Siemens steel-melting furnaces; 306 pots can be used at each heat; two 12-gross-ton Siemens open-hearth steel furnaces, made their first ingots April 15, 1880; 32 shearing machines, 42 steam boilers, and 15 engines; product, all varieties of crucible and open-hearth cast steel; annual capacity, 45,000 net tons. Brands, "Black Diamond" and "Corona."

Byers (A. M.) & Co., Pittsburgh. Built in 1862-3; 26 puddling furnaces, 6 heating furnaces, 1 scrap furnace, and 3 trains of rolls (one 16, one 18, and one 20-inch); product, bars, plates, sheets, shafting, and skelp iron; annual capacity, 15,000 net tons. Also, a galvanizing department and 2 pipe mills, to make lap and butt welded wrought iron gas, steam, and water pipe, oil well tubing, casing, boiler flues, etc.

Clinton and Millvale Rolling Mills, Graff, Bennett & Co., Pittsburgh. Two mills: Clinton on the South Side, and Millvale at Bennett Station, on W. P. R. R. Clinton was built in 1846; 26 single puddling furnaces, 10 heating furnaces, 6 trains of rolls, and 41 nail machines. Millvale was built in 1850, burned December 11, 1881, and rebuilt in 1882; 10 Danks rotary puddling furnaces, 21 single and 2 double puddling furnaces, 16 heating furnaces, 8 trains of rolls, and 1 hammer. Product, bars, sheets, plates, and nails; total annual capacity, 35,000 net tons. *See Fort Pitt Iron and Steel Works. See Allegheny County Furnaces.*

Crescent Steel Works, Miller, Metcalf & Parkin, Pittsburgh. Built in 1866; 10 heating furnaces, 6 trains of rolls, 3 steel-cementing furnaces, 24 steel-melting holes, four 24-pot Siemens melting furnaces, and 10 hammers; also, one forge for making iron for their own use; 144 pots can be used at each heat in steel works; product, hammered and rolled bar steel, and cast, spring, and edge-tool steel; specialty, fine steel; annual capacity, 6,000 net tons. Brand, "Crescent."

Crown Steel Works, Cassidy & Co., Demmler P. O., Allegheny county. Works in McKeesport borough. Established in 1875 by Jones, Ingold & Co.; one 24-pot Siemens steel-melting furnace, 4 heating furnaces, and 4 Bement hammers of 700, 1,000, 1,200, and 2,500 pounds weight of heads respectively; can use 24 pots at each heat in steel works; product, tool steel of all kinds; annual capacity, 1,400 net tons. Formerly called Pitt Steel Works.

Eagle Rolling Mill, J. W. Friend & Co., Pittsburgh. Built in 1848; 17 single puddling furnaces, 4 heating furnaces, 3 steel-heating furnaces, and 4 trains of rolls (one 20-inch muck, one 16-inch bar, one 20-inch nail plate, and one 20-inch sheet); the nail-plate train is now used for breaking down rails, and the sheet mill is used for rolling plow steel; product, muck bar, bar iron, and plow steel.

Edgar Thomson Steel Works, Carnegie Brothers & Co. Limited, Bessemer Station, Allegheny county. Branch office and post-office address, 48 Fifth avenue, Pittsburgh. Began operations in August, 1875; three 10-gross-ton converters; 6 cupolas, 40 x 8; 4 spiegel cupolas, 40 x 2; two 12-ton cupola ladles; 5 No. 7 Baker blowers and 3 blowing engines of Mackintosh, Hemphill & Co. type; 1 steam and 2 hydraulic hoists; 28 tubular boilers, 15 x 5, and 16 flue boilers, 30 feet x 50 in.; 28 gas producers; 11 Siemens heating furnaces; two 3-high blooming mills (one 32 and one 36-inch); 2 shears and one 3-ton hammer for shearing and clipping blooms; one 23-inch 3-high rail train; forge, containing one 6-ton hammer and 2 heating furnaces, and machine and smith shops attached; product, only Bessemer steel in the several forms of rails, blooms, and billets; daily capacity, double turn, 750 gross tons ingots, and 650 gross tons rails and billets. First blow was made August 26, 1875, and first rail rolled September 1, 1875. Brand, "Edgar Thomson Steel." Use the best quality of Bessemer pig iron, containing not over 0.10 per cent. of phosphorus.

Thos. M. Carnegie, Chairman ; D. A. Stewart, Secretary and Treasurer ; Wm. R. Jones, General Superintendent. *See Union Iron Mills. See Furnaces.*

Elba Iron and Bolt Company Limited, No. 3 Smithfield st., Monongahela House, Pittsburgh. Works at Elba Station, Baltimore and Ohio Railroad. Built in 1862 ; 24 single puddling furnaces, 7 heating furnaces, and 8 trains of rolls (one 8, one 10, five 18-inch, and one "universal" mill) ; product, bolts, nuts, merchant bar, railroad supplies, skelp iron, etc. ; annual capacity, 20,000 net tons. Formerly called Pittsburgh Bolt Works. C. Donnelly, Chairman ; J. P. Speer, Treasurer ; John Scully, Jr., Secretary.

Etna Iron Works, Spang, Chalfant & Co., Pittsburgh. Built in 1828 ; 27 single puddling furnaces, 9 heating furnaces, 19 nail machines, and 5 trains of rolls (one 8, one 12, two 16, and one 18-inch) ; product, sheets, plates, rods, nails, bars, and tubing.

Fort Pitt Iron and Steel Works, Graff, Bennett & Co., Pittsburgh. Built in 1862 ; 21 puddling furnaces, 18 heating furnaces, 7 hammers, two 30-pot Siemens steel-melting furnaces, and 8 trains of rolls (two 22, two 16, one 12, one 9, and two 8-inch) ; 60 pots can be used at each heat in steel works ; product, plates, sheets, guide iron, bar iron, light T rails, and German and cast steel ; annual capacity, 12,000 net tons merchant iron, 4,000 tons tool steel, and 6,000 tons of special steel. *See Clinton and Millvale Rolling Mills. See Allegheny County Furnaces.*

Glendon Rolling Mill, Dilworth, Porter & Co., Pittsburgh. Built in 1857 ; 24 single puddling furnaces, 10 heating furnaces, 15 railroad spike machines, and 5 trains of rolls (two 8, one 10, and two 16-inch) ; two trains being "continuous" trains for spike iron ; product, railroad and marine spikes ; annual capacity, 30,000 net tons. Brand, "Dilworth, Porter & Co."

Glenwood Steel Works, Leishman, Gordon & Snyder, Pittsburgh. Works at Glenwood Station, on B. & O. R. R. One 5-gross-ton Siemens open-hearth steel furnace, built by the Blair Iron and Steel Company in 1879 ; product, steel ingots.

Hussey, Binns & Co., Pittsburgh. Steel plant built in 1875 ; one 24-pot Siemens furnace, 3 sets of rolls, 14 heating furnaces, 1 steam hammer, 3 helve hammers, and numerous machines used in shovel-making ; product, crucible cast steel, used by the firm in making shovels, spades, and scoops.

Hussey, Howe & Co. Limited, Pittsburgh. Built in 1859 ; 16 single puddling furnaces, 26 heating furnaces, 14 hammers, 36 two-pot coke steel furnaces, six 24-pot and two 30-pot Siemens furnaces, and 11 trains of rolls (one 6, one 9, one 12, five 16, two 18, and one 28-inch) ; 276 pots can be used at each heat in steel works ; product, crucible cast steel, in bars, sheets, rods, plates, and forgings of all kinds ; annual capacity, 15,000 net tons ingots. One 7-gross-ton Siemens open-hearth steel furnace, built in 1879.

Juniata Iron and Steel Works, Shoenberger & Co., Pittsburgh. Built

in 1824 and 1857; two 10-gross-ton Siemens-Martin open-hearth steel furnaces, annual capacity 9,000 net tons, one built in 1879, and one built in 1881; 29 single puddling furnaces, 14 heating furnaces, 4 annealing furnaces, 4 furnaces for heating nail plates, 1 furnace for annealing nails, 9 hammers, 9 trains of rolls (2 muck trains, one 16-inch bar, one 8-inch bar, 2 sheet trains, 1 large plate train, 1 nail-plate train, and 1 blooming-mill train), 92 nail machines, and 4 horse-shoe machines; product, nails, sheet iron, steel boiler plate, sheet steel, plate steel, fire-box steel, horse and mule shoes, horse-shoe bar, and steel blooms; annual capacity, 26,000 net tons. Brand of nails and horse and mule shoes, "Juniata;" horse-shoe bar, "Shoenberger;" sheet and plate iron, 3 grades, "Penn," "Charcoal," and "Juniata."

Kensington Iron Works, H. Lloyd, Son & Co., Pittsburgh. Built in 1828; 20 single puddling and scrapping furnaces, 6 heating furnaces, and 4 trains of rolls; product, bar, sheet, and plate iron, flat rails, and 12 to 30-lb. T rails; annual capacity, single turn, 6,000 net tons.

Keystone Rolling Mill, Keystone Rolling Mill Company Limited, Pittsburgh. Built in 1865; 27 single puddling furnaces, 5 heating furnaces, and 4 trains of rolls; product, merchant bar and skelp iron, plates, sheets, and boiler iron; annual capacity, 12,000 net tons.

La Belle Steel Works, Smith, Sutton & Co., Pittsburgh. Built in 1863; two 25-ton and two 30-ton converting furnaces, 2 double puddling furnaces, 10 forge fires, 11 heating furnaces, 24 two-pot steel-melting holes, one 36-pot and one 42-pot Siemens gas furnace, 8 hammers, and 4 trains of rolls (one 20, one 16, one 10, and one 9-inch); 126 pots can be used at each heat in steel works; product, merchant steels of every description; also, rake teeth for sulky rakes, springs, and iron and steel axles; annual capacity, 10,000 net tons. Selling agents, Wetherell Brothers, 31 Oliver st., Boston; and James C. Hand & Co., 614 and 616 Market st., Philadelphia.

Liggett Spring and Axle Company Limited, Pittsburgh. Works at Spruce and Market sts., Allegheny City. Built in 1865 and 1882; one 30-ton converting furnace, 5 double and 3 single heating furnaces, one 16-inch train of rolls, and 11 hammers; make German steel, which is used in spring works; product, buggy and wagon springs and axles; annual capacity of finished goods, 2,200 net tons.

Linden Steel Company Limited, 173 Wood st., Pittsburgh. Works at Linden Station, on B. & O. R. R. Open-hearth steel works built in 1879, containing one 10-gross-ton and one 7-gross-ton Siemens open-hearth steel furnace, 1 "universal" blooming and slab mill, one 18-inch train of rolls, and one 10-inch train; product, open-hearth steel ingots, blooms, billets, and slabs; also, spring, tire, rod, machinery, agricultural, and merchant steel of every description; unusual shapes a specialty; daily capacity, 55 net tons. W. J. Lewis, Chairman; Henry Lloyd, Secretary; M. D. W. Loomis, Treasurer.

Mackintosh, Hemphill & Co. Limited, Pittsburgh. Building open-



hearth steel department in 1882; two 7-gross-ton Siemens open-hearth furnaces; product, steel castings.

McKeesport Iron Works, W. D. Wood & Co., 111 Water st., Pittsburgh. Works at McKeesport, Allegheny county. Built in 1851; 12 forge fires, 12 single puddling furnaces, 22 heating furnaces, 6 trains of rolls, and 5 hammers; product, sheet iron, both common and planished; specialty, planished sheet iron; annual capacity, 8,000 net tons. Trade-mark, a bear in the talons of an eagle.

Miller Forge and Iron Company, Duquesne Way, Pittsburgh. Building a large forge and rolling mill at Rankin Station, on B. & O. R. R., to make forgings of any capacity or weight.

National Tube Works Company, McKeesport and Pittsburgh. Three mills: National Rolling Mill No. 1 is situated at McKeesport; built in 1879; 15 Siemens double puddling furnaces, 7 heating furnaces, 1 plate mill, and 1 "continuous" mill. National Rolling Mill No. 2 is situated at Pittsburgh; formerly called Ormsby Iron Works; built in 1863; 20 single puddling furnaces, 5 heating furnaces, and 2 trains of rolls (16 and 10-inch). Product of the above mills, boiler tube and pipe iron and boiler plate; annual capacity, 45,000 net tons. Brand, "National." National Forge and Iron Works, mill No. 3, situated at McKeesport; built in 1881; 12 forge fires, 1 run-out fire, 1 steam hammer, and 1 set of slab rolls; product, blooms and billets for boiler tubes and boiler plate iron; annual capacity, 8,000 net tons. James C. Converse, President; P. W. French, Secretary; Wm. S. Eaton, Treasurer; J. H. Flagler, Managing Director.

Nellis's Agricultural Works, Nellis, McIntire & Co., Pittsburgh. Built in 1870; 6 forge fires, 9 heating furnaces, 6 hammers, and five 4-pot steel-melting holes; 20 pots can be used at each heat in steel works; product, all kinds of steel and iron for agricultural purposes, tool-steel castings especially adapted to plow shares and plow purposes, etc.

Pennsylvania Iron Works, Everson, Macrum & Co., Pittsburgh. Built in 1844; 14 puddling furnaces, 8 heating furnaces, and 5 trains of rolls (2 sheet, 1 bar, 1 guide, and 1 muck train); product, bar, sheet, and guide iron; annual capacity, 6,000 net tons. *See Scottdale Rolling Mill. See Bituminous Furnaces.*

Pittsburgh Bessemer Steel Company Limited, 87 Wood st., Pittsburgh. Works at Munhall Station, P. V. & C. R. R. Built in 1880-1; two 4-gross-ton converters, one 30-inch blooming mill, one 23-inch rail train, with billet train attached; product, Bessemer steel blooms, billets, and rails; daily capacity, 325 net tons of ingots. First blow made March 19, 1881. Managers, W. H. Singer, Chairman; Reuben Miller, Secretary and Treasurer; C. C. Hussey, W. G. Park, and Wm. Clark.

Pittsburgh Forge and Iron Company, Tenth st. near Penn avenue, Pittsburgh. Built in 1864; 35 single puddling furnaces, 13 heating furnaces, 4 trains of rolls, and 5 hammers; product, bar, rod, band, oval and half oval iron, fish plates, track bolts, and hammered car and locomotive axles; total annual capacity, 29,000 net tons.



Brands, "P. F. & I." and "V. C." Calvin Wells, President and Treasurer; James K. Verner, Secretary.

Pittsburgh Iron Works, J. Painter & Sons, Pittsburgh. Built in 1833; 67 single puddling furnaces, 15 heating furnaces, and 13 trains of rolls (six 8-inch, three 10, one 12, one 16, and two 20-inch); product, principally oil, whisky, and trunk hoops; also, hoops for pails, tubs, and wooden ware, cotton ties, lock iron, stone saws, merchant bands, and hinge iron; annual capacity, 33,000 net tons. Brand, "Painter."

Pittsburgh Steel Casting Company, Twenty-sixth and Railroad sts., Pittsburgh. Built in 1871; two 24-pot Siemens furnaces, one 24-pot coke furnace, and 7 annealing furnaces; 72 pots can be used at each heat in steel works; product, cast steel castings; annual capacity, 4,000 net tons. One 5-ton Bessemer steel converter, built in 1881; first blow made August 26, 1881; 1 heating furnace and 1 "universal" mill; product, steel castings and billets. James Irwin, President; John Irwin, Jr., Secretary and Treasurer; Wm. Hainsworth, Superintendent.

Pittsburgh Steel Works, creditors of Siemens-Anderson Steel Company, Ross st. and First avenue, Pittsburgh. Built in 1845; five 24-pot Siemens furnaces, 3 sets of coke-hole furnaces, 6 converting furnaces (weekly capacity, 90 net tons), 3 single puddling furnaces, 8 forge fires, 25 heating furnaces, 16 hammers, a rake-tooth shop, and 10 trains of rolls (two 20-inch plate, one 16-inch bar, one "universal" train, one 16-inch spring, two 16-inch sheet, and one 8, one 9, and one 10-inch guide); 150 pots can be used at each heat in the steel works; product, cast and German plow steel, plate steel, and best edge-tool steel; annual capacity, 10,000 net tons. A plant of 3 Siemens rotators, to make blooms by direct process from iron ore, was added in 1881.

Sable Iron and Nail Works, Zug & Co., Pittsburgh. Built in 1845; 34 single puddling furnaces, 11 heating furnaces, 6 trains of rolls, and 59 nail machines; product, merchant bar iron, including heavy sizes flat bars and squares made by the "universal" rolls, and nails; annual capacity, 18,000 net tons. Brand, "Sable."

Singer, Nimick & Co. Limited, Pittsburgh. Built in 1848; 8 puddling furnaces, 8 converting furnaces, 10 steam hammers, one train of muck rolls, 4 trains of bar rolls, 4 trains of sheet rolls, and one 10-gross-ton Siemens open-hearth steel furnace; 258 pots can be used at each heat in steel works; annual ingot capacity, 23,000 net tons; product, tool, saw, boiler, and agricultural steel; also, carriage springs and axles. W. H. Singer, Chairman; George Singer, Jr., Secretary and Treasurer. General agents for the Eastern States, Hogan & Burrows, 59 Beekman st., New York.

Sligo Iron Works, Phillips, Nimick & Co., Pittsburgh. Built in 1825; 27 puddling furnaces, 10 heating furnaces, 2 hammers, and 5 trains of rolls (one 12, one 16, one 18, one 24, and one 30-inch); product, bar, sheet, and plate iron, and light T rails; fire-box iron a specialty;

make "Sligo" bars and "Tyrone" refined iron; boiler heads and flue holes flanged to order; annual capacity, 16,000 net tons.

Soho Iron Mills, Moorhead & Co., Pittsburgh. Built in 1859; 12 knobbling fires, 13 single puddling furnaces, 6 heating furnaces, 4 sheet furnaces, 3 pair furnaces, 5 annealing furnaces, 10 boiling furnaces, one 6-tuyere refinery, 8 trains of rolls (2 muck and 6 sheet trains), and 1 hammer; product, galvanized, Juniata, charcoal, and common sheet and plate iron; annual capacity, 10,000 net tons.

Solar Iron Works, Wm. Clark & Co., Pittsburgh. Built in 1869; 21 single puddling furnaces, 5 heating furnaces, and 5 trains of rolls (one 7-inch hoop, two 8-inch hoop, one 12-inch bar, and one 18-inch muck); product, hoop, band, and scroll iron; annual capacity, 10,500 net tons.

Spang Steel and Iron Company Limited, Pittsburgh. Office, 66, 68, and 70 Sandusky st., Allegheny City. Post-office address, Pittsburgh. Built in 1880-1; one 7-gross-ton Pernot steel furnace, one 7-gross-ton Siemens-Martin open-hearth steel furnace, and 4 trains of rolls (one 30-inch bloom, one 30-inch "universal," one 18-inch bar, and one 112 in. x 31 in. plate train); product, open-hearth steel billets, bars, and plates. Hugh McNeil, Chairman; John C. Porter, Secretary and Treasurer.

Star Iron Works, Lindsay & McCutcheon, Allegheny City, Allegheny county. Built in 1862; 21 puddling furnaces, 7 heating furnaces, and 6 trains of rolls, (three 8, one 10, one 12, and one 18-inch); product, cotton ties, hoop, band, and horse-shoe iron; annual capacity, 12,000 net tons. Brand, "Star." Adding a new forge, with 16 puddling furnaces.

Superior Rolling Mill, executors of Andrew Kloman, lessees, Pittsburgh. Built in 1865; 30 single puddling furnaces, 16 heating furnaces, and 4 trains of rolls; product, iron and steel structural material; special facilities for the manufacture of heavy steel rolled shapes and unusual shapes and sizes in both iron and steel, tees, angles, etc. This mill formerly made iron rails exclusively, but is now run on structural material only. A. C. Kloman and C. H. Kloman, Testamentary Trustees.

Union Forge and Iron Mill, Wilson, Walker & Co. Limited, Twenty-ninth and Railroad sts., Pittsburgh. Built in 1862; 30 single puddling furnaces, 18 heating furnaces, 16 hammers, and 5 trains of rolls (one 18, one 15, and one 10-inch, and 2 "universal" plate trains); product, railroad specialties and bridge work, angles and peculiar shapes, and bar iron; annual capacity, 17,000 net tons. John T. Wilson, Chairman; James R. Wilson, Secretary; John Walker, Treasurer.

Union Iron Mills, Carnegie Brothers & Co. Limited, Pittsburgh. Office and mills, Thirty-third st. Built in 1862; 32 single puddling furnaces, 8 double and 4 single Siemens heating furnaces, 1 single reverberatory heating furnace, and 8 trains of rolls; product, beams, channels,

tees, angles, plates, and bar iron; annual capacity, 45,000 net tons.  
*See Edgar Thomson Steel Works. See Furnaces.*

United States Iron and Tin Plate Works, United States Iron and Tin Plate Company, 116 Smithfield st., P. O. Box 24, Pittsburgh. Works at Demmler Station, McKeesport, Allegheny county. Built in 1873-4; 5 puddling and 2 heating furnaces, 4 knobbling fires, 2 double sheet-mill furnaces, 3 annealing furnaces, 4 tinning stacks (not in operation at present,) 1 hammer, 1 train of bar rolls, 2 trains of sheet rolls, and 3 sets of cold rolls; product, specialties in refined and charcoal polished black plates and Bessemer steel plates; annual capacity for black plates and tinplates, 3,300 net tons. Black plates branded "U. S. A. M." J. H. Demmler, President; D. J. Thomas, Vice-President; H. H. Demmler, Treasurer; W. C. Cronmeyer, Secretary. Eastern agents, Ely & Williams, Philadelphia and New York.

Vesuvius Iron and Nail Works, Moorhead, Brother & Co., Pittsburgh. Office, 64, 66, and 68 Anderson st., Allegheny City. Post-office address, Pittsburgh. Works at Sharpsburgh, Allegheny county. Built in 1846; 24 single puddling furnaces, 10 heating furnaces, 6 trains of rolls, and 50 nail machines; product, bar, boiler, skelp, sheet, and tank iron, rods, hoops, and nails; annual capacity, 16,000 net tons. Brand, "Vesuvius."

Vulcan Forge and Iron Works, Long & Co., Pittsburgh. Works near McKee's Rocks, P. & L. E. R. R. Forge built in 1877; rolling mill built in 1882; 14 single puddling furnaces, 5 forge fires, 7 heating furnaces, 3 trains of rolls (one 9, one 15, and one 18-inch), and 3 hammers; product, bar iron, bridge work, and iron and steel forgings, including axles; annual capacity, 8,000 net tons of finished rolled iron and 2,500 net tons of forgings. Brand, "Vulcan."

Wayne Iron and Steel Works, Brown & Co., Pittsburgh. Built in 1829; 28 puddling furnaces, 9 heating furnaces, 5 trains of rolls, 4 steam hammers, four 48-pot steel-melting furnaces, and one 45-ton converting furnace; 192 pots can be used at each heat in steel works. Product: Iron—bars, rods, sheets, light T rails, splice bars, and boiler plate. Steel—agricultural steels of all kinds and cast tool steel. Annual capacity, 15,000 net tons of iron, and 7,000 net tons of crucible steel. Brands, "Wayne" and "U. S."

Number of rolling mills and steel works in Pittsburgh and Allegheny county: 51 completed, and 2 building. Of these, 8 are rail mills, 6 making only light rails; 12 are crucible steel works; 1 makes cemented steel only; 3 are Bessemer steel works; 7 are open-hearth steel works, and 1 open-hearth steel works is building.

#### WESTERN PENNSYLVANIA, EXCEPT ALLEGHENY COUNTY.

Apollo Iron Works, Laufman & Co., Apollo, Armstrong county. Built in 1850; 9 single puddling furnaces, 6 heating furnaces, 2 annealing furnaces, 5 charcoal fires, 1 hammer, and 6 pairs of rolls; product, fine sheet iron; annual capacity, 3,300 net tons. Specialties, pan, elbow,

lock, shovel, show card, etc. Brand, "Apollo." Intend to erect a new rolling mill in 1882, which will make the total output of the works 7,800 net tons of fine sheet iron per annum.

Atlantic Iron and Nail Works, Kimberly, Carnes & Co., Sharon, Mercer county. Built in 1867; 32 puddling furnaces, 6 heating furnaces, 6 trains of rolls, and 40 nail machines; product, bar, plate, hoop, and rod iron, and nails; annual capacity, 20,000 net tons. *See Shenango Valley Furnaces. See Greenville Rolling Mill.*

Beaver Falls Rolling Mill, McKee, Anderson & Co. Limited, 56 Fifth avenue, Pittsburgh. Works at Beaver Falls, Beaver county. Built in 1879; 12 single puddling furnaces, 2 heating furnaces, 1 annealing furnace, 2 trains of rolls (14 and 22-inch), and 1 double-acting 5,000-lb. steam hammer; product, sheet iron, refined blooms, bars, and billets for steel-making; annual capacity, 7,200 net tons. Brand, "Boulding." J. D. Anderson, Chairman; J. R. McKee, Treasurer; T. H. Boyd, Secretary; Wm. Rogers, formerly of Leechburg, Manager.

Beaver Falls Steel Works, Beaver Falls, Beaver county. Built in 1875; 1 24-pot Siemens steel furnace, 1 Siemens heating furnace, 3 other heating furnaces, 2 converting furnaces, 3 steam hammers, 4 forge fires, and 2 trains of rolls (one 16 and one 9-inch); 24 pots can be used at each heat in steel works; steam and water power; product, plow, spring, cutlery, file, and tool steel; annual capacity, 1,200 net tons. Brand, "Beaver." Works were destroyed by fire on August 29, 1881, but were immediately rebuilt, and are now in full operation. James M. May, Treasurer.

Cambria Iron and Steel Works, Cambria Iron Company, Johnstown, Cambria county. Office, 218 South Fourth st., Philadelphia. Built in 1853; 20 double puddling furnaces, 35 heating furnaces, and the following trains of rolls: 21-inch steel rail mill, 5 sets; 18-inch iron rail mill, 2 sets; 12-inch rail mill, 3 sets; 16-inch merchant mill, 3 sets; 22-inch puddle mill, 6 sets; 21-inch puddle mill, 5 sets; 30-inch steel billeting mill, 1 set; 42-inch steel ingot blooming mill, 1 set; and wire-rod mill, 9 sets; total, 35 sets. Bessemer steel works made their first blow July 10, 1871: two 6½-gross-ton converters. Two 12-gross-ton Siemens open-hearth steel furnaces with the Pernot improvement built in 1878-9. Product, iron and steel rails and steel wire rods; total capacity per annum, 168,000 net tons iron and steel rails, and 20,000 net tons steel in other shapes. Officers in Philadelphia: E. Y. Townsend, President; Dr. Charles Stewart Wurts, Vice-President; Wm. S. Robinson, Secretary; John T. Killé, Treasurer. Officers at Johnstown: D. J. Morrell, General Manager; George Webb, General Agent. *See Bituminous Furnaces.*

Canonsburg Iron Company Limited, Canonsburg, Washington county. Building a mill to roll sheet iron. John Ewing, President; A. L. Meyran, Secretary; Charles H. Taylor, Treasurer.

Eames Petroleum Iron Works, Eames Oil Fuel Process Company, Titusville, Crawford county. Built in 1879; 1 single and 1 double

puddling furnace, 1 heating furnace, one 16-inch train of rolls, and 2 hammers; fuel, petroleum only; product, blooms for boiler plate, sheet iron, and steel, made from scrap and pig iron; annual capacity, 10,000 net tons. Lyman A. Cook, President, Woonsocket, R. I.; C. J. Eames, Treasurer, 21 and 23 Nassau st., New York; John A. Bales-tier, Secretary, New York.

