
THE
IRON AND STEEL WORKS
OF THE
UNITED STATES.

1880.

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1880

Class 7669.10² Book A51



PRESENTED BY

Mr W.C. Clapp.

DIRECTORY
TO THE
IRON AND STEEL WORKS
OF THE
UNITED STATES.

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

PREPARED AND PUBLISHED BY
THE AMERICAN IRON AND STEEL ASSOCIATION.

CORRECTED TO MARCH 15, 1880.

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

PREFACE.

WE present herewith a new and thoroughly-revised edition of our Directory to the Iron and Steel Works of the United States. This is the fifth edition of this work, the first having been issued immediately after the panic of 1873. The present edition has been rendered necessary by the many changes that have resulted from the revival in the iron trade which began in 1879. New firms and companies have been organized, idle works have been relighted, and new works have been established and old works enlarged. We need scarcely say that 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.

Since our last edition was issued, in the autumn of 1878, there has been noticeable in the iron trade of this country a very strong tendency to substitute steel for iron and to increase the production of individual blast furnaces. Our steel industry is now the second in the world in productive capacity, and in a year it will pass that of Great Britain and take the first rank. The increase within the last year in the capacity of our Bessemer and open-hearth works, either completed or projected, is equal to an addition of fifty per cent. to the capacity which existed in 1878. The improvement in our blast-furnace practice is simply marvelous, and to the confidence which has been inspired in the improved practice which has been so generally adopted must be attributed the enormous annual capacity which is claimed for 697 completed furnaces, namely, 6,500,000 net tons, or 5,800,000 gross tons, of pig iron. It is well to remember, however, that, in the nature of things, all of these furnaces can never be in operation at the same time, and that the large capacity that is claimed for our rolling mills and steel works is not capable of realization in actual practice, for obvious reasons.

Without further preface we present below a complete summary of the number and capacity of the iron and steel works which are described in the Directory.

Number of completed Blast Furnaces on March 1, 1880, . .	697
Number of Blast Furnaces building on March 1, 1880—23 Bituminous; 12 Anthracite; 9 Charcoal: total,	44
Annual capacity of completed Furnaces, in pig iron, net tons, . .	6,500,000
Annual capacity of the 203 Bituminous Furnaces, net tons, . .	2,825,000
Annual capacity of the 228 Anthracite Furnaces, net tons, . .	2,600,000

Annual capacity of the 266 Charcoal Furnaces, net tons, . . .	1,075,000
Number of completed Rolling Mills and Steel Works on March 1, 1880,	382
Number of Rolling Mills and Steel Works building March 1,	10
Number of Single Puddling Furnaces (a double furnace count- ing as two single ones,)	4,467
Number of Heating Furnaces,	2,419
Number of Trains of Rolls,	1,397
Annual capacity of Rolling Mills in finished iron, net tons, .	4,000,000
Annual capacity of Rail Mills in heavy rails, net tons, . . .	2,150,000
Number of Rolling Mills having Nail Factories,	73
Number of Nail Machines,	4,152
Number of completed Bessemer Steel Works on March 1, 1880,	11
Number of Bessemer Steel Works building on March 1, 1880,	2
Number of Bessemer Converters—22 completed; 10 building:	32
Annual capacity in ingots, net tons—completed converters, 1,250,000; new converters, 500,000: total,	1,750,000
Number of completed Open-Hearth Steel Works on March 1,	22
Number of Open-Hearth Steel Works building on March 1,	3
Number of Open-Hearth Furnaces—33 completed; 6 building:	39
Annual capacity in ingots, net tons—completed furnaces, 225,000; new furnaces, 50,000: total,	275,000
Number of completed Crucible Cast-Steel Works on March 1,	35
Number of Crucible Cast-Steel Works building on March 1,	3
Number of Steel-Melting Pots in the completed works, . . .	3,080
Annual capacity in ingots, net tons,	90,000
Number of Miscellaneous Steel Works on March 1, 1880, . .	9
Number of Steel Manipulating Works on March 1, 1880, . .	31
Number of completed Forges (one building) on March 1, 1880, (make wrought iron from ore,)	69
Annual capacity in blooms and billets, net tons,	85,000
Number of completed Bloomaries (one building) on March 1, 1880 (make blooms from pig iron,)	59
Annual capacity in blooms, net tons,	80,000

PHILADELPHIA, April 15, 1880.

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THE
IRON AND STEEL WORKS
OF THE
UNITED STATES.

BLAST FURNACES.

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.

MAINE.

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-power; fuel, charcoal; ore, limonite, obtained about a mile from the works, yielding from 55 to 60 per cent.; annual capacity, 6,000 net tons. Pig iron branded "Katahdin." Specialty, pig iron for car-wheels and Siemens-Martin furnaces. O. W. Davis, Jr., Treasurer and Manager.

Number of furnaces in Maine: 1 charcoal stack.

VERMONT.

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

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.

Lenox Iron Works, Smith Paper Company, Lee. Works at Lenox Furnace, Berkshire county. One stack, 32 x 9, built in 1765 and rebuilt in 1837; warm blast; water-power. For lease.

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 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. John H. Coffing, President, Van Deusenville, Mass.; Wm. H. Barnum, Treasurer, Lime Rock, Conn.; R. A. Burget, Manufacturing Agent, Richmond Furnace.

Number of furnaces in Massachusetts: 6 stacks, of which 1 uses anthracite and 5 use charcoal.

CONNECTICUT.

CHARCOAL.

Canaan Furnaces, Barnum Richardson Company, Lime Rock, Litchfield county. Three stacks, each 32 x 9; one built in 1840, one in 1847, and the last in 1872; 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; Sidney P. Ensign, Secretary.

Chapinville Furnace, Landon & Co., Chapinville, Litchfield county. One stack, 28 x 9, built in 1825; hot blast; open top; water-power; ore,

Salisbury; product, car-wheel pig iron; annual capacity, 3,000 net tons. Horace Landon, Manager. Injured by fire in 1879, but is being rebuilt.

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, 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; John Hopson, Jr., 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.

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.

Shepaug Iron Company, R. E. Day, President, Hartford. Furnace at Roxbury, Litchfield county. One stack, 40 x 9, built in 1866; hot blast; ore, spathic, mined on the company's property near the furnace; iron produced was used for the manufacture of steel. Not in blast since 1872. Held for sale.

Number of furnaces in Connecticut: 10 charcoal stacks.

NEW YORK.

ANTHRACITE.

Albany City Iron Company, Albany, Albany county. Two stacks, each 60 x 16, built in 1873-4; Ford hot-blast stoves; condensing beam blowing engines, having steam cylinders 50 inches in diameter by 11-foot stroke; product of one furnace, foundry pig iron from Lake Champlain magnetites and Harlem hematites; product of the other furnace, Besse-

mer pig iron from Northern New York magnetites and foreign hematites; fuel, anthracite and coke; total annual capacity, 28,000 net tons. Brand, "Olcott." Abm. Van Vechten, President; Wm. R. Hills, Secretary and Treasurer; H. Burden, Superintendent. Selling agents, Crocker Brothers, 32 Cliff st., New York.

Burden Iron Works, H. Burden & Sons, Troy, Rensselaer county. Two stacks, each 60 x 16, built in 1865 and 1867; closed tops; ores, magnetic from Lake Champlain and Vermont, 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; blast heated by 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; Thomas F. Witherbee, Manager.

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 H. Chapin, Vice-President; George C. Hopkins, Secretary and Treasurer.

Clove Furnace, Peter P. Parrott, 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, 11,500 net tons. Brand, "Clove." Selling agents, Thomas J. Pope & Bro., 292 Pearl st., New York. *See Greenwood (charcoal) Furnace.*

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, "Cold Spring." Executive Committee: J. C. Kent, Phillipsburg, N. J., and J. Wesley Pullman, Philadelphia. Manager at furnace, Wm. St. George Kent.

Columbia Furnace, Albany and Rensselaer Iron and Steel Company, Troy. Furnace at Hudson, Columbia county. One stack, 40 x 14, built about 1860; ores, Lake Champlain magnetites, African, and Spanish; product, Bessemer pig iron; annual capacity, 10,000 net tons. *See Fort Edward Furnace. See Rolling Mills.*

Crown Point Furnaces, Crown Point Iron Company, Crown Point, Essex county. Two stacks, situated on the bank of Lake Champlain, 60 x 17 and 60 x 16, built in 1873; 1 Ford hot blast and 3 Siemens-Cowper-Cochrane fire-brick stoves; product, Bessemer pig iron, produced from Crown Point (or Penfield) ore; total annual capacity, 33,000 net tons. John Hammond, President; C. L. Hammond, Secretary; A. L. Inman, General Manager and Treasurer; H. L. Reed, Cashier; C. H. Foote, Superintendent.

Dutchess Furnace, Clove Spring Iron Works, Sylvan Lake, Dutchess county. Agents, Crocker Brothers, 32 Cliff st., New York. One stack, 44 x 12½, built in 1873 for charcoal, and changed to anthracite in 1877; bell-and-hopper top; annual capacity, 9,500 net tons. *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, 30,000 net tons. The ores used are hematite from Jefferson county, New York, and Lake Superior and Glendower magnetic. The Glendower ore comes from the company's own mines, north of Kingston, in Frontenac county, Canada; it is used as their leading ore, is rich in metallic iron, gives great strength to the pig, and is a good Bessemer ore, being free from phosphorus and sulphur. *See Rolling Mills.*

Falkkill Iron Company, A. Tower, Agent, Poughkeepsie, Dutchess county. Two stacks, each 60 x 16, built in 1860; ores, ⅓ Dutchess county brown hematite, ⅓ Lake Champlain magnetic, and ⅓ Forest of Dean, Orange county; total annual capacity, 25,000 net tons.

Fletcher Furnace, Fletcher Furnace Company, lessees, Buffalo, Erie county. One stack, 47 x 14, built in 1863, and blown in April 8, 1864; closed top; ores, Lake Superior and Lake Champlain, with a small percentage of native; annual capacity, 12,000 net tons. Brand, "Fletcher." Edmund Carpenter, Agent; F. W. Carpenter, Treasurer.

Fort Edward Furnace, Albany and Rensselaer Iron and Steel Company, Troy. Furnace at Fort Edward, Washington county. One stack, 50 x 15, built in 1853; water-power; ores, Lake Champlain magnetites, African, and Spanish; product, Bessemer pig iron; annual capacity, 11,000 net tons. *See Columbia Furnace. See Rolling Mills.*

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 1½ to 5 miles from the works; product, pig iron for stove plates and small castings; total annual capacity, 20,000 net tons. E. L. Hedstrom, President,

Buffalo; E. F. Holden, Treasurer, Syracuse; C. H. Smyth, Secretary and Superintendent, at the works.

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, 24,000 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. Formerly called Corning Iron Works. James Hendrick, President.

Kirkland Furnace, Kirkland Iron Company, Kirkland, Oneida county. One stack, 48 x 13, built in 1873, reconstructed in 1879; water-power; ores, local hematite or fossiliferous and Lake Champlain magnetic; annual capacity, 6,500 net tons. Specialty, No. 1 foundry pig iron. Formerly called Clinton Furnace. Theodore W. Dwight, President; I. A. Williams, General Manager and Treasurer.

Manhattan Iron Works, Manhattan Iron 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, 17,000 net tons. B. W. Van Voorhis, President; Wm. W. Van Voorhis, Treasurer.

Napanoch Furnace, Napanoch, Ulster county. One stack, 46 x 12, built prior to 1854; put in blast in July, 1873, after a long rest; annual capacity, 6,000 net tons. Idle since spring of 1874. Offered for sale by Henry Bange, 94 Gold st., New York.

Niagara River Iron Company, Buffalo. Furnace at Ironton, 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, 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; ores, $\frac{1}{2}$ Jefferson county Sterling hematite, $\frac{1}{4}$ Port

Henry, and $\frac{1}{2}$ Wayne and Oneida counties; product known as "Onondaga" pig iron; total annual capacity, 36,000 net tons. J. J. Belden, President; R. N. Gere, Vice-President; W. H. H. Gere, Secretary and Treasurer.

Ontario Furnace, Ontario Iron Company, Furnaceville, Wayne county. One stack, 50 x 11, first put in operation in October, 1870; open top; annual capacity, 6,000 net tons. Company failed in 1878, and the furnace is now idle. Formerly owned by Rochester parties.

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." George H. Brown, President. Selling agency, Crocker Brothers, 32 Cliff st., New York.

Port Henry Furnaces, Bay State Iron Company, W. T. Foote, Agent, Port Henry, Essex county. General office, 2 Pemberton Square, Boston, Mass. Two stacks, each 66 x 16, built in 1853 and 1861; rebuilt in 1868 and 1871, respectively; ores, chiefly magnetic from Essex county, with some hematite from other points; total annual capacity, 30,000 net tons. Brands, "Port Henry" forge iron, and "Bay State" foundry iron, the former made from $\frac{1}{2}$ Cheever, $\frac{1}{4}$ Barton, and $\frac{1}{4}$ Rossie, and the latter from $\frac{1}{2}$ of each kind of ore. Selling agents, Crocker Brothers, 32 Cliff st., New York. *See Massachusetts Rolling Mills.*

Poughkeepsie Iron Company, A. Tower, 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, $\frac{1}{4}$ Lake Champlain magnetic, and $\frac{1}{4}$ 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 City. Furnaces in Orange county. Two stacks, Sterling, 42 x 13, built in 1848, and Southfield, 45 x 12, built in 1806; product, some foundry, mostly mill pig iron, from all magnetic ores, mined near the furnaces. Iron called "Sterling." A. W. Humphreys, Treasurer.

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: 42 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. Out of blast for several years, but will be blown in in 1880.

Beckley Iron Works, Munson & Landon, Chatham Village, Columbia county. One stack, 32 x 9, built in 1873; put in blast in July, 1873; hot blast; ore, brown hematite from Columbia and Dutchess counties; product, pig iron for car-wheels; annual capacity, 4,500 net tons.

Carthage Furnace, Carthage Iron Company, Carthage, Jefferson county. One stack, 36 x 9, built in 1818, and rebuilt in 1872; warm blast; open top; water-power; ore, local hematite; product, car-wheel and foundry pig iron; annual capacity, 3,500 net tons. R. N. Gere, President; L. H. Mills, Vice-President; Robert W. Gere, Secretary and Treasurer.

Clove Spring Furnace, Clove Spring Iron Works, Sylvan Lake, Dutchess county. Agents, Crocker Brothers, 32 Cliff st., New York. One stack, 32 x 9, built in 1830; warm blast; steam and water power; annual capacity, 3,500 net tons. *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, 4,400 net tons.

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.

Greenwood Furnace, Peter P. Parrott, Greenwood Iron Works, Orange county. One stack, 42 x 9, built in 1813; warm blast; water-power; not in blast since September, 1871. Only charcoal furnace in Southern New York or Northern New Jersey. *See Clove (anthracite) Furnace.*

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; 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. *See Bloomeries.*

Millerton Iron Company, Irondale, Dutchess county. One stack, 32 x 9; very old; repaired in 1864; hot blast; annual capacity, 4,000 net tons. W. H. Barnum, President; George S. Frink, Secretary and Treasurer.

Norwich Furnace, J. & N. C. Scoville, Buffalo. Furnace at Norwich, Chenango county. One stack, 32 x 9, built in 1856 and repaired in 1873; hot blast; annual capacity, 4,000 net tons.

Phoenix Furnace, C. S. Maltby, Millerton, Dutchess county. One stack, 32 x 9½, built in 1840; hot blast; annual capacity, 3,500 net tons.

Plattsburgh Iron Works, Naylor & Co., lessees, 6 Oliver st., Boston, Mass. Furnace at Plattsburgh, Clinton county. One stack, 45 x 9, built in 1877-8; first blown in April 7, 1878; closed top; annual capacity, 3,500 net tons. Brand, "TITAN." *See Pittsfield Furnace, Vermont. See Rolling Mills in Massachusetts and New York.*

Port Leyden Furnaces, S. A. Johnson (executor of S. C. Thompson's estate), Boonville, Oneida county. Works at Port Leyden, Lewis county. Two stacks, 40 x 9 and 32 x 9, built in 1864; hot blast; water-power; open tops; ore, from Jefferson county; total annual capacity, 7,000 net tons. Not in blast since Oct. 1, 1874.

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 ⅓ 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: 58 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 their own mines; product, all grades of pig iron, with special qualities for plates and nails; 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. Cowper 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. Idle for several years, but in blast in 1880. H. C. Jenkins, Superintendent of blast furnaces. *See Rolling Mills.*

Chester Furnace, W. J. Taylor & Co., lessees, Chester, Morris county. One stack, 50 x 12, built in 1878; intended for spiegel-making, but the project was abandoned; Weimer suspended pipe stoves, Weimer tubular boilers, and Weimer high-speed blowing engine; product, Bessemer and extra red-short mill pig iron, made from Andover roasted ore, very

low in phosphorus; estimated annual capacity, 9,000 net tons. Brand, "Jersey." Selling agents, Cabeen & Co., 230 South Third st., Philadelphia.

Franklin Iron Company, Franklin Furnace P. O., Sussex county. One stack, 67 x 23, completed in October, 1873, and blown in January 1, 1874; closed top; fuel, anthracite and coke; ores, New Jersey, Lake Champlain, Tilly Foster, and foreign; product, Bessemer pig iron; annual capacity, 29,000 net tons. Moses Taylor, President; E. F. Hatfield, Jr., Treasurer, 52 Wall st., New York; W. W. Pierce, Secretary.

Hackettstown Furnace, Joseph Wharton, P. O. Box 2,786, Philadelphia. Furnace at Hackettstown, Warren county. One stack, 56 x 16, built in 1874-5, and put in blast in 1875; ores, Beatyestown hematite and local magnetic; annual capacity, 12,000 net tons.

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, 303 Walnut st., Philadelphia; Superintendent, E. S. Moffat, Stanhope, N. J.

New Jersey Zinc Company, Newark, Essex county. 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. President, Edward Baker; Vice-President, A. B. Graves; Secretary and Treasurer, A. H. Farlin.

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; ore, magnetic, mined on the furnace property; specialty, gray forge pig iron; estimated annual capacity, 14,500 net tons. Agent, John Hewitt; General Manager, B. F. Fackenthal, Jr. *See Ringwood Furnaces. See Durham Iron Works, Lehigh Valley, Pennsylvania.*

Port Oram Furnace, Port Oram Furnace Company, Port Oram, Morris

county. One stack, 60 x 15, built in 1868, and first blown in in 1869; closed top; annual capacity, 11,000 net tons. Selling agents, Crocker Brothers, 32 Cliff st., New York.

Ringwood Furnaces, Cooper & Hewitt, Hewitt, Passaic county. Office, 17 Burling Slip, New York. One completed stack, 48 x 13, and one stack being built, 65 x 16; open tops; water-power. The former was altered from charcoal to anthracite in 1872 and is now in blast; the latter is now building for anthracite, and will be blown in in 1880. Ore, magnetic, mined at Ringwood. Use the Cooper iron hot-blast arrangement. Manager, G. W. Cunningham. *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 $\frac{1}{2}$ Tilly Foster and Morris county magnetites; fuel, anthracite and coke; product, Bessemer pig iron; annual capacity, 20,000 net tons. A. Pardee, President, Hazleton, Pa.; E. S. Moffat, Treasurer, Stanhope, N. J.; I. P. Pardee, Superintendent, Secaucus. Selling agents, Crocker Brothers, 32 Cliff st., New York.

Stephens Furnace Company, Rustic, Morris county. One stack, 30 x 4, built in 1877; first blown in in 1877; closed top; native ore; product, gray forge pig iron; annual capacity, 5,000 net tons. Wm. A. Stephens, President and Manager; George H. Moller, Secretary and Treasurer, 24 Nassau st., New York.

Number of furnaces in New Jersey: 20 completed anthracite stacks, and 1 stack building.

PENNSYLVANIA.

LEHIGH VALLEY ANTHRACITE.

Allentown Iron Works, Allentown Iron Company, Allentown, Lehigh county. Office, 230 South Third st., Philadelphia. Five stacks: No. 1, $53\frac{1}{2}$ x $14\frac{1}{2}$, built and blown in in 1846; No. 2, 60 x $15\frac{1}{2}$, built and blown in in 1846; No. 3, $53\frac{1}{2}$ x 15, built in 1853 and blown in in 1854; No. 4, $53\frac{1}{2}$ x $16\frac{1}{2}$, built in 1854 and blown in in 1855; No. 5, 60 x 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." President, John Lowber Welsh; Secretary, Henry Cabot; Manager at the works, Stephen B. Neumeyer.

Allentown Rolling Mill Company, Allentown. Office, 303 Walnut st., Philadelphia. Two stacks, each 68 x 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. Seven stacks: No. 1, 62 x 16, built in 1863; No. 2, 70 x 16½, built in 1867; No. 3, 50 x 13, built in 1868; No. 4, 70 x 17½, built in 1874-5; No. 5, 70 x 18½, built in 1874-5; all have closed tops. No. 6, 27 x 7½, built in 1874-5; open top; product, spiegeleisen from zinc residuum; annual capacity, 1,800 net tons. No. 7, 63 x 19½, 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, 95,000 net tons. *See Northampton Furnace. See Rolling Mills.*

Carbon Iron and Pipe Company Limited, Parryville, Carbon county. Three stacks, 52 x 12, 52 x 16, and 65 x 16, built in 1855, 1864, and 1869, respectively; 1 open and 2 closed tops; ores, hematite from Lehigh, Northampton, and Carbon counties, and New Jersey and Lake Champlain magnetic; total annual capacity, 30,000 net tons. Chairman, A. A. Douglas, Mauch Chunk; Secretary and Treasurer, George Ruddle, Mauch Chunk; Superintendent, H. P. Cooper, Parryville.

Coleraine Iron Works, Charles F. Shoener, 328 Walnut st., Philadelphia. Works at Redington, Northampton county. Two stacks, each 60 x 17, built in 1869 and 1872; ores used in one stack, ⅔ hematite and ⅓ magnetic, making foundry pig iron; ore used in the other stack, Cornwall, making Bessemer pig iron; total annual capacity, 26,000 net tons.

Coplay Iron Company Limited, Coplay, Lehigh county. Three stacks, 60 x 14, 55 x 16, and 55 x 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. Chairman, E. P. Wilbur, Bethlehem; Treasurer, Wm. H. Ainey, Allentown; Superintendent, V. W. Weaver, Coplay.

Crane Iron Works, Crane Iron Company, Catasauqua, Lehigh county. Office, 224 South Fourth st., Philadelphia. Four completed stacks, 45 x 11, 55 x 17½, 60 x 17½, and 60 x 17½; built in 1839, 1850, 1850, and 1867, respectively; closed tops; 3 have iron hot-blast stoves, and 1 has Whitwell stoves; ores, New Jersey magnetic, and brown hematite from Lehigh, Berks, and Northampton counties in Pennsylvania; specialty, stove, foundry, and Bessemer pig iron. Brand, "Crane." Two stacks, each 60 x 17½, in course of erection, to be completed in 1880, furnished with 6 Whitwell fire-brick stoves. These new stacks are intended to take the place of 2 stacks built in 1842 and 1846, which were torn down in 1879, and the small No. 1 stack, which is now running but will soon be torn down. Samuel Dickson, President; Geo. T. Barns,

Secretary and Treasurer. Officers at the works are: Joshua Hunt, Superintendent; Joseph Hunt, Assistant Superintendent; John Williams, Cashier.

Durham Iron Works, Cooper & Hewitt, Riegelsville, Bucks county. Office, 17 Burling Slip, New York. One stack, 75 x 20, built in 1874, and blown in in February, 1876; closed top; ores, $\frac{1}{2}$ hematite and $\frac{1}{2}$ magnetic from Durham, Pa., and $\frac{3}{8}$ magnetic from Ringwood, N. J.; specialty, gray forge pig iron; annual capacity, 30,000 net tons. Brand, "Durham." The 2 old stacks, built in 1848 and 1851, have been demolished. B. F. Fackenthal, Jr., Superintendent. *See Pequest and Ringwood Furnaces, New Jersey.*

Emaus Furnace, John Donaldson & Co., lessees, Emaus, Lehigh county. Office, 138 Walnut st., Philadelphia. One stack, 68 x 16, completed and first put in blast Oct. 10, 1872; rebuilt in 1879-80; closed top; ores, local hematite and New Jersey magnetic; product, foundry pig iron; annual capacity, 15,000 net tons. Brand, "Emaus." Idle for several years; to be blown in about May 1, 1880.

Glendon Iron Works, Glendon Iron Company, Easton, Northampton county. Five completed stacks, 63 x 16, 50 x 14, 50 x 15, 47 x 15, and 72 x 18; built in 1843, 1844, 1850, 1852, and 1869, respectively; No. 1 was rebuilt in 1849 and 1874; these furnaces are at Glendon, near Easton, except Furnace No. 4, which is situated at South Easton; No. 2 and No. 4 are 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, 70,000 net tons. Brand, "Glendon." One stack, 81 x 18, in course of erection and to be completed in 1880, to take the place of one or two of the small furnaces, which will then be torn down. President, Augustus Lowell, Boston; Secretary and Treasurer, Thomas T. Bouvé, Boston; Superintendent, Frank Firmstone, Easton.

Keystone Furnace, D. Runkle & Co., Easton, Northampton county. Furnace at Glendon, near Easton. One stack, 65 x 16, first blown in April 17, 1876; closed top; ores, magnetic from New Jersey, and local hematite; specialty, gray forge pig iron; annual capacity, 12,000 net tons. Brand, "K. F., Glendon, Pa."

Lehigh Iron Company, Allentown, Lehigh county. Two stacks, 55 x 16 and 60 x 17; No. 1, completed July 22, 1869, and No. 2, Oct. 21, 1872; ores, $\frac{3}{4}$ Lehigh county hematite and $\frac{1}{4}$ New Jersey magnetic; specialty, foundry pig iron; total annual capacity, 21,000 net tons. Brand, "Lehigh." W. H. Ainey, President; L. R. Unger, Secretary.

Lock Ridge Furnaces, Thomas Iron Company, Alburtis, Lehigh county. Two stacks, each 62 x 15, built in 1867 and 1869; ores, native hema-

- tite and New Jersey magnetic; product, foundry and forge pig iron; total annual capacity, 25,000 net tons. Edwin Thomas, Superintendent; John Thomas, General Superintendent. *See Thomas Iron Works.*
- Lucy Furnace, Lucy Furnace Company, Glendon, Northampton county. 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; annual capacity, 10,500 net tons. Formerly owned by the Millerstown Iron Company. President, J. T. Audenried, Philadelphia; Secretary, R. R. Robb, Philadelphia; Treasurer, Wm. L. Schaffer, Philadelphia; Superintendent, Wm. M. Weaver, Macungie.
- Northampton Furnace, Bethlehem Iron Company, lessees, Bethlehem. Furnace at Freemansburg, Northampton county. One stack, 64 x 16, built in 1872-3; put in blast July 17, 1873; closed top; ores, local and foreign hematite and magnetic; specialty, Bessemer pig iron; annual capacity, 11,200 net tons. *See Bethlehem Iron Company.*
- 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; open tops; 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. Fackenthal, Secretary and Superintendent, Hellertown.
- Thomas Iron Works, Thomas Iron Company, Hokendauqua, Lehigh county. Six stacks: four, 60 x 18, one, 65 x 18, and one, 55 x 18; two were built in 1855, two in 1863, and two in 1873; ores, native hematite and New Jersey magnetic; product, foundry and forge pig iron; total annual capacity, 94,000 net tons. Samuel Thomas, President; J. T. Knight, Secretary and Treasurer; John Thomas, General Superintendent. *See Lock Ridge Furnaces.*
- Number of furnaces in the Lehigh region: 49 completed anthracite stacks and 3 building.

SCHUYLKILL VALLEY ANTHRACITE.

- Anvil Furnace, Pottstown Iron Company, Pottstown, Montgomery county. One stack, 60 x 16, built in 1867 and blown in in December, 1867; closed top; ores, magnetic and hematite, mined partly at Hopewell, Chester county; specialty, mill pig iron; annual capacity, 12,000 net tons. *See Bechtelsville Furnace. See Rolling Mills.*

- Bechtelsville Furnace, Pottstown Iron Company, lessees, Bechtelsville, Berks county. Office, Pottstown. One stack, 63 x 16, built in 1875; annual capacity, 11,500 net tons. *See Anvil Furnace.*
- Chester Rolling Mills, Chester, Delaware county. Building one stack. *See Rolling Mills.*
- East Penn Furnaces, T. Garretson, lessee, Lyons Station, Berks county. Two stacks, each 48 x 12, built in 1874-5; 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, Edgehill, Montgomery county. Office, 43 North Water st., Philadelphia. 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. Brand, "Edgehill." President, Charles Richardson; Secretary and Treasurer, Wm. Stokes; Manager, Thomas F. Wright.
- 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, 43½ 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; Jacob K. Spang, 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, ¾ hematite from Moselem, Berks county, and ¼ magnetic from Cornwall, Lebanon county; specialty, foundry pig iron; annual capacity, 12,000 net tons. Brand, "Leesport." President, John G. Kaufman; Vice-President, H. S. Eckert; Secretary, H. H. Muhlenberg; Treasurer and Superintendent, L. M. Kaufman. Selling agent, J. J. Mohr, 430 Walnut st., Philadelphia.
- Lucinda Furnace, S. Fulton, Agent, Norristown, Montgomery county.

- Office, 265 South Fourth st., Philadelphia. One stack, 40 x 13, built in 1856; closed top; ores, hematite and magnetic, mined in Pennsylvania; specialty, forge pig iron; annual capacity, 8,000 net tons. Brand, "Lucinda."
- Merion and Elizabeth Furnaces, J. B. Moorhead & Co., West Conshohocken, Montgomery county. Office, 209 Walnut Place, Philadelphia. Two stacks: Merion Furnace, 48 x 13, built in 1847 and enlarged in 1876; Elizabeth Furnace, 50 x 16, built in 1872, put in blast October 24, 1872; ores, New York and New Jersey magnetic and local hematite; product, foundry and forge pig iron; combined capacity, about 400 net tons per week. Brand, "Merion."
- Minersville Furnace, George H. Snyder, lessee, Pottsville, Schuylkill county. Furnace at Minersville, Schuylkill county. One stack, 55 x 15, built in 1872-3; blown in September 5, 1873; bell-and-hopper top; weekly capacity, 200 net tons.
- Monocacy Furnace, Monocacy Furnace Company, Monocacy, Berks county. One stack, 50 x 14, built at Hopewell in 1852; moved 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, $\frac{1}{2}$ magnetic and $\frac{1}{2}$ hematite; specialty, forge pig iron; annual capacity, 11,200 net tons. Brand, "Montgomery." President, Joseph Patterson; Secretary and Treasurer, Joseph S. Patterson; Manager, John W. Eckman.
- Moselem Furnace, Leibrandt & McDowell, Moselem, Berks county. Philadelphia office, 123 North Second st. One stack, 48 x 13, built in 1823, and rebuilt several times; closed top; ore, principally hematite from Moselem mines; specialty, foundry pig iron, known as "Moselem" iron; annual capacity, 10,400 net tons.
- 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 Penn-

- sylvania, 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, 58½ x 15, built in 1845, and rebuilt in 1871; No. 3, 50 x 15, built in 1849; closed tops; ores, magnetics and hematites from Berks and Chester counties, etc.; specialty, gray forge pig iron; total annual capacity, 45,000 net tons. Brand, "Phoenix." Blast-furnace Manager, Charles I. Rader. *See Rolling Mills.*
- Pioneer Furnaces, Atkins Bros., 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 Furnaces, S. Fulton, Agent, Conshohocken, Montgomery county. Office, 265 South Fourth st., Philadelphia. Two stacks, 55 x 15 and 56 x 13, built in 1845 and 1864, respectively; closed tops; ores, Pennsylvania hematite and magnetic; specialty, foundry pig iron; total annual capacity, 22,000 net tons. Brand, "Plymouth."
- 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.
- Reading Iron Works, Reading, Berks county. Office, 261 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, D. Longenecker, Jr., lessee, New Ringgold, Schuylkill county. One stack, 52 x 14½, built in 1873; blown in February 28, 1874; ores, Cornwall and New Jersey magnetic; specialty, red-short mill pig iron; annual capacity, 7,000 net tons. Selling agents, Cabeen & Co., 230 South Third st., Philadelphia.
- Robesonia Furnaces, Ferguson, White & Co., Robesonia Furnaces P. O., Berks county. Two stacks, 30 x 9 and 50 x 14, built in 1845 and 1858, respectively; Cornwall ore is exclusively used; product, red-short pig iron for Bessemer steel and bar iron. Brand, "Robesonia."
- Sheridan Furnaces, Wm. M. Kaufman & Co., 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 Tipton Furnaces. See Mount Penn (charcoal) Furnace.*

St. Clair Furnace, Philadelphia and Reading Coal and Iron Company, St. Clair, Schuylkill county. Office, 227 South Fourth st., Philadelphia. One stack, 55 x 16, built in 1845 by Burd Patterson, but not blown in until 1863 or 1864, when Howell Fisher and Thomas Richards refitted it and blew it in; bell-and-hopper top.

Swede Furnaces, Philadelphia and Reading Coal and Iron Company, Swedeland, Montgomery county. Office, 227 South Fourth st., Philadelphia. Two stacks, each 70 x 16, built in 1850 and 1853, and rebuilt in 1879; total annual capacity, 37,000 net tons.

Temple Furnace, Temple Iron Company, Temple, Berks county. One stack, 60 x 14½, built in 1867; ores, from Lehigh, Berks, and Lebanon counties; specialty, foundry pig iron; annual capacity, 11,000 net tons. President, Wm. H. Clymer; Secretary and Treasurer, Edward T. Clymer.

Tipton Furnaces, Wm. M. Kaufman & Co., Sheridan, Lebanon county. Two stacks: one stack located at Tipton, Berks county, 55 x 16, built in 1873; the other stack, located at Kutztown, Berks county, 54 x 15½, built in 1875. Product, foundry pig iron. Isaac Eckert, Manager. *See 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. & H. S. 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.

Number of furnaces in the Schuylkill region: 49 completed anthracite stacks, and 1 stack building.

PROJECTED.

Gables, Bertolette & Co., Pottstown, Montgomery county.

Marcus Hook Iron Company, Marcus Hook, Delaware county. One stack contemplated by the company, of which Eugene Borda, of Philadelphia, and Ethelbert Watts, of Marietta, are promoters.

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., Chulasky, Northumberland county. Office, Danville, Montour county. One stack, 42 x 15, built in 1846; ores, from Snyder and Cumberland counties; 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. *See Rolling Mills.*
- Duncannon Furnace, Duncannon Iron Company, Duncannon, Perry county. Office, 122 Race st., Philadelphia. One stack, 60 x 15, built in 1853; open top; ores, Cornwall magnetic from Lebanon county, African or Spanish hematite, and some mill cinder; specialty, mill pig iron; annual capacity, 12,000 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 12 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, 12,000 net tons. Percival Roberts, President; J. W. Davis, Treasurer; William Willis, Manager. Philadelphia office, 265 South Fourth st.
- Irondale Furnaces, Bloomsburg Iron Company, Bloomsburg, Columbia county. Two stacks, 36 x 12, 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, slightly inclined to cold short, has great tensile strength, and is considered very good for sheet iron, hoops, wire, pipe, nails, etc.; total annual capacity, 13,500 net tons. 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, "Scranton." 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; closed top; annual capacity, 6,000 net tons. Anthracite coal has thus far been used as fuel, but the firm have in view the coking of the coal which can be mined on the property.