Erie Rolling Mill, Mount Hickory Iron Company Limited, Erie, Erie county. Built in 1872; 15 single and 2 double puddling furnaces, 4 heating furnaces, and 4 trains of rolls (one 8, one 10, one 16, and one 20-inch); product, bar iron; annual capacity, 14,000 net tons. Wm. L. Scott, Chairman; Wm. S. Brown, Secretary and Treasurer. *See Shenango Valley Furnaces.*

Etna Iron Works Limited, New Castle, Lawrence county. Consolidated November 1, 1874, from Etna Iron Company and Onondaga Iron and Nail Company; 2 double and 21 single puddling furnaces, 5 heating furnaces, 55 nail machines, and 4 trains of rolls (two 18, one 16, and one 8-inch); product, nails and merchant iron. P. L. Kimberly, President; A. W. Thompson, Secretary. *See Shenango Valley Furnaces.*

Gautier Steel Department of Cambria Iron Company, (formerly Gautier Steel Company Limited,) Johnstown, Cambria county. Works erected in 1878. Rolling mill has 15 heating furnaces, 2 hammers, and 7 trains of rolls (two 9, two 12, one 18, and two 20-inch); special attention given to the manufacture of all steel used in agricultural implements and tools; also, spring, tire, toe-calk, and machinery steel. Other departments are, carriage-spring works, railroad-spring works, finger-bar and rake-tooth shops, and harrow-tooth and finished plow shops. Annual capacity of all these departments, 25,000 net tons. The wire mill, in addition to ordinary grades of wire, makes a specialty of galvanized fence wire and tinned broom and mattress wires; annual capacity, 25,000 net tons. Philip E. Chapin, General Superintendent, Johnstown; Geo. V. Smith, Manager Eastern office, 13 Cedar st., New York; W. B. Corinth, Manager Philadelphia office, 523 Arch st.

Greenville Rolling Mill, Kimberly, Carnes & Co., Sharon. Works at Greenville, Mercer county. Built in 1871; 25 single puddling furnaces, 2 heating furnaces, 1 old-rail reheating furnace, and 4 trains of rolls (one 8, one 10, and two 16-inch); product, hoop, band, and bar iron; annual capacity, 12,000 net tons. *See Shenango Valley Furnaces. See Atlantic Iron and Nail Works.* \*

Kittanning Iron Company Limited, Kittanning, Armstrong county. Built in 1848; 30 single puddling furnaces, using natural gas for fuel, 5 heating furnaces, 3 trains of rolls, and 1 squeezer; product, bar iron; annual capacity, 12,000 net tons. James Mosgrove, Chairman; Henry A. Colwell, Secretary and Treasurer; Henry King, General Superintendent; Charles T. Neale, General Manager. *See Bituminous Furnaces.*

- Leechburg Sheet Iron and Tin Plate Works, Kirkpatrick & Co., Leechburg, Armstrong county. Office, 143 First avenue, Pittsburgh. Built in 1872; 6 single puddling furnaces, 6 knobbling fires, 2 heating furnaces, 2 trains of rolls, and 1 hammer; product, finest quality of stamping irons, and tea tray, show card, spoon, shovel, trunk, taggers, Juniata, and lock iron, cold-rolled sheet steel, pan and elbow iron, and tin and terne plates; annual capacity, 3,100 net tons. Use natural gas for fuel. Brand, "Leechburg."
- New Castle Iron Works, Reis Brothers, New Castle, Lawrence county. Built in 1873; 3 double and 10 single puddling furnaces, 6 heating furnaces, 4 trains of rolls, and 1 hammer; product, light and heavy sheet iron from hammered blooms; annual capacity, 6,000 net tons. *See Shenango Valley Furnaces.*
- Old Fort Iron Mills, Magee & Co., Brownsville, Fayette county. Completed December 1, 1873; 8 puddling and 3 heating furnaces, 2 trains of rolls, and one 5-ton steam hammer; product, hammered blooms and billets and rolled sheet, bar, and guide iron; annual capacity, 6,000 net tons.
- Scottdale Rolling Mill, Everson, Macrum & Co., Pittsburgh. Works at Scottdale, Westmoreland county. Built in 1873; 8 single and 4 double puddling furnaces, 4 heating furnaces, and 3 trains of rolls; product, muck bar and sheet iron; annual capacity, 10,000 net tons. *See Pennsylvania Iron Works, Pittsburgh. See Bituminous Furnaces.*
- Sharon Iron Company, (Buhl & Son,) Sharon, Mercer county. Built in 1862; 29 puddling furnaces, 12 heating furnaces, 6 trains of rolls (two 8, one 16, two 18, and one 20-inch), and 46 nail machines; product, bar, hoop, and sheet iron, railroad and boat spikes, light T rails, and nails; annual capacity, 17,000 net tons. Brand, "Westerman." Geo. H. Taylor, Manager. *See Shenango Valley Furnaces.*
- Shenango Iron Works, estate of Wm. H. Brown, New Castle, Lawrence county. Built in 1848; 27 single puddling furnaces, 9 heating furnaces, 5 trains of rolls, and 55 nail machines; product, bars, light T rails, sheets, bands, wrought spikes, and nails; annual capacity, 15,000 net tons. *See Shenango Valley Furnaces.*
- Stewart Iron Works, Stewart Iron Company Limited, Sharon, Mercer county. Built in 1870; 16 single puddling furnaces, 2 hammers, and 2 trains of 18-inch rolls; product, muck bar, and blooms for steel purposes; annual capacity, 9,000 net tons. David Stewart, Chairman, 119 Broadway, New York; Fayette Brown, General Agent, Cleveland; Theo. F. Hicks, Secretary, New York; G. P. Lloyd, Treasurer, New York; Samuel McClure, Agent, Sharon, Pa. *See Shenango Valley Furnaces.*
- West Penn Steel Works, Joseph G. Beale, Leechburg, Armstrong county. Built in 1881; one 7-gross-ton Siemens open-hearth steel furnace, 1 heating furnace, and 1 hammer; fuel, natural gas almost entirely; product, very low carbon steel, for fine sheets and wire; annual capacity, 5,000 net tons. Pittsburgh office, 106 Fourth avenue.



Wheatland Rolling Mills, Wheatland Bessemer Steel Company, Wheatland, Mercer county. Built in 1872; 12 double puddling furnaces, 14 heating furnaces, and 3 trains of rolls; product, rails, bars, and sheet iron; annual capacity, 45,000 net tons. J. W. Friend, President; J. C. Arnold, Treasurer. Was started in November, 1881, after an idleness of 7 years. *See Shenango Valley Furnaces.*

Wheeler Iron Company, Sharon. Rolling mill at West Middlesex, Mercer county. Put in operation June 1, 1873; 18 single puddling furnaces, 2 heating furnaces, 2 trains of rolls (one 10 and one 18-inch), and 1 hammer; product, muck bar, blooms, and bar iron, made from Bessemer pig iron, and sold principally to steel manufacturers; chain links, all sizes, ready for welding, a specialty; annual capacity, 9,000 net tons. E. A. Wheeler, Manager. *See Shenango Valley Furnaces.*

Number of rolling mills and steel works in Western Pennsylvania, except Pittsburgh and Allegheny county: 21 completed, and 1 building. Of these, 4 are rail mills, 2 making only light rails; 1 makes crucible steel, 2 make open-hearth steel, and 1 makes Bessemer steel.

Total number of rolling mills and steel works in Pennsylvania: 174 completed, and 6 building. Of these, 28 are rail mills, 11 making only light rails; 18 make crucible steel; 12 make open-hearth steel, and 3 open-hearth steel works are building; 7 make Bessemer steel, and 1 Bessemer steel works is building; 1 makes cemented steel only, and 2 make steel castings solely.

### DELAWARE.

Christiana Iron Works, J. & R. Meily, lessees, Wilmington, New Castle county. Built in 1873-4; 4 double puddling furnaces, 3 heating furnaces, 2 trains of rolls, and 2 hammers; product, boiler plate, flue, ship, and tank iron. *See Lower Susquehanna Furnaces, Pennsylvania. See Bloomeries, Pennsylvania.*

Delaware Iron Works, Alan Wood & Co., Wooddale, New Castle county, near Wilmington. Office, 519 Arch st., Philadelphia. Built in 1812; 1 grate and annealing furnace and one 20-inch train of rolls; water-power; bars made at Conshohocken, Pa., for these works; product, sheet iron; annual capacity, 550 net tons. *See Schuylkill Iron Works, (Rolling Mills,) Eastern Pennsylvania.*

Diamond State Iron Company, Wilmington. New York office, Coal and Iron Exchange, 21 Cortlandt st. Two mills: Diamond State Mill, built in 1853; 1 single and 5 double puddling furnaces, 1 scrap furnace, 5 heating furnaces, and 4 trains of rolls (one 8, one 10, and two 18-inch); product, merchant bar iron, fish plates, railroad spikes, bolts and nuts, and bridge bolts; annual capacity, 16,000 net tons. Old Ferry Mill, built in 1868; 3 double puddling furnaces, 4 heating furnaces, one 16-inch puddle mill, one 18-inch bar mill, and one 9-inch bar mill; product, horse shoes, fish plates, and all kinds of bar iron; annual capacity, 10,000 net tons. H. Mendinghall, President;



Clement B. Smyth, Vice-President and Treasurer; George W. Todd, Secretary.

Edge Moor Iron Company, Wilmington. Philadelphia office, 1600 Hamilton st. Rolling mill first put in operation in February, 1882; one 40-gross-ton Ponsard gas heating furnace and one 30 in. x 104 in. plate train; product, iron plates. Wm. Sellers, President; John Sellers, Jr., Vice-President; Eli Garrett, Secretary and Treasurer; George H. Sellers, General Superintendent.

Marshallton Iron Works, John R. Bringhurst, Marshallton, New Castle county. Built in 1836; steam mill built in 1880; 1 single and 1 double puddling furnace, 2 grate heating furnaces, 1 reverberatory heating furnace, 1 annealing furnace, 2 trains of sheet rolls, and 1 train of bar rolls; steam-power drives one train and water-power the others; product, bar and sheet iron; annual capacity, 2,200 net tons of bar iron and 1,350 net tons of sheet iron.

Marshall Iron Company, Newport, New Castle county. Built in 1873; galvanizing works added in 1877; 4 single puddling furnaces, 1 reverberatory heating furnace, 2 grate furnaces, 1 annealing furnace, 1 rotary squeezer, and 3 trains of rolls; product, black sheet iron; annual capacity, 1,500 net tons. Edward Mendinghall, President; Joseph W. H. Watson, Secretary and Treasurer.

Minquas Iron Works, McCullough Iron Company, Wilmington. Built in 1873, and first put in operation in 1875; 6 single puddling furnaces, 2 reverberatory heating furnaces, 3 grate heating furnaces, 1 annealing furnace, 5 trains of rolls, and 1 hammer; product, "Harvey's patent cleaned" sheet iron; annual capacity, 3,000 net tons. D. McDaniel, President; E. McCullough, Vice-President; Henry Whiteley, Treasurer. Represented in Philadelphia by the McDaniel and Harvey Company, 1600 Washington avenue. *See Maryland Rolling Mills. See Bloomaries.*

Riverside Rolling Mill Company, lessee, New Castle, New Castle county. Mill removed from Bristol, Pa., to New Castle in 1874-5; enlarged in 1879; 4 double puddling furnaces, 3 heating furnaces, 1 train of 3-high plate rolls, 1 train of 2-high plate rolls, 1 train of muck rolls, and 1 hammer; product, boiler plate, tube, and skelp iron; annual capacity, 5,000 net tons. B. T. Longstreth, President; Mifflin Wheeler, Treasurer; Henry Bright, Secretary.

Wilmington Plate Iron Rolling Mills, Seidel, Hastings & Co., Wilmington. First mill built in 1845; second, in 1870; another mill, for tops and bottoms only, with a train of rolls 17 in. x 48 in., was built in 1875; 5 forge fires, 4 heating furnaces, 3 trains of rolls, and 3 hammers; product, boiler, ship, and tank iron; annual capacity, 5,000 net tons.

Number of rolling mills in Delaware: 9.

## MARYLAND.

Abbott Iron Works, Abbott Iron Company, P. O. Box 185, Baltimore.

(1) Plate mills, built in 1851; 6 double puddling and 8 heating fur-

naces, 1 hammer, and 5 trains of rolls; 2 sets Lauth's patent 3-high rolls, with facilities for rolling plates to 100 inches in width, and girder plates 40 feet in length. (2) Rail mill, built in 1865; 17 double puddling and 10 heating furnaces, 3 trains of rolls, and 1 hammer. Product, (1) boiler, tank, boat, still, car, and bridge plates; annual capacity, 10,000 net tons. Product, (2) iron rails; annual capacity, 25,000 net tons. Charles H. Ashburner, President; J. S. Gilman, Vice-President and Treasurer. *See Furnaces in Virginia. See Bloomeries.*

Canton Iron Works, Anderson Bros. & Co., Canton, Baltimore county. Built in 1878; 3 double puddling and 2 heating furnaces, and 2 trains of rolls (one 8 and one 16-inch); product, refined merchant bar iron; annual capacity, 2,500 net tons.

Cumberland Rolling Mill, Baltimore and Ohio Railroad Company, Cumberland, Alleghany county. Rail mill built in 1870; 15 double puddling furnaces, 16 heating furnaces, 3 trains of rolls, and 3 hammers; product, rails, axles, girders, and plates; annual capacity, 33,000 net tons. Bar mill built in 1873; 4 single puddling furnaces, 6 heating furnaces, and 3 trains of rolls; product, bar and bridge iron, all sizes guide iron, bolts, rivets, spikes, and fish plates; annual capacity, 8,000 net tons. Steel rail mill projected. Wm. Robinson, Superintendent.

Cumberland Steel Works, William Hall, Cumberland, Alleghany county. Built in 1873-4; 5 heating furnaces, 1 Siemens 24-pot melting furnace, 1 blistering furnace, and 4 steam hammers; product, all sizes of hammered tool and machinery steel; annual capacity, 800 net tons. Not in operation for several years.

Locust Point Rolling Mill, Coates & Brother, Baltimore. Built in 1862; 4 double puddling furnaces, 3 heating furnaces, 2 trains of rolls, and 1 hammer; product, plate and flue iron; annual capacity, 4,500 net tons.

McCullough Iron Company, Northeast, Elkton, and Rowlandville, Cecil county. Three iron works in Cecil county: Northeast Works, at Northeast; West Amwell Works, at Elkton; and Octoraro Works, at Rowlandville. The Northeast Works were built originally in 1847; 4 single puddling and 5 heating furnaces, and 4 trains of rolls; water and steam power; product, sheet iron for galvanizing, boiled iron of the kind called "Harvey's patent cleaned," and refined and best bloom bar iron; annual capacity, 2,000 net tons of sheet iron and 6,000 tons of refined and bloom bar iron. A bloomery of 18 fires is also at Northeast, owned and operated by this company. The West Amwell Works have 3 heating furnaces, 2 trains of rolls, and smaller finishing machinery; water-power; supplied with stock from the Northeast Works; product, sheet iron for galvanizing and "Harvey's patent cleaned" sheet iron; annual capacity, 1,000 net tons. The Octoraro Works were originally built in 1829; 5 heating furnaces and 4 trains of rolls; water-power; supplied with stock from the North-

east Works; product, sheet iron for galvanizing, and "Harvey's patent cleaned" sheet iron, branded "Octoraro;" annual capacity, 2,000 net tons. Represented in Philadelphia by the McDaniel and Harvey Company, 1600 Washington avenue: D. McDaniel, President; Joseph L. McDaniel, Vice-President; Henry Whiteley, Treasurer. *See Rolling Mills in Delaware. See Bloomaries.*

Number of rolling mills and steel works in Maryland: 6. Of these, 2 are rail mills and 1 is a crucible steel works.

### DISTRICT OF COLUMBIA.

Equipment Iron Rolling Mill, (under control of Bureau of Equipment and Recruiting, United States Navy Department,) Navy Yard, Washington. Built in 1878; 7 forge fires, 2 scrap furnaces, 2 hammers, and 5 trains of rolls; product, bar and plate iron. James Wilson, Superintendent.

Number of rolling mills in District of Columbia: 1.

### VIRGINIA.

Graham's Forge, Graham & Robinson, Graham's Forge, Wythe county. Built in 1828; 3 heating furnaces, 4 trains of rolls, 5 nail machines, and 1 hammer; water-power; product, nails, and horse-shoe, tire and plate iron, blooms, and hammered iron. No iron has been rolled here for several years, and the rolling mill may be regarded as abandoned. *See Furnaces. See Bloomaries.*

James River Steel Manufacturing and Mining Company, Lynchburg. Mill situated  $4\frac{1}{2}$  miles above Lynchburg, on the Richmond and Alleghany Railroad. Built in 1867 and refitted in 1880; 4 double puddling and 6 heating furnaces, 2 spike machines, 1 rivet machine, 1 bolt machine, and 3 trains of rolls (two 18-inch and one 10-inch); water-power; product, rails, bar iron, spikes, rivets, and bolts; annual capacity, 10,000 net tons. For sale; apply to J. P. Richardson, P. O. Box 2,429, or 430 Walnut st., Philadelphia.

Lynchburg Iron Works, Lynchburg Iron Company, Lynchburg, Campbell county. Branch office, 235 Dock st., Philadelphia. Built in 1872; 1 heating furnace, 1 spike furnace, 1 spike machine, 1 bolt machine, and one 10-inch train of rolls; steam and water power; product, merchant bar and band iron, bolts, and nuts. Foundry, forge, machine shop, and bridge works operated in connection with the rolling mill. E. Burd Grubb, President; Alex. Van Rensselaer, Vice-President; John Heins, Treasurer. *See Furnaces.*

Old Dominion Iron and Nail Works, Richmond, Henrico county. Works on Belle Isle. Improved and enlarged since 1865; 15 double and 10 single puddling furnaces, 6 heating furnaces, 5 trains of rolls, 78 nail machines, 2 squeezers, and 1 hammer; water and steam power; product, merchant bar iron, cut nails, spikes, and horse shoes; annual capacity, 9,000 net tons nails, 11,000 tons rolled iron. Brand, "Old Dominion." R. E. Blankenship, Commercial Agent.

Potomac Manufacturing Company, J. B. Archer, President, 26 B st., N. E., Washington, D. C. Building a rolling mill and steel works at Alexandria, Va. The works will contain 3 puddling furnaces, 1 heating furnace, one 4-gross-ton open-hearth direct-process furnace, and a plate mill; they will be operated with vapor fuel; and they will make Washburn steel rim car-wheels, steel plates, etc.

Tredegear Iron Works, Tredegear Company, Richmond. Built in 1837; 1 double and 23 single puddling furnaces, 16 heating furnaces, and 7 trains of rolls; water-power; product, merchant bar iron, railroad axles, bridge iron, fish plates, spikes, chairs, track bolts, and horse shoes; annual capacity, 38,000 net tons. Foundry and machine shops, run by water-power, contain 3 air furnaces and 6 cupolas, have melting capacity of 150 tons per day, and make car-wheels, pipes, and machinery. Car shops, run by both water and steam power, can turn out 200 freight cars per month. Joseph R. Anderson, President; Archer Anderson, Treasurer; R. S. Archer, Superintendent rolling mills; F. T. Glasgow, Superintendent foundry, machine, and car shops; J. R. Anderson, Jr., Secretary. *See Furnaces.*

Number of rolling mills in Virginia (not including Graham's Forge): 4 completed, and 1 building. Of these, 1 is a rail mill; 1 open-hearth steel works building.

## ALABAMA.

Birmingham Rolling Mill, Birmingham Rolling Mill Company, Birmingham, Jefferson county. Main office, Louisville, Ky. Completed in July, 1880; 10 double and 3 single puddling furnaces, 3 heating furnaces, and 5 trains of rolls (one 24, one 18, one 16, and two 8-inch); product, bar, sheet, and plate iron, small T rails up to 35 lbs., and tram rails up to 45 lbs.; car iron a specialty; annual capacity, 19,000 net tons. James G. Caldwell, President; B. Du Pont, Secretary.

Brierfield Rolling Mill, Brierfield Iron and Coal Company, Brierfield, Bibb county. Built in 1863; 8 single puddling and 2 heating furnaces, and 2 trains of rolls (one 16 and one 8-inch); product, bar iron and cotton ties; annual capacity, 6,000 net tons. Adding a nail factory, and contemplate the erection of a coke blast furnace. T. J. Peter, President; A. A. Southwick, Treasurer and Manager.

Central Iron Works, Helena, Shelby county. Put in operation in March, 1873; 4 single puddling furnaces, 3 heating furnaces, and 3 trains of rolls; product, merchant bar iron and "Alabama" cotton ties; annual capacity, 1,000 net tons. Rufus W. Cobb, President; Burwell B. Lewis, Vice-President; Richard Fell, Jr., Secretary and Treasurer.

Number of rolling mills in Alabama: 3. Of these, 1 is a rail mill, making light rails.

## WEST VIRGINIA.

Andrew Kloman Steel and Iron Company, Moundsville, Marshall county. Branch office and post office address, Pittsburgh, Pa. Put in

operation March 1, 1874; 12 single puddling furnaces, 4 heating furnaces, 1 scrap furnace, 3 trains of rolls (one 8, one 16, and one 19-inch), and 3 Kloman railroad spike machines; product, merchant bar of all sizes and railroad spikes; annual capacity, 8,000 net tons of spikes. Proprietors, W. H. Carruthers, A. C. Kloman, and C. H. Kloman. This mill was formerly owned and operated by the Ohio Valley Iron Company.

**Belmont Nail Company**, Wheeling, Ohio county. Built in 1849; 25 single puddling furnaces, 4 heating furnaces, 3 trains of rolls, 111 nail machines, and 1 squeezer; product, nails exclusively, made from No. 1 mill iron, strictly red short; annual capacity, 12,000 net tons. A. W. Kelly, President; J. D. DuBois, Secretary and Treasurer. *See Furnaces.*

**Benwood Iron Works**, Wheeling. Works at Benwood, Marshall county. Built in 1852; destroyed by fire in April, 1876, and rebuilt in 1876-7; 30 single puddling furnaces, 5 heating furnaces, 2 trains of rolls, and 124 nail machines; product, nails exclusively; annual capacity, 308,000 kegs. A. W. Campbell, President; L. S. Delaplain, Vice-President; Alonzo Loring, Secretary; George Wise, Assistant Secretary. *See Miscellaneous Bituminous Furnaces in Ohio.*

**Crescent Iron Works**, Whitaker Iron Company, Wheeling. Built in 1855; 15 double boiling furnaces, 3 heating furnaces, and 9 trains of rolls (pairs including bar and muck); product, sheet iron exclusively; annual capacity, 9,000 net tons. George P. Whitaker, President, Principio, Md.; N. E. Whitaker, Secretary, Wheeling.

**La Belle Iron Works**, Wheeling. Built in 1852; incorporated December 3, 1875; 21 single puddling furnaces, 4 heating furnaces, 2 trains of rolls, and 99 nail machines; product, nails and spikes exclusively; annual capacity, 10,000 net tons. W. H. Harden, President; C. A. Robinson, Secretary.

**Riverside Iron Works**, Wheeling. Built in 1859, enlarged since; 42 single puddling furnaces, 9 heating furnaces, 126 nail machines, and 5 trains of rolls (one 9, one 12, two 20, and one 21-inch); product, bar iron, light T rails, railroad spikes, and nails; annual capacity, 10,000 net tons of bar iron and 350,000 kegs of nails. Brand, "Riverside." J. N. Vance, President; John D. Culbertson, Treasurer; N. Wilkinson, Secretary; Frank J. Hearne, General Manager. *See Furnaces.*

**Standard Nail Works**, Standard Nail and Iron Company, Clifton, Mason county. Built in 1867; 14 single puddling furnaces, 3 heating furnaces, 1 annealing and 1 blueing furnace, 2 trains of rolls (one 18 and one 20-inch), and 60 nail machines; product, nails and cut and wrought spikes; annual capacity, 10,000 net tons. Formerly called Clifton Nail Works. J. B. Green, President; Lewis W. Richards, Secretary; Charles H. Green, Treasurer. Agents, Wolfe & Good, 610 North Second st., St. Louis, and T. G. Massie, Cincinnati.

**Top Mill**, Wheeling Iron and Nail Company, Wheeling. Built in 1867, and rebuilt in 1872; 26 single puddling furnaces, 4 heating furnaces,

110 nail machines, double muck train, and 1 nail-plate train of rolls; product, nails; annual capacity, 12,000 net tons. C. R. Hubbard, President; C. D. Hubbard, Secretary. *See Furnaces.*

Number of rolling mills in West Virginia: 8. Of these, 1 is a rail mill, making only light rails.

## KENTUCKY.

Anchor Iron and Steel Works, L. M. Dayton, 184 West Second st., Cincinnati, Ohio. Works at Newport, Campbell county, Ky. Rebuilt and fitted with new machinery in 1874; 6 single puddling furnaces, 3 heating furnaces, 1 scrap furnace, 1 hammer, and 4 trains of rolls (one 10, one 18, and two 20-inch); product, bar, sheet, and plate iron; annual capacity, 4,000 net tons. John Phillips, Superintendent.

Central Rolling Mill Company, lessee, Brook st., Louisville. Mill built in 1849; 20 single puddling furnaces, 1 scrap furnace, 5 heating furnaces, 1 hammer, and 5 trains of rolls (two 8, one 16, one 18, and one 22-inch); product, bar, sheet, plate, light T rails, hoops, bands, small rounds, squares, and flats, and horse shoes; annual capacity, single turn, 9,000 net tons. First called Louisville Rolling Mill, afterwards known as the Coleman Rolling Mill. J. V. Johnston, President; A. J. Moxham, Superintendent.

Crucible Steel Castings and Metal Company, Louisville. Built in 1879-80; 5 steel-melting holes; 10 pots can be used at each heat; product, crucible steel castings. Julius Barbaroux, Secretary and Manager. Idle at present.

Licking Iron Works, Licking Rolling Mill Company, northeast corner Front and Vine sts., Cincinnati. Works at Covington, Ky. Built in 1845; 6 double puddling furnaces, 7 heating furnaces, 2 scrap furnaces, 6 knobbling fires, 1 hammer, and 5 trains of rolls (one 16-inch muck, one 16-inch bar, one 8-inch guide, one 22-inch boiler plate, and one 20-inch sheet); product, merchant bar, bridge, boiler, and sheet iron, rivets, angle and tee iron, jail, sash, and corrugated-roofing iron; annual capacity, 9,000 net tons; special products, boiler plate, shafting, charcoal bar, angle, and tee iron. H. Worthington, President; J. Droege, Vice-President; J. Droege, Jr., Secretary.

Louisville Iron and Steel Works, Clay st., Louisville. Built in 1869; 19 puddling furnaces, 1 scrap and 3 heating furnaces, one 18-inch forge mill with 2 pairs rolls and Burden squeezer, one 12-inch 3-high bar mill, and one 8-inch 3-high guide mill; product, bar, band, hoop, and horse-shoe iron; specialty, light T rails and tram rails; annual capacity, single turn, 8,000 net tons. Formerly called Kentucky Rolling Mill.

Norton Iron Works, Ashland, Boyd county. Put in operation in March, 1874; 20 single puddling furnaces, 3 heating furnaces, 80 nail machines, and 2 trains of rolls (one 20 and one 22-inch); product, nails; annual capacity, 10,000 net tons. J. C. Garrett, President and General Manager; D. B. Meacham, Secretary; Hugh Means,



Treasurer. Charles L. Colburn, Agent, No. 3 Johnston Building, Cincinnati. *See Furnaces.*

Ohio Valley Steel and Iron Works, Mitchell, Tranter & Co., Second and Race sts., Cincinnati. Works at Covington, Ky. Built in 1873; 4 knobbling, 10 puddling, 2 scrap, 2 slab, and 2 plate-mill furnaces, 2 annealing and 5 heating furnaces, 2 steam hammers, and 6 trains of rolls; one 7-gross-ton Siemens open-hearth steel furnace built in 1879; product, plate, sheet, channel, angle, and merchant iron, boiler plate, and plow steel; annual capacity, 12,000 net tons. Brand, "O. V."