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.

Marshall Furnace, Marshall Bros. & Co., Newport, Perry county. Philadelphia office, 24 Girard avenue. One stack, 50 x 14, built in 1872, and blown in in July, 1872; closed top; fuel, half coke and half anthracite; ores, magnetic, fossil, and hematite, from York, Cumberland, Perry, and Juniata counties; specialty, pig iron for foundry use and for sheet-iron blooms; annual capacity, 7,000 net tons. Brand, "Marshall." P. Hiestand, Superintendent. *See Rolling Mills.*

Matilda Furnace, Estate of B. B. Thomas, Mount Union, Huntingdon county. Office, 256 South Third st., Philadelphia. One stack, 42½ x 10, built in 1837; ores, fossil and Juniata valley hematite; product known as "Matilda" pig iron; annual capacity, 3,500 net tons. Charles E. Sackett, Superintendent.

Pennsylvania Iron Works, Montour Iron and Steel Company, Danville, Montour county. Three stacks: two, 50 x 16, and one, 34 x 14, built in 1842. *See Rolling Mills.*

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 black magnetic and Cornwall; product, neutral gray forge and foundry pig iron; annual capacity, 5,750 net tons. Barton Evans, President.

- Cameron Furnace, Cameron Furnace Company, Middletown, Dauphin county. One stack, $47\frac{1}{2} \times 13\frac{1}{2}$, 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." Blown in Nov. 25, 1879, after several years' idleness. James Young, President; J. H. Landis, Treasurer.
- Chestnut Hill Furnaces, Chestnut Hill Iron Ore Company, Columbia, Lancaster county. Three stacks: one, 34×10 , one, 46×14 , and one, 46×16 , built in 1845, 1854, and 1868; open tops; ores, hematite from Lancaster county, Pa., and Carroll county, Md., with $\frac{1}{4}$ red-short magnetic; fuel, anthracite coal and coke; specialty, foundry pig iron; total annual capacity, 18,000 net tons. Brand, "Chestnut Hill." B. G. Clark, President, and E. F. Hatfield, Jr., Treasurer, 52 Wall st., New York; Edwin Thomas, Superintendent, Columbia, Pa.; Samuel Thomas, General Manager.
- Chickies Furnaces, Chickies Iron Company, (successors to E. Haldeman & Co.,) Chickies, Lancaster county. Two stacks: No. 1, $45 \times 11\frac{1}{2}$, built in 1845; No. 2, 45×13 , built in 1854; open tops; ores, magnetic from Cornwall, Lebanon county, and Chestnut Hill brown hematite from Silver Spring, Lancaster county; product, foundry and mill pig iron; total annual capacity, 14,000 net tons. Brand, "Chickies." President, Paris Haldeman; Secretary and Treasurer, Horace L. Haldeman.
- Coleman's (R. W.) Heirs & Co., Cornwall, Lebanon county. Five completed stacks, and 4 stacks building. Bird Coleman Furnaces, owned by R. W. Coleman's Heirs; No. 1, 52×15 , built in 1872-3; No. 2, 52×15 , building. Cornwall Anthracite Furnaces, two stacks, each 38×12 , built in 1850 and 1854. Donaghmore Furnace, 44×14 , built in 1855. North Cornwall Furnaces, owned by Mrs. M. C. Freeman; No. 1, 52×15 , built in 1873-4; No. 2, 52×15 , building. Colebrook Furnaces, owned by Robert H. Coleman; two stacks, each 52×15 , building. Use Cornwall ore exclusively. A. Wilhelm, Attorney. *See Charcoal Furnaces.*
- Conestoga Furnace, Peacock & Thomas, Lancaster, Lancaster county. One stack, 38×10 , 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, 133 Walnut st., Philadelphia.
- Cordelia Furnace, Cordelia Iron Company, 520 Washington st., Reading, Berks county. Furnace near Columbia, Lancaster county. One stack, 36×14 , built in 1848; open top; ore, hematite, from York county; annual capacity, 6,500 net tons. Formerly called Kauffman

- Furnace. H. A. Muhlenberg, President ; A. A. McHose, Secretary ; Isaac McHose, Treasurer and General Manager.
- Dauphin Furnace, Dauphin Furnace Company, lessees, Dauphin, Dauphin county. Main office at Pottsville. One stack, 40 x 11, built in 1854, and rebuilt in 1872, and changed to anthracite; open top; ore, Cumberland county neutral hematite; product, foundry and forge pig iron; annual capacity, 5,000 net tons. Put in blast in November, 1879, after a long idleness. John E. Wynkoop, Manager.
- Dock Iron Works, C. S. Hurd, lessee, Steelton, Dauphin county. One stack, 40 x 11, built in 1873-4; closed top; annual capacity, 5,000 net tons. Will be blown in for the first time in 1880. *See Waldorf Furnace, West Virginia.*
- Donegal Furnace, Benson & Cottrell, Columbia, Lancaster county. Furnace at Marietta. One stack, 36 x 12, built in 1848; open top; annual capacity, 6,500 net tons.
- Harrisburg Furnace, Harrisburg, Dauphin county. One stack, 39 x 12, built in 1844; open top; specialty, best foundry pig iron; annual capacity, 6,000 net tons. Formerly called Porter Furnace. F. H. Thomas, Superintendent.
- Lebanon Furnaces, Arthur and Horace Brock, Lebanon, Lebanon county. Two stacks: one, 50 x 14, built in 1846, reconstructed in 1868; the other, 55 x 16, 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 400 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 Bloomeries.*
- 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.*
- Marietta Furnaces, Henry M. Watts & Son, Marietta, Lancaster county. Two stacks: one, 47 x 12, built in 1847; and one, 45 x 12, built in 1850; fuel, anthracite and coke; total annual capacity, 10,000 net tons.
- Middletown Furnace, Lyman Nutting, Middletown, Dauphin county. Office at Lebanon. One stack, 40 x 12½, built in 1853.
- Paxton Furnaces, McCormick & Co., Harrisburg, Dauphin county. Two stacks, 50 x 14 and 60 x 14, built in 1855 and 1872; 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, 39,000 net tons. Two stacks building, each 65 x 17, supplied with Whitwell stoves; expect to be completed in 1880. *See Rolling Mills.*

Richmond Furnace, R. T. Ryon & Co., Richmond Furnace, Franklin county. 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. Formerly called Mount Pleasant Iron Works. Selling agent, J. O. Richardson, 232 Dock st., Philadelphia.

South Mountain Mining and Iron Company, Pine Grove Furnace, Cumberland county. Building one stack, 60 x 14, to be completed in 1880. *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, 39 x 11, built in 1845; ores, Cornwall and Chestnut Hill; product, pig iron which is well known as exceptional for its quality for boiler plate, bars, nails, or foundry work; total annual capacity, 17,000 net tons. Brand, "Grubb."

Union Deposit Furnace, McCormick Estate, Harrisburg. Furnace at Union Deposit, Dauphin county. One stack, 39½ x 11, built in 1854; open top; annual capacity, 5,000 net tons. Out of blast for several years, but will be blown in in 1880. *See Rolling Mills.*

Vesta Furnace, Watts, Twells & Co. Limited, Marietta, Lancaster county. One stack, 41 x 14, built in 1868; annual capacity, 8,000 net tons. Formerly called Musselman Furnace. Ethelbert Watts, Manager.

Wister Furnace, J. & J. Wister, Harrisburg, Dauphin county. One stack, 45 x 14, built in 1867, and first blown in February 15, 1868; bell-and-hopper top; ores, magnetic from Seisholtzville, Berks county, and Cornwall, Lebanon county, and local hematite; specialty, mill pig iron; annual capacity, 11,000 net tons. Brand, "Wister." Manager, Jones Wister.

Number of furnaces in the Lower Susquehanna region: 36 completed anthracite stacks, and 7 stacks building.

SHENANGO VALLEY—BITUMINOUS COAL OR COKE.

- Allen Furnace, Henderson, Allen & Co., Sharpsville, Mercer county. One stack, 50 x 12, built in 1868; put in operation in October, 1868; ore, Lake Superior; product, red-short pig iron, No. 1 mill, soft, open, gray, and very strong; annual capacity, 10,000 net tons.
- Clara Furnace, Raney & Berger, New Castle, Lawrence county. One stack, 60 x 15½, built in 1872; put in blast in May, 1872; closed top; fuel, coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 20,000 net tons. George B. Berger, Manager.
- 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; closed top; the other stack, 50 x 14, built in 1872, and put in blast in February, 1873; fuel, Mercer county block coal and coke; ore, Lake Superior; specialty, pig iron for Bessemer and Siemens-Martin use; combined annual capacity, 40,000 net tons. Brand, "Douglas."
- Etna Furnaces, Etna Iron Works Limited, New Castle, Lawrence county. Two stacks, each 50 x 12, built in 1868; fuel, raw coal and coke; ores, Lake Superior and native; specialty, gray forge pig iron; combined annual capacity, 25,000 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.*
- Keel Ridge Furnace, Kimberly, Carnes & Co., Sharon, Mercer county. One stack, 55 x 13½, built in 1869; fuel, raw coal and coke; annual capacity, 12,000 net tons. *See Rolling Mills.*
- Little Pet Furnace, Neshannock Iron Company, lessees, New Castle, Lawrence county. One stack, 40 x 9, built in 1853; fuel, coke. *See Neshannock Furnace.*
- Mabel Furnaces, Perkins & Co. Limited, Sharon, Mercer county. Furnace at Sharpsville. One completed stack, 50 x 12, built in 1872; blown in in February, 1873; open top; fuel, block coal and coke; annual capacity, 15,000 net tons. Formerly called Ormsby Furnace. A second stack building, 50 x 12. S. Perkins, Jr., Manager.
- Mount Hickory Iron Company Limited, Sharpsville, Mercer county. General office at Erie, Pa. Two stacks, each 50 x 12, built in 1869; No. 1 has closed top; ore, Lake Superior; product, foundry and forge pig iron; combined annual capacity, 30,000 net tons. James B. Pierce, General Manager. *See Rolling Mills.*
- Neshannock Furnace, Neshannock Iron Company, New Castle, Lawrence

- county. One stack, 60 x 16, built in 1872; first put in operation December 1, 1872; closed top; fuel, coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 24,000 net tons. W. E. Reis, Manager. *See Little Pet Furnace.*
- Rosena and Sophia Furnaces, Lawrence Iron Company, lessees, New Castle, Lawrence county. Two 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; fuel, coke; combined annual capacity, 35,000 net tons. *See Rolling Mills.*
 - Sharon Furnace, Boyce, Rawle & Co., Sharon, Mercer county. One stack, 46 x 11, built in 1845; annual capacity, 9,000 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.
 - Shenango Furnaces, Shenango Furnace Company, West Middlesex, Mercer county. Two stacks, each 46 x 10, built in 1859; open tops; fuel, raw coal; combined annual capacity, 17,000 net tons. Owners are Nimick & Co. and George Boyce. The No. 1 Furnace has been leased for a short time by the Middlesex Furnace Company, of which E. A. Wheeler, of Sharon, is General 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, 50 x 13, built in 1870, and one, 55 x 14, built in 1872; closed tops; ore, Lake Superior; product, strictly Bessemer pig iron; combined annual capacity, 33,000 net tons. Formerly called Valley Furnaces. *See Rolling Mills.*
 - Wampum Furnace, Wampum Furnace Company, Wampum, Lawrence county. One stack, 50 x 13, built in 1856; open top; fuel, raw coal and coke; ores, Lake Superior and native red limestone; product, neutral forge pig iron; annual capacity, 8,000 net tons. Edward Kay, Manager.
 - Westerman Furnaces, Westerman Iron Company, Sharon, Mercer county. Two stacks, each 48 x 14, built in 1865 and 1866; one open and one closed top; 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, B. B. Reath, 1538 Pine st., Philadelphia. Works at 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: 30 completed raw coal and coke stacks, and 1 stack building. The majority of these furnaces have recently begun to use from $\frac{1}{4}$ to $\frac{1}{2}$ anthracite coal with good results.

ALLEGHENY COUNTY—COKE.

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

Edgar Thomson Steel Company Limited, Bessemer Station, Allegheny county. Branch office and post-office address, 48 Fifth avenue, Pittsburgh. One stack built in 1879, and 2 more stacks building: Furnace A, 65 x 13, and Furnaces B and C, each 80 x 20; 5 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.; one engine with blowing cylinders 60 in. x 48 in.; 3 Siemens-Cowper fire-brick stoves 55 x 15, and 6 Siemens-Cowper stoves, 60 x 20; 3 Worthington pumping engines, of 16,000,000 gallons daily capacity; 2 Worthington 7-inch pumps; 16 Bessemer steel boilers; pneumatic hoists; combined annual capacity, 120,000 net tons. *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, 75 x 18 and 75 x 20, built in 1872; closed tops; ore, Lake Superior; product, foundry and mill pig iron; total annual capacity, 75,712 net tons. Thomas M. Collins, Manager.

Lucy Furnaces, Lucy Furnace Company, (Carnegie Brothers & Co., owners,) Pittsburgh. Two stacks, each 75 x 20; No. 1 first put in blast in May, 1872; No. 2 first put in blast September 27, 1877; closed tops; 4 iron pipe stoves to each stack; fuel, $\frac{2}{3}$ coke from washed slack and $\frac{1}{3}$ Connellsville coke; ores, principally from Michigan; specialty, Bessemer pig iron; aggregate annual capacity, about 82,000 net tons. Thomas M. Carnegie, President; Henry Phipps, Jr., Treasurer; Henry M. Curry, Secretary; F. G. Fricke, Ph. D., Manager.

Manchester Iron and Steel Company, Pittsburgh. Two stacks, each 45 x 12, built in 1862-3. Out of blast since 1874. 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, gray forge pig iron; total annual capacity, 45,000 net tons.

Soho Furnace, Moorhead, McCleane & Co., Pittsburgh. One stack 67 x 18½, built in 1872; put in blast November 22, 1872; fuel, coke; ore, Lake Superior; specialty, Bessemer pig iron; annual capacity, 25,000 net tons. Brand, "Soho."

Number of furnaces in Allegheny county: 13 completed coke stacks, and 2 stacks 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. 1

Atlas Furnace, Atlas Iron Company Limited, lessees, Danville. Works at 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. L. K. Rishel, Chairman; R. M. Grove, Treasurer; J. H. Grové, Secretary. 1

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, 40 x 9½, built in 1856; No. 1 and No. 2, at Hollidaysburg, 45 x 12 and 51½ x 10½, 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, Pennsylvania hematite from Springfield and Bloomfield, and Lake Superior; combined annual capacity, 36,000 net tons. President, Dr. Charles Stewart Wurts, Philadelphia; Secretary and Treasurer, W. S. Robinson, Philadelphia; Superintendent, W. R. Babcock, Hollidaysburg; General Manager, D. J. Morrell, Johnstown. See *Rolling Mills*. 4

Cambria Iron Works, Cambria Iron Company, Johnstown, Cambria county. Office, 218 South Fourth st., Philadelphia. Six completed stacks, and a seventh stack building; 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 Dec. 22, 1876; the sixth, now building, is 78 x 19½, and will be ready for work by May 1, 1880. Ores used are brown hematite from Blair county, Pa.; specular from Lake Superior; Spanish and 6 5+7

African ores, and New Jersey magnetic ores. Specialty, Bessemer pig iron. The stack at East Conemaugh is $50 \times 11\frac{1}{2}$, was built in 1857, and is now making spiegeleisen from a mixture of foreign and domestic ores. Total annual capacity, 117,000 net tons. The furnaces of the Blair Iron and Coal Company and the Rodman Furnaces, which are practically under the same management, add 62,000 net tons to this capacity, making the total 179,000 net tons. *See Rolling Mills.*

Charlotte Furnace Company, Everson, Macrum & Co., Scottdale, Westmoreland county. One stack, 65×16 , built in 1872-3; put in blast October 14, 1873; fuel, coke; ores, $\frac{1}{2}$ Lake Superior and $\frac{1}{2}$ native; specialty, mill pig iron; annual capacity, 13,000 net tons. Brand, "Charlotte." *See Rolling Mills.*

Dunbar Furnaces, Dunbar Furnace Company, Dunbar, Fayette county. One completed stack and a second building: Furnace No. 1, 77×20 , built in 1790, rebuilt in 1870, and rebuilt to present size in 1876; blown in March 1, 1877; 4 Whitwell hot-blast stoves, three, 40×18 , and one, 40×22 ; fuel, Connellsville coke and $\frac{1}{2}$ anthracite; ores, a mixture of $\frac{1}{2}$ calcined carbonate ore mined on the property, $\frac{1}{2}$ New Jersey, Cornwall, or Spanish ore, and $\frac{1}{2}$ mill cinder. Specialty, mill pig iron. Old stack was called "Union." Furnace No. 2 will be 78×20 , and will have 3 Whitwell stoves, 60×18 . Total annual capacity, 44,000 net tons. President, Charles Parrish; Superintendent and Vice-President, Arthur B. DeSaulles; Treasurer, G. W. Thurston.

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

Emma Furnace, Logan Iron and Steel Company, Lewistown, Mifflin county. Philadelphia office, 218 South Fourth st. One stack, $36 \times 9\frac{1}{2}$, built in 1867; formerly operated with charcoal, but enlarged in 1879 to be run with coke; ores, brown hematite and red fossiliferous. *See Greenwood (charcoal) Furnaces. See Rolling Mills.*

Erie Furnace, Rawle, Noble & Co., Erie, Erie county. One stack, $55 \times 13\frac{1}{2}$, built in 1869, enlarged in 1879, and blown in on raw coal and coke after an idleness of four years.

Fairchance Furnace, Fairchance Furnace Company, Fairchance, Fayette county. One stack, 44×12 , built in 1784, and rebuilt in 1871; fuel, coke; ores, native carbonates, varying from 30 to 50 per cent.; all stock is 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.*

Gap Furnace, Hollidaysburg and Gap Iron Company, Hollidaysburg. Furnace at McKee, Blair county. One stack, $46\frac{1}{2} \times 10$, 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.

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

2 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." President, Peter P. Parrott, New York; Secretary and Treasurer, R. A. Wight, New York; General Superintendent, William Lauder, Riddlesburg.

Kittanning Iron Company Limited, Kittanning, Armstrong county. Building one stack, 65 x 16½. *See Rolling Mills.*

1 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."

1 Mahoning Furnace, Wesley Wilson & Co., lessees, Oakland, Armstrong county. One stack, 40 x 10½, built in 1845; closed top; fuel, coke; ore, local limonite; annual capacity, 4,500 net tons.

1 Oliphant Furnace, S. D. Oliphant, Oliphant Furnace, Fayette county. One stack, 50 x 11; built in 1875-6; fuel, coke; ore, local carbonate. Selling agent, A. H. Childs, Pittsburgh.

0 Powelton Furnaces, Robert Hare Powel, Saxton, Bedford county. Philadelphia office, 424 Walnut st. Two stacks, each 70 x 18, building; fuel, Broad Top coke; local ores; Whitwell fire-brick stoves; annual capacity of each, 25,000 net tons. No. 1 will be completed in May or June, 1880.

1 Rebecca Furnace, Mrs. Elizabeth Lytle, Martinsburg, Blair county. One stack, 30 x 8½, built in 1820. *See Bloomaries.*

1 Red Bank Furnace, Reynolds & Co., 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, 5,000 net tons. David Reynolds, Manager.

2 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, $\frac{1}{2}$ hematite, $\frac{1}{4}$ soft fossil, and $\frac{1}{4}$ hard fossil; 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.

2 Rodman Furnaces, J. King McLanahan, lessee, Hollidaysburg, Blair county. Furnaces at Roaring Springs, Blair county. Two stacks, 61 x 14, and 43 x 6, built in 1846, and rebuilt in 1879-80; fuel, coke; ores, $\frac{1}{2}$ foreign and $\frac{1}{2}$ Bloomfield brown hematite; total annual capacity, 26,000 net tons. Controlled by the Blair Iron and Coal Company.

1 Stewardson Furnace, F. B. & A. Laughlin, P. O. Box 259, Pittsburgh. Furnace at Mahoning, Armstrong county. One stack, 43 $\frac{1}{2}$ 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.

Number of raw coal or coke furnaces in Pennsylvania, outside of Allegheny county and the Shenango region: 32 completed stacks, and 5 stacks building.

PROJECTED.

G. W. Smith, Pittsburgh. Furnace contemplated near Rodman, Blair county. John G. McGraw, Agent.

CHARCOAL—STATE.

Barree Furnace, Mumper & Co., Barree Forge, Huntingdon county. Herberton & Co., Agents, 333 Walnut st., Philadelphia. One stack, 33 x 9, built in 1863; hot blast; open top; water-power; annual capacity, 2,000 net tons. *See Bloomaries.*

Big Pond Furnace, Philadelphia and Reading Coal and Iron Company, Newville, Cumberland county. Office, 227 South Fourth st., Philadelphia. One stack, 33 x 8 $\frac{1}{2}$, built in 1836.

Carlisle Iron Works, C. W. Ahl & Son, Carlisle. Works at Boiling Springs, Cumberland county. One stack, 28 x 8 $\frac{1}{2}$, built in 1798 and rebuilt in 1815; hot blast; closed top; water-power; limestone and mountain ore; specialty, neutral forge pig iron; annual capacity, 1,600 net tons. Brand, "Carlisle." *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.

Chambersburg Furnace, C. Burkhart & Co., Chambersburg, Franklin county. One stack building, 40 x 9; to be completed in May, 1880; closed top; cold blast; ore, local hematite; specialty, car-wheel pig iron; annual capacity, 3,000 net tons. Brand, "Chambersburg."

Chestnut Grove Furnace, Jesse R. Group, Idaville, Adams county. One

- stack, 33 x 8½, built in 1830; cold blast; closed top; annual capacity, 1,000 net tons.
- Cornwall Charcoal Furnace, R. W. Coleman's Heirs & Co., Cornwall, Lebanon county. One stack, 31 x 8, built in 1742; cold blast; water-power. A. Wilhelm, Attorney. *See Lower Susquehanna Furnaces.*
- Eagle Furnace, Curtins & Co., Roland, Centre county. One stack, 28 x 7½, built in 1848; open top, open hearth, and closed tuyere; ore, Nittany valley brown hematite; cold blast; water-power; annual capacity, 1,800 net tons. All the pig iron made is turned into billets for rods, shovels, and sheet iron. 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 Bloomaries.*
- East Penn Furnace, John Balliet, Parrysville, Carbon county. One stack, 28 x 7½, built in 1837; cold blast; water-power.
- Franklin Furnace, Hunter & Springer, 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. *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 Bloomaries.*
- Hope Furnace, Hope Furnace Company Limited, 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. Entire make is used by Brown & Co.'s Wayne Iron and Steel Works at Pittsburgh.
- Hopewell Furnace, Edward S. Buckley, 228½ Walnut 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. *See Rolling Mills in Philadelphia.*

- Hopewell Furnace, Lowry, Eichelberger & Sons, Hopewell, Bedford county. Heberton & Co., Agents, 333 Walnut st., Philadelphia. One stack, $30 \times 8\frac{1}{2}$, built in 1800; warm blast; open top; water-power; ores, hematite and fossil; specialty, car-wheel pig iron; annual capacity, 1,600 net tons. Not in blast since 1875.
- Howard Furnaces, Bernard Lauth, Howard, Centre county. Two stacks: one $31 \times 8\frac{1}{2}$, built in 1833; the other, 33×8 , 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, 33×8 , built in 1835 and rebuilt in 1864; cold blast; water-power; product, neutral pig iron, made from magnetic and hematite ores, mined from 4 to 7 miles from the furnace.
- Jefferson Furnace, J. M. & H. Y. Kaufman, Auburn, Schuylkill county. Furnace at Jefferson Station. One iron stack, 33×8 , built in 1879-80; cold blast; specialty, pig iron for car-wheels and heavy rolls; weekly capacity, 50 net tons. The furnace at Auburn, which was built in 1864, was abandoned in 1879.
- Joanna Furnace, L. Heber Smith, Joanna Furnace, Berks county. One stack, 30×8 , 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, 32×8 , built in 1815 and rebuilt 3 miles from the 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, Spang, Hunsicker & Erb, Lenhartsville, Berks county. One stack, 33×9 , 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, $37\frac{1}{2} \times 9\frac{1}{2}$, built in 1808; 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, 5,600 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, 31×8 , 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., Sheridan, Lebanon county. Furnace near Reading, Berks county. One stack, 30 x 8½, built in 1830. *See Sheridan Furnaces. See Tipton 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.*
- Pennsylvania Furnace, Lyon, Shorb & Co., Graysville, Huntingdon county. One stack, 43 x 9½, built in 1813; pig iron made into blooms for boiler plate and sheet iron. Geo. W. Lyon, Manager.
- 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. The furnace has been worked during the winter for the past two years on coke and anthracite coal, the remainder of the year on charcoal. Pig iron is used for blooms; annual capacity, 5,000 net tons. J. C. Fuller, President; W. H. Woodward, Secretary and Treasurer; John Birkinbine, General Manager; S. C. Miller, Superintendent. *See Lower Susquehanna Furnaces. See Bloomaries.*
- Rockland Furnace, Rockland Furnace Company Limited, Douglassville, Berks county. One stack, 32 x 8, built in 1791, and rebuilt in 1879 after many years' idleness; formerly called Sally Ann Furnace. Comly B. Shoemaker, President; Joseph L. Bailey, Secretary and Treasurer; B. F. Morret, General Superintendent.
- Sarah Furnace, G. W. Smith, (of Hostetter & Smith,) Pittsburgh. Furnace at Sarah, Blair county. One stack, 32½ x 8½, built in 1824; cold blast; open top; annual capacity, 1,500 net tons. Not in blast since 1874. *See Bloomaries.*
- 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 Sept. 13, 1877, after a long rest.

York Furnace, John Bair, York Furnace, York county. One stack, 32 x 8, built in 1830; cold blast; water-power. Not in blast since 1874.

Number of charcoal furnaces in Pennsylvania: 37 completed stacks, and 1 stack building. Total number of furnaces in Pennsylvania: 271 completed stacks, and 20 stacks building.

MARYLAND.

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; 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; product, car-wheel and malleable pig iron; annual capacity, 4,500 net tons. Secretary, G. W. P. Coates; Treasurer, Horace L. Brooke.

Chesapeake Furnaces, Wm. F. Pannell, Clinton st. and 9th ave., Canton, Baltimore. A. W. Slee, Manager. 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 the furnace; 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.

Green Spring Furnace, J. B. Haines & Co., Green Spring Furnace, Washington county. One stack, 35 x 8½, built in 1848 and 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.

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, E. S. Rogers, Rocks of Deer Creek P. O., Harford county. One stack, 32 x 7½, built in 1836; warm blast; water-power.
- Laurel Furnace, D. M. Reese & Sons, Baltimore. One stack, 52 x 10, built in 1856, and rebuilt in 1873; warm blast; closed top; brown and white hematite 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;" annual capacity, 4,500 net tons. This furnace was at one time an anthracite furnace, known as the South Baltimore Furnace. Selling agents, R. C. Hoffman & Co.
- Locust Grove Furnace, Levi Furstenburg, Rossville, Baltimore county. One stack, 30 x 7½, built in 1849; hot blast; open top; local ore mined at the furnace; product, car-wheel and malleable pig iron; annual capacity, 2,600 net tons. Brand, "Locust Grove." Selling agents, R. C. Hoffman & Co., Baltimore.
- Maryland Furnaces, H. W. Ellicott, Baltimore. Two stacks, each 50 x 10, built in 1853 and 1870; hot blast; closed tops; argillaceous ore mined near Baltimore; specialty, car-wheel and malleable pig iron; total annual capacity, 8,000 net tons. Brand, "Maryland."
- Muirkirk Furnace, Charles E. Coffin, Muirkirk, Prince George's county. One stack, 29 x 8½, built in 1847; closed top; Raymond & Campbell hot oven; oak and pine charcoal; ores mined in the neighborhood; pig iron used for car-wheels, guns, flange iron, shot and shell; annual capacity, 3,000 net tons. Average tensile strength of six specimens of No. 4 pig, 41,329 lbs. Brand, "Muirkirk."
- Principio Furnace, George P. Whitaker, Principio, Cecil county. One stack, 33 x 8, built in 1700, and rebuilt in 1835; 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 Furnace, Stickney Iron Company, 11 South Gay st., Baltimore. One stack, 50 x 9, built in 1854, and rebuilt in 1871; hot blast; Baltimore ore exclusively used; product, pig iron specially adapted to malleable castings and car-wheels. Formerly called Lazaretto Furnace. Brand, "Stickney Iron Co." Geo. H. Stickney, President; Wm. Harvey, Secretary; Wm. Gerhauser, Manager.
- Number of charcoal furnaces in Maryland: 15 stacks.

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, 20,000 net tons. Brand, "Ashland." President, George Small, Baltimore; Secretary and Manager, Walter S. Franklin, Ashland; Assistant Manager, T. C. Blair.

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, 8,000 net tons. *See Charcoal Furnaces.*

Cedar Point Anthracite Furnace, Horace B. Burt, lessee, Baltimore. One stack, 44 x 12, built in 1873; closed top; fuel, anthracite and coke; annual capacity, 6,000 net tons.

Number of anthracite furnaces in Maryland: 5 stacks.

BITUMINOUS COAL OR COKE.

Antietam Furnace, Quitman P. Ahl, Sharpsburgh, Washington county. One stack, 50 x 11, built in 1838; water-power; ore, brown hematite, from the vicinity of Harper's Ferry; product, principally No. 3 mill pig iron. Operated under a deed of trust, with W. C. Bradley as Agent. Selling agents, Troxell, Handy & Greer, Baltimore.

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; J. Richards, Secretary.

Elk Ridge Furnace, T. H. Brown, Elk Ridge Landing, Howard county. One stack, 32 x 10, rebuilt in 1855; open top; annual capacity, 3,000 net tons. Not in blast since January, 1874.

Knoxville Furnace, C. S. Maltby, Knoxville, Frederick county. One stack, 41 x 12½, built in 1837. Formerly called Longacoming Furnace. Not in blast since 1874.

Number of raw coal and coke furnaces in Maryland: 4 stacks. Total number of furnaces in Maryland: 24 stacks.

VIRGINIA.

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. Selling agents, R. C. Hoffman & Co., Baltimore.
- Brown Hill Furnace, Lobdell Car-wheel Company, Wilmington, Del. Furnace at Brown Hill, Wythe county. One stack, 32 x 9, built in 1810, cold blast; water-power. George G. Lobdell, President; Wm. W. Lobdell, Secretary; P. N. Brennan, Treasurer. *See White Rock and Walton Furnaces.*
- 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. *See Gray Eagle Furnace. See Rolling Mills. See Bloomaries.*
- Columbia Furnace, John Wissler & Son, Columbia Furnace, Shenandoah county. One stack, 34 x 11, rebuilt in 1809; cold blast; water-power; ore, brown hematite; specialty, car-wheel pig iron. Brand, "Columbia." *See Virginia Furnace.*
- 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. Formerly leased to the New Jersey Iron Company.
- Grace Furnace, Tredegar Company, 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.*
- Gray Eagle Furnace, Graham & Robinson, Max Meadows, Wythe county. One stack, 33 x 9, built in 1863; cold blast; water-power; ore, local brown hematite; specialty, car-wheel pig iron; annual capacity, 600 net tons. *See Cedar Run Furnace. See Rolling Mills. See Bloomaries.*
- Laurel Furnace, Newlie & Greer, Cumberland Gap, Tennessee. Furnace in Lee county, Virginia. One stack, 28 x 8, rebuilt in 1873; cold blast; water-power. W. H. Newlie, administrator of J. G. Newlie's estate, Cumberland Gap, Tenn.; A. L. Greer, Covington, Kentucky.
- Liberty Furnace, Wissler, Armstrong & Stone, Liberty Furnace, Shenandoah county. One stack, 30 x 8½, built in 1821; cold blast; water-power; specialty, car-wheel pig iron. *See Bloomaries.*
- Mine Run Furnace, Wm. Boyer, 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." Selling agents, Keyser Brothers & Co., Baltimore.
- Mount Vernon Furnace, Mount Vernon Iron Works Company, lessees,

- 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." Jerome Keeley, President, 206 Walnut Place, Philadelphia. *See Bloomaries.*
- Oxford Iron Works, D. W. Moore, Mount Athos, Campbell county. One stack, built prior to 1837; hot blast.
- Panther Gap Furnace, Central Iron Company, Goshen, Rockbridge county. One stack, 38 x 9, completed in December, 1874; cold blast.
- Radford Furnace, Radford Iron Company, Radford Furnace, Pulaski county. One stack, 35 x 10, built in 1868; warm blast. Not in blast since 1876. Richard Wood, President, 400 Chestnut st., Philadelphia.
- Raven Cliff Furnace, Crockett & Co., Crockett's, Wythe county. One completed stack, 29 x 9, built in 1810, and rebuilt in 1876; cold blast; water-power. A second stack building, 33 x 9; cold blast; water-power; product, car-wheel pig iron; daily capacity, 10 net tons. Selling agents, R. C. Hoffman & Co., Baltimore.
- Salisbury Furnace, Eugene Kelly, Fincastle, 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." Henry S. Dakin, Agent.
- Shenandoah Iron Works, Wm. Milnes, Jr., lessee, 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 has not been in blast for several years. The other has an annual capacity of 3,000 net tons. *See Bloomaries.*
- Sinking Creek Furnace, I. Willcox Brown, Newport, Giles county. One stack, 35 x 9½, built in 1873; hot blast; water-power. E. P. Williams, Superintendent.
- Speedwell Furnace, D. E. James & Son, Speedwell, Wythe county. One stack, 32 x 9, built in 1873-4; cold blast; water-power; open top.
- Van Buren Furnace, 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."
- Victoria Furnace, Ira F. Jordan & Co., Tolarsville, Louisa county. One stack, 33 x 8½, built in 1835; warm blast; open top; ores, local hematite and magnetic; specialty, forge pig iron; annual capacity, 1,200 net tons. Selling agent, Wm. Warren, Richmond.
- 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 9, 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, 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, Sayers, Oglesby & Co., Crockett's, Wythe county. One stack, built in 1873; cold blast; water-power. Selling agents, R. C. Hoffman & Co., Baltimore.

Number of charcoal furnaces: 27 completed stacks, and 1 stack building.

COKE.

Buffalo Gap Furnaces, New York and Virginia Iron and Coal Company, lessees, 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." President, H. R. Baltzer; Vice-President, Henry J. Rogers; Secretary and Treasurer, H. W. Howell.

Callie Furnace, Hileman, Cook & Co., Williamsons P. O., 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.

Ferrol Furnace, Pennsylvania and Virginia Iron and Coal Company, Ferrol P. O., Augusta county. One stack, 40 x 10, built in 1864, rebuilt in 1878; closed top; fuel, New river coke; annual capacity, 5,000 net tons. General office, 407 Walnut st., Philadelphia: President, J. F. Hartranft; 1st Vice-President, R. N. Pool; 2d Vice-President and General Manager, J. F. Lewis; Secretary, R. W. Dorphley; Treasurer, Thomas B. Suplee. Sales agents, Pluemer & Bramwell, Cincinnati, Ohio. *See Quinnimont Furnace, W. Va.*

Low Moor Iron Company of Virginia, Low Moor, Alleghany county. Building one stack, 70 x 18; Whitwell fire-brick stoves; to use New river coke, and to make 100 net tons of pig iron daily. President, John Means, Kentucky; Vice-President, H. M. Bell, Virginia; Chairman Ex. Com., Jno. F. Winslow, New York; Treasurer, A. A. Low, New York; Managing Director, George T. Wickes.

Lucy Selina Furnace, Longdale Iron Company, Longdale, Alleghany county. One completed stack, 60 x 11, built in 1827, rebuilt in 1873, and raised to 60 feet in 1876; closed top; water and steam power; ore, brown hematite, mined near the furnace; product, principally gray forge pig iron; annual capacity, 10,000 net tons. Brand, "Longdale." A second stack is building, to make 300 tons per week. F. A. Comly, President, 407 Walnut st., Philadelphia; J. E. Johnson, Manager. E. L. Harper & Co., Cincinnati, sole Western sales agents.

Number of coke furnaces: 5 completed stacks, and 2 stacks building.

PROJECTED.

Arcadia Iron Works Company, Buchanan, Botetourt county.

ANTHRACITE.

Powhatan Iron Works, Richmond. Furnace in Henrico county, on James river and Kanawha canal, 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. Property to be sold on March 29, 1880.

Number of anthracite furnaces: 1 stack. Total number of furnaces in Virginia: 33 completed stacks, and 3 stacks building.

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.

Relioboth 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, Asa Snyder, Richmond, Va. *See Bloomaries.*

Stonewall Furnace, Estate of James M. Smith, Iron Station, Lincoln county. One stack, 32 x 7, built in 1863; cold blast; water-power;

annual capacity, 600 net tons. Not in blast for several years. *See Vesuvius Furnace.*

Vesuvius Furnace, Estate of James M. Smith, Iron Station, Lincoln county. One stack, 32 x 8, built in 1780; cold blast; water-power; annual capacity, 700 net tons. Not in blast for several years. *See Stonewall Furnace.*

Number of furnaces in North Carolina: 7 charcoal stacks.

GEORGIA.

CHARCOAL.

Bear Mountain Furnaces, Thomas & Brown, Cartersville, Cass county. Furnaces in Bartow county. Two stacks, each 32 x 7½, built in 1842; cold blast; water-power; open tops; total annual capacity, 2,400 net tons. Not in blast since 1875.

Cherokee Iron Works, Cherokee Iron Company, Cedartown, Polk county. One stack, 60 x 12½, built in 1874-5; blown in March 22, 1877; closed top; hot blast; annual capacity, 8,000 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.

Diamond Furnace, Robert A. Cooper, Manager, Cartersville, Cass county. Furnace in Bartow county. One stack, 28 x 7½, built in 1856; cold blast; water-power. Ran on spiegeleisen and ferro-manganese in 1875.

Etna Furnace, C. M. Pennington, lessee, Prior's Station, Polk county. One stack, 44 x 10, built in 1870; warm blast; capacity, 10 to 12 net tons daily.

Pool Furnace, B. G. Pool, Cartersville, Cass county. Furnace in Bartow county. One stack, 33 x 8, built in 1855; cold blast; water-power. Not in blast since 1874. For lease.

Ridge Valley Furnace, Floyd county, eight miles north of Rome, on the Selma, Rome and Dalton Railroad. One stack, 43 x 10, built in 1873-4. Out of blast for several years. To be blown in in 1880.

Rogers Furnace, Rogers & Co., Cartersville, Cass county. Furnace in Bartow county. One stack, 36 x 9, built in 1873; cold blast; open top; annual capacity, 2,500 net tons.

Number of charcoal furnaces: 8 stacks.

COKE.

Bartow Iron Works, Bartow Furnace Company, Bartow Iron Works P. O., Bartow county. Two stacks, 36 x 10 and 58 x 12, built in 1871 and 1873, respectively; closed tops; ore, brown hematite, mined near

the works; annual capacity, No. 1, 3,000 net tons; No. 2, 7,000 net tons. H. McNeal, Manager.

Rising Fawn Furnace, James C. Warner & Co., 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, 16,000 net tons.

Number of coke furnaces: 3 stacks. Total number of furnaces in Georgia: 11 stacks.

ALABAMA.

CHARCOAL.

Alabama Furnace, Alabama Iron Company, Alabama Furnace, Talladega county. One stack, 41½ x 8½, built in 1873; hot blast; ore, brown hematite; open top, with thimble; product, strictly neutral car-wheel pig iron; annual capacity, 6,000 net tons. Stephen S. Glidden, President and Manager; Horace Ware, Vice-President; James L. Orr, Treasurer.

Bibb Furnaces, Thomas S. Alvis, Day Mill P. O., Bibb county. Works at Brierfield, Bibb county. Two stacks, each 40 x 8, built in 1864; cold blast; out of blast since 1874. For sale.

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.

Rock Run Furnace, Gray & Bass, Pleasant Gap, Cherokee county. One stack, 38 x 9, built in 1873-4; put in blast June 1, 1874; hot blast; closed top; annual capacity, 4,000 net tons.

Round Mountain Furnace, R. P. Sibley, lessee, Round Mountain, Cherokee county, Alabama. 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." President, John W. Lapsley; Secretary, Charles J. Hazard; Treasurer, Newton Case, Hartford, Conn.; Superintendent, J. F. Black. Selling agent, L. E. Warner, 16 Johnston Building, Cincinnati, Ohio.

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 and mill pig iron; annual capacity, 8,000 net tons; brand, "Tecumseh." Willard Warner, President and Manager.

Woodstock Furnaces, Woodstock Iron Company, Anniston, Calhoun county. Two stacks: one, 43 x 12, first blown in April 13, 1873; 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: 11 stacks.

COKE.

Alice Furnace, Alice Furnace Company, Birmingham, Jefferson county. Building one stack, 65 x 15. H. F. DeBardeleben, President.

Edwards Iron Company, Woodstock, Bibb county. Building one stack, 55 x 12; 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 complete the furnace, at the same time enlarging it to use coke; local brown hematite will be exclusively used; specialty, mill pig iron; annual capacity, 11,000 net tons. Giles Edwards, President; Thos. J. Edwards, Superintendent; H. F. DeBardeleben, Treasurer.

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. President, J. W. Sloss, Birmingham, Ala.; Vice-President, B. F. Guthrie, Louisville, Ky.; Secretary and Treasurer, Dr. D. B. Miller, Cincinnati; Assistant Superintendent, C. B. Knowles, Oxmoor, Ala.

Stonewall Iron Works, W. H. Harison, lessee, Stonewall, Cherokee county. One stack, 40 x 11, built in 1873; hot blast; closed top; ore, brown hematite; specialty, foundry pig iron; annual capacity, 6,000 net tons. Langdon Bowie, General Manager.

Number of coke furnaces: 3 completed stacks, and 2 building. Total number of furnaces in Alabama: 14 completed stacks, and 2 building.

TEXAS.

CHARCOAL.

Henry & Andrews, Sherman, Grayson county. Building one stack.

Kelly Furnace, Jefferson Iron Company, Jefferson, Marion county. One stack, 34 x 9½, built in 1869; rebuilt in 1873-4; hot and cold blast; brown hematite ore. G. A. Kelly, President.

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

WEST VIRGINIA.

COKE.

Belmont Furnace, Belmont Nail Company, Wheeling. One stack, 63 x 14, 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, Raccoon, 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 Agent.

Quinnimont Furnace, Pennsylvania and Virginia Iron and Coal Company, Quinnimont, Fayette county. One stack, 60 x 15, built in 1874; ore, from Ferrol, Va.; product is principally foundry pig iron for machine shops and mixtures for car-wheels; annual capacity, 8,000 net tons. General office, 407 Walnut st., Philadelphia. *See Ferrol Furnace, Va.*

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.*

Waldorf Furnace, C. S. Hurd, lessee, 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. *See Dock Iron Works, Lower Susquehanna Furnaces, Pa.*

Wheeling Iron and Nail Company, Wheeling. One stack, 65 x 18, built in 1873-4; first blown in October 3, 1878; ores, Lake Superior and Iron mountain; annual capacity, 25,000 net tons. *See Rolling Mills.*

Number of coke furnaces: 6 stacks.

CHARCOAL.

Bloomery Furnace, Pancoast & Magee, Bloomery P. O., Hampshire county. One stack, 30 x 8, built in 1844; put in blast November 1, 1873, after a long rest; open top; product, car-wheel and mill pig iron; weekly capacity, 33 net tons. Philadelphia office, 251 South Fourth st.

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. *See Bloomeries.*

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, Gladeville Iron Company, Gladeville, Preston county. One stack, 36 x 7, built in 1872; warm blast. Owners, Charles Laverty, John Laverty, and William Tait.

Kanawha Iron Company, Charleston, Jefferson 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, James C. McGrew, 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 chiefly used; product, foundry and forge pig iron; daily capacity, 6 net tons.

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

PROJECTED.

John Shillito, Jr., Jackson county.

KENTUCKY.

BITUMINOUS COAL OR COKE.

Ashland Furnace, Lexington and Big Sandy Railroad Company, Douglas Putnam, Jr., Agent, Ashland, Boyd county. One stack, 62 x 15, built in 1869; 3 Whitwell hot-blast stoves, each 50 x 16, added in 1877; closed top; fuel, raw coal; ores, Missouri and native; annual capacity, 15,000 net tons. Brand, "Ashland." John Means, President; John G. Peebles, Vice-President; Wm. F. Gaylord, Treasurer; Robert Peebles, Secretary.

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; ores, ⅔ Iron mountain, ⅓ native, and ⅓ mill cinder; specialty, forge pig iron. *See Rolling Mills.*

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.

Number of bituminous furnaces: 4 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, William Fullard, Assignee, Boone Furnace P. O., Carter county. One stack, 43 x 10, built in 1855; hot blast; open top; annual capacity, 4,500 net tons. Not in blast since 1871. N. A. L. Marchant, Agent.

Buffalo Furnace, John Armstrong, Greenupsburg, Greenup county. Furnace at Argillite. One stack, 40 x 10½, built in 1851; hot and cold blast; fuel, half charcoal and half wood; annual capacity, 3,000 net tons.

Charlotte Furnace, Frank Powers, lessee, 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. Selling agent, H. W. Bates, Riverton, Ky., and 10 West Third st., Cincinnati.

Hunnewell Furnace, Eastern Kentucky Railway Company, Riverton, 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." President, Nathaniel Thayer, Boston; Vice-President, H. W. Bates, Riverton, Ky.; Treasurer, R. Sullivan, Boston. Agency, 10 West Third st., Cincinnati. *See Pennsylvania Furnace.*

Kenton Furnace, L. C. Damarin, Quincy, Lewis county. Furnace in Greenup county. Office at Portsmouth, Ohio. One stack, 36 x 11, built in 1856; open top; hot blast; annual capacity, 4,000 net tons. J. B. Fullerton, Manager. *See Hamden Furnace, Hanging Rock region, Ohio.*

Laurel Furnace, Joshua Kelley, Riverton, Greenup county. One stack, 39 x 11, built in 1849; open top; cold and hot blast; annual capacity, 3,000 net tons.

Mount Savage Furnace, T. B. Walker, lessee, Mount Savage, Carter county. One stack, 40 x 11, built in 1848; hot blast; open top; annual capacity, 4,000 net tons.

Pennsylvania Furnace, Eastern Kentucky Railway Company, Riverton, Greenup county. One stack, 37 x 11, built in 1848; open top; hot blast; limestone and kidney ores; specialty, foundry pig iron; annual capacity, 4,000 net tons. Brand, "Pennsylvania." *See Hunnewell Furnace.*

Raccoon Furnace, Raccoon Mining and Manufacturing Company, Greensburg, Greenup county. One stack, 35 x 10½, 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. E. F. Dulin, President; W. J. Worthington, Secretary.

Number of charcoal furnaces in Hanging Rock region of Kentucky: 10 stacks.

MISCELLANEOUS—CHARCOAL.

Bath Furnace, Louisville Car-wheel and Railway Supply Company, lessees, Louisville. Furnace at Owensville, Bath county. One stack, 40 x 10½, built in 1839, rebuilt in 1872-3; cold blast; product, car-wheel pig iron.

Centre Furnace, D. Hillman, Tennessee Rolling Works P. O., Lyon county. One stack, 36 x 11, built in 1852; hot and cold blast; daily capacity, 14½ net tons.

Cottage Furnace, Joel McKinney, Irvine, Estill county. One stack, 38 x 10½, built in 1855; cold blast.

Estill Furnace, E. K. Goodnow (of New York), Fitchburg, Estill county. One stack, 32 x 10, built in 1830; cold blast; native ores; specialty, car-wheel pig iron; daily capacity, 6 net tons. Brand, "Red River, Ky." C. W. Russell, Agent. *See Red River Furnaces. See Bloomaries.*

Laura Furnace, John P. Pringle & Co., Laura Furnace, Trigg county. One stack, 36 x 9, built in 1851; cold blast. This furnace has not been in blast since 1874.

Red River Furnaces, E. K. Goodnow (of New York), Fitchburg, Estill county. Two stacks, each 50 x 14, built in 1869; cold blast; open tops; native ores. Brand, "Red River, Ky." Not in blast since 1874. C. W. Russell, Agent. *See Estill Furnace.*

Trigg Furnace, D. Hillman & Sons, Trigg Furnace, Trigg county. Office at Tennessee Rolling Works, Lyon county. One stack, 48 x 12, built in 1871; hot and cold blast; daily capacity, 18 net tons. For sale. *See Rolling Mills.*

Number of charcoal furnaces outside of Hanging Rock region: 8 stacks.
Total number of furnaces in Kentucky: 22 stacks.

TENNESSEE.

BITUMINOUS COAL OR COKE.

Chattanooga Iron Company, Chattanooga, Hamilton county. One stack, 61 x 12½, completed in 1874; blown in in September, 1874; closed top; ores, native fossiliferous and hematite; annual capacity, 10,000 net tons. Specialty, neutral gray forge pig iron. President, James C. Warner, Nashville; Superintendent, Edward Doud.

Cherry, O'Connor & Co., Cowan, Franklin county. Building two stacks; total daily capacity, 100 net tons.

Oakdale Iron Works, Oakdale, Roane county. One stack, 64 x 16, completed and first put in blast November 11, 1873; bought by present company in 1879; fossil ores; product, foundry pig iron; daily capacity, 55 net tons. Built in 1879 a narrow-gauge steam railroad, 3½ miles long, to the finest coal fields in Tennessee. John G. Scott, President and Superintendent; Pierre Chouteau, Vice-President; E. C. Lackland, Secretary and Treasurer; D. A. Carpenter, Assistant Secretary and Treasurer.

Rockwood Furnaces, Roane Iron Company, Rockwood, Roane county. Office at Chattanooga. Two stacks, 65 x 16 and 56 x 14, built in 1867 and 1872; fuel, raw coal and coke; closed tops; total annual capacity, 24,000 net tons. Henry S. King, Furnace Superintendent. *See Rolling Mills.*

Southern States Coal, Iron, and Land Company Limited, South Pittsburg, Marion county. One completed stack, 70 x 20, first blown in May 2, 1879; Whitwell hot-blast stoves; ores, red and brown hematites, from Northern Alabama, Northwest Georgia, and East Tennessee; product, foundry and mill pig iron; weekly capacity, 600 net tons. A second stack is building. W. Barrett, President; E. L. Pease, H. F. Pease, Henry Barrett, and W. Ramwell, Directors; J. Bowron, General Manager. Selling agents: E. L. Harper & Co., Cincinnati; G. H. Hull & Co., Louisville; Card & Hoffer, St. Louis.

Worley Furnace, Warner Bros., lessees, Nashville. Furnace near Dickson, Dickson county. One stack, 36 x 9, built in 1847 to use charcoal with hot blast; repaired and put in blast December 1, 1879, on coke; ore, brown hematite; product, mainly mill pig iron.

Number of bituminous coal or coke furnaces: 6 completed stacks, and 3 stacks building.

EASTERN OR UNAKA REGION—CHARCOAL.

Carter Furnace, Knoxville Car-wheel Company, Knoxville. Furnace in Carter county. One stack, 32 x 8, built in 1840; cold blast; water-power. Building an additional stack, to make ten tons of cold-blast pig

- iron a day, and to be called Maxwell Furnace No. 1: A. L. Maxwell, President; J. A. Quaife, Secretary and Treasurer. *See Bloomaries.*
- Dougherty's Furnace, Elijah Dougherty & Sons, Baker's Gap, Johnson county. One stack, 26 x 5, built in 1878, and blown in in November, 1878; cold blast; open top; water-power; ore, brown hematite; annual capacity, 500 net tons.
- Eagle Furnace, R. & S. Stone, Bristol, Sullivan county. One stack, 33 x 8, built in 1838; cold blast; water-power. Out of blast since 1875.
- Embreeville Furnace, Bradley & Co., Jonesboro, Washington county. One stack, 32 x 8½, built in 1846. Out of blast since 1874.
- Pottsdale Furnace, New York and East Tennessee Iron Company, Greeneville, Greene county. One stack, 32 x 8½, built in 1862; cold blast; water-power; open top; annual capacity, 2,500 net tons. W. R. Potts, President, and F. A. Potts, Secretary and Treasurer, 110 Broadway, New York; J. A. Trim, Agent, Greeneville, Tenn. Out of blast since February, 1874.
- Rose and Crockett Iron Works, Rose & Greer, Cumberland Gap, Claiborne county. One stack, 32 x 9, built in 1823. G. W. Rose, Tazewell, Tenn.; A. L. Greer, Covington, Ky.
- Speedwell Furnace, Woodson, Rose & Harbison, Speedwell, Claiborne county. One stack, 30 x 9, built in 1825; cold blast; water-power; ore, hematite; specialty, car-wheel pig iron; annual capacity, 1,000 net tons. Address J. M. Harbison, Cumberland Gap. *See Bloomaries.*
- Unaka Furnace, W. F. Gleason, Unaka, Greene county. One stack, 33 x 10½, built in 1868; hot blast. Out of blast since 1874.
- Number of charcoal furnaces in Eastern region: 8 completed stacks, and 1 stack building.

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; either hot or cold blast; ore, native brown hematite; annual capacity, 5,000 net tons. Pig iron used for stoves, malleable work, and boiler plate. J. P. Drouillard, President; Albert W. Harris, Secretary. *See Dover Furnace.*
- Brownport Furnace, Charles B. Young, Nashville. Works at Brownport Furnace, Decatur county. One stack, 42 x 9, built in 1850; hot blast; ore, brown hematite; product, soft pig iron for foundry purposes. *See Cedar Grove Furnaces.*
- Cedar Grove Furnaces, Charles B. Young, Nashville. Works in Perry county. Two stacks, 36 x 11 and 36 x 7; very old; hot blast. *See Brownport Furnace.*

Clark Furnace, La Grange Iron Company, Danville, Houston county. Furnace in Stewart county. One stack, 36 x 10, built in 1854; to be altered to 42 x 9½ in 1880; warm blast; open top; ore, local brown hematite; specialty, car-wheel pig iron. Brand, "Eclipse." Main office, 706 Pine st., St. Louis, Missouri. E. C. Sterling, President; M. D. Collier, Vice-President; W. H. Lee, General Manager; J. B. Folsom, Superintendent. *See La Grange Furnace.*

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.

Dover Furnace, Cumberland Iron Works Company, Nashville. Works at Cumberland Iron Works, Stewart county. One stack, 34½ x 10, built in 1828, abandoned in 1834, rebuilt in 1854, and repaired in 1873; open top; cold blast; ore, native brown hematite; pig iron used for car-wheels and boiler plate; annual capacity, 3,600 net tons. *See Bear Spring Furnace.*

La Grange Furnace, La Grange Iron Company, Danville, Houston county. Furnace in Stewart county. One stack, 42 x 9½, built in 1832, and rebuilt in 1880; hot blast; closed top; ore, local brown hematite; specialty, No. 1 foundry pig iron. Brand, "La Grange." *See Clark Furnace.*

Napier Furnace, Napier Iron Company, Columbia, Maury county. Furnace at Napier Furnace P. O., Lawrence county. One stack, 33 x 9, built in 1860, and repaired in 1873; cold blast; ore, brown hematite; product, car-wheel pig iron. A second stack, hot blast, will be erected in 1880. W. C. Whitthorne, President; W. P. Ingram, Secretary and Treasurer; J. E. R. Carpenter, Superintendent; G. W. Boyd, General Manager. *See Bloomaries.*

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. President, D. Theobald, Youngstown, Ohio; Secretary and Treasurer, Isaac Wertheimer, Pittsburgh, Pa. Main office with A. Guckenheimer & Bros., Pittsburgh.

Vernon Furnace, Sechler, McCullough & Co., Vernon Furnace, Montgomery county. One stack, 34 x 10½, built in 1833; hot blast; closed top; annual capacity, 4,000 net tons.

Wayne Furnace, Gaylord, Son & Co., (of Cincinnati, Ohio,) G. W. Boyd, Superintendent, Wayne Furnace, Wayne county. One stack, 42 x 11, built in 1856; hot blast. Out of blast since May, 1875.

Number of furnaces in Western region: 12 stacks. Total number of furnaces in Tennessee: 26 completed stacks, and 4 stacks building.

OHIO.

HANGING ROCK—CHARCOAL.

- Bloom Furnace, Clare, Amos & 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, 37 x 11, built in 1851; open top; ore, red limestone, mined on the property; hot and cold blast; specialty, No. 1 foundry pig iron; annual capacity, 4,000 net tons. L. Davies, Superintendent and Agent; T. J. Williams, Secretary and Treasurer.
- Buckhorn Furnace, Campbell, McGugin & Co., Ironton, Lawrence county. One stack, 32 x 10½, built in 1833; open top; cold blast; annual capacity, 1,500 net tons. Brand, "B. H." *See Olive Furnace.*
- Cambria Furnace, Cambria Iron Company, Samsonville, Jackson county. One stack, 38 x 11, built in 1854; hot blast; open top; annual capacity, 4,000 net tons. Out of blast since 1875.
- Centre Furnace, W. D. Kelly & Sons, Ironton, Lawrence county. One stack, 40 x 10½, built in 1837; open top; hot blast; annual capacity, 4,000 net tons. *See Grant Furnace.*
- Clinton Furnace, William J. Bell, Wheelersburg, Scioto county. One stack, 31 x 9½, built in 1832; hot blast; open top; annual capacity, 5,020 net tons. Not in blast since October, 1873.
- Cornelia Furnace, Cornelia Furnace Company, Jackson, Jackson county. One stack, 37 x 10½, built in 1853; open top; hot and cold blast; annual capacity, 4,000 net tons. Formerly called Lincoln Furnace. J. M. McGhee, Agent.
- Eagle Furnace, J. A. Simmons & Co., Reed's Mills, Vinton county. One stack, 32½ x 11, built in 1852; open top; hot blast; annual capacity, 4,500 net tons.
- Etna Furnace, Etna Iron Works, Ironton, Lawrence county. One stack, 37 x 10½, built in 1832; open top; hot and cold blast; limestone ores from furnace property; specialty, car-wheel pig iron; annual capacity, 4,000 net tons. *See Vesuvius Furnace and Etna (coke) Iron Works.*
- 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.
- Grant Furnace, W. D. Kelly & Sons, Ironton, Lawrence county. One stack, 42 x 11, built in 1869; open top; hot blast; annual capacity, 5,000 net tons. Will use coke until charcoal can be had in the spring of 1880. *See Centre Furnace.*

- Hamden Furnace, Damarin & Co., Portsmouth, Scioto county. Furnace at Hamden Junction P. O., in 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. *See Kenton Furnace, Kentucky.*
- Hecla Furnace, Hecla Iron and Mining Company. Ironton, Lawrence county. One stack, 36 x 10½, built in 1833; cold blast; open top; product, car-wheel pig iron; annual capacity, 3,500 net tons. John Campbell, President; Charles Campbell, Secretary and Treasurer.
- Hope Furnace, Hope Furnace P. O., Vinton county. Owned by Ashford Poston, of Nelsonville, Ohio, and others. One stack, 36 x 10½, built in 1854; open top; hot blast; annual capacity, 4,000 net tons.
- Howard Furnace, Ironton, Lawrence county. Furnace in Scioto county. Owned by John Campbell and others. One stack, 36 x 10½, built in 1853; open top; hot blast; annual capacity, 4,500 net tons.
- Jefferson Furnace, Jefferson Furnace Company, Oak Hill, Jackson county. One stack, 40 x 11½, built in 1854; open top; cold blast; annual capacity, 5,000 net tons.
- Keystone Furnace, H. S. Bundy, 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. *See Eliza (bituminous) Furnace.*
- Latrobe Furnace, J. C. H. Cobb, 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.
- Lawrence Furnace, Lawrence Furnace Company, Ironton, Lawrence county. One stack, 38 x 11, built in 1834; hot blast; fuel, charcoal, coke, and coal; open top; annual capacity, 4,500 net tons. George Peters, President; John Peters, Jr., Secretary; W. H. Peters, Vice-President and Manager.
- Logan Furnace, Logan Iron Company, Logan, Hocking county. One stack, 29 x 10, built in 1852; open top; hot blast; annual capacity, 3,500 net tons. W. W. Woodruff, President; W. H. England, Treasurer; S. H. Bright, Secretary.
- Madison Furnace, Clare, Duduit & Co., Clay, Jackson county. One stack, 37 x 9½, built in 1854; hot blast; open top; native limestone red ore; 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 1863; open top; cold blast; annual capacity, 3,500 net tons. John Peters, Jr., Secretary and Manager.

- Monroe Furnace, Union Iron Company, Portsmouth, Scioto county. Furnace at Monroe Furnace P. O., in Jackson county. One stack, 37 x 12, built in 1856; hot blast; open top; ore, native limonite; annual capacity, 5,000 net tons. John Campbell, President; Wm. M. Bolles, Secretary. Selling agents, Matthew Addy & Co., Cincinnati. *See Washington (bituminous) Furnace.*
- Mount Vernon Furnace, H. Campbell & Sons, Ironton, Lawrence county. One stack, 32 x 10, built in 1833; hot blast; open top; ore, native hematite; product, foundry pig iron; annual capacity, 4,400 net tons. Jno. W. Campbell, Manager. *See Sarah (bituminous) Furnace.*
- Ohio Furnace, Means, Kyle & Co., Hanging Rock, Lawrence county. Furnace in Scioto county. One stack, 36 x 11½, built in 1845; open top; hot blast; product, principally foundry pig iron; annual capacity, 4,000 net tons. Thomas W. Means, President; E. B. Willard, Secretary and Treasurer. *See Pine Grove Furnace.*
- Olive Furnace, Campbell, McGugin & Co., Ironton, Lawrence county. One stack, 37 x 10½, built in 1846; hot blast; open top; annual capacity, 4,000 net tons. *See Buckhorn Furnace.*
- Pine Grove Furnace, Means, Kyle & Co., Hanging Rock, Lawrence county. One stack, 36 x 12, built in 1829; open top; hot blast; product, principally foundry pig iron; annual capacity, 4,500 net tons. *See Ohio Furnace.*
- 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, Sec'y.
- 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.
- Vesuvius Furnace, Etna Iron Works, Ironton, Lawrence county. One stack, 32 x 9, built in 1833; cold blast; open top; limestone ore from furnace property; specialty, car-wheel pig iron; annual capacity, 3,000 net tons. *See Etna Furnace and Etna (coke) Iron Works.*
- Total number of charcoal furnaces in Hanging Rock region: 31 stacks.

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, Connells-

ville 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, H. S. Bundy, Wellston, Jackson county. One stack, 46 x 12, built in 1877, from material of the abandoned Ophir Furnace, and blown in October 30, 1877; closed top; fuel, raw coal; ores, native (block and limestone); specialty, No. 1 foundry pig iron; annual capacity, 4,500 net tons. E. L. Harper & Co., Cincinnati, sales agents. *See Keystone (charcoal) Furnace.*

Etna Iron Works, Ironton. Two stacks: Alice, 86 x 18, first blown in Sept. 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. Cyrus Ellison, President; E. Bixby, Vice-President; Geo. K. Hosford, Secretary, Treasurer, and Superintendent. E. L. Harper & Co., Cincinnati, sales agents. *See Etna and Vesuvius (charcoal) Furnaces.*

Fulton Furnace, Globe Iron Company, Jackson, Jackson county. One stack, 50 x 11½, built in 1868; closed top; fuel, raw coal; annual capacity, 4,000 net tons. *See Globe Furnace.*

Globe Furnace, Globe Iron Company, Jackson, Jackson county. One stack, 46½ x 12, built in 1872; closed top; fuel, raw coal; annual capacity, 4,000 net tons. *See Fulton Furnace.*

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; M. D. Jones, Secretary. Principal sales agents, E. L. Harper & Co., Cincinnati.

Ironton 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 and raw coal; daily capacity, 50 net tons. *See Rolling Mills.*

Milton Furnace, Milton Furnace and Coal Company, Wellston, Jackson county. One stack, 50 x 13, 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.

Orange Furnace, Orange Iron Company, Jackson, Jackson county. One stack, 40 x 10, built in 1864; closed top; annual capacity, 4,000 net tons. Out of blast since 1874.

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; annual capacity, 10,000 net tons. J. H. Campbell, Manager.
See Mount Vernon (charcoal) Furnace.

Star Furnace, Star Furnace Company, Jackson, Jackson county. One stack, 54 x 14, built in 1866, rebuilt in 1879; fuel, raw coal; ore, native; bell-and-hopper top; 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 Isaac Watkin, 808 Market st., Philadelphia.

Washington Furnace, Union Iron Company, Portsmouth, Scioto county. Furnace in Lawrence county. Furnace post-office address is Sansonville, Jackson county. One stack, 50 x 11, built in 1853; altered from charcoal to bituminous coal in 1877; open top; annual capacity, 5,000 net tons. *See Monroe (charcoal) Furnace.*

Wellston Furnaces, Wellston Coal and Iron Company, Wellston, Jackson county. Two stacks: No. 1, 53 x 11½, built in 1874-5; closed top; annual capacity, 3,650 net tons. No. 2, 52 x 12½, built in 1874-5, remodeled in 1879; bell top; annual capacity, 7,300 net tons. Product, neutral foundry pig iron from native ore, used in the proportion of ½ block to ¼ kidney and ¼ limestone. H. S. Bundy, President; Theodore Fluhart, Secretary.

Number of bituminous furnaces in Hanging Rock region: 17 stacks.

MAHONING VALLEY—BITUMINOUS COAL OR COKE.

Brier Hill Furnace, Brier Hill Iron and Coal Company, Youngstown, Mahoning county. One stack, 66 x 14½, built in 1846, and rebuilt in 1879; closed top; fuel, coke and block coal; ore, Lake Superior; product, Bessemer and strong foundry pig iron; annual capacity, 22,000 net tons. President, John Stambaugh; Secretary, N. Crandall; Manager, J. G. Butler, Jr. *See Grace Furnaces.*

Brown, Bonnell & Co., Youngstown, Mahoning county. Two stacks: Falcon, 60 x 14, built about 1850, and Phoenix, 65 x 16, built in 1854; closed tops; ore, Lake Superior; fuel, block coal and Connellsville coke; product, foundry and mill pig iron; total annual capacity, 32,000 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 Con-

nellsville coke; ores, Lake Champlain and Lake Superior; product, principally mill pig iron for Cartwright, McCurdy & Co., and Bessemer pig iron; annual capacity, 13,500 net tons. W. H. McCurdy, President; W. B. Hazeltine, Vice-President; W. E. Saylor, 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." Wm. R. Drake, Manager.

Grace Furnaces, Brier Hill Iron and Coal Company, Youngstown, Mahoning county. Two stacks: No. 1, 65 x 20, built in 1860, and torn down in 1873, is now being rebuilt. No. 2, 57 x 17½, built in 1861; closed top; fuel, coke and raw coal; ore, Lake Superior specular; specialty, Bessemer pig iron; annual capacity, 25,000 net tons. Brand, "Brier Hill." See *Brier Hill Furnace*.

Haselton Furnaces, Andrews Brothers, Haselton, Mahoning county. Two stacks, 56 x 18 and 56 x 13½, built in 1867 and 1868; fuel, block coal and coke; product, Bessemer 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; combined daily capacity, 100 net tons.

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 used in 1879 were mainly from Lawrence county, Pa., and Columbiana county, Ohio, making soft foundry and neutral mill iron; closed tops; annual capacity, No. 1, 15,000 net tons; No. 2, 20,000 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, 32,000 net tons.

Mahoning Valley Iron Company, Youngstown. One stack, 65 x 14½, built at Niles, in 1859; now being removed from Niles to Youngs-

town. Formerly called Elizabeth Furnace. Another stack is to be built in 1880. *See Rolling Mills.*

Mary Furnace, Ohio Iron and Steel Company, Lowellville, Mahoning county. One stack, 56 x 15, built in 1845; rebuilt of iron in 1872.

Formerly called Ada Furnace. R. Bentley, Secretary and Treasurer.

Struthers Furnace, Struthers Furnace Company, lessees, Struthers Station, Mahoning county. One stack, 54 x 16, built in 1869; open top; fuel, $\frac{1}{2}$ block coal and $\frac{1}{2}$ Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 22,000 net tons. Thos. W. Kennedy, Manager; H. T. Stewart, Agent.

Thomas Furnace, Thomas Furnace Company, Niles, Trumbull county. One stack, 55 $\frac{1}{2}$ x 12 $\frac{1}{2}$, built in 1870; specialty, blackband foundry and forge pig iron; annual capacity, 13,000 net tons. Formerly called Kitty Furnace.

Number of bituminous furnaces in the Mahoning valley: 17 stacks.

HOCKING VALLEY—BITUMINOUS COAL OR COKE.

Akron Furnace, Akron Iron Company, Akron, Summit county. Furnace at Bessemer, Athens county. One stack, 50 x 16, built at Akron in 1872; removed to Bessemer in 1877, and blown in November 30, 1877; closed top; fuel, raw coal; ore, native, mined near the furnace; specialty, A. No. 1 foundry pig iron; annual capacity, 8,500 net tons. 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 11 $\frac{1}{2}$, 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." President, Walter Crafts; Secretary, C. F. Eisele; Manager, Frederick Eisele.

Bessie Furnace, Moss & Marshall, New Straitsville, Perry county. General office at the works; Columbus office, corner High and Broad sts., Columbus, O. One stack, 50 x 14, built in 1877-8, and blown in January 21, 1878; 3 Whitwell hot-blast stoves, each 36 x 15; fuel, raw coal; ores, native limestone, with one-fourth Lake Superior; product, strong and soft foundry and gray forge pig iron; annual capacity, 10,000 net tons. Brand, "Bessie." B. Marshall, Manager.

Crafts Iron Company, Greendale, Hocking county. One stack, 58 x 15, first put in blast Nov. 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, Jr., President; Walter Crafts, Treasurer and Manager; Grove Stoddard, Secretary.