Swift's Iron and Steel Works, 26 West Third st., Cincinnati, Ohio. Works at Newport, Campbell county, Ky., (opposite Cincinnati.) Built in 1857, and enlarged in 1872; 29 single puddling and 18 heating furnaces, and 9 trains of rolls (8, 10, and 18-inch bar trains, 2 forge, 2 sheet, and 2 plate trains); product, boiler, tank, jail, safe, light and heavy sheet, bar, angle, tee, car, bridge, and architectural shaped-iron, mine and narrow and standard gauge T rails and street rails; specialties, Swift's bloom flange plates and heads, charcoal hammered No. 1 boiler plate of from 50,000 to 55,000 and 60,000 pounds tensile strain, extra quality of bar iron for car and bridge work, and light and heavy T rails; annual capacity, 60,000 net tons. E. L. Harper, President; Geo. E. Clymer, Vice-President; J. L. Pfau, Secretary; J. H. Mathews, Treasurer; L. T. Hubbard, Mill Superintendent. *See Furnaces. See Riverside Iron and Steel Works, Ohio.*

Tennessee Rolling Works, Ewald Iron Company, 801 North Second st., St. Louis, Mo. Works at Tennessee Rolling Works P. O., Lyons county, Ky. Built in 1846; 9 single puddling furnaces, 13 knobbling fires, 7 heating furnaces, 2 hammers, and 5 trains of rolls (8-inch guide, 9 and 16-inch bar, and 22 and 26-inch plate trains); product, boiler plate, sheet iron, bar and rod iron, and blooms; annual capacity, 4,000 net tons. L. P. Ewald, President.

Number of rolling mills and steel works in Kentucky: 9. Of these, 3 are rail mills, 2 making only light T and street rails; 1 makes open-hearth steel, and 1 makes crucible steel.

## TENNESSEE.

Knoxville Iron Company, Knoxville, Knox county. Built in 1865; 9 single puddling furnaces, 3 heating furnaces, 40 nail machines, and 4 trains of rolls (15-inch muck, 18-inch nail plate, 16-inch bar, and 8-inch guide); product, merchant bar, nails, railroad and boat spikes, fish plates, bolts, nuts, wrought washers, railroad, car, and miscellaneous forgings, and light T and street rails; annual capacity, 12,000 net tons. W. R. Tuttle, President; W. S. Mead, Secretary and Treasurer.

Lookout Rolling Mill, P. O. Box 624, Chattanooga. Started in October, 1876; 3 double puddling and 2 heating furnaces, 2 trains of rolls, and 1 spike machine; product, merchant bar iron, 10 to 16-lb.



T rails, rail splices, and railroad spikes; annual capacity, 5,000 net tons. Formerly owned by the Tennessee Iron and Steel Company. George H. Hazlehurst, President; A. M. Johnson, Secretary, Treasurer, and Manager.

Providence Steel Works, John Leighton, P. O. Box 176, Chattanooga. Removed from Kingston in 1877; 1 puddling furnace, three 2-pot steel furnaces, and 2 hammers; product, cast steel, and iron blooms.

Roane Iron Company, Chattanooga, Hamilton county. Rolling mill built in 1864; puddle mill built in 1869; 9 double puddling furnaces, 10 heating furnaces, 1 hammer, and 3 trains of rolls (two 18 and one 20½-inch); product, rails; annual capacity, 40,000 net tons. Steel plant added in 1877-8; first cast made June 6, 1878; melting house, 80 ft. x 130 ft.; two 10-gross-ton Siemens open-hearth steel furnaces; 12 gas producers; 36-inch Fritz blooming mill; use the "pig-ore-and-scrap" process; product, steel for merchant and rail purposes. H. S. Chamberlain, President; H. Clay Evans, Vice-President and General Manager; S. B. Strang, Assistant Manager. *See Furnaces.*

South Tredegar Iron Company, Chattanooga. Built in 1866; 7 single and 4 double puddling furnaces, 4 heating furnaces, 62 nail machines, 1 squeezer, and 3 trains of rolls (one muck, one nail plate, and one guide train); product, nails, railroad spikes, and splice bars; annual capacity, 10,000 net tons. Formerly known as the Vulcan Iron and Nail Works. H. L. Fox, President, St. Louis; H. G. Young, General Manager, Secretary, and Treasurer; J. M. Duncan, Vice-President and Superintendent of works.

Number of rolling mills and steel works in Tennessee: 5. Of these, 3 are rail mills, 2 making only light T and street rails; 1 makes open-hearth steel, and 1 makes crucible steel.

## OHIO.

### LAKE COUNTIES.

Britton Iron and Steel Company, Cleveland, Cuyahoga county. Built in 1851; rebuilt in 1873; 5 single puddling and 10 knobbling furnaces, 7 heating furnaces, 3 trains of rolls, and 1 hammer; product, black and galvanized sheet iron; annual capacity, 5,000 net tons. Formerly called Cleveland Boiler Plate Manufacturing Company and afterwards Standard Iron Company. J. W. Britton, President and Manager; Harvey H. Brown, Vice-President; Ralph W. Hickox, Secretary and Treasurer.

Cleveland Crucible Steel Company, Garden st., crossing C. & P. R. R., Cleveland. Built in 1880; 8 steel-melting holes, 5 heating furnaces, one 9-inch train of rolls, and 3 hammers; 32 pots can be used at each heat; product, tool, machinery, and spring steel; annual capacity, 2,400 net tons. J. H. Clark, President; E. M. Grant, Secretary, Treasurer, and Superintendent.

Cleveland Hardware Company, Cleveland. Built in 1876; 1 heating furnace and one 9-inch train of rolls; product, shapes for wagon

- hardware; annual capacity, 4,500 net tons. L. McBride, President; A. W. Train, Secretary; S. E. Brown, Treasurer and Manager.
- Cleveland Rolling Mill Company, Cleveland. Works principally located at Newburgh. Bessemer steel works, built in 1867-8; made first blow October 15, 1868; two 10-gross-ton converters; annual capacity, 110,000 net tons Bessemer steel ingots. Siemens-Martin steel works, built in 1876-8; contain five open-hearth furnaces—two 15-gross-ton furnaces and three 7-ton; annual capacity, 40,000 tons of open-hearth steel ingots. Rail mills, built in 1857; 5 heating furnaces, 1 train of rolls, and blooming mill; annual capacity, 90,000 tons of rails. Four rod mills; 4 trains of rolls; annual capacity, 60,000 tons. Wire mills built in 1868; employ 1,500 men; annual output, 27,000 tons of finished wire. Plate mills consist of 6 single puddling furnaces and 4 trains of rolls (muck mill, 2 sheet mills, and plate mill); galvanizing works attached; annual capacity, 10,000 tons. The company also have a foundry, forge, machine shops, and blast furnaces. Lake Shore Mill, at Cleveland, built in 1852; 4 puddling furnaces, 7 heating furnaces, and 2 trains of rolls; product, iron rails; annual capacity, 30,000 tons. The mill has been repaired with a view to rolling steel rails, with a daily capacity of 135 net tons. The works formerly operated by the Cleveland Iron Company, leased by the Cleveland Rolling Mill Company, consist of 19 single puddling furnaces, 11 heating furnaces, 5 trains of rolls, and 1 hammer; annual capacity, 40,000 tons of iron rails and merchant bar iron. The mill is used for rolling Siemens-Martin steel rails at the rate of 100 tons per day. Product, wire, tire, and spring steel, galvanized and black sheet iron; horse shoes, steel plate, boiler and tank plate, corrugated roofing and siding, Siemens-Martin steel, and Bessemer steel and iron rails. William Chisholm, President; S. H. Chisholm, Vice-President; E. S. Page, Secretary; W. B. Chisholm, General Manager. *See Furnaces.*
- Forest City Iron Works, G. J. Atkins & Co., Union st., Cleveland. Built in 1866-7; 17 single puddling and 3 heating furnaces, and 3 trains of rolls (one 9, one 12, and one 18-inch); product, band and light bar iron; specialties, nut, bolt, and refined carriage iron. Works were formerly part of the Union Iron Works.
- Lake Erie Iron Works, Lake Erie Iron Company, office and warehouse, 104 and 106 St. Clair st., Cleveland. Built in 1852; 16 puddling furnaces, 19 heating furnaces, 4 trains of rolls, and 13 hammers; product, steel axles, iron fagoted car and locomotive axles, iron and steel forgings of every description, iron shafting up to 20-inch round, and merchant bar iron; annual capacity, 19,000 net tons. Nut and bolt works recently added, producing 20 tons daily of nuts and bolts of every description used by railroads, car builders, and for agricultural implements. W. C. Scofield, President; Edward Lewis, Vice-President; C. W. Scofield, Secretary and Treasurer; James E. Lewis, Superintendent; S. A. Sague, Business Manager.

Otis Iron and Steel Works, Otis Iron and Steel Company, Cleveland. Built in 1873-4; put in operation January 1, 1875; 7 Siemens heating furnaces, 4 hammers, two 7-gross-ton and four 15-gross-ton Siemens open-hearth furnaces, and 4 trains of rolls (one 10, one 20, and two 31-inch); product, steel plate, bar steel, and forgings. Charles A. Otis, President; Thomas Jopling, Treasurer; J. K. Bole, Secretary; S. T. Wellman, Superintendent.

Sandusky Rolling Mill and Manufacturing Company, Sandusky, Erie county. Put in operation in October, 1873; 6 single puddling furnaces, 8 heating furnaces, 1 hammer, and 2 trains of rolls (one 18 and one 19-inch); product, iron and steel rails; steel rails rolled from imported blooms; annual capacity, 30,000 net tons. Formerly called Nes Silicon Steel Works. R. H. Lewis, General Manager.

Union Iron Works, Union Rolling Mill Company, 127 Superior st., Cleveland. Works at Newburgh. Built in 1866-7; 14 single puddling and 5 heating furnaces, and 4 trains of rolls; product, bar iron, and light T and street rails; specialties, "Union Refined" bar and cold-straightened shafting; daily capacity, 110 net tons of finished iron. S. W. Sessions, President; A. S. Upson, Vice-President; Samuel Frisbie, Secretary; S. A. Fuller, Treasurer; J. Morgan Coleman, Superintendent.

Number of rolling mills and steel works in the Lake region: 9. Of these, 3 are rail mills; 1 making only light T and street rails; 1 makes Bessemer steel, 2 make open-hearth steel, and 1 makes crucible steel.

#### PROJECTED.

The Toledo Rolling Mill Company intends to erect a rolling mill at Toledo, Lucas county, within 12 months.

The Toledo Hay Steel Rolling Mill Company was incorporated in 1881, and proposes to make rails, bars, sheets, and plates.

The Bartlett Iron and Steel Works propose to erect works at Vermilion, Erie county.

#### MAHONING VALLEY.

Akron Iron Works, Akron Iron Company, Akron, Summit county. Built in 1866; 19 single puddling furnaces, 1 scrap furnace, 4 heating furnaces, and 3 trains of rolls; product, best common, refined, and charcoal bar iron, hot-polished shafting, and light T rails from 10 to 30 lbs. per yard; specialties, patent hot-polished shafting and irons for agricultural implements; annual capacity, 8,500 net tons. L. Miller, President; J. A. Long, Secretary; Frederick Bishop, Superintendent. *See Hocking Valley Furnaces.*

Corns Iron Company, Girard, Trumbull county. Built in 1872 by the Girard Rolling Mill Company; put in operation September 1, 1873; purchased by the present company in 1878; 17 single puddling furnaces, 2 heating furnaces, and 3 trains of rolls; product, all sizes of merchant bar, and small T rails; special attention given to the manufacture of irons for agricultural implements, guard and finger iron,

drag and brace bars, knife-back iron, cylinder-bar and tooth irons for threshers, chain, bolt, and nut iron; annual capacity, 7,000 net tons. Henry Wick, President; Myron C. Wick, Secretary, Treasurer, and General Manager.

Cuyahoga Forge and Iron Company, Cuyahoga Falls, Summit county. Built in 1865; 1 heating furnace and one 7½-inch train of rolls in rolling mill, and 4 heating furnaces and 3 hammers in forge department; product, bar iron and car axles; annual capacity, 1,200 net tons. Formerly called James Iron Works.

Enterprise Iron Works, Cartwright, McCurdy & Co., Youngstown, Mahoning county. Built in 1863 and 1874; 30 single puddling furnaces, 9 heating furnaces, and 8 trains of rolls (one 6, one 7, two 8, one 10, one 16, and two 18-inch); product, hoops, band and scroll iron, cotton ties, skelp, and refined iron; annual capacity, 18,000 net tons. James Cartwright, President; S. J. Atkins, Vice-President; W. E. Taylor, Secretary and Treasurer.

Falcon Iron and Nail Works, Falcon Iron and Nail Company, Niles, Trumbull county. Built in 1867; 16 single puddling and 3 heating furnaces, 44 nail machines, and 3 trains of rolls (one 8, one 18, and one 21-inch); product, nails and guide iron; annual capacity, 8,000 net tons. John Stambaugh, President; Henry Wick, Vice-President; Myron I. Arms, Secretary and Treasurer.

Grasshopper Iron Works, The Arms, Bell & Company, Youngstown. Formerly called Turner Spike Works. Built in 1876; 1 heating furnace, one 10-inch train of rolls, 3 spike machines, 6 nut machines, and 2 rivet machines; product, bar iron, spikes, rivets, and nuts; annual capacity, single turn, 4,500 net tons bar iron, 2,500 tons spikes, 400 tons rivets, and 1,200 tons hot-punched nuts. The same company operates the Glencoe Iron Works, making bolts, nuts, and washers. Frank B. Williams, President and Treasurer; Joseph B. Wilder, Vice-President; Wm. H. Wick, Secretary.

Hall Iron Works, Jesse Hall & Son, Hubbard, Trumbull county. Put in operation in November, 1872; 1 double and 6 single puddling furnaces, 2 heating furnaces, and 3 trains of rolls (one 8, one 12, and one 16-inch); product, merchant bar iron; specialty, horse-shoe bar, and bolt and nut iron; annual capacity, 4,000 net tons.

Mahoning Iron Works, Brown, Bonnell & Co., Youngstown, Mahoning county. Built in 1846; 42 double and 40 single puddling furnaces, 19 heating furnaces, 50 nail machines, 1 hammer, 6 spike machines, and 13 trains of rolls (two 8, two 10, one 12, one 18, two 20-inch, 1 sheet, and 4 muck); product, merchant bar, sheets, nails, and railroad and boat spikes; annual capacity, 75,000 net tons. Brand, "Mahoning." Incorporated in September, 1875. H. C. Ayer, President; F. H. Matthews, Vice-President and Treasurer; A. W. Jones, Secretary. *See Mahoning Valley Furnaces.*

Mahoning Valley Iron Company, Youngstown, Mahoning county. Built in 1871; 2 single and 28 double puddling furnaces, 14 heat-

ing furnaces, and 4 trains of rolls (one 20, one 16, one 9, and one 6-inch); product, bar iron; annual capacity, 40,000 net tons. Richard Brown, General Manager. Formerly called Valley Iron Works, afterwards Ridgway Iron Works, and built to make rails. *See Mahoning Valley Furnaces.*

Niles Iron Works, Niles Iron Company, Youngstown, Mahoning county. Built at Niles, Trumbull county, in 1872, and removed to Haselton, Mahoning county, in 1880-1; 19 single puddling furnaces, 7 heating furnaces, and 5 trains of rolls; product, bar, sheet, rod, skelp, and band iron; annual capacity, 12,000 net tons. L. G. Andrews, President; L. E. Cochran, Secretary and Treasurer.

Russia Sheet-Iron Mills, L. B. Ward, Niles, Trumbull county. Built in 1864; 9 puddling furnaces, 4 heating furnaces, 1 scrap furnace, and 3 trains of rolls; product, light sheet iron from No. 16 to No. 30 in widths from 20 to 40 inches, shingle bands, and Sykes's improved metallic roofing; annual capacity, 4,600 net tons. Formerly part of the works of James Ward & Co. James Ward, General Manager.

Summers Iron Works, Summers Brothers & Co., Struthers, Mahoning county. Built in 1881-2; 3 double puddling furnaces, 1 pair furnace, 1 heating furnace, 1 annealing furnace, and 1 sheet mill; product, sheet iron; daily capacity, 9 net tons. Will add another sheet mill and a plate mill, with 9 double puddling and 2 heating furnaces, 1 hammer, and all necessary machinery to make all kinds of plate and sheet iron; will also make Summers' patent roofing. George Summers, Sr., General Manager.

Ward Iron Company, Niles, Trumbull county. Built in 1841; 18 puddling and 6 heating furnaces, and 5 trains of rolls; product, bar, plate, and sheet iron; annual capacity, 10,000 net tons. Formerly part of the works of James Ward & Co. James Ward, General Manager. *See Rolling Mills in Interior Counties.*

Warren Rolling Mill, C. Westlake & Co., Warren, Trumbull county. Built in 1870, burned in 1878, rebuilt in 1879; 16 single puddling furnaces, 2 heating furnaces, and 2 trains of rolls (18-inch muck and bar, and 10-inch guide); product, muck bar, railroad links and pins, and bar iron of all sizes; annual capacity, 9,000 net tons.

Youngstown Rolling Mill, Youngstown Rolling Mill Company, Youngstown. Built in 1871; burned and rebuilt in 1877; 19 single and 1 double puddling furnaces, 4 heating furnaces, and 4 trains of rolls; product, hoop, band, hame, box, pole-cap iron and cotton ties; annual capacity, 8,000 net tons. Paul Wick, President; Henry Wick, Secretary and Treasurer.

Number of rolling mills in the Mahoning region: 15. Of these, 2 are rail mills, making only light T rails.

#### INTERIOR COUNTIES.

Canton Steel Works, Bolton Steel Company, Canton, Stark county. Built in 1872; 8 heating furnaces, one 12-inch and one 20-inch train

of rolls, 3 hammers, and one 6-gross-ton Siemens open-hearth steel furnace; product, patent rolled machinery steel, spring steel (oil and water temper), tire steel, and gun-barrel and set-screw steel; specialty, tool steel; annual capacity, 3,350 net tons of steel ingots. Brand, "Canton." Ogden Bolton, President and Superintendent; R. H. Bulley, Vice-President; P. S. Sowers, Secretary and Treasurer; H. A. Weaver, Mill Manager.

Cherry Valley Iron Works, Leetonia, Columbiana county. Formerly called Leetonia Iron and Coal Company. Built in 1871; 16 single puddling furnaces, 1 scrap furnace, 3 heating furnaces, and 3 trains of rolls (one 8, one 16, and one 18-inch); product, muck bar, merchant bar, and guide iron; annual capacity, 10,000 net tons. J. H. King, President; C. N. Schmick, Secretary and Treasurer; J. G. Chamberlain, Superintendent. *See Furnaces.*

Columbus Iron Works, P. Hayden & Son, Columbus. Built in 1854; 12 single puddling furnaces, 5 heating furnaces, and 4 trains of rolls; product, merchant bars, splice bars, light T rails, wire of all kinds, and iron for harness and saddle work.

Columbus Rolling Mill, Columbus Rolling Mill Company, Columbus, Franklin county. Built in 1872; 10 single puddling furnaces, 14 heating furnaces, and 3 trains of rolls; product, iron and steel rails; annual capacity, 40,000 net tons. S. Churchill, President; D. S. Gray, Vice-President; W. A. Harrison, Treasurer and General Manager; W. S. S. Rodgers, Secretary.

Dover Rolling Mill, J. L. Edwards & Co., Canal Dover, Tuscarawas county. Built in 1865-6; first iron rolled in February, 1866; 12 puddling furnaces, 1 heating furnace, and 3 trains of rolls; product, merchant bar iron; annual capacity, 6,000 net tons. *See Furnaces.*

Massillon Rolling Mill, Joseph Corns & Son, lessees, Massillon, Stark county. Built in 1873, and put in operation January 4, 1875; 8 single puddling furnaces, 2 heating furnaces, and 3 trains of rolls (one 9 and two 18-inch); product, bar iron and light T rails; annual capacity, 6,000 net tons.

Ward Iron Company, New Philadelphia, Tuscarawas county. Building a rolling mill, to contain 20 single puddling furnaces, 4 heating furnaces, and 4 trains of rolls; product, to be sheets, plates, bands, and small rounds and squares. James Ward, General Manager. *See Rolling Mills in Mahoning Valley.*

Whitely, Fasler & Kelley, Springfield, Clarke county. Building a Siemens-Martin steel plant and a mill to roll the product.

Zanesville Iron Works, Ohio Iron Company, Zanesville, Muskingum county. The first mill of these works was built in 1848; present company was incorporated in 1857, and has operated the works since then; now comprise 22 single puddling furnaces, 2 scrap furnaces, 7 heating furnaces (all constructed so as to embrace the points covered by A. F. Cassel's improved patent furnace), 1 hammer, 2 spike machines, and 5 trains of rolls (two 8, one 10, one 16, and one 18-inch);



product, assorted merchant bar iron, light T and street rails, and railroad spikes; specialty, agricultural irons; annual capacity, 14,000 net tons. M. Churchill, President; C. W. Greene, Secretary and Treasurer. *See Furnaces.*

Number of rolling mills and steel works in Central Ohio: 7 completed, and 2 building. Of these, 4 are rail mills, 3 making light T rails only; 1 makes open-hearth steel, and 1 open-hearth steel works building.

#### PROJECTED.

Co-operative bar mill contemplated at Leetonia, Columbiana county:

#### OHIO RIVER COUNTIES.

**Ætna Iron and Nail Company**, Bridgeport, Belmont county. Built in 1873, and put in operation January 1, 1874; 22 single puddling furnaces, 1 scrap furnace, 5 heating furnaces, and 5 trains of rolls (one 9, one 16, one 18, and two 20-inch); product, bar, sheet, plate, and band iron, and light T and street rails; annual capacity, 12,000 net tons. Have never made any nails. W. W. Holloway, President; W. H. Tallman, Secretary; Lewis Jones, Manager.

**Alikanna Rolling Mill**, Sharpe, Daniels & Co., Steubenville, Jefferson county. Built in 1871-2; 8 puddling furnaces, 2 heating furnaces, and 3 trains of rolls (one 8, one 12, and one 15-inch); product, bar, rod, band, hoop, and guide iron, and light T rails. A number of new puddling and heating furnaces will be added in 1882.

**Belfont Iron Works**, Belfont Iron Works Company, Ironton, Lawrence county. Built in 1852; 21 single puddling furnaces, 3 heating furnaces, 2 trains of rolls, and 92 nail machines; product, nails; annual capacity, 10,000 net tons. F. D. Norton, President; L. T. Dean, Vice-President; B. H. Burr, Secretary and Treasurer. *See Furnaces.*

**Bellaire Nail Works**, Bellaire, Belmont county. Built in 1867, and put in operation in February, 1868; 26 single puddling furnaces, 4 heating furnaces, 2 trains of rolls, and 108 nail machines; product, nails and spikes; annual capacity, 12,000 net tons. J. R. McCortney, President; A. D. Hilborn, Secretary; James Wilson, Agent. *See Furnaces.*

**Burgess Steel and Iron Works**, Portsmouth. Built in 1871; 9 single puddling furnaces, 12 heating furnaces, one 24-pot Siemens crucible steel furnace, one 8-gross-ton Siemens open-hearth steel furnace, 3 trains of rolls (one 8, one 18, and one 20-inch), and 5 steam hammers; 24 pots can be used at each heat in steel works; product, plow steel (Siemens-Martin, German cast, and iron-centre cast), tool steel, steel and iron boiler plate, "U. S. Norway" refined iron, and blooms; annual capacity, 7,000 net tons. George Davis, President; L. C. Robinson, Vice-President; E. N. Hope, Secretary and Treasurer; J. E. York, Superintendent.

**Cincinnati Rolling Mill Company**, 493 East Front st., Cincinnati, Hamilton county. Built in 1864, and enlarged in 1881; 9 Danks rotary



puddling furnaces, 10 heating furnaces, one large 3-high plate train of rolls, two 21-inch trains, one squeezer, and one 5-ton hammer; product, superior plate iron, rails, beams, and angles; annual capacity, 13,000 net tons of plate iron and 12,000 net tons of beams, angles, and rails. Samuel Danks, Superintendent.

Cincinnati Rolling Mills, B. Benjamin & Co., 17 East Second st., Cincinnati. Works on Gest st. and C. H. & D. R. R. Built in 1876; 2 heating furnaces and 2 trains of rolls (one 10 and one 16-inch); product, bar, band, and hoop iron; annual capacity, 3,000 net tons. Resumed work in 1880. Formerly called Empire Rolling Mill.

Crescent Iron Works, Watson & Co., Pomeroy, Meigs county. Built in 1847; 16 single puddling furnaces, 4 heating furnaces, 5 trains of rolls, and 16 nail machines; product, bar, band, and hoop iron, rounds and squares, light T and flat rails, nails, and boat and cut spikes; annual capacity, 10,500 net tons. Formerly called Pomeroy Iron Works.

Globe Rolling Mill, Globe Rolling Mill Company, offices at 163 and 165 West Pearl st., Cincinnati. Mill No. 1 at 413 West Front st., built in 1845; Mill No. 2 at corner Eighth and Evans sts., purchased and enlarged in 1879; 20 single puddling furnaces, 9 heating and 4 scrap furnaces, 1 hammer, and 8 trains of rolls (three 8, one 12, one 16, two 18, and one 20-inch); product, bars, sheets, plates, angles, all guide irons, hoop iron, wire rods and wire, and scrap steel for plow and other uses; annual capacity, single turn, 12,000 net tons. Joseph Kinsey, President; J. Walter, Vice-President; H. P. Mann, Secretary.

Ironton Rolling Mill, New York and Ohio Iron and Steel Company, Ironton, Lawrence county. Built in 1852, and enlarged several times since; 21 single puddling furnaces, 8 heating furnaces, and 5 trains of rolls; product, sheet and plate iron, merchant iron, light rails, and agricultural and machine steel; annual capacity, double turn, 10,000 net tons. Frederick J. Stone, President; Lenox Smith, Vice-President; E. McMillin, General Manager; Heman L. Field, Treasurer. *See Furnaces.*

Jefferson Iron Works, Steubenville, Jefferson county. Built in 1855; 21 single puddling furnaces, 4 heating furnaces, 2 trains of rolls, and 98 nail machines; product, nails; annual capacity, 11,000 net tons. Brand, "Jefferson Iron Works." W. H. Wallace, President; Calvin B. Doty, Vice-President; H. M. Priest, Secretary; Wm. R. E. Elliott, Forge Manager. *See Furnaces.*

Junction Iron Company, Wheeling, W. Va. Works at Mingo Junction, Jefferson county, Ohio. Building a rolling mill and nail factory, to contain 24 single puddling and 4 heating furnaces, 2 trains of rolls, and 100 nail machines; product to be cut nails and spikes; annual capacity, 10,000 net tons. *See Furnaces.*

Laughlin Nail Company, Wheeling, W. Va. Works at Martin's Ferry, Belmont county, Ohio. Built in 1873-4; were destroyed by fire

August 8, 1881, but were immediately rebuilt; 24 puddling furnaces, 4 heating furnaces, 2 trains of rolls, and 114 nail machines; first keg of nails was made March 4, 1874; product, cut nails and spikes; annual capacity, 12,500 net tons. Formerly called Ohio City Iron and Nail Works. Alexander Laughlin, President; W. L. Glessner, Secretary; A. L. Wetherald, General Manager.

Lawrence Iron Works, Lawrence Iron Works Company, Ironton. Built in 1853; 19 single puddling furnaces, 6 heating furnaces, and 5 trains of rolls (two 8, one 9, one 16, and one 18-inch); product, bar, band, chain, spike, and hoop iron of every variety, cotton ties, and light T rails from 8 to 30 lbs.; annual capacity, 10,000 net tons. Specialties, chain iron, iron fencing, concave tire, and cotton ties. Cyrus Ellison, President; Geo. T. Scott, General Superintendent; F. C. Tomlinson, Secretary and Treasurer.

Marietta Rail Mill, estate of Wm. Lottimer, Marietta, Washington county. Built in 1867; 12 single puddling furnaces, 9 heating furnaces, 4 trains of rolls (one 12, one 16½, and two 18-inch), and 1 squeezer; two 8-inch 3-high guide trains and one 12-inch fish-plate train in warehouse, not set up; product, rails, fish plate, and bar, hoop, and bridge iron; annual capacity, 30,000 net tons. Idle since 1876, and for sale. John Bloodgood, 84 Broadway, New York, or R. K. Shaw, Marietta, Ohio, will furnish information, terms, etc.