Fannie Furnaces, Licking Iron Company, Newark, Licking county. Fur-

- naces at Shawnee, Perry county. Two stacks: No. 1, 50 x 12, built in 1874-5 at Newark, removed to Shawnee in 1876; put out of blast at Newark on April 15, 1876, and blown in at Shawnee on September 15, 1876; closed top; six 4-inch tuyeres; annual capacity, 5,000 net tons. No. 2, 50 x 13, first put in blast October 10, 1877; closed top; six 4-inch tuyeres; annual capacity, 8,000 net tons. Coal, lime, and blackband iron ore are found near the furnaces. Product, "American Scotch" foundry pig iron. J. C. Hamilton, President; E. S. McKinlay, Secretary and Treasurer; George Shields, Superintendent. E. L. Harper & Co., Cincinnati, sole sales agents.
- Franklin Furnace, Franklin Iron Works Company, Columbus, Franklin county. One stack, 62 x 17, completed in November, 1873; fuel, raw coal and coke; closed top; annual capacity, 18,000 net tons. J. R. Buchtel, President; Lewis Moss, Secretary and Treasurer; J. Frank Wheeler, General Manager.
- Helen Furnace, Hocking Iron Company, Orbiston, Hocking county. One stack, 52 x 15, built in 1877; blown in in December, 1877; 3 Whitwell hot-blast stoves, 28½ x 15; fuel, raw coal; ores, native and Lake Superior; specialty, foundry pig iron; annual capacity, 12,000 net tons. Formerly called Ogden Furnace. J. Cummings, Manager. *See Lee Furnace.*
- Lee Furnace, Hocking Iron Company, Orbiston, Hocking county. Furnace at Monday Creek Station, Mowry P. O., Hocking county. One stack, 52½ x 14, built in 1877-8, and blown in in March, 1878; fuel, raw coal, mined on the property; ores, Hanging Rock limestone and Lake Superior. This furnace was built at Columbus in 1870 by the Columbus Iron Company, and removed to Hocking county in 1877. Afterwards known as Monday Creek Furnace, and as Mowry Furnace. J. Cummings, Manager. *See Helen Furnace.*
- Mollie Furnace, Joseph Vilas, Shawnee, Perry county. One stack, 50 x 14½, first blown in November 10, 1877; closed top; fuel, raw coal; annual capacity, 9,000 net tons.
- Moxahala Furnace, Moxahala Iron Company, Moxahala, Perry county. One stack, 55½ x 15, built in 1877-8, blown in January 5, 1878; fuel, coke and raw coal; closed top; ores, Lake Superior and native blackband; specialty, soft fluid foundry pig iron; annual capacity, 10,000 net tons. Brand, "Moxahala." President and Treasurer, W. C. Lemert; Secretary, M. P. Wright; Manager, J. G. Chamberlain.
- Thomas Iron Works, Gore, Hocking county. One stack, 47 x 12½, built in 1876, blown in Dec. 8, 1876; fuel, raw coal; product, American Scotch pig iron; annual capacity, 6,000 net tons. S. Churchill, President; C. H. Rippey, Secretary.

Winona Furnace, Winona Iron Company, Winona Furnace P. O., Hocking county. One stack, 50 x 12½, completed and blown in Feb. 20, 1878; Whitwell hot-blast stoves; fuel, raw coal; closed top; annual capacity, 6,000 net tons. President, S. Churchill; Secretary and Treasurer, E. B. Greene, Jr.

XX Furnace, Sandusky and Shawnee Coal and Iron Company, Shawnee, Perry county. One stack, 50 x 14, first blown in January 18, 1877, rebuilt in 1879; native ore exclusively used; product, principally foundry pig iron; daily capacity, about 25 net tons. General office at Sandusky, Ohio. John Gardiner, President, Norwalk, Ohio; A. H. Moss, Secretary and Treasurer, Sandusky; A. W. Nason, Superintendent, Shawnee; T. D. Shepherd, Assistant Secretary, Shawnee.

Number of bituminous furnaces in the Hocking valley: 14 stacks.

MISCELLANEOUS—BITUMINOUS COAL OR COKE.

Bellaire Nail Works, Bellaire, Belmont county. One stack, 65 x 16, built in 1873; put in blast September 18, 1875; closed top; fuel, coke; annual capacity, 13,000 net tons. *See Rolling Mills.*

Benwood Iron Works, Wheeling, West Virginia. Furnace at Martinsville, Belmont county, Ohio. One stack, 51 x 12½, built in 1866; fuel, Connellsville and Steubenville coke. *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. M. Schmick, Secretary and Treasurer; J. G. Chamberlain, Superintendent. *See Rolling Mills.*

Cleveland Rolling Mill Company, Cleveland, Cuyahoga county. Four stacks. Newburg Furnaces have two stacks: one, 60 x 16, built in 1864; the other, 60 x 16½, built in 1872, was put in blast in October, 1872; closed tops. Proton Furnace, formerly operated by the Cleveland Iron Company; one stack, 60 x 16, built in 1869, and rebuilt in 1878. The fourth stack, 70 x 17, was built near Proton Furnace in 1879, and blown in October 15, 1879. Fuel, raw coal and coke; ore, Lake Superior; product, No. 1 Bessemer pig iron; total annual capacity, 75,000 net tons. *See Rolling Mills.*

Dover Furnace, Tuscarawas Coal and Iron 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.; 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. President,

J. F. Card, 130 Water st., Cleveland, Ohio ; Treasurer, Jas. F. Rhodes, Cleveland ; General Manager, S. W. Croxton, Canal Dover ; Secretary, Henry Anderman, Canal Dover. *See Rolling Mills.*

Emma Furnace, Union Iron Works Company, 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. Works in the hands of creditors. *See Rolling Mills.*

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 on December 1, 1879 ; closed tops ; fuel, hitherto Connellsville coke ; ores, a mixture of native blackband and Lake Superior hematite ; product, foundry pig iron ; total annual capacity, 33,000 net tons. Brand, "Glasgow." President, James Reid Stewart, Glasgow, Scotland ; Secretary, Laurence Hill Watson ; General Agent at works, William Rennie.

Graffton Furnaces, Graffton Furnace Company, Leetonia, Columbiana county. Two stacks, 54 x 14 and 54 x 16, built in 1866 and 1872 ; fuel, coke and raw coal. 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, 30,000 net tons. *See Rolling Mills.*

Massillon Furnace, J. P. Barton, Massillon, Stark county. One stack, 45 x 14, built in 1854 ; fuel, raw coal ; ore, blackband ; annual capacity, 6,000 net tons.

Mingo Furnaces, Junction Iron Company, Mingo Junction, Jefferson county. Two stacks : No. 1, 60 x 15½, built in 1871 ; No. 2, called "Estella," 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 ; specialty, mill pig iron ; total annual capacity, 36,000 net tons. Brand, "Mingo." Alexander Laughlin, President ; Mason W. Burt, General Manager ; George A. Dean, Secretary ; James Skelding, Foundryman.

Morgan Furnace, Irondale, Jefferson county. One stack, 60 x 16, built in 1870 ; fuel, coke ; closed top ; annual capacity, 12,000 net tons. In hands of trustees for creditors of the Morgan Iron and Coal Company. *See Rolling Mills.*

Steubenville Furnace, Steubenville Furnace and Iron Company, Steubenville, Jefferson county. One stack, 60 x 16, built in 1872, and blown in in December, 1872 ; closed top ; fuel, native coke ; ore, Lake Superior ; specialty, mill pig iron ; annual capacity, 12,000 net tons.

W. B. Lindsay, President; T. C. Carothers, Secretary; Wm. H. Mooney, Treasurer; M. S. Stokely, Furnace Manager.

Volcano Furnace, Volcano Furnace Company, Massillon, Stark county. One stack, 44 x 14, built in 1855; closed top; ore, native 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 15, built in 1870-1, and blown in Sept. 7, 1871; bell-and-hopper top; fuel, raw coal and coke; ores, $\frac{1}{2}$ Lake Superior and $\frac{3}{2}$ native; specialty, forge pig iron; annual capacity, 14,000 net tons. *See Rolling Mills.*

Number of bituminous coal or coke furnaces outside of the Hanging Rock, Mahoning valley, and Hocking valley districts: 23 stacks.

CHARCOAL—MISCELLANEOUS.

Antwerp Furnace, Antwerp Furnace Company, Antwerp, Paulding county. One stack, 42 x 8 $\frac{1}{2}$, built in 1865; ore, Lake Superior; product, principally car-wheel pig iron. A. Cobb, Agent, 112 Superior st., Cleveland.

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.

Paulding Furnace, Paulding Iron Company Limited, Cecil, Paulding county. One stack, 42 x 10, built in 1865; hot blast; closed top; annual capacity, 6,000 net tons. John F. R. Evans, Superintendent. Selling agents, Tuttle & Co., 13 and 15 Atwater Building, Cleveland. *See Bloomaries.*

Number of charcoal furnaces in Ohio, outside of Hanging Rock region: 3 stacks. Total number of furnaces in Ohio: 105 stacks.

INDIANA.

RAW BITUMINOUS BLOCK COAL.

Brazil Furnace, Major Collins, lessee, 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, 12,000 net tons. Brand, "Brazil."

Vigo Furnaces, Vigo Iron Company, Terre Haute, Vigo county. Two stacks, each 52 x 12, built in 1869 and 1872, and blown in in 1870 and 1873; one open top and one closed; fuel, raw coal; ore, Missouri; specialty, forge pig iron; combined annual capacity, 15,000 net tons.

Brand, "Vigo." President, A. L. Crawford; Secretary, Treasurer, and Manager, A. J. Crawford.

Number of bituminous furnaces: 3 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: 1 stack. Total number of furnaces in Indiana: 4 stacks.

ILLINOIS.

BITUMINOUS COAL OR COKE.

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

Illinois Furnace, Illinois Furnace Company, Elizabethtown, Hardin county. One very old stack, 39 x 11, probably the first built in Illinois, repaired in 1873; controlled by Indianapolis capital. Out of blast for several years. Lewis H. McKernan, agent in charge of property.

Joliet Steel Company, Honore Building, Chicago. Works at Joliet, Will county. Two stacks, each 72 x 20, built in 1873; closed tops; total annual capacity, 55,000 net tons. Built to use coke and Lake Superior and Missouri ores, and to make Bessemer pig iron. Not yet in operation, but to be blown in in 1880. *See Rolling Mills.*

Joseph H. Brown Iron and Steel Company, Joseph H. Brown & Co., lessees, 180 Dearborn st., Chicago. Works at Brown's Mills P. O., Cook county. Building one stack, 75 x 18; closed top. *See Rolling Mills.*

Meier Furnaces, Missouri Furnace Company, lessees, 305 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 to be 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. Chicago Furnaces have two stacks, (No. 1 and No. 2,) each 66 x 17, built in 1869; closed tops; fuel, coke; ore, Lake Superior; product, Bessemer and mill pig iron; total annual capacity, 48,000 net tons. *See Wisconsin Furnaces. See Rolling Mills in Illinois and Wisconsin.*

North Chicago Steel Company, 17 Metropolitan Block, Chicago. Build-

ing 4 stacks, each 75 x 21; hope to have 2 of them in blast by Jan. 1, 1881. *See Rolling Mills.*

Union Iron and Steel Company, northeast corner Dearborn and Madison sts., Chicago. Two completed stacks, each 60 x 14½, built in 1869; closed tops; fuel, Connellsville coke and Indiana coal; ore, Lake Superior; erecting Whitwell fire-brick stoves; specialty, Bessemer pig iron; total annual capacity, 44,800 net tons. Two stacks building, each 74 x 16; Whitwell fire-brick stoves; total annual capacity, 60,000 net tons. *See Rolling Mills.*

Total number of furnaces in Illinois: 10 completed bituminous stacks, and 7 stacks building.

MISSOURI.

BITUMINOUS COAL OR COKE.

Jupiter Iron Works, Vulcan Steel Company, lessees, 221 Olive st., St. Louis, St. Louis county. Works at South St. Louis. One stack, 75 x 20, finished in 1873; to be blown in for the first time in 1880; fuel, coke; ores, Iron mountain and Pilot Knob and about ¼ red hematite; annual capacity, 33,000 net tons. *See Vulcan Steel Company's Furnaces. See Rolling Mills.*

Missouri Furnaces, Missouri Furnace Company; 305 Olive st., St. Louis. Two stacks, each 56 x 15, built in 1870; closed tops; fuel, Connellsville coke; 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, lessees, 305 Olive st., St. Louis. Two stacks, each 56 x 15, built in 1870 and 1872; closed tops; fuel, Big Muddy raw coal and Connellsville coke; specialty, Bessemer pig iron; total annual capacity, 40,000 net tons. *See Missouri Furnaces. See Meier Furnaces in Illinois.*

Vulcan Steel Company, 221 Olive 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 ¼ red hematite; product, Bessemer pig iron; total annual capacity, 55,000 net tons. *See Jupiter Iron Works. See Rolling Mills.*

Number of bituminous furnaces: 8 stacks.

CHARCOAL.

Hamilton Furnace, Henry R. Tracy, Portsmouth, Ohio. Furnace at Sullivan, Franklin county. One stack, 40 x 9½, built in 1873; put in blast October 22, 1873; open top; ores mined on the furnace property, con-

- sisting 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.
- Iron Mountain Furnaces, Iron Mountain Company, Iron Mountain, St. Francois county. Office, 941 North Second st., St. Louis. Two stacks, each 38 x 9½, built in 1846 and 1854; combined daily capacity, 40 net tons. Edwin Harrison, President, St. Louis; Charles P. Chouteau, Vice-President, St. Louis; Charles A. Pilley, Secretary, Iron Mountain; Paul A. Fusz, Assistant Secretary, St. Louis.
- Maramec Iron Works, Maramec Iron Company, Maramec Iron Works P. O., Phelps county. One stack, 32 x 9½, 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." *See Bloomaries.*
- Midland Furnace, Midland Blast-Furnace Company, Midland, Crawford county. Main office, 706 Pine 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; product, foundry and Bessemer pig iron; annual capacity, 14,000 net tons. This furnace stack is wholly built of fire brick; 22½ inches thick. Brand, "Midland." E. C. Sterling, President; Wm. H. Lee, Secretary; George T. Baker, 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. Joseph H. Brown, Vice-President, Chicago; 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.
- 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; annual capacity, 10,000 net tons. Out of blast at present. H. Garvens in charge of property.
- Pilot Knob Furnace, Pilot Knob Iron Company, Pilot Knob, Iron county. Office, 110 Chestnut st., St. Louis. One stack, 60 x 11, built in 1848, remodeled in 1879; ores, ¼ Shephard mountain and ¾ Pilot Knob; prod-

uct, Bessemer pig iron; daily capacity, 35 net tons. A second stack building. Thomas Allen, President; Edward Walsh, Jr., Vice-President; Thomas F. Farrelly, Secretary and Treasurer; G. W. Crains, Superintendent.

Scotia Iron Furnace, Scotia Iron Company, Leesburg, Crawford county. One stack, 40 x 9½, built in 1870; hot blast; open top; annual capacity, 12,000 net tons. President and Treasurer, Robert Anderson; Vice-President, Thomas Howard; Secretary, E. R. Lackland; Manager, Thomas J. Scott.

Sligo Furnace Company, Cook's Station, Crawford county. Furnace in Dent county. One stack, 55 x 11, now building; closed top; hot blast; ores, blue specular and red oxide, mined near the furnace; specialty, Bessemer pig iron; annual capacity, 15,000 net tons. Brand, "Sligo." Furnace lands comprise 20,000 acres of timber land with several good deposits of ore and limestone. President, A. L. Crawford, New Castle, Pa.; Secretary and Treasurer, H. A. Crawford, St. Louis; Superintendent, David Carson.

Number of charcoal furnaces: 10 completed stacks, and 2 stacks building. Total number of furnaces in Missouri: 18 completed stacks, and 2 stacks building.

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; specialty, Bessemer pig iron; annual capacity, 14,000 net tons. A. B. Hough, President, Cleveland, Ohio; D. C. Bradley, Vice-President, 42 Dearborn st., Chicago; C. D. Rhodes, Treasurer, Chicago; H. S. Pickands, Superintendent, Bangor, Michigan.

Carp River Furnace, Carp River Iron Company, lessees, 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.*

Caseville Furnace, Pigeon River Furnace and Salt Company, Caseville, Huron county. One stack, 45 x 9½, built in 1873; hot blast. Wm. McKinley, Agent. Not in blast for several years.

Champion Furnace, C. Sprong, lessee, (owned by estate of Menominee Iron 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. Brand, "Champion." Sole agents, Cherrie & Co., Chicago. Deer Lake Furnaces, Deer Lake Iron and Lumber 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; both hot blast; water-power; ore, Lake Superior, $\frac{2}{3}$ hard specular and $\frac{1}{3}$ hematite; product, Bessemer pig iron; total annual capacity, 8,000 net tons. Brand, "Deer Lake." Gardiner Greene, President, Norwich, Connecticut; Theo. F. McCurdy, Secretary and Treasurer, Norwich, Connecticut; E. R. Hall, Superintendent, Ishpeming, Michigan.

Detroit and Lake Superior Iron Manufacturing Company, Detroit, Wayne county. One stone stack, 42 x 9 $\frac{1}{2}$, built in 1857; warm blast; open top; ores, Lake Superior specular, magnetic, and hematite; the pig iron is specially adapted to malleable castings; annual capacity, 5,000 net tons. Edward C. Walker, President; Wm. H. Barnum, Vice-President; Wm. M. Gaylord, Secretary and Manager.

Elk Rapids Furnace, Elk Rapids Iron Company, Elk Rapids, Antrim county. One stack, 47 x 11 $\frac{1}{2}$, built in 1873; put in blast in July, 1873; hot blast; 4 4-inch tuyeres; ore, Lake Superior; product used for car-wheels and malleable castings; daily average production, 39 net tons.

Eureka Furnaces, Eureka Iron Company, Detroit. Two stacks: Furnace No. 1, 45 x 9, built in 1853; hot blast; annual capacity, 8,000 net tons. Furnace No. 2, 45 x 9 $\frac{1}{2}$, built in 1862; formerly called Ward Furnace; hot blast; closed top; annual capacity, 8,000 net tons. Ores, a mixture of Lake Superior specular, hematite, magnetic, and Menominee. 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.*

Frankfort Furnaces, Frankfort Furnace Company, 32 and 34 Woodward ave., Detroit. Furnaces at South Frankfort, Benzie county. Two stacks, each 42 x 9 $\frac{1}{2}$, built in 1870 and 1873; hot blast; open tops; ore, Lake Superior; total annual capacity, 13,500 net tons. W. H. Tefft, President and Treasurer; M. I. Mills, Vice-President; C. E. Ames, Secretary. Only selling agents, R. P. Elmore & Co., Milwaukee, Wis. New company organized in 1879, and the works will be put in operation in 1880.

Hamtramck Furnace, Detroit Iron and Furnace Company, Detroit. One stack, 53 x 13, built in 1870; open top; changed from bituminous coal

to charcoal in 1879, and to be blown in in 1880, after several years' idleness.

Iron Cliffs Company, Negaunee, Marquette county. Three stacks: Cliffs Furnace, 48 x 9½, built in 1867, and rebuilt in 1873; Pioneer Furnace No. 1, 47 x 9½, built in 1858, and burnt and rebuilt in 1877; Pioneer Furnace No. 2, 47 x 9½, built in 1859; ore, Lake Superior, ¾ red specular and ¼ soft hematite; product, Bessemer pig iron; combined annual capacity, 40,000 net tons. Brands, "Pioneer" and "Cliffs." Wm. H. Barnum, President; Charles J. Canda, Treasurer; T. J. Houston, General Manager; James Rood, Agent.

Jackson Furnaces, Jackson Iron Company, Fayette, Delta county. Two stacks, each 40 x 9½, built in 1867 and 1869; hot blast; open 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 58 charcoal kilns. Fayette Brown, General Agent, Cleveland, Ohio; H. H. Brown, Asst. General Agent, Cleveland; J. B. Kitchen, Agent, Fayette, Mich.

Lawton Furnace, Michigan Central Iron Company, Lawton, Van Buren county. One stack, 40 x 9½, 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." President, Gen. Q. A. Gillmore; Secretary and Treasurer, D. Van Nostrand; Agent and Manager, J. C. Ford.

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.

Munising Furnace, Munising Iron Company, Munising, Schoolcraft county. One stack, 40 x 9, built in 1867; hot blast; closed top; water-power; annual capacity, 12,000 net tons. Formerly called Schoolcraft Furnace.

Peninsular Furnace, Peninsular Iron Company, Detroit, Wayne county. One stack, 42½ x 9½, built in 1863, put in blast in February, 1864; hot 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."

Pine Lake Furnace, Pine Lake Iron Company, Charlevoix, Charlevoix county. Building one stack, 50 x 11; hot blast; closed top; ore, Lake Superior; specialty, Bessemer and malleable pig iron; estimated annual capacity, 12,000 net tons. Brand, "Pine Lake." President,

R. M. Cherrie; Secretary and Treasurer, H. C. Dolph; Manager, C. Sprong. Furnace to be completed by September, 1880.

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; actual yield in second week of blast, 371 net tons, making in one day 59 net tons. Principal office at Milwaukee, Wis.: Samuel Marshall, President; D. C. Bradley, Vice-President; Irving M. Bean, Secretary and Treasurer; H. S. Pickands, Manager, Fruitport. Agents, Rhodes & Bradley, 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." President, Wells Burt; Secretary and Treasurer, Austin Burt; Superintendent, Lee Burt.

Number of charcoal furnaces: 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.

Rolling Mill Furnace, Marquette and Pacific Rolling Mill Company, Marquette, Marquette county. One stack, 60 x 15, built in 1868, rebuilt in 1873; closed top; fuel, anthracite and bituminous coal and coke; annual capacity, 14,000 net tons. In the hands of bondholders.

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

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 and foundry pig iron; total annual capacity, 15,000 net tons. Augustus Ledyard Smith, President; Henry A. Foster, Vice-President; Henry D. Smith, Secretary and Treasurer.

Fond du Lac Furnace, Charles J. L. Meyer, 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, but not yet in blast.

Fox River Iron Company, West Depere, Brown county. Two stacks,

each 40 x 9½; 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, 10,000 net tons. D. W. Blanchard, President and Treasurer; D. D. Kellogg, Secretary; S. D. Arnold, Vice-President and Manager.

Green Bay Furnace, National Furnace Company, Green Bay, Brown county. One stack, 39 x 9, built in 1870; closed top; hot blast; annual capacity, 7,000 net tons. H. D. Smith, President; W. L. Brown, Treasurer; M. R. Hunt, Secretary and General Manager. *See National Furnaces.*

Iron Ridge Furnace, North Chicago Rolling Mill Company, 17 Metropolitan Block, Chicago, Ill., and 37 Mitchell Block, Milwaukee. Furnace at Iron Ridge, Dodge county. One stack, (furnace No. 6,) 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 and Minerva Furnaces. See Illinois and Wisconsin Rolling Mills.*

John F. Smith Iron Works, Ironton, Sauk county. One stack, 30 x 8, built in 1857; warm blast; open top; ore, native brown hematite; product, foundry pig iron; steam and water-power; annual capacity, 2,000 net tons. Brand, "Sauk." M. R. Doyon, Agent.

National Furnaces, National Furnace Company, Depere, Brown county. Two stacks; one, 45 x 10, built in 1869; the other, 48 x 12, built in 1872, put in blast in March, 1873; hot blast; bell-and-hopper tops; combined annual capacity, 12,000 net tons. *See Green Bay Furnace.*

North Western Iron Company, Mayville, Dodge county. Office, 328 East Water st., Milwaukee. One stack, 40 x 9½, built in 1853 and rebuilt in 1872; weekly capacity, 100 net tons. I. M. Bean, President; S. Marshall, Vice-President; J. C. Spencer, Secretary; C. F. Ilsley, Treasurer.

Number of charcoal furnaces: 11 stacks.

HALF ANTHRACITE COAL AND HALF COKE.

Bay View Furnaces, North Chicago Rolling Mill Company, 17 Metropolitan Block, Chicago, Ill., and 37 Mitchell Block, Milwaukee. Works at Bay View, Milwaukee county, near Milwaukee. Two stacks, (furnaces No. 3 and No. 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, 48,000 net tons. Formerly belonged to Milwaukee Iron Company. *See Illinois Furnaces. See Iron Ridge and Minerva Furnaces. See Rolling Mills of Illinois and Wisconsin.*

Minerva Furnace, North Chicago Rolling Mill Company, 17 Metropolitan Block, Chicago, Ill., and 37 Mitchell Block, Milwaukee. One stack, (furnace No. 5,) 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. *See Bay View Furnaces.*

Number of anthracite coal and coke furnaces: 3 stacks. Total number of furnaces in Wisconsin: 14 stacks.

MINNESOTA.

Duluth Furnace, Duluth Iron Company, Duluth, St. Louis county. One stack, 45 x 9½, built in 1873-4; to be blown in in June, 1880; hot blast; bell-and-hopper top; fuel, charcoal; ores, specular and hematite, from Marquette, Michigan; specialty, No. 1 foundry and Bessemer pig iron; estimated annual capacity, 12,000 net tons. Brand, "Duluth." D. M. Sabin, President, Stillwater, Minn.; C. H. Graves, Secretary and Treasurer, Duluth; Seymour Brownell, Manager, Duluth.

Number of furnaces in Minnesota: 1 charcoal stack.

OREGON.

Oswego Furnace, Oswego Iron Company, Oswego, Clackamas county. One stone stack, 42 x 9½, built in 1866; stack raised in 1879; open top; hot blast; water-power; fuel, charcoal, made exclusively from fir; annual capacity, 5,000 net tons. President and Treasurer, S. H. Brown, 220 Front st., Portland; Secretary and Superintendent, E. W. Crichton, Oswego; Agent, L. B. Seeley, Main and Folsom sts., San Francisco, California. Brand, "Oregon Iron."

Number of furnaces in Oregon: 1 charcoal stack.

UTAH TERRITORY.

CHARCOAL.

Great Western Iron Works, Thomas Taylor, Salt Lake City. Works at Iron City, Iron county. Two stacks, both very small, built in 1873-5. Laura May Furnace, Equitable Iron and Coal Company, Ogden City. One stack, 45 x 12, begun in 1875, but not completed; hot or cold blast; water-power; annual capacity, 7,000 net tons. Hematite and magnetic ores mined within 10 miles of the furnace. James D. Kase, General Manager. *See Rolling Mills.*

Number of furnaces in Utah: 2 completed charcoal stacks, and 1 unfinished stack.

PROJECTED.

Norway Iron and Manufacturing Company, Salt Lake City. John T.

Lynch, President; Charles Popper, Vice-President; Frederick G. Lynberg, Treasurer; B. A. M. Froiseth, Secretary. Charcoal furnace projected.

COLORADO.

Colorado Coal and Iron Company, South Pueblo, Pueblo county. One stack building, 65 x 15, and arrangements made for a second; fuel, coke; ores, native magnetic and red hematite. *See Rolling Mills.*

CALIFORNIA.

P. Fitzhugh, Clipper Gap, Placer county. Charcoal furnace projected.

WASHINGTON TERRITORY.

Puget Sound Iron Company, Port Townsend, Jefferson county. General Agent, D. W. Moor. Charcoal furnace projected.

UNITED STATES.

Total number of furnaces in the United States on March 1, 1880: 697 completed stacks, and 44 stacks building.

RECENTLY ABANDONED FURNACES.

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.

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.

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. Built in 1834; abandoned in 1870.

Fletcher ville Furnace, Witherbees & Fletcher, Mineville, Essex county.

Built in 1863-4; abandoned in 1875.

Myers Steel and Iron Company, Clifton, St. Lawrence county. Abandoned in 1870.

Rossie Iron Works, Ogdensburg, St. Lawrence county. Built in 1843; abandoned in 1868.

NEW JERSEY.

Wawayanda Furnace, Wawayanda, Sussex county. Built in 1845; fuel, charcoal. Thomas Iron Company, owners, Hokendauqua, Pa.

PENNSYLVANIA.

ANTHRACITE.

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.

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 Shipensburg.

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 1797; 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.

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.

COKE.

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

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.

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.

BITUMINOUS COAL.

Kenton Furnace, Gaylord Iron and Pipe Company, Cincinnati, Ohio. Works at Newport, Campbell county, Ky. 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.

TENNESSEE.

CHARCOAL.

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.

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.

OHIO.

CHARCOAL.

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.

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; burnt in 1878.

ILLINOIS.

BITUMINOUS COAL OR COKE.

Grand Tower Furnaces, Grand Tower Mining, Manufacturing and Transportation Company, Grand Tower, Jackson county. Two stacks, each 68 x 16, built in 1868; not in blast since March, 1876, and will probably never be blown in again. Thomas M. Williamson, Superintendent.

MICHIGAN.

CHARCOAL.

Bancroft Furnace, Bancroft Iron Company, Marquette, Marquette county. Built in 1859, and rebuilt in 1871; water-power.

Bay Furnaces, Bay Furnace Company, Onota, Schoolcraft county. Two stacks: one, 45 x 9, built in 1870; the other, 45 x 9½, built in 1872; burnt in 1877. E. P. Williams, Secretary, Marquette.

Collins Furnace, Collins Iron Company, Marquette, Marquette county. Built in 1858; abandoned in 1873.

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 burnt in 1874.

WISCONSIN.

CHARCOAL.

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

MISSOURI.

CHARCOAL.

Osage Furnace, J. A. Quealy, Osage Iron Works, Camden county. Built in 1873, and in blast a very short time.

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 Mill, Ligon Iron Company, 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. Philip Henry Brown, President; J. W. Leavitt, Secretary and Treasurer.

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

NEW HAMPSHIRE.

Nashua Iron and Steel Company, Nashua, Hillsborough county. M. A. Herrick, Treasurer, 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, hardened-steel-tired car, truck, and tender wheels. Brand, an Indian head. Alfred Sweetney, Superintendent, Nashua.

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

VERMONT.

St. Albans Iron and Steel Works, St. Albans Iron and Steel Company, St. Albans, Franklin county. Put in operation May 10, 1873; 2 double and 6 single puddling furnaces, 8 heating furnaces, 1 hammer, and 2 trains of rolls (one 19 and one 21-inch); one 10-gross-ton Siemens open-hearth steel furnace added in 1877; product, silicon-steel-top rails rerolled, and new iron and steel rails; annual capacity, 20,000 net tons. Edward A. Smith, President; Isaac Osgood, Vice-President; H. 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. Rail mill built in 1847; 12 heating furnaces and 2 trains of rolls; annual capacity, 22,000 net tons of rails. 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, 6,000 net tons. Plate mill No. 2 built in 1873; 2 trains of rolls and 6 heating furnaces; product, homogeneous steel plates, flange, boiler, and tank plates; annual capacity, 6,900 net tons. One 6-gross-ton Siemens open-hearth steel furnace; annual capacity, 2,800 net tons of ingots. Brand of iron and steel plates 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, Wm. P. Hunt, and T. K. Lothrop, 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 miscellaneous iron and steel forgings; product of rolled iron, about 6,000 net tons yearly. Nahum Stetson, Treasurer.

Cambridge Rolling Mills, Hondlette, Ellis & Co., lessees, 19 Batterymarch st., Boston. Works in Cambridgeport. Built in 1868; 5 heating furnaces, 1 horse-shoe machine, 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, horse-shoe iron, and hand and machine made horse-shoes. 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, 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; 5 buildings—rolling mill, nail mill, foundry, boiler works, and machine shop; 9 double and 5 single puddling furnaces, 11 heating furnaces, 105 nail machines, 1 hammer, and 9 trains of rolls (two 8, three 9, and four 18-inch); product, nails, hoops, bands, and merchant bar iron to 2 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. Agents, Wm. E. Coffin & Co., 8 Oliver st., Boston. Built in 1866; 1 single and 5 double puddling furnaces, 5 heating furnaces, and 3 trains of rolls (one 8, one 16, and one 18-inch); product, bar iron, of all kinds and sizes.
- Globe Nail Company, Station "A," Boston. Built in 1877; 1 heating furnace and one 12-inch train of rolls; use Swedish iron; product, horse-nail plate; annual capacity, 3,000 net tons. President, John Gardner; Secretary, W. B. Crocker; Treasurer, T. H. Fuller; Superintendent, W. W. Miner.
- 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. Built in 1788, and incorporated in 1855; burned down January 14, 1875, and rebuilt, enlarged, and put in operation 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 18-inch); steam and water power; product, bar iron, shapes, shovel plate, and railroad supplies; annual capacity, 10,000 net tons. F. L. Ames, President; Edw. R. Eager, Treasurer; Frank M. Ames, Agent.
- Mount Hope Iron Works, Mount Hope Iron Company, 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. J. M. Leonard, Treasurer; H. B. Leonard, Agent. *See Bloomaries.*
- Newton Iron Works, Estate of David Ellis, Newton Upper Falls, Middle-

- sex county. Built about 1800; 2 heating furnaces and 1 train of rolls; water-power; product, horse-nail rods, and shapes for machinery and gun barrels; annual capacity, 2,500 net tons.
- Norway Iron Works, Naylor & Co., 6 Oliver st., Boston. Works at 363 Dorchester avenue, South Boston. Built in 1854; 12 single puddling furnaces, 11 heating furnaces, 8 trains of rolls, three 7-gross-ton Siemens open-hearth steel furnaces, and 3 hammers; product, flat, round, and square iron, and spring, tire, toe-calk, and sleigh-shoe steel; annual capacity, 18,000 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 and New York. See Rolling Mills in New York.*
- Old Colony Iron Company, Taunton, Bristol county. Built in 1825; 5 double and 6 single puddling furnaces, 9 heating furnaces, 95 nail machines, 5 trains of rolls, and 5 hammers; steam and water power; product, nails, tack plate, and shovels.
- Parker Mills, Wareham, Plymouth county. Built in 1815; 6 double puddling furnaces, 2 heating furnaces, 75 nail machines, 2 trains of rolls, and 1 hammer; water-power; product, nails. O. A. Washburn, Jr., Treasurer.
- 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, Somerset Iron Company, Somerset, Bristol county. Built in 1855; 7 double puddling furnaces, 5 heating furnaces, 72 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. Formerly called Mount Hope Iron Works. O. A. Washburn, Jr., Treasurer.
- 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 3 coal heating furnaces, 4 trains of rolls, and 75 nail machines; steam and water power; product, washers, nails, tacks, brads,

- and small rounds and squares; annual capacity, 6,000 net tons. Nails and iron 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 Car-wheel Company, Hartford, Conn. Steel works at Worcester; erected in 1874; ten 4-pot steel furnaces, 1 train of tire rolls, and 1 hammer; 40 pots can be used in the steel works at each heat; product, crucible cast-steel car-wheel tires. W. A. Healy, President; W. H. Barnum, Vice-President; S. Hyde, Secretary and Treasurer.
- 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, 5,000 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 Iron Company, Worcester. Built in 1857; 1 single and 3 double puddling furnaces, 9 heating furnaces, 2 hammers, and 2 trains of rolls (one 3-high 18-inch rail train, and one 2-high 20-inch roughing train); product, rerolled rails; annual capacity, 18,000 net tons. Edward L. Davis, Treasurer; Joseph E. Davis, Secretary; Geo. W. Gill, Manager.
- 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 2 are rail mills, 2 are open-hearth steel works, and 1 is a crucible steel works.

RHODE ISLAND.

- Providence Iron Company, 69 India st., Providence. Built in 1845; 6 double puddling furnaces, 7 heating furnaces, 5 trains of rolls, 66 nail

machines, and 2 squeezers; product, cut nails, spikes, patent wrought nails, and wire rods; annual capacity, 7,200 net tons. Nails branded "Parker Mills." O. A. Washburn, Jr., Treasurer.

Rhode Island Horse Shoe Works, Rhode Island Horse Shoe Company, Providence. Works at Valley Falls, 6 miles from Providence. Built in 1857 and 1874; 6 scrap and 4 heating furnaces, 6 trains of rolls, and 16 horse-shoe machines; product, bars for the horse-shoe machines; annual capacity, single turn, 10,000 net tons. Brand, "Perkins' United States Standard Horse and Mule Shoes." F. W. Carpenter, President; C. H. Perkins, General Manager; R. W. Comstock, Secretary. *See Rolling Mills in New York.*

Rumford Chemical Works, G. F. Wilson & Co., Providence. One 6-gross-ton Siemens open-hearth steel furnace.

Number of rolling mills and steel works in Rhode Island: 3, of which 1 is an open-hearth steel works.

CONNECTICUT.

Aetna 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, E. S. Wheeler & Co., lessees, New Haven. Works at Derby, New Haven county. Built in 1843; 2 busheling furnaces, 3 single puddling furnaces, 5 heating furnaces, 5 trains of rolls, and 5 hammers; steam and water power; product, carriage springs, axles, all sizes merchant bar iron, and wire rods; annual capacity, 7,000 net tons bars, 1,500 tons axles, and 800 tons springs.

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, one forge for making iron direct from the ore, 8 heating furnaces, one 18-inch train of rolls, one 12-inch train, 2 Sellers steam hammers, one 20-ton steel cementing furnace, and 30 steel-melting holes; 180 pots can be used at each heat in steel works; water and steam power; product, bar iron and cast steel, consumed wholly in these works in the production of edge tools, steel plows, etc.; annual capacity of finished iron, 2,000 net tons, and of steel, 750 net tons. President and Treasurer, E. B. Watkinson; Vice-President, Secretary, and Manager, William J. Wood; Agent, Edward H. Sears; Superintendent, Charles H. Blair.

Farist and Windsor Company, Windsor Locks, Hartford county. Built in 1860; 4 heating furnaces, 3 trains of rolls, 3 hammers, and 18 4-pot steel-melting holes; can use 72 pots at each heat in steel works; steam and water power; product, cast steel, rolled and hammered, and rolled Siemens-Martin and Bessemer steel; also manufacture spiral car springs; 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), 5 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, 1,500 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 $\frac{5}{8}$; annual capacity, 1,500 net tons.

New Haven Rolling Mill, New Haven Rolling Mill Company, New Haven. Completed in August, 1871; 4 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, 3,000 net tons. H. M. Welch, President; E. S. Wheeler, Secretary; Pierce N. Welch, Treasurer; C. S. Poronto, Manager.

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 $\frac{5}{8}$; annual capacity, 2,000 net tons.

Thames Iron Works, Norwich, New London county. Built in 1863; 3 double puddling furnaces, 2 heating furnaces, 2 trains of rolls, and 1 rotary squeezer; product, common bar iron; spike rods a specialty; annual capacity, 2,500 net tons. John Mitchell, President; James Greenwood, Secretary and Treasurer.

Number of rolling mills and steel works in Connecticut: 10, of which 3 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; 1 double-double and 29 single puddling furnaces, 15 heating furnaces, 8 trains of rolls, 1 steam and 4 trip hammers, 2 horse-shoe machines, 45 nail machines, 2 bolt, 4 rivet,

2 nut, and 6 spike machines; steam and water power; product, bars, angles, car axles, bands, finger-bars, steel and iron horse shoes, crow-bars, railroad and boat spikes, fish plates, bolts and nuts, cut nails, and boiler rivets; annual capacity, 25,000 net tons. 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; 20 heating furnaces, 5 trains of rolls, and 2 steam hammers; product, rails, bar iron, steel shapes and sheets, and special steels; annual capacity of rail mill, 115,000 net tons; capacity of merchant mill, 25,000 tons. Bessemer steel works, built in 1864; made their first blow on Feb. 15, 1865; 2 converters, each of 7 gross tons' capacity; 3 cupolas and 2 spiegel furnaces; annual capacity, 120,000 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 one cupola; 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.*

Auburn Iron Works, D. M. Osborne & Co., 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.

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.

Buffalo Iron and Nail Works, Rhode Island Horse Shoe Company, lessees, Buffalo, Erie county. Built in 1847; destroyed by fire and rebuilt in 1865; 25 single puddling furnaces, 8 heating furnaces, 12 horse-shoe machines, and 8 trains of rolls; product, horse shoes and bar iron. C. H. Perkins, Jr., Agent. *See Rolling Mills in Rhode Island.*

Buffalo Steel Foundry, Pratt & Letchworth, Buffalo. Experimental steel works.

Burden Iron Works, H. Burden & Sons, 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." *See Furnaces.*

- Chrome Steel Works, corner Kent avenue and Keap street, 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. C. P. Haughian, Superintendent; C. D. Schubarth, Treasurer.
- Cohoes Rolling Mill, Morrison, Colwell & Page, 259 River street, Troy. Works at Cohoes, Albany county. Built in 1864; 8 double puddling furnaces, 2 scrap and 4 heating furnaces, and 4 trains of rolls; water-power; product, band and bar iron, and patent punched axle-rolls; specialty, high-grade iron for edge tools and butt hinges; annual capacity, 7,000 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; 11 single and 3 double puddling furnaces, 7 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, hoop, band, angle, and plate iron; annual capacity of rail mill, 18,000 net tons; annual capacity of bar mill, 10,000 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. Property to be sold April 17, 1880.
- Lake Champlain Nail Works, owned by the State of New York, located at the State Prison, Dannemora, Clinton county. Built in 1853; 48 nail machines and 1 train of rolls; product, cut nails, bar iron, and horse-shoe iron. *See Forges.*
- Lockport Iron Company, 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. B. H. Fletcher, Superintendent. Not in operation for several years.
- Monhagen Steel Works, Wheeler, Madden and Clemson Manufacturing Company, Middletown, Orange county. Built in 1862-3; 24 2-pot steel-melting holes, 4 heating furnaces, 1 train of rolls, and 1 hammer; 48 pots can be used at each heat in steel works; product, saw cast steel; annual capacity, 900 net tons. E. 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.
- Onondaga Steel Works, Sweet's Manufacturing Company, Syracuse, Onondaga county. Built in 1864; 14 heating furnaces, 1 hammer, 4 trains of rolls (one 9, one 10, and two 12-inch), and 4 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, and "Sweet's" seat springs. 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.
- Peru Steel and Iron Company, F. J. Dominick, Receiver, 120 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 "Pern" iron, and largely used for conversion into best grades of cast steel; annual capacity, 4,500 net tons. *See Forges.*
- Plattsburgh Iron Works, Naylor & Co., lessees, 6 Oliver st., Boston. Mill at 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. *See Charcoal Furnaces. See Rolling Mills in Massachusetts.*
- Rome Iron Works, Rome Iron Works Company, Rome, Oneida county. Built in 1866; 8 heating furnaces and one 18-inch train of rolls; product, rails; annual capacity, 22,000 net tons. Edward Huntington, President; J. S. Haselton, Treasurer; T. G. Nock, Superintendent.
- Rome Merchant-Iron Mill, Rome, Oneida county. Built in 1869; 2 double and 4 single puddling furnaces, 4 heating furnaces, 1 hammer, and 3 trains of rolls (one 8, one 9, 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, 6,500 net tons. E. B. Armstrong, 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 12 and one 8-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, Jr., lessee, 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, 16 Cliff st. Established in 1877; 5 heating furnaces, 7 hammers, 2 trains of rolls (one 9 and one 12-inch), 4 steel-cementing furnaces, and 4 steel-melting holes; 68 pots can be used at each heat in steel works; use clay pots made by themselves; product, bar cast steel; annual capacity, 2,500 net tons. Brand, "Sanderson Bros. & Co." President, Robert B. Campbell; Secretary and Treasurer, Samuel Wm. Johnson; General Manager, Wm. A. Sweet.

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.

Skaneateles Iron Works, Louis F. Powell, Syracuse. Works at Skaneateles Falls, Onondaga county. Built in 1868; 2 double puddling furnaces, 2 heating furnaces, and 2 trains of rolls (one 9 and one 16-inch); water-power; product, bars only; annual capacity, 2,500 net tons. Mill held for sale.

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; 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 4 double puddling and 5 heating furnaces, 3 trains of rolls (one 6, one 9, and one 19-inch), and 2 steam hammers; product, bar, wire-rod, band, and hoop iron, railroad and boat spikes, fish bolts, and horse-shoe and bridge iron; have lately added the manufacture of

horse shoes (Farmer's patent), and cotton ties (Wright's patent), and steel tire and wire rods; annual capacity, 6,000 net tons. Brand, "S. I. W." 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. Iron 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. *See Furnaces.*

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 5 are rail mills, 1 is a Bessemer steel works, 3 are crucible steel works, 1 is a cemented steel works, and 1 is an experimental steel works.

NEW JERSEY.

Adirondac Steel Works, Gregory & Co., 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 Siemens-Martin billets; product, cast steel; annual capacity, 3,000 net tons. Steel brand, "Adirondac." H. J. Hopper, Manager.

American Sheet Iron Works, McClees & Co., Phillipsburg, Warren county. Office, 52 Cliff st., New York. Built in 1867, and enlarged in 1870 and 1873; 2 double puddling furnaces, 1 heating furnace, 2 sheet-

finishing furnaces, 2 annealing furnaces, 4 trains of 22-inch rolls, and 1 hammer; product, black and galvanized sheet iron; galvanizing works, 51 to 57 Little 12th st., New York; annual capacity, 2,000 net tons. Wm. E. Rees, Superintendent. *See Bloomeries.*

Boonton Iron Works, Estate of J. Cowper Lord, Boonton, Morris county. Built in 1825; 12 double puddling furnaces, 11 heating furnaces, 6 trains of rolls, and 150 nail machines; steam and water power; product, nails, spikes, nuts, and washers; annual capacity, 300,000 kegs of nails. Idle since June, 1876. *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; Robert C. Nichols, Vice-President; William Stokes, Secretary and Treasurer, Philadelphia; R. J. and C. J. Buck, Managers. Agents for the sale of gas tubes, Getze & Reeves, 7 and 9 North Fifth st., Philadelphia.

Delaware Rolling Mill, Delaware Rolling Mill Company, Phillipsburg, Warren county. One single and three double puddling furnaces, 2 heating furnaces, 2 trains of rolls (one 9 and one 16-inch), and 3 hammers; product, bar and guide iron, wagon and carriage axles; annual capacity, 3,500 net tons merchant iron. W. H. Bell, President.

Dover Rolling Mill, Dover Iron Company, Dover, Morris county. Built about 1770, and rebuilt several times since; 1 double and 3 single puddling furnaces, 2 heating furnaces, and 3 trains of rolls (one 8, one 12, and one 18-inch); water-power; product, merchant bar, spikes, bolts, and rivets; annual capacity, 2,800 net tons merchant bar. George Richards, President; Charles A. Covert, Secretary.

Elizabethport Rolling Mill, Daniel W. Richards & Co., Elizabethport, Union county. Office, 90 and 92 Mangin 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, 6,500 net tons.

Jersey City Steel Works, James R. Thompson & Co., Jersey City. Commenced operations August 1, 1862; 1 single and 2 double puddling furnaces, 7 heating furnaces, 4 trains of rolls (two 9, one 12, and one

16-inch), 5 steam hammers, 2 helve 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, 4,000 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. F. W. Roebling, Treasurer.

Newark Steel Works, Benjamin Atha & Co., Newark, Essex county. Commenced business in 1864; 36 4-pot steel-melting holes, one 7-gross ton Siemens open-hearth steel furnace, 6 steam hammers, and 4 trains of rolls (one 16, one 12, one 9, and one 8-inch); 144 pots can be used at each heat in steel works; product, every kind of cast steel except sheet; total annual capacity, 3,600 net tons. Brand, "Newark."

New Jersey Charcoal Iron Company, Rockaway, Morris county. Occupy the old Rockaway Rolling Mill, built in 1826; building 2 Wilson deoxidizers to use ore in puddling furnaces by the Wilson direct process; have 3 heating furnaces, 1 train of muck rolls, and 2 trains of finishing rolls; weekly capacity, 40 net tons. Wm. McMonnies, President; A. W. Taylor, Secretary; Joel Wilson, Treasurer. *See Forges.*

New Jersey Steel and Iron Company, Trenton, Mercer county. Built in 1845; 14 double puddling and 14 heating furnaces, 7 trains of rolls, and 2 hammers; steam and water power; product, iron and steel-headed rails, beams, channels, angles, 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. *See Furnaces.*

Passaic Rolling Mills, Passaic Rolling Mill Company, Paterson, Passaic county. New York office, 138 Chambers st. 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, John Leonard, lessee, Boonton. Works at Powerville, Morris county. New York office, 450 West st. 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; 3 run-out fires, 12 forge fires, 6 heating furnaces, 2 hammers, and 4 trains of rolls (one 8, one 10, one 12, and one 19-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.
- West Bergen Steel Works, Spaulding, Jennings & Co., West Bergen, Hudson county. In course of erection; 2 heating furnaces, 2 trains of rolls (10 and 18-inch), 2 hammers, and 12 steel-melting holes; product, to be crucible cast steel; annual capacity, 1,500 net tons.
- Number of rolling mills and steel works in New Jersey: 18 completed and 1 building. Of these 1 is a rail mill, 4 are crucible steel works, 1 crucible steel works is building, 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; 1 single and 2 double puddling furnaces, 3 heating furnaces, 3 trains of rolls, and 1 hammer; product, merchant bar; annual capacity, 6,750 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 steel, frog plates and points, cast spring steel, and all kinds of steel forgings; annual capacity, 482 net tons.

Gray's Ferry Plate Iron Works, Edward S. Buckley, 228½ Walnut 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 Saw, Tool, Steel, and File Works, Henry Disston & Sons, Front and Laurel sts., Philadelphia. Branch works at Tacony, Philadelphia. Founded in 1840, and commenced the manufacture of steel in 1854; now running 42 melting furnaces, 2 trains of rolls, 7 heating furnaces, and 1 hammer; 84 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, 2,500 net tons. Brand, "Disston."

Midvale Steel Works, Nicetown P. O., Philadelphia. Built in 1866; one 4-ton air furnace for melting pig, and 10 coal and 4 gas heating furnaces; one gas pot muffle and one kiln for drying; melting and annealing shop, with 2 annealing and 4 drying furnaces; 6 steam hammers, from 8 tons to 300 lbs.; tire-rolling mill, with capacity for 35 tires, single turn, per day; rolling mill, with one 23 and one 12-inch train; machine shop, with five 80-inch boring and turning mills, two 80-inch and four 24 inch lathes, one planer, 36 inches by 10 feet, one drill press, and 2 straightening machines; one 30-ton steel-converting furnace, with a yearly capacity of 500 net tons, 16 4-pot steel-melting holes, one 30-pot Siemens gas steel-melting furnace, and one 6-gross-ton and one 10-gross-ton Siemens open-hearth steel furnace; 94 pots can be used at each heat in steel works. Product, open-hearth and crucible steel only: tires, axles, forgings, and castings; tool, machinery, and frog steel, etc. Daily capacity, 50 net tons; annual capacity, 15,000 net tons cast steel. 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; 4 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., 265 South Fourth st., Philadelphia. Works in Montgomery county, opposite Manayunk. Built in 1852; 13 double puddling furnaces, 10 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, 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 2 hammers; annual capacity, 15,000 net tons. Specialties, structural shapes, axles, shafting, and bridge iron. Brand, "Pencoyd."

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 Rolling Mills in Delaware. 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, single turn, 7,000 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, 5 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 Steam Forge, Adam Tindel, 135 South Fifth st., Philadelphia. Works at Frankford, Philadelphia. Built in 1865; 4 heating furnaces, 5 steam drop hammers, 1 cementing furnace, and 20 4-pot steel-melting holes; 80 pots can be used at each heat in steel works.

The steel plant is not in use at present, but is in shape to use at any time. Present product, iron and steel forgings; annual capacity, 2,000 net tons. All classes of railroad work a specialty.

Tioga Rolling Mill, Noblit & Hirons, Seventeenth and Clearfield sts., Philadelphia. Put in operation January 1, 1873; 2 double puddling furnaces, 1 heating furnace, 2 trains of rolls (one 8-inch and one puddle train), 1 hammer, and 3 spike machines; product, bar, hoop, band, and horse-shoe iron, railroad spikes, and cold-pressed nuts and washers; annual capacity, 2,500 net tons.

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 Mill Company, Allentown, Lehigh county. Office, 303 Walnut st., Philadelphia. 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; C. W. Leavitt, Secretary; H. W. Allison, Treasurer; C. H. Nimson, Superintendent. *See Glen Iron Works. See Lehigh Valley Furnaces.*

Bethlehem Iron Company, Bethlehem, Northampton county. Established in 1863. Engine house, 230 ft. long x 60 ft. wide; two low-pressure engines, 54 in. diameter x 80 in. stroke; one compound blowing engine, 30 in. and 54 in. diameter x 80 in. stroke; upright compound pumping engine, 16 in. and 30 in. diameter x 34 in. stroke; two horizontal compound pumping engines, 16 in. and 30 in. diameter x 50 in. stroke; four double acting pumps, 16 in. x 5 ft., general supply; two double acting 300-lb. pressure pumps, 7½ in. diameter x 17 in. stroke, and pumps, machinery, and appurtenances for supplying water to the town of South Bethlehem. Mill No. 1, built in 1863; 1 single and 13 double puddling furnaces, 9 heating furnaces, one 21-inch train of rolls with 4 sets of housings for iron rails, shapes, and merchant iron, one 12-inch train with 3 sets of housings for small shapes and merchant iron, one 21-inch train for puddled iron, and 1 "universal" hoop mill; 1 hammer, squeezers, saws, shears, presses, etc.; product, railroad iron, cotton ties, hoops, etc.; annual capacity, 22,500 net tons. Mill No. 2—

two 7-gross-ton Bessemer steel converters, which made their first blow on October 4, 1873; first steel rail was rolled October 18, 1873; 4 cupolas; 2 Siemens melting furnaces; 3 steam hammers; 8 Siemens heating furnaces; two 32-inch blooming trains of rolls; two 24-inch trains with 4 sets of housings each for steel rails, heavy shapes, and merchant steel; one 15-inch train with 3 sets of housings for merchant steel and small shapes; shears, saws, drills, punches, etc.; product, steel rails, billets, slabs, and blooms; annual capacity, 100,000 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.; also an additional Bessemer-steel plant, consisting of two 7-gross-ton Bessemer converters, 4 pig-melting cupolas, 4 spiegel cupolas, hydraulic hoist, cranes, etc. Machine shop, blacksmith shop, and foundry connected with the works. G. B. Linderman, Managing Director; 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. & G. Brooke Iron Company, Birdsboro, Berks county. Built in 1848; 11 double puddling furnaces, 2 scrap and 3 heating furnaces, 100 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, Maidencreek Iron Company, Blandon, Berks county. Office, 40 N. 6th st., Reading, Pa. Built in 1867; 5 single puddling furnaces, 2 heating furnaces, and 3 trains of rolls; product, round, square, flat, hoop, band, and skelp iron; annual capacity, 6,000 net tons. H. A. Kaufman, Manager; Z. H. Maurer, Treasurer.

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."

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, 9 heating furnaces, 7 trains of rolls (10, 15, 18, and 22-inch), 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, 22,000 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 Will-

- iams, President; John Williams, Secretary; Henry Davis, Treasurer. 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 (of the rolls one is 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. President, John Roach; Secretary, D. F. Houston; Treasurer and Manager, C. B. Houston. *See Schuylkill Valley Furnaces.*
- Chester Steel Castings Company, Chester, Delaware county. Main office, 407 Library st., Philadelphia. Built in 1871; one cupola and 7 annealing furnaces; product, steel castings by the McHaffey process; annual capacity, 600 net tons. E. P. Dwight, President and Treasurer; W. W. Wood, Secretary.
- Coatesville Iron Company, Coatesville, Chester county. New York office, 130 Cedar st. Built in 1838; 3 double and 3 single puddling furnaces, 6 heating furnaces, 4 trains of rolls, and 1 hammer; product, all kinds of boiler, fire-box, boat, tank, tube, and flue iron, and patent straightened bridge plates; annual capacity, 11,000 net tons. Formerly called Viaduct Iron Works. Andrew Williams, President; Charles Wheeler, Vice-President; W. J. Carmichael, Treasurer; J. S. Worth, Superintendent; W. P. Worth, Secretary.
- 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 7 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, 90 Beekman st., New York.
- Eureka Cast Steel Company, Chester, Delaware county. Philadelphia office, 307 Walnut st. Built in 1877; product, steel castings of all kinds, made by the McHaffey process; specialty, steel propellers. W. B. Reaney, President; W. H. Dickson, Treasurer; H. B. Faunce, Secretary; Frederick Baldt, Manager.

- Fort Allen Iron Works, Albright & Stroh, Weissport, Carbon county. Rebuilt in 1872; 1 single and 2 double puddling furnaces, 2 heating furnaces, 1 squeezer, and 2 trains of rolls (one 9 and one 16-inch); product, guide and bar iron; annual capacity, 3,000 net tons.
- Fulton Rolling Mill, Phoenix Iron Company, lessees, Norristown, Montgomery county. Office, 410 Walnut st., Philadelphia. Built in 1861; 11 double puddling furnaces, 1 rotary squeezer, and 1 train 18-inch puddle rolls; product, puddled bar; annual capacity, 12,000 net tons. *See Phoenix Iron Works. See Furnaces.*
- 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, 6,000 net tons of boiler plate. Joseph L. Bailey, President; Comly B. Shoemaker, Treasurer; G. W. Nicolls, Secretary; Edward Bailey, General Manager.
- Glen Iron Works, Allentown Rolling Mill Company, lessees, 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 Mill Company. See Furnaces.*
- Greenwood Rolling Mill, Greenwood Rolling Mill Company, Tamaqua, Schuylkill county. Philadelphia office, 328 Walnut st. Built in 1865; 5 single puddling furnaces, 2 heating furnaces, and 2 trains of rolls (8½ and 16-inch); product, bar and hoop iron, and light rails; annual capacity, 3,000 net tons. C. F. Shoener, President; H. S. Godshall, Treasurer; Z. T. Ratcliffe, Clerk; John Ralston, Superintendent.
- Hamburg Iron Works, Wister, Fisher & Fox, lessees, Hamburg, Berks county. Built in 1865; 3 double and 3 single puddling furnaces, 1 cupola furnace, 4 heating furnaces, one 3-ton steam hammer, and 2 trains of rolls (10 and 18-inch); product, small sizes of bar iron, muck and scrap bars, scrap blooms, etc.; annual capacity, 4,000 net tons. Brand, "Hamburg." Selling agents, L. & R. Wister, 323 Walnut st., Philadelphia.
- Hibernia Forge and Rolling Mill, Wagontown, Chester county. Forge built in 1792; mill built in 1837; 4 forge fires, 1 heating furnace, 1 hammer, and 1 train of rolls; use wrought scrap; water-power; product, boiler tube and light boiler plate; annual capacity, 1,000 net tons.

- Hope Iron Company Limited, Pottstown, Montgomery county. Built in 1879; 6 double puddling furnaces and one 18-inch train of rolls; product, muck bar; annual capacity, 8,000 net tons. Jacob Fegely, President; Charles H. Bowen, Secretary; George B. Lessig, Treasurer and Superintendent. Expect shortly to make finished bar iron.
- Keystone Iron Works, Craig & Snell, Reading, Berks county. Built in 1857; 5 single puddling furnaces, 2 heating furnaces, and one 16-inch train of rolls; product, boiler plate, tank, chute, stack, pipe, boat and car iron, and muck bars; annual capacity, 2,000 net tons.
- Laurel Iron Works, W. P. Worth & Co., lessees, 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.
- Little Schuylkill Rolling Mill, James A. Inness, 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. Thomas B. Inness, Superintendent.
- Lukens Rolling Mills, Huston & Penrose & Co., Coatesville. Built in 1810; 3 double puddling furnaces, 4 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; annual capacity, 6,000 net tons. The puddle mill, operated by 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. Built in 1857; 1 double and 4 single puddling furnaces, 3 heating furnaces, 2 trains of rolls, and one 3-ton hammer; product, every variety of plate iron; annual capacity, 4,500 net tons. *See Bloomeries.*
- 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; annual capacity, 5,000 net tons. James Hooven, owner. *See Schuylkill Valley Furnaces.*
- Palo Alto Rolling Mill, Philadelphia and Reading Coal and Iron Company, lessees, Pottsville, Schuylkill county. W. E. C. Coxe, Superintendent, office at Reading, Pa. 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." See *Philadelphia and Reading Rolling Mill*.
- Parkesburg Iron Works, Horace A. Beale & Co., Parkesburg, Chester county. First started in April, 1873; 2 double puddling furnaces, 3 charcoal finery fires, 3 heating furnaces, 1 train of rolls, and 1 hammer; product, tube skelp; annual capacity, 3,000 net tons. Horace A. Beale, owner.
- 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. Steel rails are rolled from purchased blooms. Brand, "P. & R." See *Palo Alto Rolling Mill*. See *Schuylkill Valley Furnaces*.
- 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; annual capacity, 35,000 net tons. A new mill is being built, which is to be of greater capacity than the old one; in May, 1880, one 18 and one 12-inch train of rolls will be started in it. David Reeves, President; John Griffen, Superintendent; W. H. Reeves, Assistant Superintendent; Geo. Gerry White, Secretary; James O. Pease, Treasurer. See *Schuylkill Valley Furnaces*. See *Fulton Rolling Mill*. See *Safe Harbor Rolling Mill*.
- Pine Iron Works, Joseph L. Bailey & Co., 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.
- Port Carbon Iron Works, Atkins Brothers, lessees, 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; 5 double puddling furnaces, 3 heating furnaces, and 3 trains of rolls (muck train, plate train, and 8-inch bar train); product, plate iron,

comprising boiler, tank, pipe, and flue-iron; annual capacity, 6,000 net tons. Specialties, pipe and tube iron. Bar mill not operated for many years. George H. Potts, Chairman; Henry Potts, Jr., Treasurer. Pottstown Iron Company, Pottstown, Montgomery county. Built in 1863 and extended in 1867; 12 double puddling furnaces, 8 heating furnaces, 54 nail machines, 1 hammer, 1 squeezer, and 5 trains of rolls (one 21-inch muck, one 23-inch muck, one 23-inch nail plate, and two 25-inch plate); product, nails, and boiler, ship, and tank plate iron; annual capacity, nails, 10,000 net tons, plate, 7,500 tons. President, Theo. H. Morris; Vice-President, Andrew Wheeler; Secretary, Joseph K. Wheeler; Treasurer and General Manager, Wm. H. Morris. *See Schuylkill Valley Furnaces.*

Pottsville Rolling Mills, Atkins Brothers, 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. *See Schuylkill Valley Furnaces. See Port Carbon Rolling Mill.*

Reading Bolt and Nut Works, J. H. Sternbergh, Reading. Built in 1865; enlarged in 1872; 2 heating furnaces, one 10-inch train of rolls, and 1 hammer; product, bar iron, which is used at these works for manufacturing machine bolts, track bolts, carriage bolts, lag screws, rods for buildings, bridges, etc., and nuts and washers of all sizes; annual capacity, about 3,000 net tons.

Reading Iron Works, Reading. Office, 261 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. President, John Penn Brock; Treasurer, F. W. Ralston; Secretary, J. S. Schroeder; General Superintendent, B. H. West. *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 one railroad spike, bolt, and rivet machine; product, merchant bar iron, small T rails for mining purposes, railroad spikes,

bolts, and rivets; 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; 16 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.*

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

Thorndale Iron Works, Wm. L. Bailey, Treasurer, Thorndale P. O., Chester county. Built in 1847; 2 double and 2 single 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.

Valley Iron Works, C. E. Pennock & Co., Coatesville, Chester county. Built in 1837; 4 double puddling furnaces, 4 heating furnaces, one 4-ton steam 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.*

West Brandywine Iron Works, S. & B. R. Hatfield, Coatesville, Chester county. Built in 1845; two mills, one-fourth of a mile apart, run by water-power; 2 heating furnaces and 2 trains of rolls; product, plate iron; annual capacity, 2,000 net tons. Puddling department in Huntingdon county, Pa. Not in operation for several years, and offered for sale. *See Bloomaries.*

Number of rolling mills and steel works in Eastern Pennsylvania, except Philadelphia: 45. Of these 8 are rail mills, 2 making only light T rails; 2 make McHaffey steel; 1 makes Bessemer steel, and 1 is building open-hearth steel works.

PROJECTED.

A rolling mill at Bethlehem is projected, which will make iron and steel hoops and wire, by the Lauth "continuous" mill, from iron and steel stock furnished by the Bethlehem Iron Company.

A rolling mill at Chester is projected, to make combination iron and steel bars and plates by the Wheeler process.

CENTRAL DISTRICT.

Altoona Iron Company, Altoona, Blair county. Built in 1872-3; put in operation in April, 1873; additions made in 1878 and 1879; 7 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, and nut iron; annual capacity, 10,800 net tons. Light irons a specialty. Brand, "Altoona." S. C. Baker, President; Wm. M. Wheatley, Secretary and Treasurer.
- 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.*
- Berwick Rolling Mill, Berwick Rolling Mill Company, Berwick, Columbia county. Built in 1872; 11 single puddling furnaces, 2 heating furnaces, and 3 trains of rolls; product, bar iron; annual capacity, 6,000 net tons. C. G. Jackson, President; C. R. Woodin, Vice-President; Garrick Mallery, Treasurer; H. F. Glenn, General Manager.
- Capouse Merchant-Iron Mill, Spencer & Price, 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.
- Central Iron Works, Harrisburg, Dauphin county. Old mill built in 1853 by Charles L. Bailey & Bro., and changed and enlarged in 1879; 1 single and 5 double puddling furnaces, 1 large squeezer, and 1 train of muck rolls, with appliances; annual capacity, about 7,000 net tons muck bar. New mill built in 1877-8; 3 large heating furnaces, 1 train roughing rolls 31 in. x 96 in., 1 train Lauth's 3-high finishing rolls, 31 in. x 96 in., with shears, crane, etc.; product, boiler and tank plate iron; annual capacity, about 7,000 net tons. Charles L. Bailey, President; Abraham S. Patterson, Secretary; G. M. McCauley, Treas.
- Chesapeake Nail Works, Chas. L. Bailey & Co., Harrisburg, Dauphin county. Built in 1867; 16 single puddling furnaces, 3 heating furnaces, 2 trains of rolls (20-inch puddle and 16-inch plate), and 67 nail machines; product, nails; annual capacity, 7,500 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. Commenced operations in March, 1879, after five years' idleness.
- Codorus Steel Works, Truscott & Co., York, York county. Built in 1869; 10 single puddling furnaces, 2 heating furnaces, 2 trains of rolls, and 1 hammer; product, principally puddled steel for heading iron rails; annual capacity, 7,500 net tons. Not in operation since 1874.
- Co-operative Iron and Steel Works, Danville, Montour county. Built in 1871; 8 single puddling furnaces, 6 heating furnaces, and 2 trains of 18-inch rolls; product, all sizes of T and street rails; street rails a specialty; annual capacity, 15,000 net tons. The machinery is fitted for

- 25,000 tons, needing only additional heating furnaces. P. Baldy, Jr., President; L. K. Rishel, Secretary, Treasurer, and Manager.
- Danville Rolling Mill, William Painter, Box 2,116, Philadelphia. Mill at Danville, Montour county. Built in 1870; 8 heating furnaces and 2 trains of 20-inch 3-high rolls; product, iron rails; annual capacity, 20,000 net tons. Superintendent, James D. Kase. *See Upper Susquehanna Furnaces.*
- Duncannon Iron Company, Duncannon, Perry county. Office, 122 Race st., Philadelphia. Built in 1838; 16 single puddling furnaces, 6 heating furnaces, 4 trains of rolls, and 54 nail machines; steam and water power; product, bar iron and nails; annual capacity, 8,000 net tons. Specialty, bar iron. William Wister, President; John Wister, 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, 1,600 net tons. Agents for wire billets, Milliken & Smith, 95 Liberty st., New York. *See Charcoal Furnaces. See Bloomeries.*
- 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; annual capacity, 20,000 net tons. Formerly owned by the National Iron Company. President, Alfred Creveling, 234 South Fourth st., Philadelphia; Treasurer, Henry Levis, Philadelphia; Secretary and General Manager, George W. Miles, Danville.
- Harrisburg Nail Works, McCormick Estate, Harrisburg. Works at West Fairview, Cumberland county. Built in 1810; 9 double puddling furnaces, 3 heating furnaces, 2 trains of rolls, and 73 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. *See Lower Susquehanna Furnaces.*
- 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 18 nail machines; product, merchant bar, pipe iron, 12 to 16-lb. T rails, "B. B." bolt rods, and cut nails and spikes; annual capacity, 6,000 net tons. J. W. Bracken, President; B. M. Johnston, Secretary and Treasurer. *See Portage Iron Works.*

- 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, one 12, and one 8-inch), and 1 rotary squeezer; water-power; product, all sizes merchant bar, band, hoop, and guide iron; annual capacity, 3,600 net tons. *See Charcoal Furnaces. See Bloomaries.*
- Juniata Rolling Mill, Blair Iron and Coal Company, lessees, Hollidaysburg. Built in 1866; 15 single puddling furnaces, 3 heating furnaces, 2 trains of rolls, 30 nail machines, and 1 hammer; fitted up to make sheets and nails; product, at present, muck bar; annual capacity, 9,000 net tons of muck bar. *See Bituminous Furnaces.*
- Lackawanna Iron and Steel Works, Lackawanna Iron and Coal Company, Scranton, Lackawanna county. Commenced in 1840; 113 single puddling furnaces, 35 heating furnaces, and 12 trains of rolls (one 31, one 23½, two 23, two 22, two 20, three 18, and one 8-inch), and 1 hammer; steam and water power; product, light and heavy railroad iron, merchant bar iron, and car axles; annual capacity, 150,000 net tons of steel and iron rails, and 13,500 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, 135,000 net tons ingots; first blow made Oct. 23, 1875; first steel rail rolled Dec. 29, 1875. An additional converter is to be erected, to have an annual capacity of 45,000 net tons of ingots. President, E. F. Hatfield, Jr., 52 Wall st., New York; General Manager, W. W. Scranton, at Scranton, Pa.; Secretary, Edward C. Lynde, Scranton, Pa. Brand, "Scranton." *See Upper Susquehanna Furnaces.*
- Lancaster Rolling Mill, Manuel McShain & Co., Hempfield, Lancaster county. Office, 138 Walnut st., Philadelphia. 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; 8 double and 4 single puddling furnaces, 8 heating furnaces for rails, 4 heating furnaces for the merchant mill, and 4 trains of rolls (one 16 and three 18-inch); product, rails from 15 lbs. per yard upward, bar iron, and splice bars; annual capacity, 25,000 net tons rails, and 3,000 tons merchant iron and splice bars. Henry McCormick, President; A. J. Dull, Treasurer and General Manager. *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; 4 double puddling furnaces, 3 heating furnaces, 1 steam hammer, and 3 trains of rolls (one 8, one 12, and one 16-inch); steam and water power; product, rolled charcoal and refined bar iron, coupling links, and pins. A part of the establishment, comprising a 10-ton hammer and a tire mill, is rented to the Standard Steel Works. President, John M. Kennedy; Secretary, C. Weston, Jr.; Treasurer, H. T. Townsend; Superintendent, R. H. Lee. *See Charcoal 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, 50 nail machines, and one 20-inch train of rolls; product, nails.
- Milton Rolling Mill, Milton Iron Company, Milton, Northumberland county. Put in operation December 1, 1872; 6 puddling furnaces, 1 heating furnace, and 3 trains of rolls; product, round, square, and flat bar iron; annual capacity, 2,000 net tons. Brand, "Milton." W. A. Schreyer, President; P. C. Johnson, Treasurer.
- Northumberland Iron and Nail Works, Van Alen & Co., Northumberland, Northumberland county. Built in 1867; 7 single puddling furnaces, 1 heating furnace, 1 train of rolls, 1 rotary squeezer, and 27 nail machines, having Coyne's patent automatic nail assorters attached; product, nails, nail plate, axe bar, muck and scrap bars; annual capacity, 4,800 net tons muck bar, 4,000 tons nail plate and axe bars, 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. Denny, Manager.
- Penn Iron Company Limited, Lancaster, Lancaster county. First put in operation in April, 1873; 8 single puddling furnaces, 4 heating furnaces, and 3 trains of rolls (one 18-inch puddle, one 16-inch bar, 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, 10,000 net tons. A. J. Steinman, Chairman; W. G. Mendinhall, Secretary and Treasurer; W. B. Middleton, Superintendent. Philadelphia office, 945 Ridge avenue.
- Pennsylvania Iron Works, Montour Iron and Steel Company, Danville.