Portsmouth Iron and Steel Company, lessee, Portsmouth, Scioto county. Formerly operated by Gaylord Rolling Mill Company. Built in 1832; 19 single puddling furnaces, 10 heating furnaces, 6 trains of rolls, and 2 hammers; iron products, boiler plate, tank plate, sheet iron, bar and hoop iron, railroad spikes, small T rails, splice bars, and bolts; annual capacity, 11,000 net tons. One 10-gross-ton Siemens open-hearth steel furnace built in 1879; steel products, boiler plate, spring steel, agricultural steel, tire steel, machinery steel, etc.; annual capacity, 4,500 net tons ingots. John P. Terry, President and General Superintendent; John G. Peebles, Vice-President; Amasa Jones, Secretary; R. J. Beatty, Treasurer.

Riverside Iron and Steel Works, Swift's Iron and Steel Works, lessee, 26 West Third st., Cincinnati. Mill at Riverside, Hamilton county. Built in 1880 by Peter Zinn and others, mainly from material of the Paducah Iron Works, built at Paducah, Ky., in 1854; purchased by E. L. Harper in March, 1881; 10 single puddling furnaces, 4 heating furnaces, one 4-ton hammer, 1 muck and billet train, and 1 plate train, with 1 set 7-foot and 1 set 4½-foot chill rolls; specialty, flange bloom boiler plate and heads, heavy sheet, and charcoal hammered No. 1 boiler plate of 50,000 to 60,000 lbs. tensile strength; annual capacity, 7,000 net tons of boiler plate, tank, and sheet iron, and 4,500 net tons of axle and other billets.

*See Rolling Mills and Blast Furnaces in Kentucky.*

Standard Iron Company, Bridgeport, Belmont county. Building a mill to roll sheet iron.

Wellsville Plate and Sheet Iron Company, Wellsville, Columbiana county. Main office at Pittsburgh, Pa. Mill built in 1873 to make tinplate; remodeled in 1880; 8 single puddling furnaces, 2 heating furnaces, and 2 trains of rolls (one 20 and one 22-inch); product, plate and sheet iron; annual capacity, 2,500 net tons. P. F. Smith, President and Manager; C. L. Umbstaetter, Vice-President; Alan W. Wood, Secretary and Treasurer.

Number of rolling mills and steel works in the Ohio river counties: 17 completed, and 2 building. Of these, 8 are rail mills, 6 making only light T and flat rails; 2 make open-hearth steel, and 1 makes crucible steel.

Total number of rolling mills and steel works in Ohio: 48 completed, and 4 building. Of these, 17 are rail mills, 12 making only light T and flat rails; 1 makes Bessemer steel, 2 make crucible steel, 5 make open-hearth steel, and 1 open-hearth steel works is building.

#### PROJECTED.

Brilliant, Jefferson county. Rolling mill and nail factory contemplated by a company of which C. H. Spaulding, of Steubenville, is the promoter.

### INDIANA.

Aurora Iron Mills, Cobb's Iron and Nail Company, Aurora, Dearborn county. Built in 1875-8; 10 single puddling furnaces, 12 heating furnaces, 42 nail machines, 1 hammer, 3 nut machines, 3 nut furnaces, 1 double and 1 single machine for making washers, 1 bolt machine, 2 nut-tapping machines, 3 bolt-threading machines, and 5 trains of rolls (22-inch sheet and plate train, 18-inch bar, 18-inch muck, 8-inch train, and 20-inch nail plate); product, sheet, plate, angle, hoop, and bar iron, patent cut nails, hot-pressed nuts, bolts, and washers; annual capacity, 14,000 net tons. O. P. Cobb, President; J. A. Stratton, Secretary; John D. Dwyer, Supt.

Central Iron and Steel Company, Brazil, Clay county. Building a mill to roll bar iron, car axles, etc. *See Furnaces.*

Greencastle Iron and Nail Company, Greencastle, Putnam county. Put in operation in January, 1868; 14 single puddling furnaces, 3 heating furnaces, 1 annealing furnace, two 18-inch trains of rolls, and 40 nail machines; product, nails and spikes; annual capacity, 4,500 net tons. J. F. Darnall, President; H. M. Thomas, Superintendent of works; G. H. Brown, Secretary and Treasurer.

Indianapolis Rolling Mill, Indianapolis Rolling Mill Company, Indianapolis, Marion county. Built in 1857; 4 double and 2 single puddling furnaces, 8 heating furnaces, and 3 trains of rolls; product, light and heavy rails; annual capacity, 30,000 net tons. Steel rail mill built in 1881-2 and to be put in operation in the summer of 1882; capacity, 165 net tons of steel rails in twenty-four hours. Aquilla Jones, President; John Thomas, Treasurer; W. H. Thomas, Asst. Treasurer; S. W. Morgan, Secretary; B. F. Jones, Manager.

New Albany Rail Mill Company, New Albany, Floyd county. Built in 1864; 5 double and 6 single puddling furnaces, 11 heating furnaces, and 4 trains of rolls; product, iron T rails, (12 to 65 lb.,) tram rails, street rails, bars, angles, fish-plates, spikes, washers, etc.; annual capacity, 35,000 net tons. W. C. DePauw, President; George L. Danforth, Vice-President; Albert Trinler, General Manager.

Ohio Falls Iron Works, New Albany, Floyd county. Built in 1866; 15 single puddling furnaces, 3 heating furnaces, 3 trains of rolls (18-inch muck, 16-inch bar, and 8-inch guide), and 20 nail machines; product, bridge and bar iron, stay-bolt iron, nails, and railroad spikes; annual capacity, 7,500 net tons. W. C. DePauw, President; Peter R. Stoy, Vice-President, Treasurer, and General Manager; Edward B. Stoy, Secretary.

Terre Haute Iron and Nail Works, Terre Haute, Vigo county. Built in 1868; destroyed by fire September 19, 1873, but rebuilt in the winter of 1873-4; new works have 16 single puddling furnaces, 2 scrap furnaces, 4 heating furnaces, 80 nail machines, and 2 trains of rolls; product, nails; use Coyne's picker; annual capacity, 215,000 kegs, or 11,500 net tons muck bar. F. Nippert, President; Samuel L. Bridwell, Secretary.

Wabash Iron Company, Terre Haute. Completed in January, 1874; 15 single puddling furnaces, 1 scrap furnace, 3 heating furnaces, and 3 trains of rolls (one 8, one 18, and one 20-inch); product, all kinds of bar and guide iron; annual capacity, 10,000 net tons. Brand, "Wabash." A. J. Crawford, President; J. P. Crawford, Secretary and Treasurer.

Number of rolling mills in Indiana: 7 completed, and 1 building. Of these, 2 are rail mills.

## ILLINOIS.

Belleville Nail Company, Belleville, St. Clair county. Part of this plant was built at St. Louis, Mo., by the Bogey Nail Works, and moved to Belleville, Ill., in 1869; works were completed in 1869-70; 16 puddling and 5 heating furnaces, 2 trains of rolls, and 57 nail machines; product, cut nails; annual capacity, 7,000 net tons. James Waugh, President; J. C. Waugh, Secretary; R. F. Waugh, Treasurer.

Calumet Iron and Steel Company, 57 Dearborn st., Chicago. Works at Cummings, Cook county. First put in operation in August, 1876; 24 double puddling furnaces, 2 scrap and 5 heating furnaces, 4 trains of rolls, and 115 nail machines; operated with the Siemens gas furnace; product, merchant bar and nails; annual capacity, 20,000 net tons of bar iron and 250,000 kegs of nails; 4 open-hearth steel furnaces added in 1882. C. R. Cummings, President; D. C. Bradley, Vice-President and General Manager; Charles D. Rhodes, Treasurer; John M. Brown, Secretary. *See Furnaces.*

Calumet Tool Company, 154 Lake st., Chicago. Steel works built in 1879; one 12-pot Siemens steel-melting furnace, two 4-pot steel-

melting holes, 2 steel-cementing furnaces, 4 heating furnaces, and 7 hammers; 20 pots can be used at each heat; product, steel hammers and other tools; annual capacity, 2,000 net tons. A. D. Lamb, President; F. W. Newland, Vice-President and Treasurer; H. C. Tillman, Secretary.

Centralia Iron and Nail Works, Centralia, Marion county. Built in 1878, and put in operation in March, 1879; 12 single puddling furnaces, 2 heating furnaces, 34 nail machines, and 2 trains of rolls; product, nails; annual capacity, 4,500 net tons. S. M. Warner, President; A. D. Bailey, Secretary; F. Kohl, Treasurer; M. H. Monkhouse, Superintendent.

Chicago Splice-Bar Mill, Morris Sellers & Co., 6 Ashland Block, Chicago. Built in 1878; 1 forge fire, 2 heating furnaces, and 2 trains of rolls; product, "Samson" splice bars; annual capacity, 6,000 net tons. Howard Greer, Superintendent.

Chicago Steel Works, 806 Noble st., Chicago. Built in 1873; 7 heating furnaces and 2 trains of rolls; manipulate Bessemer steel rail ends; product, tires, plow beams, springs, toe-calk steel, and squares and rounds; annual capacity, 6,000 net tons. C. P. Buckingham, President; E. Buckingham, Treasurer; J. H. Buckingham, Secretary; E. H. Buckingham, Superintendent.

Chicago Tyre and Spring Works, 123 Dearborn st., Chicago. Works at Melrose, Cook county. Rolling mill built in 1881-2; 1 heating furnace and 1 train of tire rolls; product, steel locomotive tires, made from imported blooms. Spring works have furnaces, rolls, and machinery for railroad springs. F. M. Atkinson, President.

Fowler, H. W., Fifty-eighth and Wallace sts., Englewood, Chicago. Building a rolling mill to make spikes, bolts, and fish plates.

Joliet Steel Works, Joliet Steel Company, Honore Building, Chicago. Works at Joliet, Will county. Built in 1870; steel works made first blow January 26, 1873, and the first steel rail March 15, 1873; the converting department has two 5-gross-ton converters, one double vertical non-condensing engine by I. P. Morris, one double vertical condensing engine with Reynolds-Corliss valve motion by E. P. Allis & Co., 10 tubular boilers, and 2 Worthington pressure pumps; annual capacity, 150,000 net tons of steel ingots. Steel rail mill A has 8 single Siemens heating furnaces, 20 gas producers, 31½-inch blooming train, 23-inch rail train, 2 vertical condensing Corliss engines, 14 tubular boilers, shears, and a Sellers 3-ton hammer; annual capacity, 126,500 net tons of steel rails. Steel rail mill B has 11 draft heating furnaces, 3-high 21-inch rolls, and 15 boilers; annual capacity, 110,000 net tons of steel rails. Bar mill has one 10 and one 21-inch train of rolls, 3 draft heating furnaces, and complete appliances for making merchant steel; annual capacity, 7,000 net tons. Alex. J. Leith, President, Chicago; W. R. Stirling, Treasurer, Chicago; C. E. Sargeant, Secretary, Chicago; H. S. Smith, General Superintendent, Joliet. *See Furnaces.*

North Chicago Rolling Mill Company, 17 Metropolitan Block, Chicago, and 37 Mitchell Block, Milwaukee, Wis. Two plants in Illinois, known as the Chicago Works and the South Chicago Works. Chicago Works located at Chicago, on the north branch of the Chicago river, at the foot of Waubansia avenue, built in 1857; 1 sextuple and 8 quadruple puddling furnaces, equal to 38 single furnaces, 23 heating furnaces, 10 trains of rolls, and 1 hammer; Bessemer steel works have two 6-gross-ton converters and all the appliances for making rails; made their first blow April 10, 1872; product, Bessemer steel ingots, and iron and Bessemer steel rails; annual capacity, 120,000 net tons steel rails, and 60,000 tons iron rails. South Chicago Works, E. C. Potter, Superintendent, located at South Chicago, made their first blow June 14, 1882; contain three 10-gross-ton Bessemer converters, 4 Siemens heating furnaces, one 3-high 40-inch blooming train, and one 2-high reversing finishing train of rolls; product, Bessemer steel rails; estimated annual capacity, 200,000 net tons. All rails branded with the company's initials. This company has in operation 4 rail mills, 1 merchant mill, and 8 blast furnaces. O. W. Potter, President, Chicago; N. Thayer, Jr., Vice-President, Boston, Mass.; S. Clement, Treasurer, Milwaukee, Wis.; R. C. Hannah, Secretary, Chicago. General office, Chicago. *For details in addition to this description, see Illinois Furnaces and Wisconsin Furnaces and Rolling Mills.*

Springfield Iron Company's Iron and Steel Works, Springfield Iron Company, Springfield, Sangamon county. Branch offices, 30 Pine st., New York, and 111 Dearborn st., Chicago. Puddle mill first put in operation in June, 1872; 6 double puddling furnaces; 1 train of 2 stands of 18-inch rolls, squeezer attached, driven by a 28 x 60 inch horizontal Corliss engine; also a 2-ton hammer for shingling puddled balls. Rail mill put in operation in September, 1872; 6 Siemens gas-heating furnaces, 20 gas producers; one 23-inch train of rolls with 3 stands, driven by a vertical engine 40 in. diameter by 36 in. stroke; also supplied with Maharg's charger, a steam pull-out, and Gustin's hot-curving apparatus; product, steel and iron rails; annual capacity, 60,000 net tons. Bar mill put in operation in November, 1878; 4 Siemens gas-heating furnaces; one 16-inch train of rolls and one 12-inch train, driven by a vertical Corliss engine, 29 x 39 inches; product, fish plates and bar iron; annual capacity, 20,000 net tons. Steel-melting house contains two 15-gross-ton Siemens-Pernot open-hearth steel-melting furnaces, built in 1879; made the first steel ingot February 9, 1880; 1 Pernot furnace and 2 cupolas for premelting for the steel-making furnaces, and for dephosphorizing the metal by the Krupp process; 12 gas producers; estimated product, 160 net tons of steel ingots per day, to be made into rails for the present, but bars and plates will be made at an early day. Blooming mill contains a stand of 30½-inch rolls, built in 1879; rolls all fixed; 2 Siemens heating furnaces, with power fixtures for charging and drawing; shears



for cutting blooms; room left for billet rolls and plate train; blooming train run by a 32 x 60-inch vertical Corliss engine; steam supplied by 6 tubular steel boilers; 16 gas producers supply the furnaces in both bar and blooming mills. Charles Ridgely, President; John W. Bunn, Vice-President; Geo. M. Brinkerhoff, Secretary.

St. Louis Bolt and Iron Company, Third and St. Charles sts., St. Louis, Mo. Works at East St. Louis, St. Clair county, Ill. Put in operation in January, 1873; 1 single and 1 double puddling furnace, 1 scrap furnace, 6 heating furnaces, 3 trains of rolls, 6 spike machines, 2 bolt headers, 4 bolt cutters, 2 nut tappers, and 1 nut machine; reroll Bessemer steel; product, bar iron, light T and street rails, angles, iron fish plates, bolts, washers, and spikes, and Bessemer steel tire, fish plates, etc. Brand of spikes, "Tudor." T. A. Meysenburg, President; Wm. E. Guy, Vice-President and Secretary; Geo. S. Edgell, Treasurer.

Union Iron and Steel Company, northeast corner Dearborn and Madison sts., Chicago. Built in 1863; 2 heating furnaces, 1 train of flat rolls, 1 rail train, and a blooming train for steel ingots; the Bessemer steel works have two 6-gross-ton converters, 4 cupolas, and 2 spiegel-melting furnaces; made their first blow July 26, 1871; product, Bessemer steel rails; total annual capacity, 65,000 net tons. A. B. Stone, President, 52 William st., New York; A. L. Griffen, Vice-President; William Watson, General Superintendent; L. S. Boomer, Secretary. *See Furnaces.*

Western Nail Company, Belleville, St. Clair county. Building a rolling mill and nail factory; to contain 4 heating furnaces, 2 trains of rolls (19 and 21-inch), and 58 nail machines; product, cut nails; annual capacity, 7,000 net tons. W. H. Powell, President and General Manager; Conrad Rienecke, Vice-President; Benjamin J. West, Jr., Secretary and Treasurer; E. B. Powell, Superintendent of works.

Western Steel Company, 110 Dearborn st., Chicago. Works at Hyde Park, Cook county. Built in 1881; 1 double puddling and 1 heating furnace, 4 trains of rolls, and 1 hammer; product, "Seymour" rolled steel horse shoes; annual capacity, 3,000 net tons. James D. Sturges, President; J. W. Helmer, Secretary and Treasurer; J. C. Blewett, Superintendent.

Willard Sons and Bell Company, Chicago. Building a forge and rolling mill; to contain 10 heating furnaces, 10 hammers, 1 puddling furnace, and 1 train of rolls.

Number of rolling mills and steel works in Illinois: 13 completed and 3 building. Of these, 5 are rail mills, 1 making light rails only, 3 make Bessemer steel, 2 make open-hearth steel, and 1 makes crucible steel.

#### PROJECTED.

Harrison Steel Company, Thomas W. Fitch, President, St. Louis. Intend to build a Bessemer steel plant at Harrison, Jackson county, Ill.



## MISSOURI.

Granite Iron Rolling Mills, St. Louis Stamping Company, Cass avenue and Second st., St. Louis. Built in 1879; 3 puddling furnaces, 2 Siemens and 2 coal heating furnaces, 10 charcoal knobbling fires, 3 trains of rolls, and 3 hammers; product, stamping sheet iron for "granite iron ware" and galvanizing sheet; annual capacity, 5,000 net tons. Wm. F. Niedringhaus, Manager.

Harrison Wire Works, Harrison Wire Company, 816 High st., St. Louis. Built and started in 1873; 2 single puddling furnaces, 6 blooming fires, one 2½-ton steam hammer, 7 heating furnaces, one 2-high 18-inch train of rolls, one rod train, and 4 engines; daily capacity of rolling mill, 40 net tons of rods, but not now in operation. Wire department has 428 blocks and 3 engines; daily capacity, 100 net tons of wire. Annealing and galvanizing departments attached. Thomas W. Fitch, President and Treasurer; A. A. Lasar, Secretary.

Helmbacher Forge and Rolling Mills Company, Allen Building, corner Fifth and Market sts., St. Louis. Works, Columbus st., between Lami and Barton sts. Built in 1858; 7 single puddling furnaces, 9 heating furnaces, 2 trains of rolls, and 5 hammers; product, bar, rod, band, and angle iron, car axles, links, pins, light T rails from 8 to 20 lbs., and all kinds of forgings for railroad and steamboat use; specialties, iron for car works, railroad and machine shops, and bridges, car axles, links, and pins; annual capacity, 12,000 net tons. M. Helmbacher, President; A. Helmbacher, Treasurer and Superintendent; G. L. Goetz, Secretary.

Laclede Rolling Mill, Chouteau, Harrison & Vallé Iron Company, 941 North Second st., St. Louis. Built in 1850; rebuilt in 1879; 21 single puddling furnaces, 1 Swindell and 4 Siemens and 2 coal heating furnaces, 1 scrap furnace, 6 knobbling fires, 6 trains of rolls, 2 hammers, 2 bolt headers, 2 spike machines, 5 screw cutters, 2 machines for making washers, 1 nut machine, and 2 nut tappers; product, bar, sheet, and plate iron, blooms, angle and tee iron, 8 to 30-lb. T rails, 20 to 50-lb. flat rails, spikes, nuts, bolts, and washers; also, cold-rolled sheet iron; annual capacity, 20,000 net tons. Edwin Harrison, President; Charles C. Maffitt, Vice-President; Paul A. Fusz, Secretary.

St. Louis Ore and Steel Company, 409 North Sixth st., St. Louis. Works at South St. Louis. Built in 1872 as an iron mill; Bessemer steel works, erected in 1875-6, made their first blow September 1, 1876; two 7-gross-ton converters, 3 pig iron cupolas, 40 x 8, 4 spiegel-melting furnaces, 40 x 5, two 12-ton cupola ladles, 12 gas producers, 7 Siemens heating furnaces, one 3-ton hammer, one 33-inch blooming train, one 24-inch rail train, and one 22-inch billet train; product, Bessemer steel rails and billets. E. A. Hitchcock, President; Thomas Dickson, 1st Vice-President; Edward Walsh, Jr., 2d Vice-President; O. L. Garrison, Secretary. *See Furnaces.*

Detroit Steel Works, Detroit. First put in operation in May, 1882; 2 Swindell heating furnaces and 2 trains of rolls (one 18 and one 9-inch); product, steel shapes, rolled from purchased steel; annual capacity, 8,000 net tons. John S. Newberry, President; Alexander De Lano, Vice-President; H. R. Newberry, Secretary and Manager.

St. Louis Steam Forge and Iron Works, A. McDonald & Bro., corner Main and Miller sts., St. Louis. Built in 1862; 2 double puddling furnaces, 8 heating furnaces, 2 trains of rolls, and 5 hammers; product, car axles and general forgings.

Number of rolling mills and steel works in Missouri: 6. Of these, 3 are rail mills, 2 making light rails only; 1 makes Bessemer steel.

### MICHIGAN.

Baugh Steam Forge Company, No. 1 Newberry and McMillan Building, Detroit, Wayne county. Works in Springwells, about three miles west of Detroit. Forge built in 1870; rolling mill in 1877; puddle mill in 1879; 1 Siemens and 8 reverberatory heating furnaces, 2 double-double and 2 single-double puddling furnaces, 7 hammers, and 3 trains of rolls (one 8-inch guide, one 16-inch bar, and one 20-inch muck); product, car axles, links, and pins, shafting, and bar iron. James McMillan, President; Hugh McMillan, Vice-President; John B. Baugh, General Manager; Samuel A. Baugh, Superintendent; W. K. Anderson, Treasurer; R. D. Field, Secretary.

Eureka Iron Company, No. 21 Newberry and McMillan Building, Detroit. Works at Wyandotte, Wayne county. Built in 1855; 6 double and 5 single puddling furnaces, 14 forge fires, 19 heating furnaces, 7 trains of rolls (one 30, three 24, one 20, one 18, and one 8-inch), and 1 hammer; product, "Wyandotte" boiler plate and tank iron, bars, and sheets; annual capacity, 30,000 net tons. Formerly called Wyandotte Rolling Mills. W. K. Muir, President, Detroit; S. D. Miller, Vice-President, Detroit; W. S. Armitage, Secretary and Treasurer, Detroit; J. S. Van Alstyne, Agent, Wyandotte. *See Furnaces.*

Number of rolling mills in Michigan: 2.

### WISCONSIN.

North Chicago Rolling Mill Company, 17 Metropolitan Block, Chicago, Ill., and 37 Mitchell Block, Milwaukee, Wis. Milwaukee Works at Bay View, near Milwaukee, Milwaukee county. Built in 1868 and 1874; 7 quadruple and 2 double puddling furnaces, 21 coal and 5 Siemens heating furnaces, 7 trains of rolls, and 1 hammer; product, rails, merchant bar iron, fish plates, car links and pins, and horse shoes; annual capacity, 60,000 net tons of rails, 40,000 tons merchant bar iron, and 20,000 tons fish plates, etc. Formerly operated by Milwaukee Iron Company. *See Furnaces. See Illinois Rolling Mills.*

Number of rolling mills in Wisconsin: 1 rail mill.

### KANSAS.

Kansas Rolling Mill Company, Kansas City, Missouri. Works at Rose-dale, Wyandotte county, Kansas, 3 miles from Kansas City; composed of the plant that was formerly at Decatur, Illinois, having been removed and rebuilt in 1875; it was first erected in 1870; has 11 heating furnaces, 2 hammers, 6 spike machines, and 3 trains of

rolls (one 9, one 18, and one 20-inch), and a set of "universal" rolls attached to the 20-inch train; product, iron rails, fish plates, bolts, nuts, spikes, merchant bar iron, wrought drawheads, head chairs, etc.; annual capacity, 35,000 net tons. A. B. Stone, President, 52 William st., New York; Ira Harris, Vice-President and General Manager, and E. V. Wilkes, Secretary, Kansas City.

Number of rolling mills in Kansas: 1 rail mill.

### NEBRASKA.

Omaha Nail Works, John D. Creighton, Omaha, Douglas county. Built in 1879; 2 heating furnaces, 2 trains of 20-inch rolls, and 26 nail machines; product, nails; use scrap iron and old rails only; annual capacity, 4,500 net tons.

Number of rolling mills in Nebraska: 1.

### COLORADO.

Colorado Coal and Iron Company, South Pueblo, Pueblo county. Works at Denver, Arapahoe county, and at South Pueblo. The works at Denver consist of a rolling mill purchased of the Denver Rolling Mill Company in 1880, having been built in 1878; 5 heating furnaces and 2 trains of rolls; product, bar iron, iron rails, and splice bars; annual capacity, 12,000 net tons. The works at South Pueblo consist of Bessemer steel works, steel rail mill, puddle mill, and nail factory; these works were built in 1881-2, and the converting department made its first blow April 11, 1882; two 5-gross-ton Bessemer steel converters, with blowing apparatus, etc., 4 Siemens heating furnaces, one 3-high 35-inch blooming train, one 3-high 23-inch rail train, 3 Siemens double-double puddling furnaces, one 3-high 20-inch muck and one 2-high 22-inch nail-plate train, heating and annealing furnaces, 27 nail machines, and railroad spike and bolt and nut machines; product, steel rails, iron cut nails, railroad spikes, bolts, and nuts; annual capacity, 50,000 net tons of steel rails, 100,000 kegs of nails, and 30,000 kegs of railroad spikes, bolts, and nuts. William J. Palmer, President, 47 William st., New York; A. H. Danforth, Vice-President and General Manager, South Pueblo; W. L. Graham, Secretary and Treasurer, South Pueblo; W. G. Brown, Sales Agent, Denver; D. N. Jones, General Superintendent of steel works, South Pueblo. *See Furnaces.*

Number of rolling mills and steel works in Colorado: 2. Both of these make rails and 1 makes Bessemer steel.

### WYOMING TERRITORY.

Union Pacific Rolling Mills, Union Pacific Railroad Company, Laramie City, Albany county. Built in 1874-5; put in operation in April, 1875; 10 heating furnaces and 2 trains of rolls (one 10 and one 19-inch), and 1 hammer; product, rails, bar iron, nuts, bolts,

spikes, and splice bars; reroll old rails; annual capacity, 22,000 net tons. George F. Nock, Superintendent.

Number of rolling mills in Wyoming Territory: 1 rail mill.

### UTAH TERRITORY.

Ogden Iron Works, R. L. Jones, lessee, Ogden. The construction of the rolling mill was begun in 1875, but it was not completed; to contain one 22-inch train of rolls and a guide mill; water-power; will make rails, bar iron, spikes, and bolts. *See Furnaces.*

Number of rolling mills in Utah Territory: 1 rail mill building.

### CALIFORNIA.

Central Pacific Railroad Rolling Mill, Central Pacific Railroad Company, Sacramento, Sacramento county. Built in 1881; 9 heating furnaces, 2 trains of rolls, and 6 hammers; product, all kinds of bar and shaped iron; annual capacity, 8,000 net tons. Brand, "C. P.-R. R." A. J. Stevens, General Manager of the mill.

Pacific Rolling Mill and Forge, Pacific Rolling Mill Company, 16 First st., P. O. Box 2,032, San Francisco. Put in operation July 25, 1868; 5 single puddling furnaces, 15 heating furnaces, 5 trains of rolls (one 8, one 10, and three 18-inch), 3 spike and 2 rivet machines, 4 bolt headers, 1 pointer, 3 hot-press nut machines, 10 punching and straightening presses, 5 steam hammers, and 2 belt hammers; product, bar iron, angle iron, shafting, 12 to 60-lb. iron and steel rails, railroad, ship, and boat spikes, bridge work, bolts (all kinds except carriage), nuts, washers, boiler rivets, horse-shoe shapes, car axles, and all kinds of railroad and ship forgings; steel rails made from purchased blooms; total annual capacity, 30,000 net tons. Wm. Alvord, President; L. B. Benchley, General Manager; C. M. Keeney, Secretary; Patrick Noble, Superintendent.

Number of rolling mills in California: 2, of which 1 is a rail mill.

#### PROJECTED.

Pacific Iron and Nail Company, San Francisco. Intend to build a rolling mill and nail factory. G. T. Walker, General Manager.

### UNITED STATES.

Total number of rolling mills and steel works in the United States: 393 completed, and 16 building. Of these, 80 are rail mills, 32 making only light T and street rails, and 2 rail mills are building; 27 make open-hearth steel, and 5 open-hearth works are building; 35 make crucible steel; 14 make Bessemer steel, and 1 Bessemer works is building; 3 make cemented steel; and 2 make patent steels.

## RECENTLY ABANDONED ROLLING MILLS.

### MASSACHUSETTS.

Dighton Rolling Mill, Dighton Rolling Mill Company, Dighton, Bristol county. Built in 1866; destroyed by fire in 1869, and not rebuilt.

New England Iron Company, Readville, Norfolk county. Built in 1862; product, bar iron, gas plates, and shapes.

Newton Iron Works, Newton Upper Falls, Middlesex county. Built about 1800; product, bar and rod iron; not in operation for several years, and abandoned in 1880.

### RHODE ISLAND.

Providence Iron Company, Providence. Built in 1845; abandoned in 1880.

### CONNECTICUT.

Hunt Canfield Iron Company, Huntsville, Litchfield county. Destroyed by fire, and not rebuilt.

### NEW YORK.

Buffalo Iron and Nail Works, Buffalo, Erie county. Built in 1847; abandoned in 1880.

Delano Iron Works, Syracuse, Onondaga county. Built in 1865; product, rails, fish plates, railroad spikes, and merchant iron. Dismantled in 1878.

Lake Champlain Nail Works, Dannemora, Clinton county. Built in 1853; abandoned in 1877.

Skaneateles Iron Works, Skaneateles Falls, Onondaga county. Built in 1868; abandoned in 1880.

Suffern, James, Suffern P. O., Rockland county. Built in 1850; product, bars.

Troy Wire Mills, Troy. One 6-inch mill built in 1874, but only used for a short time.

### NEW JERSEY.

Bergen Iron Works, Jersey City. Built in 1852; product, plate iron and blooms. Dismantled in 1879.

Camden Rolling Mill, Camden, Camden county. Annual capacity, 12,000 net tons of bar iron and 75,000 kegs of nails.

Collier's Iron Works, William Collier, Paterson, Passaic county. Built in 1872; product, merchant bar and horse-shoe iron; annual capacity, 2,000 net tons.

North River Rolling Mill, Alex. C. Durbin, Thirteenth and Henderson sts., Jersey City. Product, fire-box and boiler plate; annual capacity, 3,000 net tons. Torn down in 1875.

### PENNSYLVANIA.

Brady's Bend Iron Company, Brady's Bend, Armstrong county. Built in 1842; product, rails. Demolished in 1879.

Colemanville Rolling Mill, Colemanville, Lancaster county. Burned in 1875.

Danville Rolling Mill, Danville. Built in 1870; removed to Chester in 1881.

Hibernia Forge and Rolling Mill, Wagontown, Chester county. Forge built in 1792, mill added in 1837; abandoned in 1880.

Juniata Iron Works, S. & B. R. Hatfield, Alexandria, Huntingdon county. Built in 1838; product, sheet, plate, and bar iron; burned in 1868.

Mount Carbon Rolling Mill, Mount Carbon, Schuylkill county. Burned in May, 1879. Bar and plate mill.

West Brandywine Iron Works, Coatesville, Chester county. Built in 1845; abandoned in 1880.

### MARYLAND.

Baltimore Steam Forge and Rolling Mills, Trego, Thompson & Co., Baltimore. Built in 1853; product, bar iron and car axles.

Mount Savage Iron Company, Mount Savage, Alleghany county. Built in 1839; product, rails. Abandoned for many years, and completely dismantled in 1875.

### VIRGINIA.

Graham's Forge, Wythe county. Built in 1828; product, bar iron and nails. Abandoned in 1881.

### NORTH CAROLINA.

Briggs's Rolling Mill, Gaston county. Built in 1853; has been standing for several years.

### SOUTH CAROLINA.

Magnetic Iron Company, Limestone Springs P. O., Spartanburg county. Works on Proud river, Union county. F. G. Latham, Agent. Organized about 1840; rolling mill, nail works, forge, foundry, and 4 blast furnaces, each 36 feet high with 9-foot boshes; water-power; worked continuously from organization until 1871.

South Carolina Manufacturing Company, Spartanburg, Spartanburg county. Built in 1835; product, bar iron, blooms, and nails; annual capacity, 2,000 net tons. This mill and 2 blast furnaces belonging to the same establishment have not been in operation for several years.



## GEORGIA.

Georgia Iron Works, Atlanta, Fulton county. Built in 1865-6; product, iron rails and bar iron. Burned September 21, 1881, and the machinery sold and removed.

Rome Iron Works, Empire Iron Company, Rome, Floyd county. Built in 1869; product, bar iron and nails. Dismantled in 1881.

## KENTUCKY.

Covington Rail Mill, James G. Kyle & Bro., Covington, Kenton county. Built in 1854; product, rails. Torn down in 1878.

## TENNESSEE.

Memphis Rolling Mill, James Tranter, of Cincinnati, Ohio. Mill at Memphis, Shelby county. Built in 1866; product, merchant bar, plow slabs, fish bars, and street rails; annual capacity, 5,000 net tons. Dismantled in 1879.

## OHIO.

Alliance Rolling Mill, Alliance, Stark county. Built in 1867; product, rails. Dismantled in 1878.

Ashtabula Rolling Mill, Ashtabula, Ashtabula county. Built in 1873-4; product, boiler plate, sheet iron, shingle bands, washers, and wrought spikes. Torn down in 1879.

Leetonia Nail and Bolt Company, Leetonia, Columbiana county. 26 nail machines, and train for making nail plate; no puddling furnaces; annual capacity, 2,600 net tons. H. F. Christy, Agent.

Newark Rolling Mill, Newark, Licking county. Built in 1868 to roll rails; changed to a bar mill in 1875; abandoned and dismantled in 1879.

Pioneer Rolling Mill, Irondale, Jefferson county. Muck bar mill; not in use for several years.

Valley Iron Company, Cleveland. Built in 1874-5; product, bar iron; abandoned in 1880.

## INDIANA.

Capital City Iron Works, Indianapolis. Product, bar iron. Not in operation for several years.

Evansville Rolling Mill, Evansville. Built in 1872; product, rails. Not in operation for several years.

Western Iron Company, Knightsville, Clay county. Built in 1868; product, muck bar. Torn down in 1879.

## ILLINOIS.

Chicago Plate and Bar Mill, J. M. Ayer, 72 Washington st., Chicago. Product, plate and bar iron. Not in operation for several years.

East St. Louis Rail Mill, East St. Louis, St. Clair county. Built in 1865 to make rails. Destroyed by fire in 1879.

Northwestern Nail Works, Dunleith. Built in 1875-6; product, nails; removed to Omaha in 1879.

### MICHIGAN.

Jackson Iron Manufacturing Company, Jackson county. Built in 1872. Torn down in 1879. Machinery removed to Springfield Iron Company's mill, Springfield, Ill.

Marquette Rolling Mill, Marquette and Pacific Rolling Mill Company, Marquette, Marquette county. Built in 1871; product, bar iron. Idle since 1875, and almost totally demolished.

### MISSOURI.

Tudor Iron Works, St. Louis. Built in 1870; product, railroad spikes.

### KANSAS.

Topeka Rolling Mill, Topeka. Built in 1874; product, rails. Burned in 1881.

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## RECENTLY ABANDONED STEEL WORKS.

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American Cast Steel Company, Cleveland, Ohio. Built in 1878 to make steel by the Bechtold patent.

Atlantic Steel Works, Richardson, Boynton & Co., 232 Water st., New York. Abandoned the manufacture of steel in 1875.

Chicago Sheffield Steel Works, 149 Fulton st., Chicago. Built in 1874-5; 2 heating furnaces, 2 hammers, and 4 steel-melting holes; product, tool and machinery steel; annual capacity, 300 net tons.

Cleveland Cast Steel Works, H. W. Foote, 145 Superior st., Cleveland, Ohio. Built in 1877 to make steel castings.

Crucible Cast Steel Casting Company Limited, Pittsburgh. Built in 1875; 3 steel-cementing furnaces and 8 steel-melting holes; product, cast steel castings; annual capacity, 600 net tons.

North River Steel Works, Thirteenth and Henderson sts., Jersey City, New Jersey. Built in 1875; 24 melting holes and 2 trains of rolls; product, cast steel.

Read & Thaw, North and Irwin avenues, Allegheny City, Pa. Built in 1878; 6 melting holes and 3 hammers; product, steel castings.

Wheeling Steel Works, Martin's Ferry, Ohio. Built in 1873-4; 12 steel-melting holes, 2 heating furnaces, and 2 hammers; product, tool cast steel.

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RAIL MILLS.

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NOTE.—This list includes all rolling mills in the United States which make light and heavy sections of railroad bars and street rails. For a complete description of the works enumerated below see the preceding list of rolling mills. When not otherwise specified, the mills in this list roll only ordinary sections of iron rails.

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## MAINE—1.

Portland Rolling Mills, Portland.

## VERMONT—1.

St. Albans Iron and Steel Works, St. Albans, Franklin county. Iron and open-hearth steel rails; also, Bessemer steel rails from purchased blooms.

## MASSACHUSETTS—1.

Washburn Iron Company, Worcester. Bessemer steel rails from purchased blooms.

## NEW YORK—4.

Albany and Rensselaer Iron and Steel Company, Troy, Rensselaer county. Iron and Bessemer steel rails.

Elmira Iron and Steel Rolling Mills, Elmira Iron and Steel Rolling Mill Company, Elmira, Chemung county. Iron and silicon-steel-top rails.

Spuyten Duyvil Rolling Mill, Welch & Barnum, Spuyten Duyvil, New York City. Iron rails; also, Bessemer steel rails from purchased blooms.

Union Iron Works, Union Iron Company of Buffalo, Buffalo.

## NEW JERSEY—1.

New Jersey Steel and Iron Company, Trenton, Mercer county.

## PENNSYLVANIA—EASTERN DISTRICT—9.

Allentown Rolling Mills, 237 South Third st., Philadelphia. Works at Allentown, Lehigh county. All sizes of T and street rails.

Bethlehem Iron Company, Bethlehem, Northampton county. Iron and Bessemer steel rails.

Combination Steel and Iron Company, Chester, Delaware county. Iron-clad steel rails; also, Bessemer steel rails from purchased blooms.

Greenwood Rolling Mill, Greenwood Rolling Mill Company, Tamaqua, Schuylkill county. Office, 224 South Third st., Philadelphia. Light rails.

Palo Alto Rolling Mill, estate of Benjamin Haywood, deceased, Pottsville, Schuylkill county. Rails of light and heavy sections and street rails.

Philadelphia and Reading Rolling Mill, Philadelphia and Reading Coal and Iron Company, W. E. C. Coxe, Superintendent, Reading, Berks county. Iron rails; also, Bessemer steel rails from purchased blooms.

Phoenix Iron Works, Phoenix Iron Company, Phoenixville, Chester county. Office, 410 Walnut st., Philadelphia.

Pottsville Rolling Mills, Pottsville Iron and Steel Company, Pottsville. Rails of light and heavy sections and street rails.

Schuylkill Haven Rolling Mill, Schuylkill Haven Iron Company, Pottsville. Works at Schuylkill Haven, Schuylkill county. Light rails.

PENNSYLVANIA—CENTRAL DISTRICT—7 COMPLETED, 1 BUILDING.

Co-operative Iron and Steel Works, Danville, Montour county. All sizes of iron T and street rails; also, Bessemer steel rails from purchased blooms.

Glendower Iron Works, Danville. All sizes of T and street rails. Philadelphia office, 234 South Fourth st.

Hollidaysburg Iron Works, Hollidaysburg Iron and Nail Company, Hollidaysburg, Blair county. Light rails.

Lackawanna Iron and Steel Works, Lackawanna Iron and Coal Company, Scranton, Lackawanna county. Iron and Bessemer steel rails.

Lochiel Rolling Mill Company, Harrisburg.

Montour Iron and Steel Works, Montour Iron and Steel Company, Danville. Philadelphia office, 208 South Fourth st.

Pennsylvania Steel Works, Pennsylvania Steel Company, Steelton, Dauphin county. Office, 208 South Fourth st., Philadelphia. Bessemer steel rails of all kinds.

Scranton Steel Company, Scranton. Bessemer steel rail mill in course of erection.

PENNSYLVANIA—WESTERN DISTRICT—12.

Allegheny, Monongahela, and Birmingham Iron Works, Oliver Brothers & Phillips, Pittsburgh. Light rails.

American Iron Works, Jones & Laughlins, Pittsburgh. Light rails.

Cambria Iron and Steel Works, Cambria Iron Company, Johnstown, Cambria county. Office, 218 South Fourth st., Philadelphia. Iron and Bessemer steel rails.

Edgar Thomson Steel Works, Carnegie Bros. & Co. Limited, Pittsburgh. Bessemer steel rails.

Fort Pitt Iron and Steel Works, Graff, Bennett & Co., Pittsburgh. Light rails.

Kensington Iron Works, H. Lloyd, Son & Co., Pittsburgh. Light rails.

Pittsburgh Bessemer Steel Company Limited, Pittsburgh. Bessemer steel rails.

Sharon Iron Company, Sharon, Mercer county. Light rails.

Shenango Iron Works, estate of Wm. H. Brown, New Castle, Lawrence county. Light rails.

Sligo Iron Works, Phillips, Nimick & Co., Pittsburgh. Light rails.

Wayne Iron and Steel Works, Brown & Co., Pittsburgh. Light rails.

Wheatland Rolling Mills, Wheatland Bessemer Steel Company, Wheatland, Mercer county. Have made no rails for several years.

#### MARYLAND—2.

Abbott Iron Works, Abbott Iron Company, Baltimore.

Cumberland Rolling Mill, Baltimore and Ohio Railroad Company, Cumberland. Have made no rails for several years.

#### VIRGINIA—1.

James River Steel Manufacturing and Mining Company, Lynchburg.

#### ALABAMA—1.

Birmingham Rolling Mill, Birmingham Rolling Mill Company, Birmingham. Light T and street rails.

#### WEST VIRGINIA—1.

Riverside Iron Works, Wheeling. Light rails.

#### KENTUCKY—3.

Central Rolling Mill Company, Brook st., Louisville. Light and street rails.

Louisville Iron and Steel Works, Clay st., Louisville. Light and street rails. Not in operation for several years.

Swift's Iron and Steel Works, Newport. Office, 26 West Third st., Cincinnati. Heavy and light T and street rails.

#### TENNESSEE—3.

Knoxville Iron Company, Knoxville. Light rails.

Lookout Rolling Mill, Chattanooga. Light rails.

Roane Iron Company, Chattanooga. Iron and open-hearth steel rails; also, Bessemer steel rails from purchased blooms.

#### OHIO—17.

Ætna Iron and Nail Company, Bridgeport. Light and street rails.

Akron Iron Works, Akron Iron Company, Akron. Light rails.

Alikanna Rolling Mill, Sharpe, Daniels & Co., Steubenville. Light rails.

Cincinnati Rolling Mill Company, Cincinnati. Rail mill idle.

Cleveland Rolling Mill Company, Cleveland. Iron and Bessemer steel rails.

Columbus Iron Works, P. Hayden & Son, Columbus. Light rails.  
 Columbus Rolling Mill, Columbus Rolling Mill Company, Columbus.  
 Iron rails; also, Bessemer steel rails from purchased blooms.  
 Corns Iron Company, Girard, Trumbull county. Light rails.  
 Crescent Iron Works, Watson & Co., Pomeroy, Meigs county. Light and street rails.  
 Ironton Rolling Mill, New York and Ohio Iron and Steel Company, Ironton, Lawrence county. Light rails.  
 Lawrence Iron Works, Lawrence Iron Works Company, Ironton. Light rails.  
 Marietta Rail Mill, estate of Wm. Lottimer, Marietta. Not in operation for several years.  
 Massillon Rolling Mill, Joseph Corns & Son, Massillon. Light rails.  
 Portsmouth Iron and Steel Company, Portsmouth. Light rails.  
 Sandusky Rolling Mill and Manufacturing Company, Sandusky, Erie county. Iron rails; also, Bessemer steel rails from purchased blooms.  
 Union Iron Works, Union Rolling Mill Company, Cleveland. Light and street rails.  
 Zanesville Iron Works, Ohio Iron Company, Zanesville. Light and street rails.

## INDIANA—2.

Indianapolis Rolling Mill, Indianapolis Rolling Mill Company, Indianapolis. Iron rails; also, Bessemer steel rails from purchased blooms.  
 New Albany Rail Mill Company, New Albany.

## ILLINOIS—5.

Joliet Steel Works, Joliet Steel Company, Joliet, Will county. Office, Honore Building, Chicago. Bessemer steel rails.  
 North Chicago Rolling Mill Company, 17 Metropolitan Block, Chicago. Iron and Bessemer steel rails.  
 Springfield Iron Company, Springfield, Sangamon county. Iron and open-hearth steel rails; also, Bessemer steel rails from purchased blooms.  
 St. Louis Bolt and Iron Company, St. Louis, Mo. Works in St. Clair county, Ill. Light and street rails.  
 Union Iron and Steel Company, northeast corner Madison and Dearborn sts., Chicago. Bessemer steel rails.

## MISSOURI—3.

Helmbacher Forge and Rolling Mills Company, Allen Building, corner Fifth and Market sts., St. Louis. Light rails.  
 Laclede Rolling Mill, Chouteau, Harrison & Vallé Iron Company, 941 North Second st., St. Louis. Light and flat rails.  
 St. Louis Ore and Steel Company, 409 North Sixth st., St. Louis. Bessemer steel rails.

## WISCONSIN—1.

North Chicago Rolling Mill Company, 17 Metropolitan Block, Chicago, and 37 Mitchell Block, Milwaukee.

## KANSAS—1.

Kansas Rolling Mill Company, Kansas City, Mo. Works at Rosedale.

## COLORADO—2.

Colorado Coal and Iron Company, Denver and South Pueblo. Two rail mills. Iron and Bessemer steel rails.

## WYOMING TERRITORY—1.

Union Pacific Rolling Mills, Union Pacific Railroad Company, Laramie City.

## UTAH TERRITORY—1 BUILDING.

Ogden Iron Works, R. L. Jones, lessee, Ogden. In course of erection.

## CALIFORNIA—1.

Pacific Rolling Mill and Forge, Pacific Rolling Mill Company, 16 First st., P. O. Box 2,032, San Francisco. Iron rails of all sizes; also, Bessemer steel rails from purchased blooms.

## UNITED STATES.

Total in the United States: 80 completed rail mills; of which 48 roll rails of all sizes and 32 roll only light and street rails; 2 mills for heavy rails in course of erection.

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## BESSEMER STEEL WORKS.

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NOTE.—The ton used in giving the capacity of the converters is the ton of 2,240 pounds. For a full description of these works see the list of rolling mills.

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## NEW YORK—1.

Albany and Rensselaer Iron and Steel Company, Troy. Two 7-ton converters. Made their first blow February 15, 1865.

## PENNSYLVANIA—7 COMPLETED, 1 BUILDING.

Bethlehem Iron Company, Bethlehem. Four 7-ton converters. Made their first blow October 4, 1873, and the first steel rail October 18, 1873.

Cambria Iron and Steel Works, Cambria Iron Company, Johnstown.



Office, 218 South Fourth st., Philadelphia. Two 6½-ton converters. Made their first blow July 10, 1871.

Edgar Thomson Steel Works, Carnegie Bros. & Co. Limited, Bessemer Station, Allegheny county. Office at Pittsburgh. Three 10-ton converters. Made their first blow August 26, 1875, and the first steel rail September 1, 1875.

Lackawanna Iron and Steel Works, Lackawanna Iron and Coal Company, Scranton. Two 5-ton converters. Made their first blow October 23, 1875, and the first steel rail December 29, 1875.

Pennsylvania Steel Works, Pennsylvania Steel Company, Steelton P. O. Office, 208 South Fourth st., Philadelphia. Two 7-ton and three 8-ton converters. Made their first blow in June, 1867.

Pittsburgh Bessemer Steel Company Limited, Pittsburgh. Two 4-ton converters. Made their first blow March 19, 1881.

Pittsburgh Steel Casting Company, Pittsburgh. One 5-ton converter. Made its first blow August 26, 1881.

Scranton Steel Company, Scranton. Building two 4-ton converters.

#### OHIO—1.

Cleveland Rolling Mill Company, Cleveland. Two 10-ton converters. Made their first blow October 15, 1868.

#### ILLINOIS—3.

Joliet Steel Works, Joliet Steel Company, Joliet. Office, Chicago. Two 5-ton converters. Made their first blow January 26, 1873, and the first steel rail March 15, 1873.

North Chicago Rolling Mill Company, Chicago. Two 6-ton and three 10-ton converters. Made their first blow April 10, 1872.

Union Iron and Steel Company, Chicago. Two 6-ton converters. Made their first blow July 26, 1871.

#### MISSOURI—1.

St. Louis Ore and Steel Company, St. Louis. Two 7-ton converters. Made their first blow September 1, 1876.

#### COLORADO—1.

Colorado Coal and Iron Company, South Pueblo. Two 5-ton converters. Made their first blow April 11, 1882.

#### UNITED STATES.

Total number of Bessemer steel works: 14 completed works, and 1 works building. The North Chicago Rolling Mill Company's works are regarded as one establishment, although they consist of two separate plants. Total annual capacity of completed works, 2,150,000 net tons of ingots. The Harrison Steel Company, of St. Louis, intends to build a plant of three 10-ton converters at Harrison, Jackson county, Illinois.

## CRUCIBLE CAST-STEEL WORKS.

NOTE.—These steel works are fully described in the list of rolling mills. Their capacity is here indicated by the number of pots which each works can use at one heat.

### MASSACHUSETTS—1.

Washburn Car-wheel Company, Hartford, Conn. Steel works at Worcester. 48 pots.

### CONNECTICUT—2.

Collins Company, Collinsville, Hartford county. 180 pots.  
Farist Steel Works, Farist Steel Company, Bridgeport. 72 pots.

### NEW YORK—3.

Chrome Steel Works, Kent avenue and Keap st., Brooklyn. 96 pots.  
Monhagen Steel Works, Wheeler, Madden and Clemson Manufacturing Company, Middletown, Orange county. 96 pots.  
Sanderson Bros. Steel Company, Syracuse. New York office, 11 Gold st. 80 pots.

### NEW JERSEY—5.

Adirondac Steel Works, Andrew Williams, Jersey City. 160 pots.  
Jersey City Steel Works, James R. Thompson & Co., Jersey City. 224 pots.  
Newark Steel Works, Benjamin Atha & Co., Newark. 144 pots.  
Pompton Steel and Iron Company, Pompton, Passaic county. 160 pots.  
West Bergen Steel Works, Spaulding, Jennings & Co., West Bergen, Hudson county. 96 pots.

### PENNSYLVANIA—18.

Beaver Falls Steel Works, Beaver Falls, Beaver county. 24 pots.  
Black Diamond Steel Works, Park, Brother & Co., Pittsburgh. 306 pots.  
Crescent Steel Works, Miller, Metcalf & Parkin, Pittsburgh. 144 pots.  
Crown Steel Works, Cassidy & Co., Demmler, Allegheny county.  
Works in McKeesport borough. 24 pots.  
Fairmount Steel Works, Alexander Foster & Co., 2,325 Spring Garden st., Philadelphia. 24 pots.  
Fort Pitt Iron and Steel Works, Graff, Bennett & Co., Pittsburgh. 60 pots.  
Hussey, Binns & Co., Pittsburgh. 24 pots.  
Hussey, Howe & Co., Pittsburgh. 276 pots.  
Keystone Saw, Tool, Steel, and File Works, Henry Disston & Sons, Front and Laurel sts., Philadelphia. 132 pots.

- La Belle Steel Works, Smith, Sutton & Co., Pittsburgh. 126 pots.  
 Midvale Steel Company, Nicetown P. O., Philadelphia. 94 pots.  
 Nellis's Agricultural Works, Nellis, McIntire & Co., Pittsburgh. 20 pots.  
 Oxford Iron and Steel Works, William & Harvey Rowland, Frank-  
 ford P. O., Philadelphia. 48 pots.  
 Philadelphia Steel Forge, Adam Tindel, Frankford P. O., Philadelphia.  
 40 pots.  
 Pittsburgh Steel Casting Company, Pittsburgh. 72 pots.  
 Pittsburgh Steel Works, Pittsburgh. 150 pots.  
 Singer, Nimick & Co., Pittsburgh. 258 pots.  
 Wayne Iron and Steel Works, Brown & Co., Pittsburgh. 192 pots.

## MARYLAND—1.

- Cumberland Steel Works, William Hall, Cumberland. 24 pots.

## OHIO—2.

- Burgess Steel and Iron Works, Portsmouth, Scioto county. 24 pots.  
 Cleveland Crucible Steel Company, Cleveland. 32 pots.

## ILLINOIS—1.

- Calumet Tool Company, Chicago. 20 pots.

## KENTUCKY—1.

- Crucible Steel Castings and Metal Company, Louisville. 10 pots.

## TENNESSEE—1.

- Providence Steel Works, John Leighton, P. O. Box 176, Chattanooga.  
 6 pots.

## UNITED STATES.

- Total number of crucible cast-steel works in the United States: 35.

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## OPEN-HEARTH STEEL WORKS.

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NOTE.—These works are fully described in the list of rolling mills. The ton here used is the ton of 2,240 pounds.

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## NEW HAMPSHIRE—1.

- Nashua Iron and Steel Company, Nashua. Main office, 40 Water st.,  
 Boston. One 10-ton Siemens furnace.

## VERMONT—1.

- St. Albans Iron and Steel Works, St. Albans. One 10-ton Siemens  
 furnace.

## MASSACHUSETTS—2.

Bay State Iron Company, Boston. One 6-ton Siemens furnace. Not in operation for several years.

Norway Steel and Iron Works, Naylor & Co., 6 Oliver st., Boston. Three 10-ton Siemens furnaces.

## RHODE ISLAND—1.

Rumford Chemical Works, G. F. Wilson, 42 Weybosset st., P. O. Box 1,565, Providence. One 6-ton Siemens furnace. Not in operation for several years.

## NEW JERSEY—1.

Newark Steel Works, Benjamin Atha & Co., Newark. One 7-ton Siemens furnace.

## PENNSYLVANIA—12 COMPLETED, AND 3 BUILDING.

Bethlehem Iron Company, Bethlehem. Building two 15-ton Siemens-Pernot furnaces.

Black Diamond Steel Works, Park, Brother & Co., Pittsburgh. Two 12-ton Siemens furnaces.

Cambria Iron Company, Johnstown. Two 12-ton Siemens-Pernot furnaces.

Chester Rolling Mills, Chester. Two 10-ton Siemens furnaces.

Co-operative Iron and Steel Works, Danville. Building two 20-ton Siemens furnaces.

Glenwood Steel Works, Leishman, Gordon & Snyder, Pittsburgh. One 5-ton Siemens furnace.

Hussey, Howe & Co., Pittsburgh. One 7-ton Siemens furnace.

Juniata Iron and Steel Works, Shoenberger & Co., Pittsburgh. Two 10-ton Siemens furnaces.

Linden Steel Company Limited, Pittsburgh. One 7-ton and one 10-ton Siemens furnace.

Mackintosh, Hemphill & Co., Pittsburgh. Building two Siemens furnaces.

Midvale Steel Company, Nicetown, Philadelphia. One 7-ton and one 12-ton Siemens furnace.

Pennsylvania Steel Company, Steelton. Office, 208 South Fourth st., Philadelphia. Two 15-ton Siemens furnaces completed, and two 30-ton building.

Singer, Nimick & Co., Pittsburgh. One 10-ton Siemens furnace.

Spang Steel and Iron Company Limited, Pittsburgh. One 7-ton Siemens-Pernot furnace and one 7-ton Siemens furnace.

West Penn Steel Works, Joseph G. Beale, Leechburg. One 7-ton Siemens furnace.

## VIRGINIA—1 BUILDING.

Potomac Manufacturing Company, 26 B st., N. E., Washington, D. C. Building a 4-ton furnace at Alexandria, Va.

## OHIO—5 COMPLETED, AND 1 BUILDING.

Burgess Steel and Iron Works, Portsmouth. One 8-ton Siemens furnace.

Canton Steel Works, Bolton Steel Company, Canton. One 6-ton Siemens furnace.