Built in 1845; 22 double and 16 single puddling furnaces, 15 heating furnaces, 4 trains of rolls, and 1 hammer; product, railroad iron; annual capacity, 40,000 net tons. President, W. E. C. Cox, Reading; General Superintendent, F. P. Howe, Danville; Treasurer, S. W. Ingersoll, 227 South Fourth st., Philadelphia. *See Upper Susquehanna Furnaces.*

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 6½-gross-ton converters. Rolling mill built in 1867-8, and since enlarged; an extensive blooming mill was added to the rolling mill in 1875-6, and put in operation in December, 1876. Hammer mill contains 6 and 12-ton hammers. Open-hearth steel plant, erected in 1875, contains two 7-gross-ton Siemens open-hearth steel furnaces. 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, 100,000 net tons ingots. Additions to the Bessemer steel plant are now being made, to consist of 3 converters, to have an annual capacity of 165,000 net tons. 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 Works, Hollidaysburg Iron and Nail Company, lessees, Hollidaysburg. Works at Duncansville, Blair county. Built in 1839; 9 single puddling and 2 heating furnaces, 4 trains of 18-inch rolls, and 37 nail machines; built to make nails; product, at present, puddled bar; annual capacity, 4,600 net tons. *See Hollidaysburg Iron Works.*

Safe Harbor Rolling Mill, Phoenix Iron Company, Safe Harbor, Lancaster county. Office, 410 Walnut st., Philadelphia. Built in 1848; 1 single and 17 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. *See Phoenix Iron Works.*

Shawnee Rolling Mill, Shawnee Rolling Mill Company Limited, Columbia, Lancaster county. Built in 1854; 2 double and 12 single puddling furnaces, 7 heating furnaces, and 4 trains of rolls; built to make rails; product, at present, puddled bar; annual capacity, 15,000 net tons. Formerly called Columbia Steel and Iron Works. J. W. Thomas, Superintendent.

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 Achenbach, Mill Superintendent.

Standard Steel Works, 220 South Fourth st., Philadelphia. Works at Logan, near Lewistown, Mifflin county. Built in 1869; 6 heating furnaces, 2 hammers, 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, General Manager.

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; Wm. Patton, Treasurer; John Paine, Superintendent.

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, Williamsport, Lycoming county. Built in 1873-4; 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, 4,000 net tons. John Jenkins, Superintendent; John Schwer, Jr., Secretary and Treasurer.

Number of rolling mills and steel works in Central Pennsylvania: 39. Of these 8 are rail mills, 1 making only light T rails; 2 are Bessemer steel works, and 1 is an open-hearth steel works.

PROJECTED.

Nail works at Watsonstown, Northumberland county.

PITTSBURGH AND ALLEGHENY COUNTY.

Allegheny and Monongahela Iron Works, Lewis, Oliver & Phillips, Pittsburgh, Allegheny county. Built in 1866 and 1864, respectively; 60 single puddling furnaces, 14 heating furnaces, 2 rotary squeezers, and 9 trains of rolls (two puddle, two 16-inch bar, two 10-inch bar, and three 8-inch bar trains); product, bar iron, round, square and oval, bands, and peculiar and odd shapes, bolts, nuts, washers, hinges, and

other wrought-iron hardware; annual capacity, 50,000 net tons. *See Birmingham Iron Works.*

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, Smyth & Co., Pittsburgh. Built in 1837; 20 single puddling furnaces, 6 heating furnaces, 4 trains of rolls, 96 nail machines, 65 tack machines, and 2 hammers; product, spikes, nails, tacks, and brads; American and Swedish plates; annual capacity, 12,000 net tons.

Birmingham Iron Works, Lewis, Oliver & Phillips, lessees, Pittsburgh. Built in 1836; 20 single puddling furnaces, 5 heating furnaces, 5 trains of rolls, and a wire-rod train on the Belgian system. These works do not make finished bar iron, but are operated in connection with the other works of the firm. *See Allegheny Iron Works.*

Black Diamond Steel Works, Park, Brother & Co., Pittsburgh. Established in May, 1862; 6 single puddling furnaces, 3 forge fires, 51 heating and annealing furnaces, 7 trains of rolls (one 8, one 9, one 10, one 12, one 16, one 18, and one 26-inch), 21 hammers, 7 steel-cementing furnaces, three 42-pot Siemens furnaces, two 24-pot Siemens furnaces, one 30-pot Siemens furnace, and 24 two-pot steel-melting holes; 252 pots can be used at each heat in steel works; building two 7-gross-ton Siemens open-hearth steel furnaces; product, all varieties of crucible and open-hearth cast steel; annual capacity, 15,000 net tons. Brands, "Black Diamond" and "Corona."

Blair Iron and Steel Company's Works, Hussey, Howe & Co., lessees, Pittsburgh. Works at Glenwood, Allegheny county, on the Baltimore and Ohio railroad. One 7-gross-ton Siemens open-hearth furnace; product, steel ingots. *See Hussey, Howe & Co.*

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); also a galvanizing department and a pipe mill, to make butt-welded gas, steam, and water pipe; product, bars, plates, sheets, shafting, and skelp iron; annual capacity, 15,000 net tons.

Clinton and Millvale Rolling Mills, Graff, Bennett & Co., Pittsburgh. Built in 1846; 41 single puddling furnaces, 6 Danks rotary puddling furnaces, 17 heating furnaces, 11 trains of rolls, 41 nail machines, and 1 hammer; product, bars, sheets, plates, and nails; annual capacity, 20,000 net tons. *See Fort Pitt Iron and Steel Works. See Allegheny County Furnaces.*

Crescent Steel Works, Miller, Metcalf & Parkin, Pittsburgh. Built in 1867; 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, 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.

Duquesne Spring and Axle Works, J. S. Liggett, Spruce and Market sts., Allegheny City. Built in 1865; one 30-ton converting furnace, 5 heating furnaces, and 5 hammers; make German steel, which is used in spring works; product, buggy and wagon springs and axles.

Eagle Rolling Mill, J. W. Friend & Co., Pittsburgh. Built in 1848; 17 single puddling furnaces, 4 heating furnaces, 3 steel-heating furnaces, 42 nail machines, 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, Edgar Thomson Steel Company Limited, Bessemer Station, Allegheny county. Branch office and post-office address, 48 Fifth avenue, Pittsburgh. Began operations in August, 1875; two 7-gross-ton converters; 4 cupolas, 40 x 5; 4 spiegel cupolas, 40 x 2; two 12-ton cupola ladles; 31 tubular boilers, 15 x 5; hydraulic lifting machinery; 24 gas producers, and 9 Siemens heating furnaces; 32-inch 3-high blooming mill, and 23-inch 3-high rail train; forge, containing one 6-ton hammer and 2 reverberatory heating furnaces, machine and smith shops attached; product, only Bessemer steel in the several forms of rails, blooms, and billets, of all sizes down to 4 in. x 4 in.; daily capacity, double turn, 450 gross tons ingots, and 375 gross tons rails and billets. First blow made on August 26, 1875, and first rail rolled on 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.

Elba Iron and Bolt Company Limited, No. 3 Smithfield st., Monongahela House, Pittsburgh. Works at Elba Station, Baltimore and Ohio rail-

road. 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; 20 puddling furnaces, 15 heating furnaces, 7 hammers, two 24-pot Siemens steel-melting furnaces, and 8 trains of rolls (two 22, two 16, one 12, one 9, and two 8-inch); 48 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, 2,000 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, 8 heating furnaces, 9 railroad spike machines, and 5 trains of rolls (two 8, one 10, and two 16-inch), one train being a "continuous" train for spike iron; product, principally railroad and marine spikes, also railroad chairs, fish bars, and bolts; annual capacity, 20,000 net tons. Brand, "Dilworth, Porter & Co."

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., Pittsburgh. Built in 1859; 16 single puddling furnaces, 26 heating furnaces, 11 hammers, 96 two-pot coke steel furnaces, six 24-pot Siemens furnaces, and 10 trains of rolls (one 9, one 12, five 16, two 18, and one 28-inch); 336 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, 13,000 net tons ingots. One 7-gross-ton Siemens open-hearth furnace, built in 1879. *See Blair Iron and Steel Company's Works.*

Juniata Iron Works, Shoenberger & Co., Pittsburgh. Built in 1824 and 1857; one 10-gross-ton Siemens open-hearth steel furnace, annual capacity 6,000 net tons, built in 1879; 29 single puddling furnaces, 10 heating furnaces, 4 annealing furnaces for sheet iron, 2 pair heating furnaces for sheet iron, 6 furnaces for heating nail plates, 1 furnace for

annealing nails, 8 hammers, and 8 trains of rolls (2 muck trains, one 16-inch bar, one 8-inch bar, 2 sheet trains, 1 nail-plate train, and 1 blooming-mill train), and 92 nail machines; product, nails, sheet and plate iron, horse and mule shoes, horse-shoe bar, and steel blooms; annual capacity, 30,000 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; 16 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, Williams, Long & McDowell, 87 Water st., Pittsburgh. Built in 1865; 19 single puddling furnaces, 1 scrap and 5 heating furnaces, and 4 trains of rolls; product, merchant bar and skelp iron, plates, sheets, and boiler iron; annual capacity, 11,000 net tons. Specialty, plates and skelp iron. A mill for rolling large-sized plates will shortly be added.

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 Siemens furnace, 8 hammers, and 4 trains of rolls (one 20, one 16, one 10, and one 8-inch); 84 pots can be used at each heat in steel works; product, merchant steels of every description; also, springs, and iron and steel axles; annual capacity, 7,000 net tons.

McKeesport Iron Works, W. D. Wood & Co., 111 Water st., Pittsburgh. Works at McKeesport, Allegheny county. Built in 1851; 12 forge fires, 8 single puddling furnaces, 20 heating furnaces, 5 trains of rolls, and 4 hammers; product, sheet iron, both common and planished; annual capacity, 5,000 net tons. Trade mark, a bear in the talons of an eagle.

National Tube Works Company, McKeesport and Pittsburgh. Two mills: National Rolling Mill No. 1 is situated at McKeesport; built in 1879; 8 double puddling furnaces, 7 heating furnaces, 1 plate mill, 1 "continuous" mill, and 1 "universal" 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 3 trains of rolls (16, 10, and 8-inch). Product, pipe iron and boiler plate; total annual capacity, 40,000 net tons. Brand, "National." James C. Converse, President; P. W. French, Secretary; Wm. T. Eaton, Treasurer; J. H. Flagler, Superintendent.

Nellis's Agricultural Works, Nellis, Shriver & 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; prod-

- uct, all kinds of steel and iron for agricultural purposes, cast 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 Scottsdale Rolling Mill. See Bituminous Furnaces.*
- Pittsburgh Bessemer Steel Company Limited, Pittsburgh. Building Bessemer steel works; to contain two 4-gross-ton converters and one 30-inch blooming mill; product to be marketed in the shape of blooms and billets. Managers, W. H. Singer, Chairman; Reuben Miller, Secretary and Treasurer; C. C. Hussey, W. G. Park, and Wm. Clark.
- Pittsburgh Forge and Iron Company, 10th st. near Penn avenue, Pittsburgh. Built in 1864; 30 single puddling furnaces, 8 heating furnaces, 3 trains of rolls, and 3 hammers; product, (1) bar, rod, band, hoop, oval and half oval iron, fish plates, and track bolts, and (2) hammered car and locomotive axles, railroad, steamboat, and machine forgings; annual capacity, (1) 13,000 net tons, (2) 2,000 tons. Brands, "P. F. & L.," and "V. C." Calvin Wells, President and Treasurer; James K. Verner, Secretary.
- Pittsburgh Iron Works, Jacob Painter & Sons, Pittsburgh. Built in 1833; 52 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, 24,000 net tons. Brand, "Painter."
- Pittsburgh Steel Casting Company, 26th 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. James Irwin, President; Henry W. Patterson, Secretary, Treasurer, and General Manager; Wm. Hainsworth, Superintendent.
- Pittsburgh Steel Works, Anderson & Co., Ross st. and 1st ave., 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, 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); wire-rod mill erected in 1877, on the Belgian system, with capacity to turn out 20 tons per 10 hours of No. 5 crucible cast steel; 150 pots can be used at each heat

in the steel works, which are run double turn, 3 heats each turn, making them equal to 900 single pots daily; product, cast and German plow steel, plate steel, and best edge-tool steel; annual capacity, 10,000 net tons. Open-hearth steel works added in 1879, containing one 10-gross-ton and one 7-gross-ton Siemens open-hearth furnace, 1 blooming mill, and 1 plate mill. *See Forges.*

Read & Thaw, Pittsburgh. Works at North and Irwin avenues, Allegheny City. Made their first steel in August, 1878; 5 heating furnaces, 3 hammers, and 6 coke steel-melting holes; can use 12 pots at each heat in steel works; product, pure crucible steel cast to shape of steel castings, and agricultural wrought steels of every description; annual capacity, 1,300 net tons.

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., Pittsburgh. Built in 1848. In mill, 8 puddling furnaces, one 18-inch train of rolls, one $4\frac{1}{2}$ -ton steam hammer, four 24-pot Siemens gas furnaces, 30 melting furnaces, and one 7-gross-ton Siemens open-hearth furnace; 156 pots can be used at each heat in steel works; annual capacity, 12,000 net tons of finished cast steel. In steel-converting department, 8 furnaces; annual capacity, 5,500 net tons. In finishing mill, one 22-inch 3-high sheet and plate train, one 16-inch and one 10-inch bar train, 11 heating furnaces, and 10 hammers; the plate mill has 4 sets of 28-inch rolls, 4 sets of 20-inch rolls, and 6 heating furnaces. Product, steel boiler plates, tool steel, saw and sheet steel, and all other kinds of steel; also, carriage springs and axles. General agents for the Eastern States, Hogan & Barrows, 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, one 6-tuyere refinery, 6 trains of rolls (1 muck and 5 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. Building two 10-gross-ton Siemens-Pernot open-hearth steel furnaces and a 30-inch blooming mill. 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 5 trains of rolls; product, cotton ties, hoop, band, and horse-shoe iron; annual capacity, 9,000 net tons. Brand, "Star."
- Superior Rolling Mill, Andrew Kroman, lessee, Pittsburgh. Built in 1865; 30 single puddling furnaces, 16 heating furnaces, and 4 trains of rolls; product, iron and steel structural material and steel rails; 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 and steel rails only, made from purchased steel stock.
- Union Forge and Iron Mills, Wilson, Walker & Co., Pittsburgh. Built in 1862; 20 single puddling furnaces, 12 heating furnaces, 11 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, 11,000 net tons.
- Union Iron Mills, Carnegie Brothers & Co., Pittsburgh. Built in 1862; 31 single puddling furnaces, 6 double heating (Siemens) furnaces, 2 single heating (Siemens) furnaces, 2 single reverberatory heating furnaces, and 7 trains of rolls; product, beams, channels, tees, angles, plates, and bar iron; annual capacity, 35,000 net tons.
- 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, 3d Ward, McKeesport, Allegheny county. Built in 1873-4; 3 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, and 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. Black plates branded "U. S. A. M." J. H. Demmler, President; D. J. Thomas, Vice-President; H. H. Demmler, Treasurer; W. C. Cronmeyer, Secretary.

Vesuvius Iron and Nail Works, Moorhead, Brother & Co., Pittsburgh. 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. Brand, "Vesuvius."

Wayne Iron and Steel Works, Brown & Co., Pittsburgh. Built in 1829; 28 puddling furnaces, 7 heating furnaces, 5 trains of rolls, 2 steam hammers, 24 steel-melting holes, and two 45-ton converting furnaces; 48 pots can be used at each heat in steel works. Product: Iron—bars, rods, hoops, sheets, light T rails, splice bars, boiler plate, and rivets. Steel—cast, German, and "U. S." refined. Annual capacity, 10,000 net tons of iron, and 3,500 net tons of steel. Brands: Ordinary refined bar, "Wayne;" special, "Bloom;" highest quality, "U. S." Boiler plate, "U. S." (tensile strength, 65,000.) Steel, "Wayne," "Brown's Best German," "U. S. Refined," "Imperial," and "Cast."

Number of rolling mills and steel works in Pittsburgh and Allegheny county: 47 completed and 2 building. Of these, 7 are rail mills, 5 making only light rails; 13 are crucible steel works; 1 makes cemented steel only; 1 is a Bessemer steel works, and 1 Bessemer steel works is building; 5 are open-hearth steel works, and 2 open-hearth steel works are 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, and 6 pairs of rolls; product, fine sheet iron; specialties, pan, elbow, lock, shovel, show card, etc.; brand, "Apollo."

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, J. S. Craft & Co., Beaver Falls, Beaver county. Built in 1879; 8 single puddling furnaces, 2 heating furnaces, 2 trains of rolls (9 and 14-inch), and 1 double-acting, 5,000 lb., steam hammer; product, refined blooms, bars, and billets for steel making; annual capacity, 3,000 net tons. Brand, "Boulding." John Boulding, Superintendent.

Beaver Falls Steel Works, Beaver Falls, Beaver county. Built in 1875; 1 Siemens 24-pot 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 19-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. 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, 135,000 net tons iron and steel rails, and 13,500 net tons steel wire rods. 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; Powell Stackhouse, Assistant General Manager; George Webb, General Agent. *See Bituminous Furnaces.*

Erie Rolling Mill, Mount Hickory Iron Company Limited, Erie, Erie county. Built in 1872; 13 single 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, 7,000 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 Company Limited, Johnstown, Cambria county. Built in 1878. Rolling mill has 15 heating furnaces, 2 steam hammers, and 8 trains of rolls (three 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. The works are an outgrowth of the Lafayette Steel Works of D. G. Gautier & Co., Jersey City, N. J., transplanted and enlarged. The wire works are an outgrowth of the New Jersey Wire Mill of Henry Roberts, formerly located at Newark, N. J.; in addition to ordinary grades, galvanized wire is made a specialty. Other departments are, carriage-spring works, railroad spring works, finger-bar and rake-tooth shops.

Annual capacity of rolling mill, 25,000 net tons; wire mill, 25,000 tons; other departments, 2,000 tons. D. G. Gautier, Chairman; D. J. Morrell, Secretary and Treasurer; Charles Douglass, General Superintendent. Eastern office and warehouse, D. G. Gautier, 93 John st., New York; Philadelphia office and warehouse, W. B. Corinth, 505 Commerce st.

Greenville Rolling Mill, Kimberly, Carnes & Co., Sharon. Works at Greenville, Mercer county. Built in 1871; 12 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, bars, bands, rods, hoops, and cotton ties; 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; 16 single puddling furnaces, 5 heating furnaces, 3 trains of rolls, 22 nail machines, and 1 squeezer; product, muck bar and finished iron; annual capacity, 7,000 net tons. Formerly called Valley Rolling Mill. 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 ave., Pittsburgh. Built in 1872; 9 single puddling furnaces, 6 knobbling fires, 1 refinery, 3 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, 2,900 net tons. Use natural gas for fuel. Brand, "Leechburg."

Middlesex Rolling Mill, Wheeler Iron Company, Sharon. Works at West Middlesex, Mercer county. Put in operation June 1, 1873; 10 single puddling furnaces, 1 heating furnace, and 2 trains of rolls (one 10 and one 18-inch); product, muck bar and bar iron, made from Bessemer pig iron, and sold principally to steel manufacturers; annual capacity, 5,000 net tons. E. A. Wheeler, Manager. *See Shenango Valley Furnaces.*

New Castle Iron Works, Bradley, Reis & Co., New Castle, Lawrence county. Built in 1873; 1 double and 11 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.

Old Fort Iron Works, Adam Jacobs, Brownsville, Fayette county. Completed December 1, 1873; 6 single puddling and 3 heating furnaces, 2 trains of rolls, 2 spike and bolt machines, 2 hammers, and 1 squeezer;

product, bar iron, light T rails, car axles, spikes and bolts, and general forgings; annual capacity, 9,000 net tons. Not in operation for several years.

Scottdale Rolling Mill, Everson, Macrum & Co., Pittsburgh. Works at Scottdale, Westmoreland county. Built in 1873; 11 single puddling furnaces, 4 heating furnaces, and 3 trains of rolls; product, muck bar and sheet iron; annual capacity, 5,000 net tons. *See Pennsylvania Iron Works, Pittsburgh. See Bituminous Furnaces.*

Sharon Iron and Nail Works, Westerman Iron Company, 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, Lawrence Iron Company, lessees, 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, 1 hammer, and 2 trains of 18-inch rolls; product, muck bar and blooms; annual capacity, 9,000 net tons. David Stewart, Chairman, 119 Broadway, New York; Fayette Brown, Cleveland, O., General Agent; Theo. F. Hicks, Secretary, New York; G. P. Lloyd, Treasurer, New York; Samuel McClure, Agent, Sharon, Pa. *See Shenango Valley Furnaces.*

Wheatland Rolling Mills, B. B. Reath, 1538 Pine st., Philadelphia. Works at 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. Not in operation since 1874. *See Shenango Valley Furnaces.*

Number of rolling mills and steel works in Western Pennsylvania, except Pittsburgh and Allegheny county: 19. Of these, 5 are rail mills, 3 making only light rails; 1 makes crucible steel, 1 makes open-hearth steel, and 1 makes Bessemer steel.

Total number of rolling mills and steel works in Pennsylvania: 165 completed and 2 building. Of these, 28 are rail mills, 11 making only light rails; 19 make crucible steel; 8 make open-hearth steel, and 3 open-hearth steel works are building; 5 make Bessemer steel, and 1 Bessemer steel works is building; 1 makes cemented steel only, and 2 make McHaffey steel.

DELAWARE.

Christiana Iron Company, Wilmington, New Castle county. Built in 1873-4; 2 double puddling furnaces, 2 heating furnaces, 2 trains of rolls, and 1 hammer; product, boiler plate, flue, ship, and tank iron. Geo. G. Lobdell, President; Jno. W. Huxley, Secretary and Treasurer. Has not been in operation since its erection.

Delaware Iron Works, Alan Wood & Co., Wooddale, New Castle county, near Wilmington. Office, 519 Arch st., Philadelphia. Built in 1812; one 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; 4 double and 2 single 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 and all kinds of bar iron; annual capacity, 9,000 net tons. H. Mendenhall, President; Clement B. Smyth, Vice-President and Treasurer; George W. Todd, Secretary.

Edge Moor Iron Company, Wilmington. Philadelphia office, 1600 Hamilton st. Begun in 1873; not yet completed. Wm. Sellers, President; John Sellers, Jr., Vice-President; Eli Garrett, Secretary and Treasurer; George H. Sellers, General Superintendent.

Marshallton Iron Works, John R. Bringham, Marshallton, New Castle county. Built in 1836; 2 heating furnaces, 1 train of sheet rolls, and 1 train of bar rolls; water-power; product, sheet and bar iron; annual capacity, 700 net tons. A puddle mill will shortly be added.

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. John H. Adams, President; Edmund A. Harvey, Vice-President; William S. Hagany, Treasurer. Represented in Philadelphia by the McDaniel and Harvey Company, 1600 Washington avenue. *See Maryland Rolling Mills. See Bloomaries.*

New Castle Rolling Mill, New Castle Iron and Steel Company, lessees,

New Castle, New Castle county. Removed from Bristol, Pa., and rebuilt at New Castle in 1874-5; enlarged in 1879; 3 double puddling furnaces, 4 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. Hugh E. Steele, President; John D. Steele, Secretary and Treasurer.

Newport Rolling Mills and Volta Galvanizing Works, Marshall Bros. & Co., 24 Girard avenue, Philadelphia. Works at Newport, New Castle county. Rolling mills built in 1873; galvanizing works in 1877; 3 single puddling furnaces, 1 heating furnace, 2 grate furnaces, 2 annealing furnaces, 1 rotary squeezer, and 3 trains of rolls; product, black and galvanized sheet iron; annual capacity, 1,500 net tons. Brands are "Crescent," "A. R. G.," "Rooster," and "D. S.," for black iron, and "Crescent" and "Rooster" for galvanized. *See Rolling Mills in Pennsylvania.*

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. \times 48 in., was built in 1875; 5 forge fires (equal to 6 puddling furnaces), 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; 8 completed mills and 1 building.

MARYLAND.

Abbott Iron Works, Abbott Iron Company, P. O. Box 185, Baltimore.

(1) Plate mills, built in 1851; 6 double puddling and 8 heating furnaces, 1 hammer, and 5 trains of rolls; 2 sets Lauth's patent 3-high plate rolls, with facilities for rolling plate 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; S. F. Eagle, Secretary.

Canton Iron Works, Anderson Bros. & Co., Canton, Baltimore county.

Built in 1878; 2 double puddling and 3 heating furnaces, 1 "continuous" wire-rod rolling machine, and 2 trains of rolls (one 8 and one 15-inch); product, refined merchant bar iron and scythe, hoe, and shovel iron; carriage-bolt iron and wire rods are specialties; use exclusively cold-blast charcoal iron; annual capacity, single turn, 1,500 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 bloomary 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 Northeast 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: John H. Adams, President; E. A. Harvey, Vice-President; W. S. Hagany, Treasurer; H. Whiteley, Secretary. *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; annual capacity, 300 net tons of blooms, 600 tons rolled iron, and 300 tons nails; but no nails have been made for some time. This rolling mill is run at intervals through the year to supply the local trade. *See Furnaces. See Bloomeries.*

James River Steel Manufacturing and Mining Company, Lynchburg. Office, 407 Walnut st., Philadelphia. Mill situated $4\frac{1}{2}$ miles above Lynchburg, on the James River and Kanawha canal. Built in 1867 and refitted in 1880; 4 double puddling and 4 heating furnaces, 2 spike machines, 1 rivet machine, 1 bolt machine, and 4 trains of rolls (three 18-inch and one 10-inch); water-power; product, rails, bar iron, spikes, rivets, and bolts; annual capacity, 10,000 net tons. John F. Hartranft, President.

Lynchburg Iron Works, Lynchburg Iron, Steel, and Mining Company, Lynchburg, Campbell county. Branch office, 319 Walnut st., Philadelphia. Built in 1872; 1 heating furnace, 2 spike furnaces, 2 spike machines, 1 bolt machine, 1 hammer, and one 10-inch train of rolls; steam and water power; product, merchant iron, railroad and boat spikes, bolts, and nuts. Foundry, forge, machine shop, and bridge works operated in connection with the rolling mill. E. Burd Grubb, President; Thomas T. Munford, Vice-President; Alex. Van Rensselaer, Secretary; John Heins, Treasurer; E. G. Spilsbury, Consulting Engineer.

Old Dominion Iron and Nail Works, Richmond. Works at Belle Isle, Henrico county. Improved and enlarged since 1865; 5 double and 10 single puddling furnaces, 5 heating furnaces, 4 trains of rolls, 76 nail machines, and 1 hammer; horse-shoe machinery in course of construction; water-power; product, merchant bar iron, nails, spikes, etc.; annual capacity, nails, 7,500 net tons, rolled iron, 3,600 tons. R. E. Blankenship, Commercial Agent.

Tredegar Iron Works, Tredegar 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: 5. Of these, 1 is a rail mill.

GEORGIA.

Atlanta Rolling Mill, Atlanta Rolling Mill Company, Atlanta, Fulton county. Built in 1865-6; 5 double puddling furnaces, 10 heating furnaces, 6 trains of rolls (two 3-high 18-inch, three 2-high 18-inch, and one 3-high 8-inch), 3 punches, 1 rail-straightening machine, 9 engines, 1 hammer, 5 shears, 1 bolt header, 1 spike machine, 2 squeezers; foundry with 2 cupolas, and machine and bridge shops; product, rails, merchant bar iron, fish bars, bolts, plates and angles, bridges, rolls and rolling mill machinery, forgings, and general machine and foundry work; annual capacity, rails, 18,000 net tons, and bar iron, fish bars, etc., 7,000 net tons; specialty, the use of charcoal iron in rails, bars, and bridge iron. V. R. Tommey, President; Grant Wilkins, General Manager; Thos. W. Chandler, Secretary and Treasurer.

Rome Iron Works, Empire Iron Company, Rome, Floyd county. One single and 2 double puddling furnaces, 3 heating furnaces, 3 trains of rolls, 20 nail machines, 1 spike machine, 1 railroad spike machine, and 2 shears; product, bar iron, nails, and spikes; annual capacity, nails, 2,000 net tons; spikes, 1,000 tons; bar iron, 3,500 tons. R. T. Hargrove, President. This mill has been standing for several years.

Number of mills in Georgia: 2. Of these, 1 is a rail mill.

ALABAMA.

Birmingham Rolling Mill, Birmingham Rolling Mill Company, Birmingham, Jefferson county. In course of erection; 12 double puddling furnaces, 3 Siemens gas heating furnaces, and 3 trains of rolls (one 18, one 16, and one 8-inch); product, merchant bar iron and small T and tram rails; annual capacity, 12,000 net tons. President, W. B. Caldwell, Jr.; Manager, A. J. Moxham.

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; 1 completed mill and 1 mill building; the latter will make light rails.

WEST VIRGINIA.

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; 21 single puddling furnaces, 4 heating furnaces, 2 trains of rolls, and 124 nail machines; product, nails exclusively; annual capacity, 13,750 net tons. A. W. Campbell, President; L. S. Delaplain, Vice-President; Alonzo Loring, Secretary. *See Miscellaneous Bituminous Furnaces in Ohio.*

Crescent Iron Works, Whitaker Iron Company, Wheeling. Built in 1855; 15 double puddling furnaces, 16 heating furnaces, and 6 trains of rolls; product, sheet, plate, tank, and fire-bed iron; mill to roll T rails of all sections is not now used, but it will not at present be altered; total annual capacity, 38,000 net tons. George P. Whitaker, President, Principio, Md.; N. E. Whitaker, Secretary, Wheeling.

La Belle Iron Works, Wheeling. Built in 1852; incorporated Dec. 3, 1875; 20 single puddling furnaces, 3 heating furnaces, 2 trains of rolls, and 89 nail machines; product, nails and spikes exclusively; annual capacity, 10,000 net tons. S. H. Woodward, President; W. H. Woodward, Secretary.

Ohio Valley Iron Works, Ohio Valley Iron Company, Moundsville, Marshall county. Put in operation March 1, 1874; 8 single puddling furnaces, 2 heating furnaces, and 3 trains of rolls (one 8, one 16, and one 19-inch); product, merchant bar of all sizes; specialty, hoop iron for oil barrels; annual capacity, 4,500 net tons. J. W. Gallaher, President; J. T. Frissell, Secretary; Lott H. Joy, Manager. Works idle; mill to be sold about May 1, 1880.

Riverside Iron Works, Wheeling. Built in 1859, and since enlarged; 36 single puddling furnaces, 8 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 300,000 kegs of nails. Brand, "Riverside." J. N. Vance, President; John D. Culbertson, Treasurer; N. Wilkinson, Secretary; Frank J. Hearne, Superintendent. *See Furnaces.*
- Standard Nail Works, Standard Nail and Iron Company, Clifton, Mason county, West Virginia. 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 45 nail machines; product, nails and cut and wrought spikes; annual capacity, 11,000 net tons. Expect to add 20 more nail machines. Formerly called Clifton Nail Works. J. B. Green, President; C. H. Green, Secretary and Treasurer.
- 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. John P. Gilchrist, President; Adams Dodson, Vice-President; C. D. Hubbard, Secretary. *See Furnaces.*
- Number of rolling mills in West Virginia: 8. Of these, 2 are rail mills, 1 making only light rails.

KENTUCKY.

- Anchor Iron and Steel Works, L. M. Dayton, 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.
- Coleman Rolling Mill, Coleman Rolling Mill Company, lessees, 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. Formerly called Louisville Rolling Mill. C. P. Moorman, President; J. Morgan Coleman, Vice-President; L. G. Quigley, Secretary and Treasurer.
- Licking Iron Works, Licking Rolling Mill Company, 100 and 102 West Second st., Cincinnati, Ohio. Works at Covington, Ky. Built in 1845; 1 single and 5 double puddling furnaces, 7 heating furnaces, 1 hammer, and 6 trains of rolls (one 16-inch muck, one 16-inch bar, one 8-inch guide, one 6-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, rail-

road spikes, fish plates, and hand-made chains; annual capacity, 7,000 net tons. H. Worthington, President; J. Droege, Vice-President; S. W. Hampton, Secretary and Treasurer.

Louisville Iron and Steel Works, Louisville Iron and Steel Company, lessees, 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, from 10 to 40 lbs., for narrow-gauge roads, mines, etc., and tram rails, from 20 to 45 lbs., for street railways; annual capacity, single turn, 8,000 net tons. Formerly called Kentucky Rolling Mill. W. B. Caldwell, Jr., President; B. duPont, Vice-President; A. J. Moxham, Superintendent.

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. John Russell, President; A. R. Fennacy, Secretary; Hugh Means, Treasurer. Charles L. Colburn, Agent, 23 West Third st., Cincinnati. *See Furnaces.*

Ohio Valley Steel and Iron Works, Mitchell, Tranter & Co., 52 West Second st., Cincinnati, Ohio. Works at Covington, Ky. Built in 1873; 4 knobbling, 10 puddling, 2 scrap, 2 slab, and 2 plate-mill furnaces, 2 annealing and 4 heating furnaces, 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. Built in 1857; 25 single puddling and 18 heating furnaces, 4 knobbling fires, 10 steel-melting holes, and 9 trains of rolls (8, 10, and 18-inch bar trains, 2 forge, 2 sheet, and 2 plate trains); 20 pots can be used at each heat in steel works; product, heavy and light T and street rails for standard and narrow-gauge railroads, boiler and common plate, light and heavy sheet, merchant bar, shaped irons, and steel safe and plow plate; annual capacity, 60,000 net tons. Alexander Swift, President; Geo. E. Clymer, Vice-President; E. L. Harper, Treasurer; L. T. Hubbard, Secretary. *See Furnaces.*

Tennessee Rolling Works, D. Hillman & Sons, Tennessee Rolling Works, Lyons county. Branch office at Nashville, Tennessee. 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. To be sold on May 10, 1880. *See Furnaces.*

Number of rolling mills and steel works in Kentucky: 8. Of these, 3 are rail mills, 2 making only light T. and street rails; 1 makes open-hearth steel, and 1 makes crucible steel.

REMOVED.

The Paducah Iron Works, at Paducah, were removed to Riverside, near Cincinnati, Ohio, in 1879.

TENNESSEE.

Knoxville Iron Company, Knoxville, Knox county. Built in 1865; 11 single puddling furnaces, 3 heating furnaces, 30 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, and light T and street rails; annual capacity, 10,000 net tons. W. R. Tuttle, President; W. S. Mead, Vice-President and Treasurer; W. H. Van Beschoten, Secretary.

Lookout Rolling Mill, P. O. Box 624, Chattanooga. Started in October, 1876; 3 double puddling and 2 heating furnaces, and 2 trains of rolls; product, merchant bar iron, 10 to 16-lb. T rails, railroad spikes, and rail splices; annual capacity, 4,000 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 Works, 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, 28,000 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-and-ore" process; product, steel for merchant and rail purposes. W. P. Rathburn, President; H. S. Chamberlain, Vice-President and General Manager; S. B. Strang, Assistant Manager; H. Clay Evans, Secretary. Henry S. King, Manager of furnaces, Rockwood, Roane county. *See Furnaces.*

Vulcan Iron and Nail Works, Haselton & Harison, Chattanooga. Built in 1866; 5 double and 5 single puddling furnaces, 1 scrap furnace, 3 heating furnaces, 1 hammer, 44 nail machines, and 3 trains of rolls (one

8 and two 18-inch); product, merchant bar, light T rails, splice bars, bolts, nails, railroad spikes, nuts, etc.; annual capacity, 10,000 net tons. F. I. Stone, Treasurer and Manager.

Number of rolling mills and steel works in Tennessee: 5. Of these, 4 are rail mills, 3 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. Built in 1851; 7 single puddling and 6 knobbling furnaces, 3 heating furnaces, 4 trains of rolls, and 1 hammer; product, black and galvanized sheet iron; also make coal hods; annual capacity, 4,000 net tons. Formerly called Cleveland Boiler Plate Manufacturing Company and afterwards Standard Iron Company. J. W. Britton, Manager.

Cleveland Rolling Mill Company, Cleveland, Cuyahoga county. Works principally located at Newburgh. Bessemer steel works, built in 1867-8; made first blow October 15, 1868; two 6-gross-ton converters; annual capacity, 100,000 net tons Bessemer steel ingots. Siemens-Martin steel works, built in 1876-8; three 7-gross-ton open-hearth furnaces; annual capacity, 20,000 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. Two rod mills; 2 trains of rolls; annual capacity, 20,000 tons. Wire mills built in 1868; employ 1,500 men; annual output, 20,000 tons of finished wire. Plate mills consist of 6 single puddling furnaces and 4 trains of rolls (1 muck mill, 2 sheet mills, and 1 plate mill); galvanizing works attached; annual capacity, 8,000 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 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; but the mill is not in operation, a part of the works only being used in the manufacture of blooms, etc. 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. Henry Chisholm, President; William Chisholm, Vice-President; E. S. Page, Secretary; W. B. Chisholm, General Manager. See *Furnaces*.

- Forest City Steel Company, Centre and Detroit sts., Cleveland. Works in course of erection; to have 3 hammers and capacity to produce 2 tons of crucible cast steel per day, single turn. L. Prentiss, President; J. H. Clark, Vice-President; E. M. Grant, Treasurer; C. M. Vorce, Secretary; S. C. Prentiss, Superintendent.
- Lake Erie Iron Works, Lake Erie Iron Company, 104 and 106 St. Clair st., Cleveland. Built in 1852; 16 puddling furnaces, 15 heating furnaces, 4 trains of rolls, and 10 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, 15,000 net tons. Nut and bolt works recently added, producing 10 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, Store Manager.
- Otis Iron and Steel Works, Otis Iron and Steel Company, Cleveland. Built in 1873-4; put in operation Jan. 1, 1875; 3 Siemens heating furnaces, 2 hammers, two 7-gross-ton and two 10-gross-ton Siemens open-hearth furnaces, and 3 trains of rolls (one 10, one 20, and one 31-inch); product, steel plate, bar steel, and forgings. Charles A. Otis, President and Treasurer; J. K. Bole, Secretary.
- Sandusky Iron Company, Cleveland. Works at Sandusky, Erie county. Put in operation in October, 1873; 6 single puddling furnaces, 8 heating furnaces, 1 hammer, and 6 trains of rolls (3-high—one 7 and two 18-inch trains; and 2-high—one old-rail, and two puddle trains); product, rails; annual capacity, 30,000 net tons. Formerly called Nes Silicon Steel Works. R. H. Lewis, President.
- Union Iron Works, Union Iron Works Company, Cleveland. Thirty puddling and 7 heating furnaces, 6 trains of rolls, and 2 squeezers; product, nuts, bolts, guide and bar iron, and light T and street rails; annual capacity, 25,000 net tons. Specialty, refined bar iron. Works idle, except the bolt and nut factory now operated by W. U. Masters, 18 National Bank Building, who makes railroad spikes and bolts and steel harrow teeth. *See Furnaces.*
- Valley Iron Company, Cleveland. Built in 1874-5; 1 double puddling furnace, 1 scrap furnace, 1 finishing furnace, 1 hammer, and 2 trains of rolls (one 9 and one 14-inch); product, merchant bar. Not in operation.
- Number of rolling mills and steel works in the Lake region: 7 completed and 1 building. 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 crucible steel works is building.

PROJECTED.

The Toledo Blast Furnace and Rolling Mill Company, H. S. Walbridge, President, intend to erect a rolling mill at Toledo, Lucas county.

MAHONING VALLEY.

Akron Iron Works, Akron Iron Company, Akron, Summit county. Built in 1866; 15 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; specialty, iron for agricultural implements; annual capacity, 6,500 net tons. L. Miller, President; J. A. Long, Secretary; Frederick Bishop, Superintendent. *See Hocking Valley Furnaces.*

Corns Iron Company, Girard, Trumbull county. Put in operation September 1, 1873; 13 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. Formerly called Girard Rolling Mill. John Stambaugh, President; A. J. McCartney, Secretary; N. Crandall, Treasurer; Joseph Corns, General Manager.

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, 10,000 net tons. James Cartwright, President; Wm. H. McCurdy, Vice-President and Treasurer; Alexander Adams, Secretary.

Falcon Iron and Nail Works, Falcon Iron and Nail Company, Niles, Trumbull county. Built in 1867; 12 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, 11,000 net tons. John Stambaugh, President; Myron J. Arms, Secretary and Treasurer.

Grasshopper Iron Works, Wick, Arms & Co., Youngstown. Built in 1876; 1 heating furnace, 1 train of rolls, and 2 spike machines; product, bar iron and spikes; annual capacity, 600 net tons of bar iron and 250 tons of spikes. Formerly called Turner Spike Works.

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.

James Iron Works, P. H. Standish, lessee, Cuyahoga Falls, Summit county. Built in 1865; 1 heating furnace and one 7½-inch train of rolls; water-power; product, rods for chains; annual capacity, 1,200 net tons.

Mahoning Iron Works, Brown, Bonnell & Co., Youngstown, Mahoning county. Built in 1846; 8 double and 38 single puddling furnaces, 11 heating furnaces, 42 nail machines, 1 hammer, 4 spike machines, and 5 trains of rolls (two 8, one 10, one 18, and one 30-inch); product, merchant bar, sheets, nails, and railroad and boat spikes; annual capacity, 25,000 net tons. Brand, "Mahoning." New mill built in 1879-80; 7 double puddling and 3 heating furnaces, 1 train of muck rolls, and one 20-inch bar train. Incorporated in September, 1875. Charles L. Rhodes, President; F. H. Matthews, Vice-President and Treasurer; L. D. Phillips, Secretary. *See Mahoning Valley Furnaces.*

Mahoning Valley Iron Company, Youngstown, Mahoning county. Built in 1871; 52 single puddling furnaces, 14 heating furnaces, and 4 trains of rolls (one 20, one 16, one 9, and one 6-inch); product, bar iron. 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, Niles, Trumbull county. Put in operation in September, 1872; 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, and L. E. Cochran, Secretary and Treasurer, Youngstown.

Russia Sheet-Iron Mills, L. B. Ward, Niles, Trumbull county. Built in 1864; 12 puddling and 4 heating furnaces, 5 nail machines, and 3 trains of rolls; product, sheet iron in widths from 20 to 49 inches, shingle bands, Sykes's improved metallic roofing, plate iron, and nails; annual capacity, 7,500 net tons. Formerly part of the works of James Ward & Co. James Ward, General Manager.

Ward Iron Company, Niles, Trumbull county. Built in 1841; 20 puddling and 6 heating furnaces, and 5 trains of rolls; product, bar, plate, and sheet iron; annual capacity, 14,000 net tons. Formerly part of the works of James Ward & Co. James Ward, General Manager.

Warren Rolling Mill, C. Westlake & Co., Warren, Trumbull county. Built in 1870, burnt in 1878, and 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, bar iron; annual capacity, 9,000 net tons.

Youngstown Rolling Mill, Youngstown Rolling Mill Company, Youngstown. Built in 1871; burnt and rebuilt in 1877; 12 single and 2 double puddling furnaces, 4 heating furnaces, and 4 trains of rolls; product, hoop and band iron, charcoal horse-shoe bar, and compound steel buggy tire; annual capacity, 8,000 net tons. Paul Wick, President; Henry Wick, Secretary.

Number of rolling mills in the Mahoning region: 14. Of these, 2 are rail mills, making only light T rails.

INTERIOR COUNTIES.

Canton Steel Works, Bolton, Bulley & Co., Canton, Stark county. Built in 1872; 7 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, 2,800 net tons of steel ingots. Brand, "Canton."

Cherry Valley Iron Works, Leetonia, Columbiana county. Formerly called Leetonia Iron and Coal Company. Built in 1871; 16 single puddling furnaces, 2 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, rails; annual capacity, 30,000 net tons. D. S. Gray, President; J. M. McCune, Vice-President; Samuel Thomas, Treasurer and General Manager; W. A. Harrison, Secretary.

Dover Rolling Mill, Tuscarawas Coal and Iron Company, 130 Water st., Cleveland. Works at Canal Dover, Tuscarawas county. Built in 1865-6; first iron rolled in February, 1866; 10 puddling furnaces, 2 heating furnaces, and 3 trains of rolls; product, bar iron and light T rails; annual capacity, 5,000 net tons. *See Furnaces.*

Massillon Coal and Iron Company, Massillon, Stark county. Built in 1873, and put in operation January 4, 1875; 6 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. S.

Hunt, President; J. Coleman, Secretary; J. H. Hunt, Treasurer. For sale or to rent.

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, 12,000 net tons. M. Churchill, President; C. W. Greene, Secretary and Treasurer. *See Furnaces.*

Number of rolling mills and steel works in Central Ohio: 7. Of these, 5 are rail mills, 4 making light T rails only; 1 makes open-hearth steel.

PROJECTED.

Bar mill projected at Logan, Hocking county.

OHIO RIVER COUNTIES.

Ætna Iron and Nail Company, Bridgeport, Belmont county. Built in 1873, and put in operation January 1, 1874; 20 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, 10,000 net tons. Have never made any nails. W. W. Holloway, President; W. H. Tallman, Secretary; Lewis Jones, Manager.

Alikanna Rolling Mill, Heirs of Joseph and A. J. Beatty, 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 and hoop iron. Recently operated under a short lease by the Pittsburgh Forge and Iron Company, of Pittsburgh, Pa.

Belfont Iron Works, Belfont Iron Works Company, Ironton, Lawrence county. Built in 1852; 19 single puddling furnaces, 3 heating furnaces, 2 trains of rolls, and 82 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 1868; 21 single puddling furnaces, 3 heating furnaces, 2 trains of rolls, and 90 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 pud-

dling 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; G. W. Weyer, Secretary; E. N. Hope, Treasurer; J. E. York, Superintendent.

Cincinnati Railway Iron Works, Cincinnati Railway Iron Company, 493 East Front st., Cincinnati, Hamilton county. Built in 1864; 9 Danks rotary puddling furnaces, 10 heating furnaces, two 21-inch trains of rolls, and one 5-ton hammer; product, rails; annual capacity, 15,000 net tons. Idle since 1874.

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, 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. Geo. F. Stone, President; E. McMillin, Vice-President and General Manager; D. A. Moulton, Secretary and Treasurer.

Globe Rolling Mill, Globe Rolling Mill Company, 163 and 165 West Pearl st., Cincinnati. Built in 1845; 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, wire rods and wire, and scrap steel for plow and other uses; annual capacity, single turn, 12,000 net tons. This includes the mill formerly belonging to Evans, Clifton & Co., which was purchased in September, 1879. Jacob Traber, President; J. L. Boyer, Vice-President; J. Walter, 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, merchant iron, light rails, and agricultural and machine steel; annual capacity, double turn, 15,000 net tons. A Siemens open-hearth steel furnace is projected. *See Furnaces.*

Jefferson Iron Works, Steubenville, Jefferson county. Built in 1855;

- 22 single puddling furnaces, 3 heating furnaces, 2 trains of rolls, and 85 nail machines; product, nails; annual capacity, 10,000 net tons. Brand, "Jefferson Iron Works." David Spaulding, President; Calvin B. Doty, Vice-President; C. H. Spaulding, Secretary; Wm. R. E. Elliott, Forge Manager. *See Furnaces.*
- Laughlin Nail Company, ~~Wheeling, W. Va.~~ Works at Martin's Ferry, Belmont county, Ohio. Built in 1873-4; 12 puddling furnaces, 3 heating furnaces, 2 trains of rolls, and 56 nail machines; first keg of nails made on March 4, 1874; product, cut nails and spikes; annual capacity, 7,800 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; 16 single puddling furnaces, 6 heating furnaces, and 5 trains of rolls (two 8, one 9, one 16, and one 18-inch); ore for fixing is half local blue limestone, remainder Iron mountain and Lake Superior; product, bar, band, chair, spike, and hoop iron of every variety, cotton ties, and light T rails from 8 to 30 lbs.; annual capacity, 8,000 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.
- Pioneer Rolling Mill, Irondale, Jefferson county. 10 double puddling furnaces and 2 trains of rolls; product, muck bar; annual capacity, 9,000 net tons. In hands of trustees for creditors of the Morgan Iron and Coal Company. *See Furnaces.*
- Portsmouth Iron and Steel Company, lessees, Portsmouth, Scioto county. 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. George S. Lewis, Secretary and Treasurer. Formerly operated by Gaylord Rolling Mill Company.

Riverside Rolling Mill, 73 West Third st., Cincinnati. Mill at Riverside, Hamilton county. In course of erection; 10 single puddling furnaces, 2 scrap furnaces, 5 heating furnaces, and 4 trains of rolls; product, bar, hoop, guide, sheet, and boiler-plate iron; annual capacity, 6,000 net tons. This mill was built at Paducah, Ky., in 1854, and removed to Riverside in 1879. Proprietors, Peter Zinn, Thomas H. Caruthers, and Thomas J. Adams. Superintendent, Thomas J. Adams.

Wellsville Plate and Sheet Iron Company, Wellsville, Columbiana county. Main office at Pittsburgh, Pa. Mill built in 1873 to make tin plate; 4 single puddling furnaces, 2 heating furnaces, 1 hammer, and two 20-inch trains of rolls; product, plate and sheet iron; annual capacity, 2,500 net tons. President and Manager, P. F. Smith; Vice-President, C. L. Umbstaetter; Secretary and Treasurer, Alan W. Wood.

Number of rolling mills and steel works in the Ohio river counties: 17 completed and 1 building. Of these, 7 are rail mills, 5 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: 45 completed and 2 building. Of these, 17 are rail mills, 12 making only light T and flat rails; 1 makes Bessemer steel, 1 makes crucible steel, and 1 crucible steel works is building, and 5 make open-hearth steel.

INDIANA.

Aurora Iron Mills, Aurora 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, and 5 trains of rolls (22-inch sheet and plate train, 16-inch bar, 16-inch muck, 8-inch train, and 20-inch nail plate); product, sheet, plate, angle, hoop, and bar iron, patent cut nails, and hot-pressed nuts; annual capacity, 14,000 net tons. O. P. Cobb, President; T. H. Johnson, Vice-President; J. A. Stratton, Secretary; L. M. Foulk, Treasurer; John D. Dwyer, Superintendent.

Capital City Iron Works, W. C. DePauw (of New Albany), Indianapolis, Marion county. One scrap furnace, 11 single puddling furnaces, 3 heating furnaces, and 3 trains of rolls (one puddle train, one 8-inch guide, and one 15-inch bar); product, bar iron, hoop iron, splice bars, light T rails, and bridge iron; annual capacity, 5,400 net tons.

Evansville Iron and Steel Company, Evansville, Vanderburgh county. Built in 1872, and put in operation in June, 1873; 16 single puddling furnaces, 9 heating furnaces, and three 21-inch trains of rolls; product, rails; annual capacity, 25,000 net tons.

Greencastle Iron and Nail Company, Greencastle, Putnam county. Put in operation in January, 1868; 12 single puddling furnaces, 3 heating furnaces, 1 annealing furnace, two 18-inch trains of rolls, and 33 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 and splice bars; annual capacity, 30,000 net tons. Steel rail mill projected. Aquilla Jones, President; C. B. Parkman, Secretary; W. O. Rockwood, Treasurer.

New Albany Rail Mill Company, New Albany, Floyd county. Built in 1864; 5 double and 6 single puddling furnaces, 10 heating furnaces, and 4 trains of rolls; product, fish bars and 12 to 65 lb. rails; annual capacity, 25,000 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 M. Hubbert, 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, 70 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, 6,000 net tons. Brand, "Wabash." A. J. Crawford, President; J. P. Crawford, Secretary and Treasurer.

Number of rolling mills in Indiana: 9. Of these, 4 are rail mills, 1 making only light T rails.

ILLINOIS.

Belleville Nail Works, J. C. Waugh & Bros., 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 furnaces, 3 heating furnaces, 2 trains of rolls, and 57 nail machines; product, all kinds of cut nails; annual capacity, 7,000 net tons. Make nails out of old rails under W. H. Powell's patent, No. 189,495. General Manager, W. H. Powell.

Centralia Iron and Nail Works, Centralia, Marion county. Built in 1878, and put into operation in March, 1879; 8 single puddling furnaces, 2 heating furnaces, 32 nail machines, and 2 trains of rolls; product, nails. S. M. Warner, President; R. D. Noleman, Secretary; F. Kohl, Treasurer; John Lundy, Supt. St. Louis agents, Wolfe & Good.

Chicago Plate and Bar Mill Company, J. M. Ayer, 72 Washington st., Chicago. Two boiling furnaces, 4 forge fires, 2 scrap furnaces, 2 plate furnaces, 2 annealing furnaces, 4 trains of rolls, and 1 hammer; product, plate and bar iron. Idle and for sale.

Chicago Splice-Bar Mill, Sellers, Fowler & 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; 6 heating furnaces and 3 trains of rolls; manipulate Bessemer steel rail ends; product, tires, plow beams, springs, toe-calk steel, and squares and rounds; annual capacity, 5,000 net tons. C. P. Buckingham, President; E. Buckingham, Treasurer; J. Buckingham, Secretary; E. H. Buckingham, Superintendent.

Duffy, (J. F.), 273 and 275 South Canal st., Chicago. Building a rolling mill; 1 double puddling furnace, 3 forge fires, 1 heating furnace, 4 hammers, 2 trains of rolls (one 10-inch and one cold-rolling 20-inch), 2 steel-melting holes, 1 steel-cementing furnace, and perhaps 1 Siemens open-hearth steel furnace; product, to be hardware and tin plate.

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; puddle mill has 9 double puddling furnaces and 1 double heating furnace, one 16 and one 21-inch train of rolls, and one squeezer; iron rail mill has 8 heating furnaces and 3 trains of 21-inch 3-high rolls; the Bessemer steel works have two 6½-gross-ton converters, 2 double Siemens heating furnaces, one 30-inch blooming train, and 3 trains of 23-inch rolls; product, iron and Bessemer steel rails; annual capacity, 120,000 net tons steel ingots, and 90,000 net tons steel rails. Alex. J. Leith, President, Chicago; W. R. Stirling, Treasurer, Chicago; C. E. Sargeant, Secretary, Chicago; H. S. Smith, General Superintendent, Joliet. *See Furnaces.*

Joseph H. Brown Iron and Steel Company, operated by Joseph H. Brown & Co., lessees, 180 Dearborn st., Chicago. Works at Brown's Mills P. O., Cook county. First put in operation in August, 1876; 6 double puddling furnaces, 2 scrap and 5 heating furnaces, 4 trains of rolls, and 75 nail machines; operated with the Siemens gas furnace; product, merchant bar and nails; annual capacity, 15,000 net tons. *See Furnaces.*

North Chicago Rolling Mill Company, 17 Metropolitan Block, Chicago, Ill., and 37 Mitchell Block, Milwaukee, Wis. Chicago Works 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, 81,000 net tons steel rails, and 60,000 tons iron rails. All rails branded with the company's initials. This company has in operation 3 rail mills, 1 merchant mill, and 6 blast furnaces. O. W. Potter, President, Chicago; S. P. Burt, Vice-President, Milwaukee, Wis.; 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.*

North Chicago Steel Company, 17 Metropolitan Block, Chicago. Building Bessemer steel works, to have two 10-gross-ton converters, and to make Bessemer steel rails. O. W. Potter, President, Chicago; S. P. Burt, Vice-President, Milwaukee, Wis.; S. Clement, Treasurer, Milwaukee, Wis.; R. C. Hannah, Secretary, Chicago. *See Furnaces.*

Northwestern Nail Works, J. T. Walker (Lancaster, Wisconsin), Dunleith, Jo Daviess county. Built in 1875-6; 2 heating furnaces, 2 trains of rolls, and 6 nail machines; product, nails and spikes; annual capacity, 2,000 net tons.

South Chicago Steel Works, South Chicago. Made first steel in July, 1879; 2 heating furnaces, 2 hammers, one 12-pot Siemens steel-melting furnace, 3 steel-melting holes, and 2 steel-cementing furnaces; 18 pots can be used at each heat in steel works; product, bar steel for tools. President and Manager, Peter Schatz; Secretary and Treasurer, Francis W. Newland.

Springfield Iron Company's Iron and Steel Works, Springfield Iron Company, Springfield, Sangamon county. Puddle mill first put into 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 into 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, hitherto, iron rails; annual capacity, 50,000 net tons; mill now being fitted to roll steel rails. Bar mill put into operation in November, 1878; 3 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 blooming rolls, built in 1879; rolls all fixed; hydraulic table from new designs by A. L. Holley; 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. President, Charles Ridgely; Vice-President, John W. Bunn; Secretary, Geo. M. Brinkerhoff.

- St. Louis Bolt and Iron Company, Third and St. Charles sts., St. Louis, Mo. Works in St. Clair county, Ill. Put in operation in January, 1873; 2 single and 2 double puddling furnaces, 4 heating furnaces, 2 trains of rolls, 3 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, iron fish plates, bolts, washers, and spikes, and Bessemer steel tire, fish plates, etc. T. A. Meysenburg, President; Geo. S. Edgell, Treasurer; O. W. Meysenburg, Superintendent.
- Union Iron and Steel Company, N. E. corner Dearborn and Madison sts., Chicago. Built in 1863; 2 patent heating furnaces, 1 train of flat rolls, 1 rail train, and a patent 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; J. B. Stubbs, Vice-President and General Manager; W. C. Runyon, Secretary. *See Furnaces.*
- Number of rolling mills and steel works in Illinois: 13 completed and 2 building. Of these, 5 are rail mills, 1 making light rails only; 3 make

Bessemer steel, and 1 Bessemer steel rail mill is building; 1 makes open-hearth steel; 1 makes crucible steel, and 1 works is building to make crucible steel, cemented steel, and perhaps open-hearth steel.

MISSOURI.

Harrison Wire Works, Harrison Wire Company, 816 High st., St. Louis. Built and started in 1873; 2 single puddling furnaces, 5 heating furnaces, 3 blooming fires, 234 wire blocks, 3 pairs of 18-inch rolls, one 10-inch roughing train, one 9-inch rod train, 26 annealing pots, 3 muffler furnaces, 3 drying furnaces, 5 engines, and 9 boilers; product, iron and steel wire; annual capacity, 10,000 net tons. Thomas W. Fitch, President and Treasurer; Charles Fish, Secretary.

Helmbacher Forge and Rolling Mills Company, 817 and 819 N. Main st., 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, light T rails from 12 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 are the leading forgings; annual capacity, 10,000 net tons. M. Helmbacher, President; A. Helmbacher, Treasurer and Superintendent; G. L. Goetz, Secretary.

Laclede Rolling Mill, Chouteau, Harrison & Vallé Company, 941 N. Second st., St. Louis. Built in 1850; 1 double-double Swindell puddling furnace, 18 single puddling furnaces, 3 Swindell and 4 Siemens heating furnaces, forge with 4 fires for boiler plate, and 5 trains of rolls; product, bar, sheet, and plate iron, blooms, angle and tee iron, 8 to 30 lb. T rails, bolts, and washers; annual capacity, 15,000 net tons. Edwin Harrison, President; Charles C. Maffitt, Vice-President; Paul A. Fusz, Secretary.

St. Louis Steam Forge and Iron Works, A. McDonald & Bro., corner Main and Miller sts., St. Louis. Built in 1862; 3 double puddling furnaces, 5 heating furnaces, 2 trains of rolls, and 3 hammers; product, railroad work, car axles, cranks, connecting rods, frames, pedestals, locomotive forgings, and every description of steamboat work, such as cranks, shafts, etc.; annual capacity of rolling mill, 4,800 net tons, and of forgings, 4,500 net tons.

St. Louis Stamping Company, St. Louis. Built in 1879; 2 double Swindell puddling furnaces, 2 Siemens and 4 Swindell heating furnaces, 4 charcoal knobbling fires, and 3 trains of rolls; product, sheet iron.

Tudor Iron Works, Tudor Iron Company, 509 North Third st., St. Louis. Built in 1870; 3 heating furnaces, 2 trains of rolls, and 3 spike machines; product, railway spikes, bolts, fish plates, and merchant iron;

annual capacity, 6,000 net tons. William E. Guy, President and Treasurer; T. A. Meysenburg, Vice-President and Secretary.

Vulcan Steel Company, 221 Olive 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, and one 23 and one 18-inch rail train; product, Bessemer steel rails and billets. D. K. Ferguson, President; Wm. P. Shinn, Vice-President and General Manager; John C. Lewis, Secretary; James M. Duncan, General Superintendent. *See Furnaces.*

Number of mills in Missouri: 7. Of these, 3 are rail mills, 2 making light rails only; 1 makes Bessemer steel.

MICHIGAN.

Baugh Steam Forge Company, Moffat Block, Detroit, Wayne county. Forge built in 1870; rolling mill, in 1877; 6 heating furnaces, 5 hammers, and 2 trains of rolls (one 8 and one 16-inch); product, car axles, links, and pins, shafting, and bar iron. John S. Newberry, President; James McMillan, Treasurer; Hugh McMillan, Secretary; John B. Baugh, Manager.

Eureka Iron Company, 14 Larned st. west, Detroit. Works at Wyandotte, Wayne county. Built in 1855; 2 double and 9 single puddling furnaces, 12 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, sheets, and rails; annual capacity, 30,000 net tons. Formerly called Wyandotte Rolling Mills. S. P. Burt, President, Milwaukee; W. K. Muir, Vice-President, Detroit; W. S. Armitage, Secretary and Treasurer, Detroit; J. S. Van Alstyne, Agent, Wyandotte. *See Furnaces.*

Number of mills in Michigan: 2. Of these, 1 is a rail mill.

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 Mil-

waukee Iron Company. O. W. Potter, President, Chicago; S. P. Burt, Vice-President, Milwaukee; S. Clement, Treasurer, Milwaukee; R. C. Hannah, Secretary, Chicago. *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 10 heating furnaces, 3 trains of rolls (one 9, one 18, and one 20-inch), 2 hammers, and 6 spike machines; product, iron rails, fish plates, track, boat, and bridge spikes, merchant bar iron, and wrought draw-heads; annual capacity, 35,000 net tons. A. B. Stone, President, 52 William st., New York; W. H. Harris, Vice-President, Cleveland, Ohio; Ira Harris, Manager and Treasurer, Rosedale, Kansas; E. V. Wilkes, Secretary, Kansas City, Mo.

Topeka Rolling Mill Company, Topeka, Shawnee county. First put in operation in 1874; 6 heating furnaces and 1 train of 19-inch rolls; product, rails; annual capacity, 20,000 net tons. T. B. Sweet, Agent. Number of rolling mills in Kansas: 2 rail mills.

NEBRASKA.

Omaha Iron and Nail Company, Omaha, Douglas county. Built in 1879; 2 heating furnaces, 1 train of 20-inch rolls, and 22 nail machines; product, nails; use scrap iron and old rails only; annual capacity, 3,000 net tons. G. T. Walker, President; G. W. Lininger, Vice-President; M. M. Marshall, Secretary and Treasurer; R. W. Wilson, Supt. Number of rolling mills in Nebraska: 1.

COLORADO.

Denver Rolling Mill Company, Denver, Arapahoe county. Removed from Danville, Pa., to Pueblo, Colorado, in 1877, put in operation at Pueblo on March 1, 1878, and thence removed to Denver in the same year; 4 heating furnaces and 2 trains of rolls; product, rails and bar iron; annual capacity, 12,000 net tons. Wm. Faux, President; Wm. J. Faux, Secretary and Treasurer.

Number of rolling mills in Colorado: 1 rail mill.

PROJECTED.

Colorado Coal and Iron Company, South Pueblo, Pueblo county. Rail

mill, steel works, and spike works to be built. President, W. J. Palmer, Colorado Springs. *See Furnaces.*

WYOMING TERRITORY.

Union Pacific Rolling Mills, Union Pacific Railroad Company, Laramie City, Albany county. Built in 1874-5; put in operation in April, 1875; 8 heating furnaces and 1 train of rolls; product, rails; reroll old rails; daily make, 55 gross tons, single turn; annual capacity, single turn, 15,000 net tons. Building additional works to contain one 10-inch train of rolls with 2 heating furnaces and 1 puddling furnace. J. H. Brazier, Superintendent.

Number of rolling mills in Wyoming Territory: 1 rail mill.

UTAH TERRITORY.

Ogden Iron Works, Equitable Iron and Coal Company, Ogden City. The construction of the 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, nail plate, and muck bar. General Manager, James D. Kase. *See Furnaces.*

Number of rolling mills in Utah Territory: 1 rail mill building.

CALIFORNIA.

Pacific Rolling Mill and Forge, Pacific Rolling Mill Company, 16 First st., San Francisco. P. O. Box 2,032. Put in operation July 25, 1868; 3 single puddling furnaces, 15 heating furnaces, 6 trains of rolls, 3 spike and 2 rivet machines, 4 bolt headers, 1 pointer, 3 hot-press nut machines, 10 punching and straightening presses, 7 steam hammers, and 2 belt hammers; product, bar iron, angle iron, shafting, 12 to 60 lb. 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; annual capacity, 30,000 net tons. Wm. Alvord, President; L. B. Benchley, General Manager; C. M. Keeney, Secretary; Patrick Noble, Superintendent.

Number of mills in California: 1 rail mill.

Total number of rolling mills and steel works in the United States: 382 completed, and 10 building. Of these, 87 are rail mills, 33 making only light T and street rails, and 2 rail mills are building; 22 make open-hearth steel, and 3 open-hearth steel works are building; 35 make crucible steel, and 3 crucible steel works are building; 11 make Bessemer steel, and 2 Bessemer steel works are building; 2 make cemented steel only; and 3 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.

CONNECTICUT.

Hunt Canfield Iron Company, Huntsville, Litchfield county. Destroyed by fire, and not rebuilt.

NEW YORK.

Delano Iron Works, Syracuse, Onondaga county. Built in 1865; product, rails, fish plates, railroad spikes, and merchant iron. Dismantled in 1878.

James Suffern, 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. Burnt in 1875.

Juniata Iron Works, S. & B. R. Hatfield, Alexandria, Huntingdon county. Built in 1838; product, sheet, plate, and bar iron; burnt in 1868.

Mount Carbon Rolling Mill, Mount Carbon, Schuylkill county. Burnt in May, 1879. Bar and plate mill.

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.

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.

ALABAMA.

Brierfield Iron Works Company, Brierfield, Bibb county. Bar mill. Standing since 1865.

KENTUCKY.

Covington Rail Mill, James G. Kyle & Bro., Covington, Kenton county. Built in 1854; product, rails. Torn down in 1878.

Paducah Iron Works, Paducah, McCracken county. Built in 1854; product, bar, hoop, sheet, and plate iron. Removed to Riverside, Ohio, in 1879.

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.

INDIANA.

Western Iron Company, Knightsville, Clay county. Built in 1868; product, muck bar. Torn down in 1879.

ILLINOIS.

East St. Louis Rail Mill, East St. Louis, St. Clair county. Built in 1865 to make rails. Destroyed by fire 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.

RECENTLY ABANDONED STEEL WORKS.

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, 13th and Henderson sts., Jersey City, New Jersey. Built in 1875; 24 melting holes and 2 trains of rolls; product, cast steel.
- 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.

RAIL MILLS.

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.

MAINE—1.

Portland Rolling Mill, Ligon Iron Company, Portland.

VERMONT—1.

St. Albans Iron and Steel Works, St. Albans Iron and Steel Company, St. Albans, Franklin county. Iron and open-hearth steel rails.

MASSACHUSETTS—2.

Bay State Iron Works, Bay State Iron Company, Boston.

Washburn Iron Works, Washburn Iron Company, Worcester.

NEW YORK—5.

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.

Rome Iron Works, Rome Iron Works Company, Rome, Oneida county.
 Spuyten Duyvil Rolling Mill, Welch & Barnum, Spuyten Duyvil,
 New York City.

Union Iron Works, Union Iron Company of Buffalo, Buffalo.

NEW JERSEY—I.

New Jersey Steel and Iron Company, Trenton, Mercer county. Iron and steel-headed rails.

PENNSYLVANIA—EASTERN DISTRICT—8.

Allentown Rolling Mill Company, Allentown, Lehigh county. Office, 303 Walnut st., Philadelphia. All sizes of T and street rails.

Bethlehem Iron Company, Bethlehem, Northampton county. Iron and Bessemer steel rails.

Greenwood Rolling Mill, Greenwood Rolling Mill Company, Tamaqua, Schuylkill county. Office, 328 Walnut st., Philadelphia. Light rails.

Palo Alto Rolling Mill, Philadelphia and Reading Coal and Iron Company, lessees, Pottsville, Schuylkill county. Rails of light and heavy sections and street rails. W. E. C. Coxe, Superintendent, Reading.

Philadelphia and Reading Rolling Mill, Philadelphia and Reading Coal and Iron Company, W. E. C. Coxe, Supt., Reading, Berks county.

Phoenix Iron Company, Phoenixville, Chester county. Office, 410 Walnut st., Philadelphia.

Pottsville Rolling Mills, Atkins Brothers, Pottsville. Rails of light and heavy sections and street rails.

Schuylkill Haven Rolling Mill, Schuylkill Haven Iron Company, Schuylkill Haven, Schuylkill county. Light rails.

PENNSYLVANIA—CENTRAL DISTRICT—8.

Co-operative Iron and Steel Works, Danville, Montour county. All sizes of T and street rails.

Danville Rolling Mill, William Painter, Box 2116, Philadelphia. Works at Danville.

Glendower Iron Works, Danville. All sizes of T and street rails. Office, 234 South Fourth st., Philadelphia.

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.

Pennsylvania Iron Works, Montour Iron and Steel Company, Danville. Philadelphia office, 227 South Fourth st.

Pennsylvania Steel Works, Pennsylvania Steel Company, Steelton, Dauphin county. Office, 208 South Fourth st., Philadelphia. Bessemer steel rails of all kinds.

PENNSYLVANIA—WESTERN DISTRICT—12.

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, Edgar Thomson Steel Company 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.

Old Fort Iron Works, Adam Jacobs, Brownsville. Light rails.

Sharon Iron and Nail Works, Westerman Iron Company, Sharon, Mercer county. Light rails.

Shenango Iron Works, Lawrence Iron Company, lessees, New Castle, Lawrence county. Light rails.

Sligo Iron Works, Phillips, Nimick & Co., Pittsburgh. Light rails.