Cleveland Rolling Mill Company, Cleveland. Three 7-ton and two 15-ton Siemens furnaces.

Otis Iron and Steel Works, Otis Iron and Steel Company, Cleveland. Two 7-ton and four 15-ton Siemens furnaces.

Portsmouth Iron and Steel Company, Portsmouth. One 10-ton Siemens furnace.

Whitely, Faslser & Kelley, Springfield. Building an open-hearth furnace.

## KENTUCKY—1.

Ohio Valley Steel and Iron Works, Mitchell, Tranter & Co., Second and Race sts., Cincinnati. Works at Covington, Ky. One 7-ton Siemens furnace.

## TENNESSEE—1.

Roane Iron Company, Chattanooga. Two 10-ton Siemens furnaces.

## ILLINOIS—2.

Calumet Iron and Steel Company, Chicago. Four Siemens furnaces.

Springfield Iron Company, Springfield. Two 15-ton Siemens-Pernot furnaces.

## UNITED STATES.

Total number of open-hearth steel works in the United States: 27 completed, and 5 building.

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## STEEL MANIPULATING WORKS.

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NOTE.—These works are fully described in the list of rolling mills. They manipulate *purchased* crucible cast steel and steel scrap, or roll Bessemer steel blooms, Bessemer steel rail ends, old Bessemer steel rails, or Siemens-Martin steel ingots, blooms, or billets. Several of these works are solely engaged in the manipulation of purchased steel, but it will be observed that others are largely engaged in the manufacture of iron or of crucible cast steel.

## VERMONT—1.

St. Albans Iron and Steel Works, St. Albans. Roll steel rails from purchased blooms.

## MASSACHUSETTS—4.

Bridgewater Iron Company, Bridgewater. Roll steel from steel scrap.  
Cambridge Rolling Mills, Gilmore & Eustis, Cambridgeport. Roll steel from steel scrap.

Washburn and Moen Manufacturing Company, Worcester. Roll wire rods from crucible and Bessemer steel.

Washburn Iron Company, Worcester. Roll steel rails from purchased blooms.

## CONNECTICUT—1.

Farist and Windsor Company, Windsor Locks. Roll Siemens-Martin and Bessemer steel.

## NEW YORK—4.

Manhattan Rolling Mill, John Leonard, 445 and 451 West st., New York. Rolls steel from steel scrap.

Onondaga Steel Works, Sweet's Manufacturing Company, Syracuse. Roll Bessemer steel.

Spuyten Duyvil Rolling Mill, Welch & Barnum, Spuyten Duyvil, New York. Roll steel rails from purchased blooms.

Syracuse Iron Works, Syracuse. Roll steel from steel scrap.

## NEW JERSEY—5.

Adirondac Steel Works, Andrew Williams, Jersey City. Roll Siemens-Martin steel.

Jersey City Steel Works, James R. Thompson & Co., Jersey City.

John A. Roebling's Sons Company, Trenton. Roll wire rods from steel.

Pompton Steel and Iron Company, Pompton, Passaic county.

Trenton Iron Company, Trenton. Roll wire rods from steel.

## PENNSYLVANIA—19.

Beaver Falls Steel Works, Beaver Falls, Beaver county.

Catasauqua Manufacturing Company, Catasauqua. Manipulate Bessemer steel.

Combination Steel and Iron Company, Chester, Delaware county. Roll steel rails from purchased blooms.

Co-operative Iron and Steel Works, Danville. Roll steel rails from purchased blooms.

Eagle Rolling Mill, J. W. Friend & Co., Pittsburgh.

Gautier Steel Department of Cambria Iron Company, Johnstown. Roll Bessemer and open-hearth steel.

Harrisburg Steel and Iron Works Limited, Hummel, Fendrich & Co., Harrisburg.

Kensington Iron and Steel Works, James Rowland & Co., 920 North Delaware avenue, Philadelphia.

La Belle Steel Works, Smith, Sutton & Co., Pittsburgh.

- Leechburg Sheet Iron and Tin Plate Works, Kirkpatrick & Co., Leechburg, Armstrong county. Office, 143 First avenue, Pittsburgh.
- Lochiel Rolling Mill Company, Harrisburg. Roll steel rails from purchased blooms.
- Lukens Rolling Mills, Charles Huston & Sons, Coatesville, Chester county.
- Oxford Iron and Steel Works, William & Harvey Rowland, Frankford, Philadelphia. Roll Bessemer and Siemens-Martin steel.
- Philadelphia and Reading Rolling Mill, Philadelphia and Reading Coal and Iron Company, W. E. C. Coxe, Superintendent, Reading. Roll steel rails from purchased blooms.
- Standard Steel Works, 220 South Fourth st., Philadelphia. Works at Lewistown. Roll steel tires from Siemens-Martin steel.
- Superior Rolling Mill, executors of Andrew Kloman, Pittsburgh. Roll steel for structural purposes.
- Union Forge and Iron Mills, Wilson, Walker & Co., Pittsburgh.
- United States Iron and Tin Plate Works, United States Iron and Tin Plate Company, 116 Smithfield st., P. O. Box 24, Pittsburgh.
- Wayne Iron and Steel Works, Brown & Co., Pittsburgh.

## TENNESSEE—1.

- Roane Iron Company, Chattanooga. Roll Bessemer steel rails from purchased blooms.

## OHIO—5.

- Columbus Rolling Mill, Columbus Rolling Mill Company, Columbus. Roll steel rails from purchased blooms.
- Globe Rolling Mill, Globe Rolling Mill Company, Cincinnati. Roll steel from steel scrap.
- Ironton Rolling Mill, New York and Ohio Iron and Steel Company, Ironton. Agricultural steel.
- Lake Erie Iron Company, Cleveland. Roll steel axles.
- Sandusky Rolling Mill and Manufacturing Company, Sandusky. Roll steel rails from purchased blooms.

## INDIANA—1.

- Indianapolis Rolling Mill, Indianapolis Rolling Mill Company, Indianapolis. Roll steel rails from purchased blooms.

## ILLINOIS—4.

- Chicago Steel Works, 806 Noble st., Chicago. Roll Bessemer steel.
- Chicago Tyre and Spring Works, Chicago. Roll tires from imported blooms.
- St. Louis Bolt and Iron Company, St. Louis, Mo. Works in St. Clair county, Ill. Roll light rails and steel tire, from old Bessemer steel rails.
- Western Steel Company, Chicago. Roll steel horse-shoe bar.



## MISSOURI—1.

Harrison Wire Company, 816 High st., St. Louis. Roll steel wire rods.

## CALIFORNIA—1.

Pacific Rolling Mill Company, San Francisco. Roll steel rails from purchased blooms.

## UNITED STATES.

Total number of steel manipulating works in the United States: 47.

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## MISCELLANEOUS STEEL WORKS.

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NOTE.—These works are fully described in the list of rolling mills. They do not convert Bessemer, open-hearth, or crucible cast steel, but *only* make puddled, blister, German, McHaffey, or patent steel.

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## NEW YORK—2.

Elmira Iron and Steel Rolling Mill Company, Elmira. Product, silicon steel for rail tops.

Onondaga Steel Works, Sweet's Manufacturing Company, Syracuse. Product, blister steel.

## PENNSYLVANIA—4.

Chester Steel Castings Company, 407 Library st., Philadelphia. Works at Chester. Product, McHaffey steel castings.

Eureka Cast Steel Company, 307 Walnut st., Philadelphia. Works at Lamokin, near Chester. Product, steel castings.

Liggett Spring and Axle Company Limited, Spruce and Market sts., Allegheny City. Product, German steel.

Oxford Iron and Steel Works, William & Harvey Rowland, Frankford, Philadelphia. Product, blister steel.

## UNITED STATES.

Total number of miscellaneous steel works in the United States: 6.

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# FORGES.

NOTE.—Under this title are embraced all works which make wrought iron from ore. All direct processes are included under this head.

## VERMONT.

East Middlebury Iron Works, Williams & Nichols, East Middlebury, Addison county. Rebuilt in 1880; 4 fires; product, charcoal blooms for steel, made from ore; annual capacity, 1,300 net tons.

Pittsfield Iron and Steel Company, Pittsfield, Rutland county. Works in the town of Chittenden, Rutland county; built in 1881-2; 8 fires and 1 hammer; product, charcoal blooms for steel purposes, made by improved Catalan forges from magnetic sand ore existing in gneiss formation. William G. Bell, President, and J. Foster Clark, Treasurer, Boston; J. J. Saltery, Superintendent, Pittsfield.

Number of forges in Vermont: 2.

## NEW YORK.

### LAKE CHAMPLAIN DISTRICT.

Altona Bloom Iron Works, G. W. & F. Palmer & Co., Altona, Clinton county. Two forges: One, at Altona, built in 1868; 6 fires and 1 hammer; brand, "Altona." One, at Alder Bend, 4 miles from Altona, built in 1880; 6 fires. Water-power; product, charcoal blooms for boiler plate and sheet, made from Chateaugay ore; annual capacity of each forge, 2,400 net tons.

Chateaugay Ore and Iron Company, Plattsburgh, Clinton county. Three works: Chateaugay Lake, Clayburgh, and Russia. Chateaugay Lake Iron Works were built at Chateaugay Lake, Franklin county, in 1875; 16 fires and 3 hammers. Clayburgh Iron Works were built at Clayburgh, Clinton county, in 1844; 5 fires and 1 hammer. Russia Iron Works were built at Moffittsville, Clinton county, in 1844; 6 fires and 1 hammer. All run by water-power; product, charcoal blooms for general purposes, made from Chateaugay ore; total annual capacity, 11,000 net tons. *See Charcoal Furnaces. See Rolling Mills.*

Horicon Iron Company, 24 Cliff st., New York. Works at Ticonderoga, Essex county. Built in 1865; 6 fires and 2 steam hammers; product, charcoal blooms for crucible and open-hearth steel, made from ore. Cyrus Butler, President; Hermon B. Butler, Secretary and Treasurer; Morton Butler, Superintendent.

Irona Forge, J. F. Reynolds, Irona, Clinton county. Built in 1868 by Reynolds, Smith & Co., who were succeeded on January 1, 1870, by Asa Reynolds, who was succeeded on November 1, 1876, by present

- owner; 5 fires and 1 hammer; product, "Chateaugay" blooms, from Chateaugay ore, intended wholly for steel.
- Ironville Iron Works, Crown Point Iron Company, Ironville, Essex county. Main office at Crown Point. Built in 1828, and rebuilt in 1879; 8 fires and 1 hammer; steam-power; product, charcoal blooms for steel, made from ore; annual capacity, 2,400 net tons. J. N. Stower, Superintendent. *See Anthracite Furnaces.*
- Justin, Signor & Co., Redford, Clinton county. Built in 1880; 4 forge fires and 1 hammer; water-power; product, charcoal blooms for steel, made from ore; annual capacity, 1,500 net tons.
- Keene Forge, W. F. & S. H. Weston, Keene, Essex county. Built in 1880, and put in operation January 1, 1881; 6 fires and 1 hammer; water-power; product, charcoal blooms and billets for boiler plate and steel, made from Keene ore; brand, the letter W in a circle. *See Wilmington Forge.*
- Lewis Iron Works, Stower & Esmond, Essex, Essex county. Works at Lewis, Essex county. Built in 1837, rebuilt in 1875; 5 fires and 1 hammer; steam and water power; product, charcoal blooms for plate and sheet iron, wire, and steel, from ore alone.
- New Russia Iron Works, H. A. Putnam, Elizabethtown, Essex county. Forge at New Russia, 4 miles south of Elizabethtown. Rebuilt in 1879-80; 1 hammer and 4 fires; steam and water power; product, charcoal blooms for wire and steel, made from ore.
- Payne's Forge, D. F. Payne, Wadham's Mills, Essex county. Built in 1873; 4 fires and 1 hammer; water-power; product, charcoal blooms for best boiler plate, made from ore; annual capacity, 2,000 net tons.
- Peru Steel and Iron Company, F. J. Dominick, Receiver, 115 Broadway, New York. Works and main office at Clintonville, Clinton county. Built in 1837; 20 fires and 5 hammers; water-power; product, charcoal blooms for steel, made from ore; annual capacity, 5,000 net tons. *See Rolling Mills.*
- Petersburg Iron Works, Tremblay Iron Company, Clayburgh, Clinton county. Forge at Redford. Four fires and 1 hammer; water-power; product, charcoal blooms for steel, made from ore.
- Rockville Forges, Stephen Stackpole, Altona, Clinton county. Two forges, 3 miles apart. One, built in 1874, burned and rebuilt in 1879; the other, built in 1879; 7 fires and 2 hammers; product, charcoal blooms from ore.
- Sable Iron Works, J. & J. Rogers Iron Company, Ausable Forks, Essex county. One forge at Ausable Forks, built in 1848; 4 fires. Two forges at Black Brook, Clinton county, built in 1832; 12 fires. One forge at Jay, Essex county, built in 1809; 6 fires. Total, 22 fires, with 5 hammers; all run by water-power; product, charcoal blooms for best tool cast steel, made from ore; total annual capacity, 8,000 net tons. *See Rolling Mills.*
- Star Iron Works, Bowen & Signor, Saranac, Clinton county. Two

forges, built in 1844; each has 6 fires and 1 hammer, and is operated by water-power. Product of one forge is steel billets, wire billets, and blooms for boiler plate and flue iron, all made from ore; annual capacity, 2,000 net tons. Product of the other forge is blooms made by the Peckham process, equal to the best Norway or Swedish iron for bolts, rivets, and horse nails; annual capacity, 2,300 net tons. *See Rolling Mills.*

Stone Forge, Nichols & Hull, Plattsburgh, Clinton county. Built in 1835; 6 fires and 1 hammer; water-power; product, charcoal blooms for all purposes, made from ore; annual capacity, 2,000 net tons.

Willsborough Forge, Belden Noble, Willsborough, Essex county. Built in 1835 and rebuilt in 1863; 4 fires and 1 hammer; water-power; product, charcoal blooms for boiler plate and wire, made from ore.

Wilmington Forge, W. F. & S. H. Weston, Wilmington, Essex county. Rebuilt in 1874; 4 fires and 1 hammer; water-power; product, charcoal blooms for boiler plate and steel, made from Keene ore; brand, two W's in circles. *See Keene Forge.*

Wood, Wm. W., Wood's Falls, Clinton county. Built in 1863, and rebuilt in 1872; 10 fires (3 of which are knobbling fires), 1 run-out fire, 1 cupola for casting, and 2 hammers; water-power; product, charcoal blooms for all purposes as demanded, made from ore and occasionally scrap iron; annual capacity, 4,000 net tons. *See Rolling Mills.*

Number of forges in New York: 27.

## NEW JERSEY.

American Swedes Iron Company, Rockaway, Morris county. Four fires and 1 steam hammer; product, charcoal blooms by the Wilson process, from black sand ore, brought from Block Island; weekly capacity, 35 net tons. *See Rolling Mills.*

Split Rock Forge, George W. Brown, 728 Fulton avenue, Brooklyn, N. Y. Works at Split Rock, Morris county. Built in 1797, and rebuilt in 1837. Wilson deoxidizing furnace built in 1874, and remodeled and improved in 1878; 4 fires and 1 hammer; water-power; product, refined charcoal blooms for wire, tubes, tack plates, and boiler plates by the Wilson process, from ore; annual capacity, 1,300 net tons.

Number of forges in New Jersey: 2.

## PENNSYLVANIA.

Black Diamond Steel Works, Park, Brother & Co., Pittsburgh. Have 1 Siemens rotator, to make iron directly from the ore.

Siemens-Anderson Steel Company, Pittsburgh. Works at Pittsburgh, Allegheny county, and at Tyrone, Blair county. Old Tyrone Forge built in 1809; rebuilt in 1870, with 12 fires, 1 double run-out, and 1 hammer; 1 Siemens rotator added in 1879-80 to make iron direct-

ly from the ore. The Pittsburgh direct-process works consist of 3 Siemens rotators. Product, blooms for open-hearth steel. *See Rolling Mills.*

Number of forges in Pennsylvania: 3.

## VIRGINIA.

Bowling Green Forge, R. M. Bales & Co., Bales Mills, Lee county. Built in 1829; 2 fires and 1 hammer; water-power; product, bar iron for local use, made from hematite ore.

Mockasine Forge, James P. White, Estillville, Scott county. Built by Wm. B. White in 1851; 1 fire and 1 hammer; water-power; product, bar iron for neighborhood use, made from ore and scrap iron.

Penington's Forge, Wm. Penington, Jonesville, Lee county. Built in 1873; 1 fire and 1 hammer; water-power; product, bar iron for neighborhood use, made from ore and scrap iron.

Reed Island Forge, J. S. Crockett, lessee, Allisonia, Pulaski county. Built in 1875; water-power; 2 fires; product, bar iron from brown hematite ore.

Number of forges in Virginia: 4.

## NORTH CAROLINA.

Catawba Valley Iron Works, John W. Blackweld, Catawba, Catawba county. Built in 1874; 2 fires and 1 hammer; steam and water power; fuel, charcoal; product, bar iron, plow moulds, etc., made from ore. Idle.

Cranberry Forge, Mitchell county. Product, bar iron for local use, made from ore.

Henson's Forge, Selena Henson, Murphy, Cherokee county. Built in 1853; 2 fires and 1 hammer; water-power; fuel, charcoal; product, bar iron for local use, made from ore. Benjamin Posy, Agent.

Hyatt's Forges, Martin Hyatt, Mount Airy, Surry county. Two forges on Bull run, Stokes county. Product, bar iron for local use, made from ore.

Madison Forge, Jonas W. Derr, Lincolnton, Lincoln county. Built about 1830; 3 fires and 2 hammers; water-power; fuel, charcoal; product, bar iron for local use, made from ore, scrap, and pig iron. *See Furnaces.*

Maiden Creek Forge, William Williams & Son, Maiden, Catawba county. Built about 1825; 2 fires and 1 hammer; water-power; fuel, charcoal; product, bar iron for local use, made from ore and scrap iron.

Owl Creek Forge, Mercer Fain, Murphy, Cherokee county. Built in 1852; 2 fires; water-power; product, bar iron for local use, made from ore.

Roan Mountain Steel and Iron Company, Wilder's, Mitchell county. Built in 1875; 1 forge fire, 3 run-out fires, and 1 hammer; water-

power; product, charcoal blooms made from ore. Wm. D. Jenkins, Superintendent.

Rocky Point Forge, Dr. J. W. Patton, Murphy, Cherokee county. Rebuilt in 1870; 2 fires and 1 hammer; water-power; fuel, charcoal; product, charcoal blooms for boiler plate, made from ore.

Tomatola Forge, Tomatola Iron Company, Tomatola, Cherokee county. Office at Cincinnati. Built in 1869. Product, bar iron for local use, made from ore. Joseph Kinsey, President, Cincinnati, O. Now idle.

Tuscarora Forge, North Carolina Centre Iron and Manufacturing Company, 233 South Third st., Philadelphia, Pa. Forge in Guilford county. Built in 1869; 4 fires. T. B. English, Secretary and Treasurer.

Worth's Forge, Job Worth, War Hill. Forge on Tom's creek, Stokes county. Product, bar iron for local use, made from ore.

Number of forges in North Carolina: 12.

## TENNESSEE.

Camp Creek Forge, Jones & Kennedy, Camp Creek, Greene county. Built about 1815; 2 fires and 1 hammer; water-power; product, bar iron for local use, made from ore.

Click's Forge, Green Click, Middle Creek, Sevier county. Forge on Middle creek, Greene county, 7 miles southeast of Greeneville.

Dugger's Forge, Dugger's Heirs, Stump Knob, Johnson county. Forge near Watauga river. Built in 1820; 2 fires and 1 hammer; water-power; product, bar iron for local use, made from ore. Now idle.

Heaton's Iron Works, G. D. Heaton, Howard's Iron Works P. O., Johnson county. Built in 1867; 2 fires and 1 hammer; water-power.

Jackson's Forge, A. E. Jackson, Jonesboro, Washington county. Forge in Unicoi county, on Clarke's creek, 15 miles south of Jonesboro. Idle for two years.

King's Works, James E. Northington, Shady, Johnson county. Built in 1838; 2 fires and 1 hammer; water-power; product, bar iron for local use, made from ore.

Laurel Iron Works, T. G. McConnell, Abingdon, Virginia. Works at Laurel Bloomery, Johnson county. Built in 1824, rebuilt in 1848; 2 fires and 1 hammer; additional facilities can easily be added; water-power; product, bar iron for local use, made from ore.

Little Doe Forge, Wm. A. Morley, High Heath, Johnson county. Forge on Little Doe creek, 13 miles west of Taylorsville.

McQueen's Forge, Isaac McQueen, Baker's Gap, Johnson county. Forge on Roane creek, 10 miles southeast of Taylorsville, built in 1877.

Morrison's Forge, Nat. Morrison, Head of Laurel P. O., Johnson county. Forge on Laurel creek, 7 miles from Taylorsville. Built in 1879; 3 fires and 1 hammer; water-power; product, bar iron for local use, made from ore.

Potter's Forge, Jonathan Potter, Taylorsville, Johnson county. Forge on Roane creek, 4 miles southeast of Taylorsville.

Rhea's Forge, Dr. Robert Rhea, Shoun's X Roads, Johnson county. Built in 1880.

Roane Creek Forge, B. R. Brown, Shoun's X Roads, Johnson county. Built in 1859; 2 fires and 1 hammer; water-power; product, bar iron for local use, made from ore.

Rocky Ford Forge, J. W. McQueen & L. Hodge, Shoun's X Roads, Johnson county.

Shupe's Forge, Thomson Shupe, Shady, Johnson county. Built in 1872; 2 fires and 1 hammer; water-power; product, bar iron for local use, made from ore.

Slimp's Forge, Daniel Slimp, Baker's Gap, Johnson county. Forge on Roane creek, 8 miles southeast of Taylorsville. Built in 1852; 2 fires and 2 hammers; water-power.

Smith's Forge, H. C. Smith, Elizabethtown, Carter county. Forge on Doe river, 3 miles southeast of the village. Built in 1830; 3 fires and 1 hammer.

Speedwell Forge, J. M. Harbison, Cumberland Gap, Claiborne county. Two fires; one for refining pig iron, capacity 600 lbs. per day; and the other to make iron direct from the ore, capacity 300 lbs. per day; fuel, charcoal; product, horse-shoe bars, wagon tire, harrow bars, plow moulds, etc.

Wagner's Forges, M. M. Wagner's Sons, Taylorsville, Johnson county. Two forges on Little Doe creek; one 7 miles and the other 9½ miles west of Taylorsville.

Walker's Forge, Jefferson Walker, Pandora, Johnson county. Forge on Little Doe creek, 8 miles west of Taylorsville.

Number of forges in Tennessee: 21.

In the mountainous districts of East Tennessee the forges are usually operated by farmers who only make bar iron from ore whenever it is needed in their immediate neighborhood. The forges are generally given the names of their proprietors. Each forge usually has two fires. Daily production about 250 lbs. to the fire; much depends upon the water-power which drives the blast and hammer; in exceptional cases even 700 lbs. a day are made.

## MISSOURI.

Peckham Iron Company, Kimmswick, Jefferson county. Built in 1873 and remodeled in 1877-9; 12 Peckham converting furnaces and fires to make iron by Peckham's patent direct process; 3 steam hammers; product, charcoal blooms for Siemens-Martin steel; annual capacity, 4,000 net tons. C. S. Greeley, President, St. Louis; E. Peckham, Vice-President and General Manager, Kimmswick; J. C. Porter, assignee, Kimmswick.

Number of forges in Missouri: 1.



Total number of iron-ore forges in the United States: 72. In addition to these works, the Collins Company, at Collinsville, Connecticut, makes a small quantity of wrought iron from ore, as also do Miller, Metcalf & Parkin, at Pittsburgh, Pennsylvania. The Dupuy direct process is in operation at the works of the Phoenix Iron Company at Safe Harbor, Pennsylvania, making iron from mill cinder.

## BLOOMARIES.

NOTE.—Under this title are embraced all works which hammer blooms from pig or scrap iron. Many plate, sheet, and wire makers have charcoal forge fires in their mills making blooms for their own use, but such establishments are not named in this list.

### MASSACHUSETTS.

Mount Hope Iron Works, Old Colony Iron Company, East Bridgewater, Plymouth county. Office at Somerset, Bristol county. Built in 1840; 2 forge fires and 1 hammer; water-power; product, charcoal blooms for tack plate, made from scrap iron. *See Rolling Mills.* Number of bloomaries in Massachusetts: 1.

### CONNECTICUT.

Canton Bloomary Company, Collinsville, Hartford county. Built in 1880; 3 forge fires; water-power; product, charcoal blooms for fine forgings, steel-making, and wire-rods, made from scrap iron; brand, "C. B. C.;" annual capacity, 2,000 net tons. William J. Wood, President; Edward H. Sears, Vice-President and Manager; William A. Baker, Treasurer; Oliver F. Perry, Secretary. Number of bloomaries in Connecticut: 1.

### NEW JERSEY.

Bloomington Forge, Martin J. Ryerson, Bloomington, Passaic county. Built in 1800 and rebuilt in 1841; 2 fires and 1 hammer; water-power; product, charcoal blooms for boiler plate and wire, made from scrap iron.  
 Oram, B. B., Rockaway, Morris county. Product, charcoal blooms, made from scrap iron.  
 Paterson Bloomary, Peter Oberg & Co., Paterson, Passaic county. Built in 1878; 4 fires and 1 hammer; product, cold blast charcoal blooms and charcoal iron for boiler plate and wire, made from scrap iron; annual capacity, double turn, 2,500 net tons.  
 Port Oram Forge, Port Oram Manufacturing Company, Port Oram, Morris county. Built in 1878; started in August, 1878; 8 forge fires,

1 run-out fire, and 1 hammer; product, charcoal blooms, from scrap and pig iron, used for all purposes; annual capacity, double turn, 4,500 net tons. Robert F. Oram, President; Edward S. Hance, Superintendent.

Powerville Forge, B. F. Howell, Morristown. Works at Powerville. Built in 1845; 3 forge fires and 1 hammer; water-power; product, charcoal blooms for wire, made from scrap iron; annual capacity, 900 net tons. *See Rolling Mills.*

Rockaway Forge, T. H. Hoagland, Rockaway, Morris county. Built about 1800; 3 forge fires and 1 hammer; water-power; product, charcoal blooms for wire, made from scrap iron; annual capacity, double turn, 1,000 net tons.

Warren Forge, American Sheet Iron Company, Phillipsburg, Warren county. Built in 1875; one 4-tuyere run-out, 3 forge fires, and 1 steam hammer; product, charcoal blooms for sheet iron, made from pig iron; annual capacity, 1,000 net tons. *See Rolling Mills.*

Windham Forge, George E. Righter, lessee, Parsippany, Morris county. Forge at Stockholm. Two fires and 1 hammer; water-power; product, charcoal blooms for plate iron, wire, or steel, made from scrap; annual capacity, 800 net tons.

Number of bloomaries in New Jersey: 8.

## PENNSYLVANIA.

Barree Forge, J. W. Mumper & Co., Barree Forge, Huntingdon county. Built in 1785; 6 forge fires and 1 hammer; water-power; product, charcoal blooms for general purposes, made from pig iron; annual capacity, 2,000 net tons. *See Charcoal Furnaces.*

Bellefonte Iron Works, Valentines & Co., Bellefonte, Centre county. Built in 1810; 12 forge fires, one 6-tuyere run-out, and one 4-ton hammer; product, charcoal blooms for boiler plate, tubes, wire, nail rods, etc., made from pig iron; annual capacity, 3,000 net tons. *See Charcoal Furnaces. See Central Pennsylvania Rolling Mills.*

Carlisle Iron Works, C. W. Ahl & Son, Carlisle. Works at Boiling Springs, Cumberland county. Built in 1760, and rebuilt in 1860; 5 forge fires and 1 hammer; water-power; product, charcoal blooms for general purposes, made from pig iron; annual capacity, 2,200 net tons. Brand, "Carlisle." *See Furnaces.*

Charming Forge, W. & B. F. Taylor, Womelsdorf, Berks county. Built before 1770; 5 forge fires, 1 heating furnace, 1 refinery, and 2 hammers; water-power; product, charcoal blooms for boiler plate and sheet iron, made from pig iron; annual capacity, 1,000 net tons.

Colemanville Works, Edward S. Davies, Colemanville, Lancaster county. Built in 1828; 3 forge fires, 1 run-out fire, and 1 hammer; water-power; product, charcoal blooms for boiler plate, made from pig iron; annual capacity, 500 net tons. William I. Rutter, Manager.

- Cove Forge, John Royer, Royer P. O., Blair county. Works on Frankstown branch, 2 miles northeast of Williamsburg. Built in 1811; 4 charcoal forge fires, 2 coke run-out fires, and 1 hammer; water-power; product, No. 1 charcoal blooms, chunks, and slabs, made of charcoal pig iron from Springfield Furnace; metal tapped from run-out to forge; annual capacity, 600 net tons. S. R. Schmucker, Manager, Williamsburg. *See Charcoal Furnaces.*
- Cove Forge, Wm. McIlvain & Sons, Duncannon, Perry county. Office, Reading, Pa. First put in operation in 1864; 5 fires, 1 refinery, and 1 hammer; blast operated by water-power, and hammer by steam; product, charcoal blooms for general purposes, made from pig iron; annual capacity, 1,200 net tons. Francis Heilig, Superintendent. *See Eastern Pennsylvania Rolling Mills.*
- Eagle Forge, Curtins & Co., Roland, Centre county. Built in 1809 by Curtin & Boggs, succeeded by Roland Curtin soon after; 8 fires and 1 hammer; water-power; product, charcoal blooms for general purposes, made from pig iron; specialties, blooms for boiler plate and rivet rods; annual capacity, 1,500 net tons. *See Charcoal Furnaces. See Central Pennsylvania Rolling Mills.*
- Ellendale Forge, Killinger, Kaufman & Co., Ellendale Forge, Dauphin county. Built in 1838 and rebuilt in 1872; 5 charcoal forge fires, 1 coke run-out, and 1 hammer; steam and water power; original manufacturers of the "Sheridan" blooms, made exclusively from Sheridan pig iron, used for boiler, flue, and sheet iron; annual capacity, 1,200 net tons. P. C. Snyder, Superintendent.
- Ellwood Forge, Dr. G. N. Eckert's heirs, Ellwood, Schuylkill county. Built in 1863; 4 fires and 1 run-out; water-power; product, charcoal blooms for general purposes, made from pig iron; annual capacity, 1,250 net tons. Not in operation since 1879.
- Exeter Forge, Morgan J. Althouse, Jacksonwald, Berks county. Built in 1836; 3 fires and 1 hammer; water-power; product, charcoal blooms for steel, made from pig iron and steel scrap.
- French Creek Forge, Esther Kaufman, St. Peters P. O., Chester county. Built in 1872; 4 fires and 1 hammer; water-power; product, coke and charcoal blooms for general purposes, made from scrap and pig iron. Thomas Wanner, Attorney.
- Gibraltar Iron Works, S. Seyfert & Co., Reading, Berks county. Built in 1846; 1 coke run-out, 4 charcoal forge fires, and 2 hammers; water-power; product, charcoal blooms for flue iron and boiler plate; annual capacity, 500 net tons. *See Eastern Pennsylvania Rolling Mills.*
- Howard Iron Works, Bernard Lauth, Howard, Centre county. Built in 1879; 10 fires, one 6-tuyere run-out, and 1 steam hammer; steam and water power; product, charcoal blooms; annual capacity, 3,000 net tons. *See Charcoal Furnaces. See Central Pennsylvania Rolling Mills.*
- Juniata Forge, Eichelberger & Co., Petersburg, Huntingdon county.

- 4 fires and 1 hammer; water-power; product, charcoal blooms; annual capacity, 800 net tons. *See Charcoal Furnaces.*
- Laurel Forge, South Mountain Mining and Iron Company, Pine Grove Furnace, Cumberland county. Built in 1830; 6 fires, 1 double run-out, and 1 hammer; water-power; product, charcoal blooms for general purposes, made from Pine Grove pig iron; annual capacity, 2,000 net tons. Joseph Fuller, Superintendent. *See Furnaces.*
- Liberty Forge, Mumma & Boyer, Lisburn, Cumberland county. Built in 1836; 3 fires, 1 run-out, and 1 hammer; water-power; product, charcoal and coke blooms for general purposes, made from pig iron.
- Lucknow Forge, Reily, Seidel & Co., Harrisburg. Forge in course of erection at Lucknow Station, P. R. R., 4 miles west of Harrisburg; 6 fires and 1 steam upright hammer; annual capacity, 3,000 net tons.
- Mainville Forge, C. E. Pennock & Co., Mainville, Columbia county. Built in 1824; 3 fires, 1 run-out, and 2 hammers; water-power; product, charcoal blooms for boiler plate, made from pig iron and old car-wheels; annual capacity, 800 net tons. F. E. Bentz, Superintendent. *See Eastern Pennsylvania Rolling Mills.*
- Martic Forge, Davies & Potts, Colemanville, Lancaster county. Built in 1755; 4 fires and 2 hammers; water-power; product, charcoal blooms for boiler plate, made from pig iron; annual capacity, 800 net tons. R. S. Potts, Agent.
- Milesburg Iron Works, McCoy & Linn, Milesburg, Centre county. Built in 1830; 7 fires and 1 hammer; water-power; product, charcoal blooms for best wire, made from pig iron. *See Charcoal Furnaces. See Central Pennsylvania Rolling Mills.*
- Mont Alto Iron Works, Mont Alto Iron Company, Mont Alto, Franklin county. Built in 1866; 8 forge fires and a double run-out fire; 1 Nasmyth steam hammer and 1 self-acting steam helve hammer; product, flat charcoal blooms for best boiler plate, made from pig iron; annual capacity, 3,000 net tons. Brand, "Mont Alto." I. S. Waterman, President, 407 Library st., Philadelphia. General office at the works, and all sales made by the Superintendent, George B. Wiestling. *See Charcoal Furnaces.*
- Mount Airy Forge, Thomas E. Williams, Manager, Shartlesville, Berks county. Built about 1840; 2 forge fires, one 4-tuyere run-out, and 1 hammer; water-power; product, run-out anthracite, charcoal, and scrap blooms and billets for boiler plate, galvanizing sheets, and wire; annual capacity, 450 net tons. Owned by Robert C. Green, Pottsville.
- Mount Etna Forge, Samuel Isett, Yellow Springs, Blair county. Built in 1808; 4 fires and 1 hammer; water-power; product, charcoal blooms for boiler plate and general purposes, made from pig iron. Idle by reason of the abandonment of the Pennsylvania Canal. *See Charcoal Furnaces.*
- New Market Forge, S. K. Wanner, lessee, Palmyra, Lebanon county. Built in 1860; 5 fires, 1 run-out, and one 5-ton hammer; steam and

water power; product, charcoal blooms for boiler plate and general purposes, made from pig iron; annual capacity, 1,300 net tons. Theodore B. Klein, proprietor.

North Kiln Forge, M. B. Seyfert & Co., Shartlesville, Berks county.

Built in 1830, and repaired and started in 1879 after a long idleness. Product, run-out anthracite blooms. Wm. H. Seyfert, Agent.

Perry Forge, Seidel Brothers, Marysville, Perry county. Built in 1862; 7 forge fires, 1 run-out fire, and 1 hammer; water and steam power; product, charcoal and anthracite blooms for boiler plate, sheet iron, wire, etc., made from pig iron; annual capacity, 2,800 net tons.

Schuylkill Steam Forge, B. F. Morret, Douglassville, Berks county.

Completed in 1878; 8 fires, 1 double run-out, and 1 hammer; product, charcoal blooms for boiler plate, made from charcoal pig iron.

Springton Forge, John Cornog, Wallace, Chester county. Built in 1790, and rebuilt in 1881; 4 forge fires, 1 run-out, and 1 hammer; water-power; product, charcoal blooms.

Union Forge, J. & R. Meily, lessees, Lebanon. Forge at Union Forge P. O., Lebanon county. Built about 1790; 5 forge fires, 1 run-out, and 1 hammer; steam and water power; product, charcoal blooms for wire, boiler plate, and sheet iron, made from scrap and pig iron; annual capacity, 2,000 net tons. *See Anthracite Furnaces. See Rolling Mills in Delaware.*

Washington Forge, Lamar, Clinton county. Product, blooms. *See Charcoal Furnaces.*

Number of bloomaries in Pennsylvania: 30 completed, and 1 building.

## MARYLAND.

Northeast Forge, McCullough Iron Company, Northeast, Cecil county.

Built in 1847 and 1875; 18 fires and 2 hammers; product, charcoal blooms for sheet iron exclusively, made from scrap and pig iron; annual capacity, 6,000 net tons. *See Rolling Mills in Delaware and Maryland.*

Number of bloomaries in Maryland: 1.

## VIRGINIA.

Columbia Forge, John Wissler & Son, Columbia Furnace P. O., Shenandoah county. *See Furnaces.*

Graham's Forge, Graham & Robinson, Graham's Forge P. O., Wythe county. Built in 1827; 2 fires and 1 hammer; water-power; product, bar and other iron, from charcoal pig iron. *See Charcoal Furnaces. See Rolling Mills.*

Liberty Forge, Wissler, Armstrong & Stone, Liberty Furnace, Shenandoah county. Built in 1821 and rebuilt in 1867; 3 forge fires, 1 run-out fire, and 2 hammers; water-power; product, charcoal blooms for general purposes, made from pig iron. *See Charcoal Furnaces.*

Mount Vernon Iron Works, Abbott Iron Company, Baltimore, Md.

Works near Weyer's Cave, Rockingham county. Built in 1848; 5 fires and 1 hammer; water-power; product, charcoal blooms for general purposes, made from pig iron. *See Charcoal Furnaces. See Rolling Mills in Maryland.*

Pine Forge, J. C. Frederick & Co., Mount Jackson, Shenandoah county. Rebuilt in 1874; 1 forge fire, 2 hammers, 1 refinery, and 3 knobbling fires; water-power; product, blooms and bar iron.

Shenandoah Iron Works, Shenandoah Iron, Lumber, Mining, and Manufacturing Company, Milnes, Page county. Built in 1871; 7 forge fires, one 6-tuyere run-out, and 1 hammer; product, charcoal blooms for boiler plate and flange iron, made from pig iron; annual capacity, 1,800 net tons. Brand, "Wm. M., Jr." *See Furnaces.*

Number of bloomaries in Virginia: 6.

### GEORGIA.

Allatoona Creek Forge, Lewis T. Erwin, Allatoona, Bartow county.

Built in 1878-9; 6 charcoal fires and 1 hammer; product, charcoal blooms for boiler plate, made from scrap iron.

Number of bloomaries in Georgia: 1.

### TENNESSEE.

Speedwell Forge, Knoxville Car-wheel Company, Knoxville. Forge at Stony Creek, Carter county. One fire and 1 hammer; water-power; product, bar iron for local use, made from charcoal pig iron. *See Charcoal Furnaces.*

Number of bloomaries in Tennessee: 1.

### OHIO.

Paulding Forge, Paulding Iron Company Limited, lessee, Cecil, Paulding county. Built in 1867; 8 fires and 1 steam hammer; product, charcoal blooms for general purposes, made from pig iron; annual capacity, single turn, 1,500 net tons. Not in operation since 1872, but will probably be started up in 1882. *See Charcoal Furnaces.*

Number of bloomaries in Ohio: 1.

### MISSOURI.

Germania Iron Works, Anthony Zeitinger, South St. Louis, St. Louis county. Built in 1871; 7 knobbling fires and 2 steam hammers; product, charcoal blooms for boiler plate and sheet iron, and billets for carriage bolts and tack plate, made from pig iron; annual capacity, 1,500 net tons blooms, and 400 net tons billets.

Maramec Iron Works, Maramec Iron Company, Maramec Iron Works, Phelps county. Eight fires; water-power; product, charcoal blooms. Has not been in operation since 1876. *See Charcoal Furnaces.*

Number of bloomaries in Missouri: 2.

Total number of pig-and-scrap bloomaries in the United States: 52 completed, and 1 building.

## RECENTLY ABANDONED FORGES AND BLOOMARIES.

### VERMONT.

Fairhaven Iron Works, Fairhaven, Rutland county. Built in 1796; 2 fires and 1 hammer.

### NEW YORK.

Jefferson Iron Company, Antwerp, Jefferson county. One forge; 4 fires. Abandoned in 1873.

John Merchant's Forge, Schuyler Falls, Clinton county. Built in 1844.

Kingdom Forge, Essex and Lake Champlain Ore and Iron Company, Elizabethtown, Essex county. Built in 1825; 6 fires and 1 hammer.

Lake Champlain Forge, State of New York, owner, State Prison yard, Dannemora, Clinton county. Built in 1865; 9 fires and 1 hammer; abandoned in 1877.

Merriam & Rouse, Westport, Essex county.

Paradox Iron Works, Schroon River, Essex county. Built in 1864.

Plattsburgh Iron Works, Plattsburgh, Clinton county. Built in 1878.

Schroon River Iron Works, Schroon River, Essex county. Built in 1857; burned in 1881.

### PENNSYLVANIA.

Allegheny Forge, Mrs. Elizabeth Lytle, Martinsburg, Blair county. Built in 1831. Abandoned in 1879.

Castle Fin Forge, James K. Brown, Castle Fin, York county. Built in 1835; abandoned in 1874.

Cold Spring Forge, Tyrone.

Coleraine Forge, Shorb, Stewart & Co., Coleraine, Huntingdon county.

Franklin Forge, James Gardner, Hollidaysburg, Blair county. Four fires.

Juniata Iron Works, Samuel Hatfield, Alexandria, Huntingdon county. Built in 1837; 4 fires and one 4-tuyere run-out, and a puddling forge with 3 single puddling furnaces; water-power.

Logan Works, Lewistown.

Maria Forge, G. W. Smith, Sarah, Blair county. Four fires and 1 hammer; water-power.

Mary Ann Forge, Augustus Dowlin, Downingtown, Chester county. Built in 1785.

Monroe Forge, Lebanon county.



Ringwood Forge, Thomas J. Bailey, Penningtonville, Chester county.  
Three fires and 1 run-out.

Sadsbury Forge, Charles Goodman & Brother, Atglen, Chester county.  
Built about 1820 to make bar iron; began to make blooms about 1850; rebuilt in 1863; 3 forge fires, 1 run-out fire, and 1 hammer; water-power. Burned in 1880, and will not be rebuilt.

### VIRGINIA.

Crockett, Sanders & Co., Wytheville, Wythe county. Built in 1863; 2 fires; destroyed by a freshet in 1878.

Gray Eagle Forge, David Huddle, Red Bluff, Wythe county. Built in 1862; 3 fires; destroyed by a freshet in 1878.

Porter's Forge, A. L. Porter & Co., Speedwell, Wythe county. Built in 1865; 2 fires; destroyed by a freshet in 1878.

Wilkinson's Forge, Lobdell Car-wheel Company, Carroll county. Destroyed by a freshet in 1878.

### NORTH CAROLINA.

Brevard's Forge, on Dutchman's creek, Lincoln county. Washed away.

Rehoboth Forge, John Leonard & Co., Iron Station, Lincoln county.

### WEST VIRGINIA.

Capon Iron Works, Keller & Co., Capon Iron Works, Hardy county.  
Built in 1874; 4 fires.

### KENTUCKY.

Red River Forge, E. K. Goodnow (of New York), Fitchburg, Estill county.

### TENNESSEE.

Chief Creek Forge, Napier Iron Company, Columbia, Maury county.  
Works at Napier Furnace, Lawrence county. Built in 1860, and refitted in 1879-80; 4 fires and 2 hammers; water-power.

Hampton Iron Works, on Doe river, in the Crab Orchard, 18 miles southeast of Elizabethton, Carter county. Destroyed by a freshet.

Nave's Forge, John Nave, Watauga, Carter county. Forge on Stony creek, 6 miles north of Elizabethton.

Northington's Forge, James Northington, Shady, Johnson county.

Smith's Forge, John Smith, Watauga, Carter county. Forge on Stony creek, 10 miles north of Elizabethton.

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## WIRE-ROD MILLS.

NOTE.—The mills here named roll iron and steel wire-rods. For a complete description of these works see the list of rolling mills.

### MASSACHUSETTS—4.

Gilmore & Eustis, Cambridgeport. Iron wire-rods.  
 Gosnold Mills, New Bedford. Iron wire-rods.  
 Naylor & Co., Boston. Iron and steel wire-rods.  
 Washburn and Moen Manufacturing Company, Worcester. Iron and steel wire-rods and wire.

### CONNECTICUT—2.

Birmingham Rolling Mill, Peck, Stow and Wilcox Company, Birmingham. Iron wire-rods.  
 New Haven Rolling Mill Company, New Haven. Iron and steel wire-rods.

### NEW YORK—2.

Syracuse Iron Works, Syracuse. Iron wire-rods.  
 Westerman Rolling Mill, Westerman, Bruce & Co., Lockport. Iron wire-rods.

### NEW JERSEY—3.

John A. Roebling's Sons Company, Trenton. Iron and steel wire-rods and wire.  
 New Jersey Steel and Iron Company, Trenton. Iron wire-rods.  
 Trenton Iron Company, Trenton. Iron and steel wire-rods and wire.

### PENNSYLVANIA—7.

Cambria Iron Company, Johnstown. Steel wire-rods.  
 Gautier Steel Department of Cambria Iron Company, Johnstown. Steel wire-rods and wire.  
 Lehigh and Franklin Wire Mills, Stewart & Co., Easton. Iron and steel wire-rods and wire.  
 Linden Steel Company Limited, Pittsburgh. Steel wire-rods.  
 Milesburg Iron Works, McCoy & Linn, Milesburg, Centre county. Iron wire-rods.  
 Oliver Wire Company Limited, Pittsburgh. Steel wire-rods and wire.  
 Williamsport Rolling Mill and Iron Works, Milton Iron Company, Williamsport. Iron wire-rods.

### OHIO—3.

Cleveland Rolling Mill Company, Cleveland. Steel wire-rods and wire.

Columbus Iron Works, P. Hayden & Son, Columbus. Iron and steel wire-rods and wire.

Globe Rolling Mill Company, Cincinnati. Iron and steel wire-rods and wire.

MISSOURI—1.

Harrison Wire Company, St. Louis. Iron and steel wire-rods and wire.

UNITED STATES.

Total number of iron and steel wire-rod mills in the United States: 22.

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## CAR AXLE MANUFACTURERS.

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NOTE.—Some of these works make rolled axles and others make hammered axles.

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MAINE—1.

Portland Forge Company, Portland.

NEW HAMPSHIRE—2.

Cole Manufacturing Company, Lake Village.

Nashua Iron and Steel Company, Nashua.

MASSACHUSETTS—6.

Atlantic Works, Boston.

Boston Forge Company, Boston.

Bridgewater Iron Company, Bridgewater.

Cape Ann Forge Works, Gloucester.

Franconia Iron and Steel Works, James C. Warr, Wareham.

Kinsley Iron and Machine Company, Canton.

CONNECTICUT—1.

Winsted Iron Company, Winsted.

NEW YORK—10.

Albany and Rensselaer Iron and Steel Company, Troy.

Buffalo Forge Company, Buffalo.

Buffalo Steam Forge Company, Buffalo.

Childs, Henry, Buffalo.

Delaney Forge and Iron Company, Buffalo.

Hudson River Iron Company, Poughkeepsie.

New York Steam Forge Company, New York.

Sizer, W. S., Steam Forge, Buffalo.

Union Iron Company, Buffalo.

Wood, William W., Wood's Falls.

## NEW JERSEY—3.

Macpherson, Willard & Co., Bordentown.  
Paterson Iron Company, Paterson.  
Taylor Iron Works, Highbridge.

## PENNSYLVANIA—22.

Allentown Rolling Mills, Allentown.  
Atglen Axle and Iron Manufacturing Company Limited, Atglen.  
Berwick Rolling Mill Company, Berwick.  
Catasauqua Manufacturing Company, Catasauqua.  
Cayuta Forge and Axle Company, Sayre.  
Erie Forge Company, Erie.  
Graft, Bennett & Co., Pittsburgh.  
Jones & Laughlins, Pittsburgh.  
Lackawanna Iron and Coal Company, Scranton.  
Long & Co., Pittsburgh.  
McKee & Fuller, Catasauqua.  
Midvale Steel Company, Nicetown.  
Montour Iron and Steel Company, Danville.  
Old Fort Iron Mills, Magee & Co., Brownsville.  
Penn Iron Company Limited, Lancaster.  
Pennsylvania Steel Company, Steelton.  
Pittsburgh Forge and Iron Company, Pittsburgh.  
Roberts, A. & P., & Co., Philadelphia.  
Smith, Sutton & Co., Pittsburgh.  
Standard Steel Works, Lewistown.  
Ward Axle, Brake, and Coupling Company, Monongahela City.  
Wilson, Walker & Co. Limited, Pittsburgh.

## DELAWARE—1.

J. R. Johnson & Co., Wilmington.

## . MARYLAND—1.

Baltimore and Ohio Railroad Company, Cumberland.

## VIRGINIA—3.

J. R. Johnson & Co., Richmond.  
Lynchburg Iron Company, Lynchburg.  
Tredegar Company, Richmond.

## GEORGIA—1.

Noble Bros. & Co., Rome.

## WEST VIRGINIA—1.

Ensign Manufacturing Company, Huntington.

## KENTUCKY—1.

Louisville Steam Forge Company, Louisville.

## OHIO—8.

Akron Forge Company, Akron.  
 Cincinnati Steam Forge Company, Cincinnati.  
 Cleveland City Forge and Iron Company, Cleveland.  
 Cleveland Rolling Mill Company, Cleveland.  
 Cuyahoga Forge and Iron Company, Cuyahoga Falls.  
 Lake Erie Iron Company, Cleveland.  
 Otis Iron and Steel Company, Cleveland.  
 Swift's Iron and Steel Works, Cincinnati.

## INDIANA—1 COMPLETED, AND 1 BUILDING.

Central Iron and Steel Company, Brazil. Building.  
 New Albany Steam Forge Company, New Albany.

## ILLINOIS—5.

Chicago Axle and Forge Company, Chicago.  
 Chicago Car Axle Company, Chicago.  
 Chicago Steam Forge Works, Chicago.  
 Rust & Coolidge, Chicago.  
 Willard Sons & Bell Company, Chicago.

## MISSOURI—3.

Chouteau, Harrison and Vallé Iron Company, St. Louis.  
 Helmbacher Forge and Rolling Mills Company, St. Louis.  
 McDonald, A., & Bro., St. Louis.

## MICHIGAN—2.

Baugh Steam Forge Company, Detroit.  
 Detroit Steam Forge, Detroit.

## WISCONSIN—1.

De Pere Steam Forge, West De Pere.

## KANSAS—1.

Kansas Rolling Mill Company, Rosedale.

## NEBRASKA—1.

Union Pacific Rolling Mill Company, Omaha.

## UTAH TERRITORY—1.

Silver Iron Works, Wm. J. Silver, Salt Lake City.

## CALIFORNIA—1.

Pacific Rolling Mill Company, San Francisco.

## UNITED STATES.

Total number of car axle manufacturers: 77 completed, and 1 building.

## INDEX.

## BLAST FURNACES.

PAGE		PAGE		PAGE	
Akron, . . . . .	63	Bowery, . . . . .	41	Clara, . . . . .	31
Alabama, . . . . .	50	Brazil, . . . . .	67	Clark, . . . . .	57
Alabama Central, . . . . .	52	Brierfield, . . . . .	52	Cleveland, . . . . .	65
Albany City, . . . . .	11	Brier Hill, . . . . .	62	Cleversburg, . . . . .	38
Alice, . . . . .	49, 61	Brownspport, . . . . .	57	Clinton, . . . . .	33
Allegheny, . . . . .	34	Brown Hill, . . . . .	45	Clove, . . . . .	12
Allentown, . . . . .	18, 19	Buchtel, . . . . .	64	Clove Spring, . . . . .	15
Alpha, . . . . .	40	Buckeye, . . . . .	58	Cold Spring, . . . . .	12
Alpine, . . . . .	15	Buckhoro, . . . . .	48, 58	Colebrook, . . . . .	28
Amherst, . . . . .	44	Buffalo Gap, . . . . .	43	Coleraine, . . . . .	19
Andover, . . . . .	17	Burden, . . . . .	11	Colorado, . . . . .	76
Anna, . . . . .	62	Butler, . . . . .	56	Columbia, . . . . .	11, 25, 45
Antietam, . . . . .	41	California, . . . . .	76	Conemaugh, . . . . .	34
Anvil, . . . . .	21	Callie, . . . . .	43	Conestoga, . . . . .	28
Appleton, . . . . .	74	Calumet, . . . . .	68	Conewago, . . . . .	28
Arcadia, . . . . .	47	Cambria, . . . . .	34	Coosa, . . . . .	50
Ashland, . . . . .	41, 53	Cameron, . . . . .	27	Copake, . . . . .	16
Atlas, . . . . .	34	Canaan, . . . . .	10	Coplay, . . . . .	19
Augusta, . . . . .	43	Capon, . . . . .	53	Cordelia, . . . . .	28
Aurora, . . . . .	27	Carbon, . . . . .	19	Cornelia, . . . . .	58
Baird, . . . . .	64	Carlisle, . . . . .	27, 37	Cornwall, . . . . .	28, 38, 50
Bangor, . . . . .	70	Carp River, . . . . .	71	Cornwall Bridge, . . . . .	11
Barree, . . . . .	87	Carrick, . . . . .	37	Cottage, . . . . .	55
Barren Springs, . . . . .	44	Carter, . . . . .	56	Crafts, . . . . .	64
Bath, . . . . .	55	Carthage, . . . . .	15	Crane, . . . . .	20
Bay View, . . . . .	75	Catharine, . . . . .	46	Crown Point, . . . . .	12
Bear Mountain, . . . . .	48	Catoctin, . . . . .	41	Crozer, . . . . .	43
Bear Spring, . . . . .	57	Cave Hill, . . . . .	45	Cumberland, . . . . .	57
Bechtelsville, . . . . .	21	Cedar Point, . . . . .	12, 41	Dauville, . . . . .	25
Belfont, . . . . .	60	Cedar Run, . . . . .	45	Dauphin, . . . . .	29
Belmont, . . . . .	52	Centennial, . . . . .	34	De Bardeleben, . . . . .	49
Bellaire, . . . . .	65	Central, . . . . .	47, 65	Deer Lake, . . . . .	71
Bellefonte, . . . . .	54	Centre, . . . . .	58	Denver, . . . . .	76
Beenington, . . . . .	34	Chapinville, . . . . .	10	Detroit, . . . . .	71
Benwood, . . . . .	65	Charlotte, . . . . .	12, 35, 54	De Wolf, . . . . .	13
Berlin, . . . . .	37	Chateaugay, . . . . .	15	Diamond, . . . . .	49
Bessie, . . . . .	64	Chatham, . . . . .	15	Donaghmore, . . . . .	27
Bethlehem, . . . . .	19	Chattanooga, . . . . .	55	Donegal, . . . . .	29
Beverly, . . . . .	45	Cherokee, . . . . .	49	Douglas, . . . . .	31
Bibb, . . . . .	50	Cherry Valley, . . . . .	65	Dover, . . . . .	66
Big Muddy, . . . . .	68	Chesapeake, . . . . .	42	Duluth, . . . . .	76
Bird-Coleman, . . . . .	27	Cheshire, . . . . .	10	Dunbar, . . . . .	35
Blair, . . . . .	34	Chester, . . . . .	17, 22	Duncannon, . . . . .	26
Blanche, . . . . .	61	Chestnut Grove, . . . . .	37	Durham, . . . . .	20
Bloom, . . . . .	25, 58	Chestnut Hill, . . . . .	28	Dutchess, . . . . .	12
Bloomery, . . . . .	53	Chickies, . . . . .	28	Eagle, . . . . .	38, 45, 58, 62
Boone, . . . . .	54	Chipman, . . . . .	47	East Chattanooga, . . . . .	58
Boonton, . . . . .	17	Chulasky, . . . . .	25	East Penn, . . . . .	22, 38