Superior Rolling Mill, Andrew Kloman, lessee, Pittsburgh. Bessemer steel rails.

Wayne Iron and Steel Works, Brown & Co., Pittsburgh. Light rails.

Wheatland Rolling Mills, B. B. Reath, 1538 Pine st., Philadelphia. Works at Wheatland, Mercer county. Not operated for several years.

MARYLAND—2.

Abbott Iron Works, Abbott Iron Company, Baltimore.

Cumberland Rolling Mill, Baltimore and Ohio Railroad Company, Cumberland.

VIRGINIA—1.

James River Steel Manufacturing and Mining Company, Lynchburg.

GEORGIA—1.

Atlanta Rolling Mill, Atlanta Rolling Mill Company, Atlanta.

WEST VIRGINIA—2.

Crescent Iron Works, Whitaker Iron Company, Wheeling.

Riverside Iron Works, Wheeling. Light rails.

KENTUCKY—3.

Kentucky Rolling Mill, Louisville Iron and Steel Company, lessees, Louisville. Light and street rails.

Louisville Rolling Mill, Coleman Rolling Mill Company, lessees, Louisville. Light and street rails.

Swift's Iron and Steel Works, Newport. Office, 26 West Third st., Cincinnati. Heavy and light T and street rails.

TENNESSEE—4.

Knoxville Iron Company, Knoxville. Light rails.

Lookout Rolling Mill, Chattanooga. Light rails.

Roane Iron Works, Roane Iron Company, Chattanooga. Iron and open-hearth steel rails.

Vulcan Iron and Nail Works, Haselton & Harison, Chattanooga. Light rails.

OHIO—17.

Ætna Iron and Nail Company, Bridgeport. Light and street rails.

Akron Iron Works, Akron Iron Company, Akron. Light rails.

Cincinnati Railway Iron Works, Cincinnati Railway Iron Company, Cincinnati. Not in operation for several years.

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.

Corns Iron Company, Girard, Trumbull county. Light rails.

Crescent Iron Works, Pomeroy, Meigs county. Light and street rails.

Dover Rolling Mill, Tuscarawas Coal and Iron Company, Canal Dover, Tuscarawas county. Light 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.

Massillon Coal and Iron Company, Massillon. Light rails.

Portsmouth Iron and Steel Company, Portsmouth. Light rails.

Sandusky Iron Company, Cleveland. Works at Sandusky, Erie county.

Union Iron Works Company, Cleveland. Light and street rails.

Zanesville Iron Works, Ohio Iron Company, Zanesville. Light and street rails.

INDIANA—4.

Capital City Iron Works, W. C. DePauw, (of New Albany,) Indianapolis. Light rails.

Evansville Iron and Steel Company, Evansville.

Indianapolis Rolling Mill, Indianapolis Rolling Mill Company, Indianapolis.

New Albany Rail Mill Company, New Albany.

ILLINOIS—6.

Joliet Steel Works, Joliet Steel Company, Joliet, Will county. Office, Honore Building, Chicago. Iron and Bessemer steel rails.

North Chicago Rolling Mill, North Chicago Rolling Mill Company, 17 Metropolitan Block, Chicago. Iron and Bessemer steel rails.

North Chicago Steel Company, 17 Metropolitan Block, Chicago. Building Bessemer steel rail mill.

Springfield Iron Works, Springfield Iron Company, Springfield, Sangamon county. Iron and open-hearth steel rails.

St. Louis Bolt and Iron Company, St. Louis, Mo. Works in St. Clair county, Ill. Light and street rails.

Union Iron and Steel Company, Chicago. Bessemer steel rails.

MISSOURI—3.

Helmbacher Forge and Rolling Mills Company, 817 and 819 North Main st., St. Louis. Light rails.

Laclede Rolling Mill, Chouteau, Harrison & Vallé Company, 941 North Second st., St. Louis. Light rails.

Vulcan Steel Company, 221 Olive st., St. Louis. Bessemer steel rails.

MICHIGAN—1.

Wyandotte Rolling Mills, Eureka Iron Company, 14 Larned st. west, Detroit.

WISCONSIN—1.

Milwaukee Works, North Chicago Rolling Mill Company, 17 Metropolitan Block, Chicago, and 37 Mitchell Block, Milwaukee.

KANSAS—2.

Kansas Rolling Mill Company, Kansas City, Mo. Works at Rosedale.

Topeka Rolling Mill Company, Topeka.

COLORADO—1.

Denver Rolling Mill Company, Denver.

WYOMING TERRITORY—1.

Union Pacific Rolling Mills, Union Pacific Railroad Company, Laramie City.

UTAH TERRITORY—1.

Ogden Iron Works, Equitable Iron and Coal Company, Ogden City. In course of erection.

CALIFORNIA—1.

Pacific Rolling Mill and Forge, Pacific Rolling Mill Company, 16 First st., P. O. Box 2032, San Francisco. Rails of all sizes.

UNITED STATES.

Total in the United States: 87 completed rail mills, of which 33 roll only light and street rails; and 2 rail mills in course of erection.

BESSEMER STEEL WORKS.

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.

Albany and Rensselaer Iron and Steel Company, Troy, New York. Two 7-ton converters. Made their first blow February 15, 1865.

Bethlehem Iron Company, Bethlehem, Pa. Two 7-ton converters. Made their first blow on Saturday, October 4, 1873, and their first steel rail on Saturday, October 18, 1873. Adding 2 more 7-ton converters.

Pennsylvania Steel Works, Pennsylvania Steel Company, Steelton P. O., Pa. Office, 216 South Fourth st., Philadelphia. Two 6½-ton converters. Made their first blow in June, 1867. Adding 3 more converters.

Lackawanna Iron and Steel Works, Lackawanna Iron and Coal Company, Scranton, Pa. Two 5-ton converters. Made their first blow October 23, 1875, and their first steel rail December 29, 1875. Adding 1 more converter.

Cambria Iron and Steel Works, Cambria Iron Company, Johnstown, Pa. Office, 218 South Fourth st., Philadelphia. Two 6½-ton converters. Made their first blow July 10, 1871.

Edgar Thomson Steel Works, Edgar Thomson Steel Company Limited, Bessemer Station, Allegheny county, Pa. Office at Pittsburgh. Two 7-ton converters. Made their first blow August 26, 1875, and their first steel rail September 1, 1875.

Cleveland Rolling Mill Company, Cleveland, Ohio. Two 6-ton converters. Made their first blow October 15, 1868.

- Union Iron and Steel Company, Chicago, Illinois. Two 6-ton converters. Made their first blow July 26, 1871.
- North Chicago Rolling Mill Company, Chicago, Illinois. Two 6-ton converters. Made their first blow April 10, 1872.
- Joliet Steel Works, Joliet Steel Company, Joliet, Illinois. Two 6½-ton converters. Made their first blow January 26, 1873, and their first steel rail March 15, 1873.
- Vulcan Steel Company, St. Louis, Mo. Two 7-ton converters. Made their first blow September 1, 1876.
- Pittsburgh Bessemer Steel Company Limited, Pittsburgh. Building two 4-ton converters.
- North Chicago Steel Company, Chicago, Illinois. Building two 10-ton converters.
- Number of Bessemer steel works: 11 completed works, and 2 works building. Total annual capacity of completed works, 1,250,000 net tons of ingots. The works now building and the additions to old works will add 500,000 tons to this capacity.

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. Works at Worcester. 40 pots.

CONNECTICUT—3.

Collins Company, Collinsville, Hartford county. 180 pots.
 Farist and Windsor Company, Windsor Locks, Hartford county. 72 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. 48 pots.
 Sanderson Bros. Steel Company, Syracuse. New York office, 16 Cliff st. 68 pots.

NEW JERSEY—5.

- Adirondac Steel Works, Gregory & Co., 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. Building.

PENNSYLVANIA—19.

- Beaver Falls Steel Works, Beaver Falls, Beaver county. 24 pots.
Black Diamond Steel Works, Park, Brother & Co., Pittsburgh. 252 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., 2325 Spring Garden st., Philadelphia. 24 pots.
Fort Pitt Iron and Steel Works, Graff, Bennett & Co., Pittsburgh. 48 pots.
Hussey, Binns & Co., Pittsburgh. 24 pots.
Hussey, Howe & Co., Pittsburgh. 336 pots.
Keystone Saw, Tool, Steel, and File Works, Henry Diston & Sons, Front and Laurel sts., Philadelphia. 84 pots.
La Belle Steel Works, Smith, Sutton & Co., Pittsburgh. 84 pots.
Midvale Steel Works, Nicetown P. O., Philadelphia. 94 pots.
Nellis's Agricultural Works, Nellis, Shriver & Co., Pittsburgh. 20 pots.
Oxford Iron and Steel Works, William & Harvey Rowland, Frankford P. O., Philadelphia. 48 pots.
Philadelphia Steam Forge, Adam Tindel, 135 South Fifth st., Philadelphia. Works at Frankford. 80 pots.
Pittsburgh Steel Casting Company, Pittsburgh. 72 pots.
Pittsburgh Steel Works, Anderson & Co., Pittsburgh. 150 pots.
Read & Thaw, Pittsburgh. 12 pots.
Singer, Nimick & Co., Pittsburgh. 156 pots.
Wayne Iron and Steel Works, Brown & Co., Pittsburgh. 48 pots.

MARYLAND—1.

- Cumberland Steel Works, William Hall, Cumberland. 24 pots.

OHIO—2.

- Burgess Steel and Iron Works, Portsmouth, Scioto county. 24 pots.
Forest City Steel Company, 13 Detroit st., Cleveland. Building.

ILLINOIS—2.

J. F. Duffy, 273 and 275 South Canal st., Chicago. In course of erection. South Chicago Steel Works, South Chicago. 18 pots.

KENTUCKY—1.

Swift's Iron and Steel Works, 26 West Third st., Cincinnati. Works at Newport, Ky. 20 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 completed and 3 building.

OPEN-HEARTH STEEL WORKS.

NOTE.—These works are fully described in the list of rolling mills. The ton here used is the ton of 2,240 pounds.

NEW HAMPSHIRE—1.

Nashua Iron and Steel Company, Nashua. One 10-ton Siemens furnace.

VERMONT—1.

St. Albans Iron and Steel Company, St. Albans. One 10-ton Siemens furnace.

MASSACHUSETTS—2.

Bay State Iron Company, Boston. One 6-ton Siemens furnace.

Norway Iron Works, Naylor & Co., 6 Oliver st., Boston. Three 7-ton Siemens furnaces.

RHODE ISLAND—1.

Rumford Chemical Works, G. F. Wilson & Co., Providence. One 6-ton Siemens furnace.

NEW JERSEY—1.

Newark Steel Works, Benjamin Atha & Co., Newark. One 7-ton Siemens furnace.

PENNSYLVANIA—11.

- Bethlehem Iron Company, Bethlehem. Building two 15-ton Siemens-Pernot furnaces.
- Black Diamond Steel Works, Park, Brother & Co., Pittsburgh. Building two 7-ton Siemens furnaces.
- Blair Iron and Steel Company's Works, Hussey, Howe & Co., lessees, Pittsburgh. One 7-ton Siemens furnace.
- Cambria Iron Company, Johnstown. Two 12-ton Siemens-Pernot furnaces.
- Hussey, Howe & Co., Pittsburgh. One 7-ton Siemens furnace.
- Juniata Iron Works, Shoenberger & Co., Pittsburgh. One 10-ton Siemens furnace.
- Midvale Steel Works, Nicetown, Philadelphia. One 6-ton and one 10-ton Siemens furnace.
- Pennsylvania Steel Company, Steelton. Office, 208 South Fourth st., Philadelphia. Two 7-ton Siemens furnaces.
- Pittsburgh Steel Works, Anderson & Co., Pittsburgh. One 10-ton and one 7-ton Siemens furnace.
- Singer, Nimick & Co., Pittsburgh. One 7-ton Siemens furnace.
- Spang Steel and Iron Company Limited, Pittsburgh. Building two 10-ton Siemens-Pernot furnaces.

OHIO—5.

- Burgess Steel and Iron Works, Portsmouth. One 8-ton Siemens furnace.
- Canton Steel Works, Bolton, Bulley & Co., Canton. One 6-ton Siemens furnace.
- Cleveland Rolling Mill Company, Cleveland. Three 7-ton Siemens furnaces.
- Otis Iron and Steel Works, Otis Iron and Steel Company, Cleveland. Two 7-ton and two 10-ton Siemens furnaces.
- Portsmouth Iron and Steel Company, Portsmouth. One 10-ton Siemens furnace.

KENTUCKY—1.

- Ohio Valley Steel and Iron Works, Mitchell, Tranter & Co., 52 West Second st., Cincinnati. Works at Covington. One 7-ton Siemens furnace.

TENNESSEE—1.

- Roane Iron Company, Chattanooga. Two 10-ton Siemens furnaces.

ILLINOIS—1.

Springfield Iron Company, Springfield. Two 15-ton Siemens-Pernot furnaces.

UNITED STATES.

Total number of open-hearth steel works in the United States: 22 completed and 3 building.

MISCELLANEOUS STEEL WORKS.

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.

NEW YORK—3.

Buffalo Steel Foundry, Pratt & Letchworth, Buffalo. Experimental Steel Works.

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.

NEW JERSEY—1.

New Jersey Steel and Iron Company, Trenton. Product, puddled steel.

PENNSYLVANIA—4.

Chester Steel Castings Company, Chester. Product, McHaffey steel castings.

Codorus Steel Works, Truscott & Co., York. Product, puddled steel.

Duquesne Spring and Axle Works, J. S. Liggett, Spruce and Market sts., Allegheny City. Product, German steel.

Eureka Cast Steel Company, Chester. Product, McHaffey steel castings.

OHIO—1.

Ironton Rolling Mill, New York and Ohio Iron and Steel Company, Ironton, Lawrence county. Product, puddled steel.

UNITED STATES.

Total number of miscellaneous steel works in the United States: 9.

STEEL MANIPULATING WORKS.

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.

MASSACHUSETTS—3.

Bridgewater Iron Company, Bridgewater. Roll steel from steel scrap.
Cambridge Rolling Mills, Hondlette, Ellis & Co., 19 Batterymarch st., Boston. Roll steel from steel scrap.
Washburn and Moen Manufacturing Company, Worcester. Roll wire rods from crucible and Bessemer steel.

CONNECTICUT—2.

Birmingham Rolling Mill, E. S. Wheeler & Co., New Haven. Works at Derby. Roll steel from steel scrap.
Farist and Windsor Company, Windsor Locks. Roll Siemens-Martin and Bessemer steel.

NEW YORK—2.

Onondaga Steel Works, Sweet's Manufacturing Company, Syracuse. Roll Bessemer steel.
Syracuse Iron Works, Syracuse. Roll steel scrap.

NEW JERSEY—5.

Adirondac Steel Works, Gregory & Co., 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—13.

Beaver Falls Steel Works, Beaver Falls, Beaver county.

- Catasauqua Manufacturing Company, Catasauqua. Manipulate Bessemer steel.
- Gautier Steel Company Limited, Johnstown. Roll Bessemer and open-hearth steel.
- Kensington Iron and Steel Works, James Rowland & Co., 920 North Delaware avenue, Philadelphia.
- LaBelle Steel Works, Smith, Sutton & Co., Pittsburgh.
- Leechburg Sheet Iron and Tin Plate Works, Kirkpatrick & Co., Leechburg, Armstrong county. Office, 143 First avenue, Pittsburgh.
- 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, Andrew Kloman, Pittsburgh. Rolls steel for structural purposes and steel rails from purchased blooms.
- 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.

OHIO—3.

- Globe Rolling Mill, Globe Rolling Mill Company, Cincinnati. Roll steel from steel scrap.
- Lake Erie Iron Company, Cleveland. Roll steel axles.
- Youngstown Rolling Mill Company, Youngstown. Make compound steel buggy tire.

ILLINOIS—2.

- Chicago Steel Works, 806 Noble st., Chicago. Roll Bessemer steel.
- 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.

MISSOURI—1.

- Harrison Wire Company, 816 High st., St. Louis. Roll steel wire rods.

UNITED STATES.

Total number of steel manipulating works in the United States: 31.

FORGES.

NOTE.—Under this title are embraced all works which make wrought iron from ore. Includes all direct processes.

VERMONT.

Fairhaven Iron Works, Fairhaven, Rutland county. Built in 1796; 2 fires and 1 hammer; water-power; product, blooms. Not in operation for many years.

White River Iron Company, Bethel, Windsor county. Forge built in 1878; 4 fires (with a capacity of 8) and 1 steam hammer; 4 more fires building; product, charcoal blooms for steel, made by the improved Wilson direct process from the pure magnetic iron sand obtained from alluvial deposits along White river. J. J. Saltery, Manager.

Williams, A., East Middlebury, Addison county. One forge; 3 fires; product, charcoal blooms. To be operated in 1880, after several years' idleness.

Number of forges in Vermont: 3.

NEW YORK.

LAKE CHAMPLAIN DISTRICT.

Altona Bloom Iron Works, G. W. & F. Palmer & Co., Altona, Clinton county. Built in 1868; 6 fires and 1 hammer; water-power; product, charcoal blooms for boiler plate and sheet, made from Arnold hill and Port Henry ores; brand, "Altona"; annual capacity, 2,400 net tons. Building a new forge at Chazy, 4 miles distant, to have 5 fires, and to be completed in April, 1880; annual capacity, 2,000 net tons.

Chateaugay Lake Iron Works, Chateaugay Iron Company, Chateaugay Lake P. O., Franklin county. Built in 1875; 16 fires and 2 hammers; water-power; product, charcoal blooms for general purposes, made from ore. Andrew Williams, President; John H. Moffitt, Supt.

Clayburgh Iron Works, Andrew Williams, Clayburgh, Clinton county. Built in 1844; 5 fires and 1 hammer; water-power; product, charcoal blooms for steel, made from ore.

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; F. W. Potter, Secretary and Treasurer; Wm. Hooper, Superintendent. *See Paradox Iron Works.*

Irona Forge, J. F. Reynolds, Irona, Clinton county. Built in 1868 by Reynolds, Smith & Co., who were succeeded on Jan. 1, 1870, by Asa Reynolds, who was succeeded on Nov. 1, 1876, by present owner; 4 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.*

Lake Champlain Forge, State of New York owner, State Prison yard, Dannemora, Clinton county. Built in 1865; 9 fires and 1 hammer; product, charcoal blooms for nail plate, made from ore and scrap. *See Rolling Mills.*

Lewis Iron Works, Stower & Esmond, Essex, Essex county. Works at Lewis, Essex county. One forge, built in 1837; 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.

Nichols & Hull, Plattsburgh, Clinton county. Built in 1835; 4 fires and 1 hammer; water-power; product, charcoal blooms for all purposes, made from ore.

Paradox Iron Works, Horicon Iron Company, 24 Cliff st., New York. Works at Schroon River, Essex county. Built in 1864; 3 fires and 1 hammer; water-power; product, charcoal blooms for general purposes, made from ore; annual capacity, 900 net tons. *See Horicon Iron Company.*

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, 120 Broadway, New York. Works and main office at Clintonville, Clinton county. Built in 1837; 20 fires and 4 hammers; water-power; product, charcoal blooms for steel, made from ore; annual capacity, 5,000 net tons. *See Rolling Mills.*

Petersburg Iron Works, Peter Tremblay, Redford, Clinton county. Four fires and 1 hammer; water-power; product, charcoal blooms for steel, made from ore.

Plattsburgh Iron Works, C. F. Norton, Plattsburgh, Clinton county.

One forge; 6 fires; product, charcoal blooms for steel and other purposes, made from ore. Not now in operation. *See Bloomaries.*

Russia Iron Works, Andrew Williams, Moffittsville, Clinton county. Built in 1844; 6 fires and 1 hammer; water-power; product, blooms for steel and boiler plate, made from Chateaugay ore; brand, "W. M." Make half blooms for open-hearth steel.

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.*

Schroon River Iron Works, John Roth, Schroon River, Essex county. Built in 1857; 4 fires; water-power; product, blooms from ore.

Stackpole, S., Dannemora, Clinton county. Forge near Chazy P. O. Built in 1874; burnt and rebuilt in 1879; 3 fires; product, charcoal blooms from ore.

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. A 4-fire forge will be built by the same firm near Redford. *See Rolling Mills.*

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.

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: 23.

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 wire and steel, made from ore.

New Jersey Charcoal Iron Company, Rockaway, Morris county. Four fires and 1 steam hammer; have a stamp mill; use Lake Champlain ores; product, charcoal blooms by the Wilson process, from ore; weekly capacity, 35 net tons. *See Rolling Mills.*

Split Rock Forge and Steel Company, Dover, Morris county. Built in 1797, and rebuilt in 1837; 4 fires and 1 hammer; product, charcoal blooms by the Wilson process, from ore. T. E. Miner, President; J. A. Braman, Treasurer.

Number of forges in New Jersey: 3.

PENNSYLVANIA.

Tyrone Forge, Anderson & Co., Pittsburgh. Forge at Tyrone, Blair county. Old forge built in 1809; rebuilt in 1870, with 12 fires, 1 double run-out, and 1 hammer; Siemens rotator plant added in 1879-80, to consist when complete of perhaps 5 rotators, to make iron direct from the ore; product, blooms for open-hearth steel.

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 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.

Brevard's Forge, on Dutchman's creek, Lincoln county. Product, bar iron for local use, made from ore.

Catawba Valley Iron Works, Powells, Little & Co., Catawba, Catawba county. Built in 1874; 2 fires and 1 hammer; steam and water power; fuel, charcoal; product, bar iron, plow molds, etc., made from ore.

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. Wm. Beal, 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.

Livingood's Forge, Dr. J. W. Patton, Murphy. 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, Meser Fain, Murphy, Cherokee county. Built in 1852. Product, bar iron for local use, made from ore.

Tomotla Forge, Tomotla, Cherokee county. Built in 1869. Product, bar iron for local use, made from ore. Joseph Kinsey, President, Cincinnati, O. A. A. Campbell, Superintendent, Ducktown, Polk county, Tennessee. Idle for several years.

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, John & Wm. Dugger's Heirs, Butler, Johnson county. Forge near Watauga river. Now idle.

Hampton Iron Works, J. C. Hardin, Johnson City, administrator of estate of Samuel W. Williams. Forge on the Doe river, in the Crab Orchard, 18 miles southeast of Elizabethton, Carter county. Now idle.

- Howard & Heaton, Pandora, Johnson county. Forge on Little Doe creek, 11 miles west of Taylorsville. Wm. Howard and Godfrey Heaton, owners.
- 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.
- Laurel Iron Works, Frederick Slimp, 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.
- 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.
- Mouly's Forge, William Mouly, Pandora, Johnson county. Forge on Little Doe creek, 13 miles west of Taylorsville.
- 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.
- 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. Building a forge one mile southeast of the village.
- 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.
- Shady Forge, Joseph R. Anderson, Bristol, Sullivan county. Forge in Johnson county. Built in 1838; 2 fires and 1 hammer; water-power; product, bar iron for local use, made from ore.
- 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.
- Smith's Forge, H. C. Smith, Elizabethton, Carter county. Forge on Doe river, 3 miles southeast of the village. Built in 1830; 3 fires and 1 hammer.
- Smith's Forge, John Smith, Watauga, Carter county. Forge on Stony creek, 10 miles north of Elizabethton.
- 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 molds, etc.

Wagner's Forge, 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: 22 completed and 1 building.

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 being made.

MISSOURI.

Peckham Iron Company, Kimmswick, Jefferson county. Built in 1873 and remodeled in 1877; 6 Peckham converting furnaces and fires to make iron by Peckham's patent direct process; 2 steam hammers; product, charcoal blooms for Siemens-Martin steel; annual capacity, 4,000 net tons. E. Peckham, President and General Manager, Kimmswick; A. F. Shapleigh, Vice-President, St. Louis; S. B. Kellogg, Secretary and Treasurer, St. Louis.

Total number of forges in the United States: 69 completed and 1 building. In addition to these works, the Collins Company, at Collinsville, Connecticut, make a small quantity of wrought iron from ore.

BLOOMARIES.

[Under this title are embraced all works which hammer blooms from pig or scrap iron.]

MASSACHUSETTS.

Mitchell Forge, Mount Hope Iron Company, East Bridgewater, Plymouth county. Office at Somerset, Bristol county. Built in 1830; 2

forge fires and 1 hammer; water-power; product, charcoal blooms for tack plate, made from scrap iron. *See Rolling Mills.*

CONNECTICUT.

Canton Bloomary Company, Collinsville, Hartford county. Building a 6-fire bloomary; will make charcoal blooms from scrap, ore, and pig iron.

NEW YORK.

Jefferson Iron Company, Antwerp, Jefferson county. One forge; 4 fires. *See Charcoal Furnaces.*

Plattsburgh Iron Works, C. F. Norton, Plattsburgh, Clinton county. Built in 1878; 8 forge fires; product, charcoal blooms from pig iron. Not now in operation. *See Forges.*

Number of bloomaries in New York: 2.

NEW JERSEY.

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, John Leonard, Boonton. Works at Powerville. Office, 450 West st., New York. 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. Hoogland, 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, McClees & Co., 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. Office, 52 Cliff st., New York. *See Rolling Mills.*

Number of bloomaries in New Jersey: 4.

PENNSYLVANIA.

Allegheny Forge, Mrs. Elizabeth Lytle, Martinsburg, Blair county. Built in 1831. *See Bituminous Furnaces.*

Barree Forge, Mumper & Co., Barree Forge, Huntingdon county. Built in 1785; 4 forge fires and 1 hammer; water-power; product, charcoal blooms for general purposes, made from pig iron; annual capacity, 900 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 Charcoal 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; 4 forge fires and 1 hammer; water-power; product, charcoal blooms for boiler plate, made from pig iron; annual capacity, 500 net tons.
- 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 from charcoal pig iron from Springfield Furnace; metal tapped from run-out to forge; annual capacity, 600 net tons. *See Charcoal Furnaces.*
- Cove Forge, Wm. McIlvain & Sons, Duncannon, Perry county. Office, Reading, Pa. Built 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; annual capacity, 1,500 net tons. *See Charcoal Furnaces. See Central Pennsylvania Rolling Mills.*
- Eames Petroleum Iron Works, Eames Oil Fuel Process Company, Titusville, Crawford county. Built in 1879; 1 fire 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. President, Lyman A. Cook, Woonsocket, R. I.; Treasurer, C. J. Eames, Ph. D., Titusville; Secretary, John A. Balestier, New York.
- 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; 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.
- Ellwood Forge, J. B. Seidel, 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.
- 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, J. R. Hunter & Co., Petersburg, Huntingdon county. 4 fires and 1 hammer; water-power; product, charcoal blooms; annual capacity, 800 net tons. Idle for several years.
- 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; product, charcoal blooms, made into boiler plate at the Brandywine Rolling Mills, Coatesville, Pa.; annual capacity, 950 net tons of blooms, and 750 net tons of puddled blooms. These works have been idle since 1876, owing to the abandonment of the Pennsylvania canal between Huntingdon and Hollidaysburg. *See Eastern Pennsylvania Rolling Mills.*
- 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, 1,500 net tons. John Birkinbine, General Manager; Joseph Fuller, Superintendent. *See Charcoal 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.

- 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.*
- Maria Forge, G. W. Smith, Sarah, Blair county. Four fires and 1 hammer; water-power; product, charcoal blooms; annual capacity, 900 net tons. *See Charcoal Furnaces.*
- 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.
- Mary Ann Forge, Augustus Dowlin, Downingtown, Chester county. Built in 1785; 3 fires and 1 hammer; water-power; product, blooms; annual capacity, 720 net tons. Idle for several years.
- 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; Nasmyth steam hammer; product, flat charcoal blooms for best boiler plate, made from pig iron; annual capacity, 4,000 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, Palmyra, Lebanon county. Built in 1860; 5 fires, 1 run-out, and 1 hammer; water-power; product, charcoal blooms for boiler plate and general purposes, made from pig iron.
- 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;

6 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, 2,200 net tons.

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; product, charcoal blooms for best flange iron, made from pig iron.

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 pig and scrap iron.

Springton Forge, John Cornog, Wallace, Chester county. Built in 1790; 4 forge fires and 1 run-out; 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.*

Washington Forge, Lamar, Clinton county. Product, blooms. *See Charcoal Furnaces.*

Number of bloomaries in Pennsylvania: 36.

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.*

VIRGINIA.

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 1828 and rebuilt in 1867; 4 fires and 1 hammer; water-power; product, charcoal blooms for general purposes, made from pig iron. *See Charcoal Furnaces.*

Mount Vernon Iron Works, Weyer's Cave, Rockingham county. Philadelphia office, 206 Walnut Place. Built in 1848; 5 fires and 1 hammer; water-power; product, charcoal blooms for general purposes, made from pig iron. *See Charcoal Furnaces.*

Pine Forge, James Leonard, 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; annual capacity, 500 net tons.

Potomac Forge, J. P. Agnew & Co., P. O. Box 366, Alexandria, Alexandria county. Put in operation April 7, 1880; 6 forge fires, 1 cupola run-out fire with 2 tuyeres, and 1 steam hammer; product, charcoal blooms for general purposes, made from pig and scrap iron.

Shenandoah Iron Works, Wm. Milnes, Jr., Shenandoah Iron Works, 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." Selling agents, Troxell, Handy & Greer, Baltimore. *See Charcoal Furnaces.*

Number of bloomaries in Virginia: 6.

NORTH CAROLINA.

Rehoboth Forge, John Leonard & Co., Iron Station, Lincoln county. Product, charcoal blooms; yearly capacity, 400 net tons. *See Furnaces.*

GEORGIA.

Allatoona Forge, Peter Zoppi, Allatoona, Bartow county. Built in 1878-9; 2 charcoal fires and 1 hammer; product, charcoal blooms, made from scrap iron.

WEST VIRGINIA.

Capon Iron Works, Keller & Co., Capon Iron Works, Hardy county. Built in 1874; 4 fires; product, charcoal blooms. *See Charcoal Furnaces.*

KENTUCKY.

Red River Forge, E. K. Goodnow (of New York), Fitchburg, Estill county. C. W. Russell, Agent. *See Charcoal Furnaces.*

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; product, charcoal blooms, made from ore, scrap, and pig iron; annual capacity, 600 net tons. *See Charcoal Furnaces.*

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 : 2.

OHIO.

Paulding Forge, Paulding Iron Company Limited, 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. J. F. R. Evans, Superintendent. *See Charcoal Furnaces.*

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. *See Charcoal Furnaces.*

Number of bloomaries in Missouri : 2.

Total number of bloomaries in the United States : 59 completed and 1 building.

RECENTLY ABANDONED FORGES AND BLOOMARIES.

NEW YORK.

Kingdom Forge, Essex and Lake Champlain Ore and Iron Company, Elizabethtown, Essex county. Built in 1825; 6 fires and 1 hammer. John Merchant's Forge, Schuyler Falls, Clinton county. Built in 1844.

PENNSYLVANIA.

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.

Logan Works, Lewistown.

Monroe Forge, Lebanon county.

Ringwood Forge, Thomas J. Bailey, Penningtonville, Chester county.
Three fires and 1 run-out.

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.

ADDENDA.

[We present below such information in regard to changes in ownership of works, changes in names, etc., as was received too late for insertion in its proper place.]

FURNACES.

Hackettstown Furnace, at Hackettstown, N. J., is now called Warren Furnace.

Mill Hall Furnace, at Mill Hall, Clinton county, Pa., which has not been used since 1857, is to be blown in on anthracite and coke by Austin Curtin during the coming summer.

Oliphant Furnace, at Oliphant Furnace P. O., Fayette county, Pa., is now operated by H. & R. C. Oliphant.

Chestnut Grove Furnace, at Idaville, Adams county, Pa., has been purchased by H. D. Markley, of Fleetwood, Berks county.

Washington Iron Works, at Lamar, Clinton county, Pa., will probably be leased to P. C. Brink, who is negotiating for the furnace and bloomary.

Principio Furnace, in Cecil county, Md., is now operated by the George P. Whitaker Company, an incorporation of the same owners.

Wythe Furnace, at Crockett's, Wythe county, Va., is now operated by Robert Sayers.

Powhatan Furnace, at Richmond, Va., has been purchased by the Philadelphia and Reading Coal and Iron Company, of 227 South Fourth st., Philadelphia.

Ridge Valley Furnace, in Floyd county, Georgia, is to be put in blast. Edward Nichols, Manager, Rome, Ga.

The Eureka Company intends to build 2 more blast furnaces at Oxmoor, Alabama. Two other furnaces are projected at Birmingham.

Bloomery Furnace, in Hampshire county, W. Va., will be operated by James R., Horace, and F. H. Magee, of 251 South Fourth st., Philadelphia, organized as the Bloomery Furnace Company.

Vernon Furnace, in Montgomery county, Tennessee, owned by Sechler, McCullough & Co., has been dismantled.

The Mahoning Valley Iron Company's Furnace, at Youngstown, Ohio, is 67 x 16, will be blown by 2 engines, and will be started about May 1, 1880.

The Buchtel Iron Company are building 2 blast furnaces in Hocking county, Ohio. Main office at Boston, Mass.

Mollie Furnace, formerly owned by Joseph Vilas, situated at Shawnee, Perry county, Ohio, has been purchased by the New York and Straitsville Coal and Iron Company.

Antwerp Furnace, at Antwerp, Paulding county, Ohio, is now called Maumee Furnace, and is operated by the FitzSimons Furnace Company. General office, 18 National Bank Building, Cleveland, Ohio: William FitzSimons, President; Thomas FitzSimons, General Manager; W. U. Masters, Secretary and Treasurer.

Nelson Furnace, at Shoals, Martin county, Ind., is now operated by the Nelson Iron and Coal Company, of 109 North Third st., St. Louis, Mo. I. R. Adams, President; S. D. Morgan, Furnace Supt.

Caseville Furnace, at Caseville, Huron county, Mich., is now called Lake Huron Furnace, and is owned by the Lake Huron Iron Company. General office at Cleveland, Ohio: A. G. Stone, President and Treasurer; W. U. Masters, 18 National Bank Building, General Manager.

ROLLING MILLS.

The Napanoch Rolling Mill Company's Works, at Napanoch, Ulster county, New York, were built in 1872-3; 3 heating furnaces and 2 trains of rolls (9 and 16-inch); steam and water power; annual capacity, 4,000 net tons of merchant-bar iron. Richard Pancoast, President; Benjamin Tomes, Secretary and Treasurer; H. G. H. Tarr, Supt. The Pottstown Iron Company have purchased the rolling mill of the Hope Iron Company Limited, at Pottstown, Pa.

The American Tube and Iron Company contemplate the erection of a rolling mill at Middletown, Dauphin county, Pa.

The Pennsylvania Iron Works at Danville, Pa., are now called the Montour Iron and Steel Works.

Andrew Kloman will build a steel rail mill at Homestead, Allegheny county, Pa., to roll rails from blooms to be furnished mainly by the Pittsburgh Bessemer Steel Company Limited.

The Fort Pitt Iron and Steel Works, at Pittsburgh, Pa., are offered for sale by the owner, John Graff, of Graff, Bennett & Co.

The Union Rolling Mill Company will operate the mill at Cleveland, Ohio, formerly known as the No. 2 mill of the Union Iron Works Company, and will make bridge, car and merchant iron, nuts, and bolts.

The No. 1 mill of the Union Iron Works Company, and Emma Furnace, part of the same property, are offered for sale by H. L. Terrell, Trustee, 122 Water st., Cleveland, Ohio.

The Vulcan Steel Company's office is now at the southwest corner of Second and Pine sts., St. Louis, Mo.

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