	PAGE		PAGE		PAGE
Edgar Thomson, . . . . .	33	Harmer, Randle & Co.,	43	Lime Rock, . . . . .	11
Edgehill, . . . . .	22	Harrisburg,	29	Little Pet, . . . . .	32
Edwards, . . . . .	49	Haselton, . . . . .	63	Lochiel, . . . . .	29
Eliza, . . . . .	33, 60	Hecla, . . . . .	38, 59	Lock Ridge, . . . . .	21
Elizabeth, . . . . .	22, 35	Helen, . . . . .	64	Locust Grove, . . . . .	42
Elk Rapids, . . . . .	71	Hematite, . . . . .	55	Logan, . . . . .	39, 59
Elk River, . . . . .	53	Henderson, . . . . .	31	Longdale, . . . . .	44
Ella, . . . . .	31	Henry Clay, . . . . .	22	Louise, . . . . .	29
Elmira, . . . . .	13	Hermitage, . . . . .	49	Low Moor, . . . . .	44
Emaus, . . . . .	20	Himrod, . . . . .	63	Lucinda, . . . . .	24
Enma, . . . . .	35, 66	Holston, . . . . .	47	Lucy, . . . . .	21, 33, 36
Endor, . . . . .	48	Holidaysburg, . . . . .	34	Lucy Selina, . . . . .	44
Erie, . . . . .	35	Hope, . . . . .	38	Lycoming, . . . . .	26
Estella, . . . . .	66	Hopewell, . . . . .	38, 39	Lynchburg, . . . . .	44
Estill, . . . . .	55	Howard, . . . . .	39, 59	Mabel, . . . . .	31
Etna, . . . . .	31, 49, 58	Hubbard, . . . . .	63	Macungie, . . . . .	21
Eureka, . . . . .	50, 71	Hudson, . . . . .	13	Madison, . . . . .	48, 59
Everett, . . . . .	35	Hunnell, . . . . .	54	Maggie, . . . . .	61
Excelsior, . . . . .	15, 71	Hunts Lyman, . . . . .	11	Mahoning, . . . . .	36
Fairchance, . . . . .	35	Huron, . . . . .	61	Maiden Creek, . . . . .	39
Fairmount, . . . . .	35	Irondale, . . . . .	26, 45, 52, 69, 77	Manchester, . . . . .	33
Falcon, . . . . .	62	Iron Mountain, . . . . .	75	Manhattan, . . . . .	14, 67
Falling Spring, . . . . .	38	Isabella, . . . . .	33, 39	Mansfield, . . . . .	26
Fallkill, . . . . .	13	Ivanhoe, . . . . .	45	Maramec, . . . . .	69
Fannie, . . . . .	16, 31, 64	Jackson, . . . . .	72	Marietta, . . . . .	29
Fletcher, . . . . .	13	Jagger, . . . . .	13	Marshall, . . . . .	26, 52
Florence, . . . . .	74	Jefferson, . . . . .	39, 59, 66	Martel, . . . . .	73
Fond du Lac, . . . . .	74	Joanna, . . . . .	39	Mary, . . . . .	63
Fort Edward, . . . . .	11	Joliet, . . . . .	68	Maryland, . . . . .	42
Fox River, . . . . .	74	Juniata, . . . . .	36	Mary Pratt, . . . . .	51
Frances, . . . . .	26	Jupiter, . . . . .	68	Maumee, . . . . .	67
Frankfort, . . . . .	72	Kanawha, . . . . .	53	Maxwell, . . . . .	56
Franklin, . . . . .	13, 17, 38, 64	Katabdin, . . . . .	9	Means, Kyle & Co., . . . . .	61
Frankstown, . . . . .	34	Keel Ridge, . . . . .	31	Meier, . . . . .	68
Fullerville, . . . . .	16	Kemble, . . . . .	36	Menominee, . . . . .	73
Fulton, . . . . .	61	Kent, . . . . .	11	Merion, . . . . .	22
Furnaceville, . . . . .	13	Keystone, . . . . .	21, 22, 59	Midland, . . . . .	69
Gallia, . . . . .	58	Kirkland, . . . . .	14	Milton, . . . . .	61
Gap, . . . . .	35	Kutztown, . . . . .	25	Millerton, . . . . .	16
Girard, . . . . .	62	Lackawanna, . . . . .	26	Minersville, . . . . .	23
Gladeville, . . . . .	53	La Grange, . . . . .	42, 57	Mine Run, . . . . .	46
Glamorgan, . . . . .	26	Lake Huron, . . . . .	72	Minerva, . . . . .	75
Glencon, . . . . .	20	Lanesborough, . . . . .	10	Mingo, . . . . .	66
Glenwood, . . . . .	45	Latrobe, . . . . .	59	Missouri, . . . . .	69
Grace, . . . . .	45, 62, 74	Laura, . . . . .	55	Mollie, . . . . .	64
Gracie, . . . . .	16	Laurel, . . . . .	42	Monitor, . . . . .	15, 59
Grafton, . . . . .	66	Lawrence, . . . . .	59	Monocacy, . . . . .	23
Grant, . . . . .	58	Lawton, . . . . .	72	Monroe, . . . . .	60
Green Bay, . . . . .	74	Lebanon, . . . . .	29	Mont Alto, . . . . .	39
Green Spring, . . . . .	42	Lebanon Valley, . . . . .	29	Montgomery, . . . . .	23
Greenwood, . . . . .	38	Lee, . . . . .	64	Montour, . . . . .	27
Haines, . . . . .	47	Leesport, . . . . .	22	Moselem, . . . . .	23
Hamden, . . . . .	59	Lehigh, . . . . .	20	Moselle, . . . . .	70
Hamilton, . . . . .	69	Lehigh Zinc, . . . . .	20	Mount Etna, . . . . .	39
Hampton, . . . . .	38	Leland, . . . . .	73	Mount Hickory, . . . . .	31
Hamtramck, . . . . .	72	Lemont, . . . . .	36	Mount Hope, . . . . .	40
Hannah, . . . . .	62	Liberty, . . . . .	45	Mt. Laurel, . . . . .	23
Harford, . . . . .	42	Licking, . . . . .	54	Mount Penn, . . . . .	40



	PAGE		PAGE		PAGE
Mount Savage, . . . .	54	Proton, . . . . .	65	St. Charles, . . . .	30
Mount Vernon, . . .	46, 60	Quinnimont, . . . .	52	St. Louis, . . . . .	69
Moxahala, . . . . .	64	Raccoon, . . . . .	54	Stanhope, . . . . .	30
Muirkirk, . . . . .	42	Radford, . . . . .	46	Star, . . . . .	61
Musconetcong, . . . .	17	Raven Cliff, . . . .	46	Sterling, . . . . .	15
Napanoch, . . . . .	16	Reading, . . . . .	24	Sterlingbush, . . . .	16
Napier, . . . . .	57	Rebecca, . . . . .	36, 40	Sterlingville, . . . .	16
National, . . . . .	75	Red Bank, . . . . .	37	Steubenville, . . . .	66
Nelson, . . . . .	67	Red River, . . . . .	55	Stewardson, . . . . .	37
Neshannock, . . . . .	32	Reed Island, . . . .	46	Stewart, . . . . .	32
Newburgh, . . . . .	65	Rehoboth, . . . . .	48	Stickney, . . . . .	43
New Jersey Zinc, . . .	17	Richland, . . . . .	60	Stonewall, . . . . .	51
New River, . . . . .	46, 48	Richmond, . . . . .	10, 30	Sullivan County, . . .	56
New Tacoma, . . . . .	77	Ringgold, . . . . .	24	Swatara, . . . . .	30
Niagara River, . . . .	14	Ringwood, . . . . .	18	Swede, . . . . .	24
Northampton, . . . .	19	Rising Fawn, . . . .	48	Tecumseh, . . . . .	51
North Chicago, . . . .	68	Riverside, . . . . .	52	Temple, . . . . .	25
North Cornwall, . . . .	27	Robesonia, . . . . .	24	Thomas, . . . . .	21, 63, 65
North Western, . . . .	75	Rockhill, . . . . .	27	Tipton, . . . . .	46
Norristown, . . . . .	23	Rock Run, . . . . .	51	Top Mt., . . . . .	53
Norton, . . . . .	54	Rockwood, . . . . .	56	Topton, . . . . .	25
Norway, . . . . .	76	Rodman, . . . . .	37	Trigg, . . . . .	55
Nova Scotia, . . . . .	70	Roland, . . . . .	37	Tropic, . . . . .	61
Oakdale, . . . . .	56	Rolling Mill, . . . .	74	Tuscaloosa, . . . . .	52
Ogden, . . . . .	76	Rosena, . . . . .	32	Union, . . . . .	27, 60, 68, 73
Ohio, . . . . .	60	Rough and Ready, . .	57	Van Buren, . . . . .	47
Oley, . . . . .	40	Round Mountain, . . .	51	Van Deusenville, . . .	10
Oliphant, . . . . .	36	Rusk, . . . . .	52	Van Vorhis, . . . . .	48
Olive, . . . . .	58	Salisbury, . . . . .	46	Vesta, . . . . .	30
Onondaga, . . . . .	14	Sarah, . . . . .	61	Vesuvius, . . . . .	58
Ore Hill, . . . . .	48	Saucon, . . . . .	21	Victoria, . . . . .	44
Oswego, . . . . .	77	Scioto, . . . . .	60	Vigo, . . . . .	67
Oxford, . . . . .	18	Secaucus, . . . . .	18	Vinton, . . . . .	61
Ozark, . . . . .	70	Sewanee, . . . . .	56	Virginia, . . . . .	47, 48, 53
Panther Gap, . . . . .	46	Shaparon, . . . . .	16	Volcano, . . . . .	66
Paulding, . . . . .	67	Sharon, . . . . .	32	Vulcan, . . . . .	73
Paxton, . . . . .	29	Sharon Valley, . . . .	11	Waldorf, . . . . .	53
Peekskill, . . . . .	14	Sharpsville, . . . . .	32	Walton, . . . . .	47
Peninsular, . . . . .	73	Shelby, . . . . .	51	Wampum, . . . . .	32
Pennsylvania, . . . .	30, 36	Shenandoah, . . . . .	44, 46	Ware, . . . . .	52
Pequest, . . . . .	18	Sheridan, . . . . .	24	Warner, . . . . .	57
Philadelphia, . . . . .	23	Shoenberger, . . . . .	34	Warren, . . . . .	18
Phenix, . . . . .	16	Sinking Creek, . . . .	47	Warwick, . . . . .	25
Phoenix, . . . . .	23, 62	Sligo, . . . . .	70	Washington, . . . . .	40, 62
Pilot Knob, . . . . .	70	Sloss, . . . . .	50	Wasade, . . . . .	16
Pine Grove, . . . . .	40, 54, 60	Soho, . . . . .	34	Wellston, . . . . .	62
Pine Lake, . . . . .	73	Sophia, . . . . .	32	Westerman, . . . . .	32
Pioneer, . . . . .	15, 24, 52, 72	South Chicago, . . . .	68	Wheatland, . . . . .	32
Pittsford, . . . . .	9	Southfield, . . . . .	15	White Rock, . . . . .	47
Plymouth, . . . . .	24	South Mountain, . . . .	30	William Penn, . . . . .	25
Pomeroy, . . . . .	10	South Pittsburg, . . . .	56	Windsor, . . . . .	40
Port Carbon, . . . . .	24	South St. Louis, . . . .	69	Winona, . . . . .	65
Port Henry, . . . . .	14	Spearmen, . . . . .	32	Wister, . . . . .	30
Port Oram, . . . . .	18	Speedwell, . . . . .	47	Woodstock, . . . . .	51
Poughkeepsie, . . . .	14	Spiegel, . . . . .	62	Woodward, . . . . .	50
Powelson, . . . . .	36	Springfield, . . . . .	40	Wythe, . . . . .	47
Powhatan, . . . . .	44	Spring Hill, . . . . .	40	XX, . . . . .	64
Principio, . . . . .	43	Spring Lake, . . . . .	73	Zanesville, . . . . .	66

## ROLLING MILLS AND STEEL WORKS.

	PAGE		PAGE		PAGE
Abbott, . . . . .	127	Centralia, . . . . .	145	Ferndale, . . . . .	103
Adirondack, . . . . .	96	Central Pacific, . . . . .	151	Forest City, . . . . .	135
Ætna, . . . . . 90, 140		Cherry Valley, . . . . .	139	Fort Pitt, . . . . .	117
Akron, . . . . .	136	Chesapeake, . . . . .	109	Fowler, H. W., . . . . .	145
Albany, . . . . .	91	Chester, . . . . .	103	Franconia, . . . . . 85, 87	
Alikanna, . . . . .	140	Chicago, . . . . .	145	Franklin, . . . . .	105
Allegheny, . . . . .	115	Chickies, . . . . .	109	Gautier, . . . . .	124
Allentown, . . . . .	101	Christiana, . . . . .	126	Gibraltar, . . . . .	104
Altoona, . . . . .	109	Chrome, . . . . .	92	Glasgow, . . . . .	104
American, . . . . .	115	Cincinnati, . . . . . 140, 141		Glen, . . . . . 89, 104	
American Sheet, . . . . .	96	Cleveland, . . . . . 134, 135		Glendale, . . . . .	104
American Swedes, . . . . .	96	Clinton, . . . . .	116	Glendon, . . . . .	117
Anchor, . . . . . 115, 132		Coatesville, . . . . .	103	Glendower, . . . . .	110
Anchor Brand, . . . . .	92	Cohoes, . . . . .	93	Glenwood, . . . . .	117
Andrew Kloman, . . . . .	130	Cold Spring, . . . . .	90	Globe, . . . . . 87, 141	
Apollo, . . . . .	122	Collins, . . . . .	90	Gosnold, . . . . .	87
Atlantic, . . . . .	123	Colorado, . . . . .	150	Graham's, . . . . .	129
Auburn, . . . . .	92	Columbus, . . . . .	139	Granite, . . . . .	148
Aurora, . . . . .	143	Combination, . . . . .	104	Grasshopper, . . . . .	137
Ausable, . . . . .	92	Conschocken, . . . . .	104	Gray's Ferry, . . . . .	99
Bartlett, . . . . .	136	Co-operative, . . . . .	109	Greencastle, . . . . .	143
Baugh, . . . . .	149	Corliss, . . . . .	104	Green Ridge, . . . . .	110
Bay State, . . . . .	86	Corns, . . . . .	136	Greenville, . . . . .	124
Beaver Falls, . . . . .	123	Crescent, . . . . . 116, 131, 141		Greenwich, . . . . .	91
Belfont, . . . . .	140	Crown, . . . . .	116	Greenwood, . . . . .	105
Bellaire, . . . . .	140	Crucible, . . . . .	132	Grove, . . . . .	89
Bellefonte, . . . . .	109	Cumberland, . . . . . 97, 128		Hall, . . . . .	137
Belleville, . . . . .	144	Cuyahoga, . . . . .	137	Hamburg, . . . . .	105
Belmont, . . . . .	131	Danvers, . . . . .	86	Harrisburg, . . . . .	110
Benwood, . . . . .	131	Delaware, . . . . . 97, 99, 126		Harrison, . . . . . 147, 148	
Berwick, . . . . .	109	Denver, . . . . .	150	Helmbacher, . . . . .	148
Bethlehem, . . . . .	102	Diamond State, . . . . .	126	Holidaysburg, . . . . .	111
Birdsboro, . . . . .	102	Dover, . . . . . 97, 139		Howard, . . . . .	111
Birmingham, . . . . . 90, 115, 130		Duncannon, . . . . .	110	Hudson River, . . . . .	93
Black Diamond, . . . . .	115	Eagle, . . . . . 110, 116		Hussey, Binns & Co., . . . . .	117
Blandon, . . . . .	102	Eames, . . . . .	123	Hussey, Howe & Co., . . . . .	117
Boonton, . . . . .	97	East Bridgewater, . . . . .	87	Indianapolis, . . . . .	143
Brandywine, . . . . .	102	Easton, . . . . .	104	Ironton, . . . . .	141
Bridgewater, . . . . .	86	Edgar Thomson, . . . . .	116	James River, . . . . .	129
Brierfield, . . . . .	130	Edge Moor, . . . . .	127	Jefferson, . . . . .	141
Brilliant, . . . . .	143	Elba, . . . . .	117	Jersey City, . . . . .	97
Bristol, . . . . .	102	Elizabethport, . . . . .	97	John A. Roebling's, . . . . .	97
Britton, . . . . .	134	Elmira, . . . . .	93	Joliet, . . . . .	145
Burden, . . . . .	92	Enterprise, . . . . .	137	Junction, . . . . .	141
Burgess, . . . . .	140	Equipment, . . . . .	129	Juniata, . . . . .	111, 117
Byers, A. M., & Co., . . . . .	115	Erie, . . . . .	124	Kansas, . . . . .	149
Calumet, . . . . .	144	Etna, . . . . . 117, 124		Kensington, . . . . . 99, 118	
Cambria, . . . . .	123	Eureka, . . . . . 104, 149		Keystone, . . . . . 100, 105, 118	
Cambridge, . . . . .	86	Fair Hill, . . . . .	99	Kinsley, . . . . .	87
Canonsburg, . . . . .	123	Fairmount, . . . . .	99	Kittanning, . . . . .	124
Canton, . . . . . 128, 138		Falcon, . . . . .	137	Knoxville, . . . . .	133
Carbon, . . . . .	103	Fall River, . . . . .	87	La Belle, . . . . . 118, 131	
Catasauqua, . . . . .	103	Farist, . . . . .	91	Lackawanna, . . . . .	111
Central, . . . . . 109, 130, 132, 143		Farist and Windsor, . . . . .	90	Laclede, . . . . .	148

	PAGE		PAGE		PAGE
Lake Erie, . . . . .	135	Northumberland, . . . . .	112	Sable, . . . . .	94, 120
Lake Shore, . . . . .	135	Norton, . . . . .	132	Safe Harbor, . . . . .	113
Lancaster, . . . . .	111	Norway, . . . . .	88	Samsondale, . . . . .	95
Laughlin, . . . . .	141	Octoraro, . . . . .	128	Sanderson, . . . . .	95
Laurel, . . . . .	105	Ogden, . . . . .	151	Sandusky, . . . . .	136
Lawrence, . . . . .	142	Ohio Falls, . . . . .	144	Schuylkill, . . . . .	108
Lebanon, . . . . .	111, 115	Ohio Valley, . . . . .	133	Schuylkill Haven, . . . . .	108
Leechburg, . . . . .	125	Old Colony, . . . . .	88	Scottdale, . . . . .	125
Leetonia, . . . . .	140	Old Dominion, . . . . .	129	Scranton, . . . . .	113
Lehigh and Franklin, . . . . .	105	Old Ferry, . . . . .	126	Seyfert, . . . . .	108
Licking, . . . . .	132	Old Fort, . . . . .	125	Sharon, . . . . .	125
Liggett, . . . . .	118	Omaha, . . . . .	150	Shawnee, . . . . .	114
Linden, . . . . .	118	Onondaga, . . . . .	93	Shenango, . . . . .	125
Lochiel, . . . . .	111	Osborne, . . . . .	94	Singer, Nimick & Co., . . . . .	120
Locust Point, . . . . .	128	Otis, . . . . .	136	Sligo, . . . . .	120
Logan, . . . . .	112	Oxford, . . . . .	98, 100	Soho, . . . . .	121
Lookout, . . . . .	133	Pacific, . . . . .	151	Solar, . . . . .	121
Louisville, . . . . .	132	Palo Alto, . . . . .	106	Somerset, . . . . .	88
Lukens, . . . . .	105	Parker, . . . . .	88	South Chicago, . . . . .	146
Lynchburg, . . . . .	129	Parkeburg, . . . . .	106	South Tredegar, . . . . .	134
Mackintosh, Hemphill		Passaic, . . . . .	98	Spang, . . . . .	121
& Co., . . . . .	118	Paxton, . . . . .	112	Springfield, . . . . .	146
Mahoning, . . . . .	137	Pembroke, . . . . .	85	Spuytzen Duyvil, . . . . .	95
Mahoning Valley, . . . . .	137	Pencoyd, . . . . .	100	St. Albans, . . . . .	85
Manhattan, . . . . .	93	Penn, . . . . .	113	St. Louis, . . . . .	147, 148, 149
Marietta, . . . . .	142	Pennsylvania, 104, 113, . . . . .	119	Standard, . . . . .	108, 114, 131, 142
Marshall, . . . . .	127	Penn Treaty, . . . . .	101	Star, . . . . .	95, 121
Marshallton, . . . . .	127	Peru, . . . . .	94	Stewart, . . . . .	125
Massillon, . . . . .	139	Philadelphia, . . . . .	101	Stillwater, . . . . .	91
McIlvain, . . . . .	105	Philadelphia and Read-		Stony Creek, . . . . .	108
McKeesport, . . . . .	119	ing, . . . . .	106	Summers, . . . . .	138
Midvale, . . . . .	100	Phoenix, . . . . .	106	Superior, . . . . .	121
Milesburg, . . . . .	112	Pine, . . . . .	106	Susquehanna, . . . . .	114
Milldale, . . . . .	105	Pittsburgh, . . . . .	119, 120	Swift's, . . . . .	133
Miller, . . . . .	119	Plattsburgh, . . . . .	94	Syracuse, . . . . .	95
Millvale, . . . . .	116	Plymouth, . . . . .	106	Tennessee, . . . . .	133
Milton, . . . . .	112	Pompton, . . . . .	98	Terre Haute, . . . . .	144
Milwaukee, . . . . .	149	Portage, . . . . .	113	Thames, . . . . .	91
Minquas, . . . . .	127	Port Carbon, . . . . .	106	Thorndale, . . . . .	108
Monbagen, . . . . .	93	Portland, . . . . .	85	Tisdale, . . . . .	88
Monongahela, . . . . .	115	Portsmouth, . . . . .	142	Toledo, . . . . .	136
Montour, . . . . .	112	Potomac, . . . . .	130	Top Mill, . . . . .	131
Mt. Hope, . . . . .	87	Pottsgrove, . . . . .	107	Towanda, . . . . .	114
Napanoch, . . . . .	93	Pottstown, . . . . .	107	Tredegar, . . . . .	130
Nashua, . . . . .	85	Pottsville, . . . . .	107	Tremont, . . . . .	89
National, . . . . .	119	Powerville, . . . . .	98	Trenton, . . . . .	99
Nellis's, . . . . .	119	Providence, . . . . .	134	Ulster, . . . . .	95
New Albany, . . . . .	144	Quinsigamond, . . . . .	89	Union, . . . . .	95, 121, 136, 147
Newark, . . . . .	98	Reading, . . . . .	107	Union Pacific, . . . . .	150
Newburgh, . . . . .	135	Reed Brothers, . . . . .	88	United States, . . . . .	122
New Castle, . . . . .	125	Rensselaer, . . . . .	91	United States Navy, . . . . .	89
New Haven, . . . . .	91	Rhode Island, . . . . .	90	Valley, . . . . .	108
New Jersey, . . . . .	98	Riverside, . . . . .	127, 131, 142	Van de Sand & Capp, . . . . .	114
New York, . . . . .	93	Roane, . . . . .	134	Vesuvius, . . . . .	122
Niles, . . . . .	138	Robinson, . . . . .	88	Vulcan, . . . . .	122
Norristown, . . . . .	106	Rome, . . . . .	94	Wabash, . . . . .	144
North Chicago, . . . . .	146	Rumford, . . . . .	90	Ward, . . . . .	138, 139
Northeast, . . . . .	128	Russia, . . . . .	138	Wareham, . . . . .	89

	PAGE		PAGE		PAGE
Warren, . . . . .	138	West Penn, . . . . .	125	Wilmington, . . . . .	127
Washburn, . . . . .	89	Weymouth, . . . . .	89	Winch's, . . . . .	101
Wayne, . . . . .	122	Wheatland, . . . . .	126	Wood, Wm. W., . . . . .	96
Wellsville, . . . . .	143	Wheeler, . . . . .	126	York, . . . . .	114
West Amwell, . . . . .	128	Whitely, Faslter & Kel-		Youngstown, . . . . .	138
West Bergen, . . . . .	99	ley, . . . . .	139	Zanesville, . . . . .	139
Westerman, . . . . .	96	Willard, . . . . .	147		
Western, . . . . .	147	Williamsport, . . . . .	114		

## FORGES.

	PAGE		PAGE		PAGE
Altona, . . . . .	169	Laurel, . . . . .	173	Rocky Ford, . . . . .	174
American Swedes, . . . . .	171	Lewis, . . . . .	170	Rocky Point, . . . . .	173
Black Diamond, . . . . .	171	Little Doe, . . . . .	173	Russia, . . . . .	169
Bowling Green, . . . . .	172	Madison, . . . . .	172	Sable, . . . . .	170
Camp Creek, . . . . .	173	Maiden Creek, . . . . .	172	Shupe's, . . . . .	174
Catawba Valley, . . . . .	172	McQueen's, . . . . .	173	Siemens-Anderson, . . . . .	171
Chateaugay Lake, . . . . .	169	Mockasine, . . . . .	172	Slimp's, . . . . .	174
Clayburgh, . . . . .	169	Morrison's, . . . . .	173	Smith's, . . . . .	174
Click's, . . . . .	173	New Russia, . . . . .	170	Speedwell, . . . . .	174
Cranberry, . . . . .	172	Owl Creek, . . . . .	172	Split Rock, . . . . .	171
Dugger's, . . . . .	173	Payne's, . . . . .	170	Star, . . . . .	170
East Middlebury, . . . . .	169	Peckham, . . . . .	174	Stone, . . . . .	171
Heaton's, . . . . .	173	Penington's, . . . . .	172	Tomatola, . . . . .	173
Henson's, . . . . .	172	Peru, . . . . .	170	Tuscarora, . . . . .	173
Horicon, . . . . .	169	Petersburg, . . . . .	170	Tyrone, . . . . .	171
Hyatt's, . . . . .	172	Pittsfield, . . . . .	169	Wagner's, . . . . .	174
Irona, . . . . .	169	Potter's, . . . . .	174	Walker's, . . . . .	174
Ironville, . . . . .	170	Reed Island, . . . . .	172	Willaborough, . . . . .	171
Jackson's, . . . . .	173	Rhea's, . . . . .	174	Wilmington, . . . . .	171
Justin, Signor & Co., . . . . .	170	Roan Mountain, . . . . .	172	Wood, Wm. W., . . . . .	171
Keene, . . . . .	170	Roane Creek, . . . . .	174	Worth's, . . . . .	173
King's, . . . . .	173	Rockville, . . . . .	170		

## BLOOMARIES.

	PAGE		PAGE		PAGE
Allatoona Creek, . . . . .	180	Graham's, . . . . .	179	North Kiln, . . . . .	179
Barree, . . . . .	176	Howard, . . . . .	177	Oram, B. B., . . . . .	175
Bellefonte, . . . . .	176	Juniata, . . . . .	177	Paterson, . . . . .	175
Bloomington, . . . . .	175	Laurel, . . . . .	178	Paulding, . . . . .	180
Canton, . . . . .	175	Liberty, . . . . .	178, 179	Perry, . . . . .	179
Carlisle, . . . . .	176	Lucknow, . . . . .	178	Pine, . . . . .	180
Charming, . . . . .	176	Mainville, . . . . .	178	Port Oram, . . . . .	175
Colemanville, . . . . .	176	Maramac, . . . . .	180	Powerville, . . . . .	176
Columbia, . . . . .	179	Martie, . . . . .	178	Rockaway, . . . . .	176
Cove, . . . . .	177	Milesburg, . . . . .	178	Schuylkill, . . . . .	179
Eagle, . . . . .	177	Mont Alto, . . . . .	178	Shenandoah, . . . . .	180
Ellendale, . . . . .	177	Mount Airy, . . . . .	178	Speedwell, . . . . .	180
Ellwood, . . . . .	177	Mount Etna, . . . . .	178	Springton, . . . . .	179
Exeter, . . . . .	177	Mount Hope, . . . . .	175	Union, . . . . .	179
French Creek, . . . . .	177	Mount Vernon, . . . . .	179	Warren, . . . . .	176
Germania, . . . . .	180	New Market, . . . . .	178	Washington, . . . . .	179
Gibraltar, . . . . .	177	Northeast, . . . . .	179	Windham, . . . . .	176



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