THE

IRON AND STEEL WORKS

OF

THE UNITED STATES.

ALSO OF CANADA AND MEXICO.

1894.

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DIRECTORY

TO THE

IRON AND STEEL WORKS

OF

THE UNITED STATES.

EMBRACING A FULL LIST OF THE BLAST FURNACES, ROLLING MILLS, STEEL WORKS, TINPLATE WORKS, AND FORGES AND BLOOMARIES IN THE UNITED STATES; ALSO OF ALL THE ROD MILLS, WIRE MILLS, CUT-NAIL WORKS, WIRE-NAIL WORKS, AND HORSE-NAIL WORKS, CAR-AXLE WORKS, CAR-WHEEL WORKS, CARBUILDERS, LOCOMOTIVE WORKS, CAST AND WROUGHT-IRON PIPE WORKS, SHIPBUILDING, AND BRIDGEBUILDING WORKS.

TO WHICH IS ADDED A COMPLETE LIST OF THE IRON AND STEEL WORKS OF CANADA AND MEXICO.

COMPILED AND PUBLISHED

BY THE AMERICAN IRON AND STEEL ASSOCIATION.

TWELFTH EDITION. CORRECTED TO MARCH 1, 1894.

PHILADELPHIA:
THE AMERICAN IRON AND STEEL ASSOCIATION,
No. 261 South Fourth Street.
1894.

Printed by
ALLEN, LANE & SCOTT,
Nos. 229-231-233 South Fifth Street,
Philadelphia.

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PREFACE TO THE TWELFTH EDITION.

THE twelfth edition of the Directory to the Iron and Steel Works of the United States is herewith submitted to the members of the American Iron and Steel Association and to the American iron trade generally. It makes a volume of more than 300 pages, every page of which is devoted to the legitimate purposes of a directory and not one of which contains an advertisement of any kind. The proportions of the volume could easily have been swollen to 1,000 pages if advertisements had been admitted and if the technical information it contains had been less compactly and systematically presented. All the information given is brought down to the early months of 1894.

New and Old Features.—The present edition is the most comprehensive and in every way the most complete that the American Iron and Steel Association has yet published. All the well-known features of previous editions are retained and in addition many new features are incorporated. For the first time there is given a list of works in our country which produce tinned or retinned stamped ware; a list of the works which make horse-shoe nails; a list of all iron and steel bridgebuilding works; and a list of iron and steel shipbuilding works. The old features of the Directory which are contained in the present edition embrace complete lists of the blast furnaces, rolling mills, Bessemer, open-hearth, and crucible steel works, plate and sheet mills, forges, bloomaries, cut-nail works, wire-rod and wire mills, wire-nail works, locomotive works, car works, car-axle works, car-wheel works, cast and wrought iron and wrought steel pipe works, and tinplate works in the United States; also lists of the blast furnaces, rolling mills, and steel works in Canada and Mexico. Lists of recently abandoned blast furnaces, rolling mills, steel works, and forges and bloomaries are also given. The list of tinplate works is the first complete list that has ever been published in any form. A table of contents and elaborate indexes will enable the reader to readily find any item of information that is desired. The indexes embrace names of firms and companies, names of works, and brands of pig iron.

The Period Covered by the Directory.—The present edition covers the changes made in the development of our iron and steel industries since the appearance of the previous edition in February, 1892, over two years ago. The year 1892 was one of very general activity in all branches of our iron and steel industries and many new enterprises were undertaken, but 1893 was a year of very great depression and reaction in these industries, during which there were many failures. Few new works of any kind were built or undertaken in 1893, while

work was suspended on some that had previously been undertaken. The unfavorable conditions existing in 1893 have continued in full force during the early months of 1894.

Blast Furnaces.—In the edition of the Directory for 1892 there were enumerated and described 569 completed blast furnaces and 11 which were in course of erection. The total annual capacity of the completed furnaces was 14,550,708 gross tons. In the present edition we enumerate and describe 519 completed furnaces, with an aggregate annual capacity of 16,271,027 gross tons, or just 50 furnaces less than in 1892, and 7 furnaces which have been partly erected but upon which work has been suspended. Not one new furnace in the United States is now being built—a remarkable circumstance. Since the appearance of the Directory in February, 1892, there have been built 16 new furnaces, and in the present edition we have transferred to the abandoned list 66 furnaces which were classed in 1892 among the furnaces that were then active or likely to be active at some future time.

Of the 66 furnaces now transferred to the abandoned list 20 are in Pennsylvania, 11 in New York, 7 in Ohio, 6 in Virginia, 4 in Tennessee, 3 each in Michigan and Missouri, 2 each in Connecticut, Maryland, and Alabama, and 1 each in Maine, New Jersey, Kentucky, Georgia, Illinois, and Wisconsin. Of the 16 new furnaces built since January, 1892, 7 are in Tennessee, 5 in Virginia, and 1 each in New York, North Carolina, Alabama, and Wisconsin. It is a curious fact that since January, 1892, 20 furnaces have been abandoned in Pennsylvania and not one furnace has been built in that State. Of the 7 furnaces upon which work has been suspended 2 are in Alabama, 2 in Wisconsin, and 1 each in Pennsylvania, Virginia, and Tennessee.

Of the 519 furnaces described in the present Directory 118 use charcoal as fuel and the remainder use anthracite and bituminous coal and coke. In the Directory for 1892 the number of charcoal furnaces described was 138, or just 20 more than in 1894. The number of anthracite and bituminous furnaces described in 1892 was 431, and in 1894 the number is 401, or 30 less than in 1892. It will be seen that the number of charcoal furnaces has decreased in two years proportionately much more than the number of furnaces using mineral fuel.

The average annual capacity of the 569 completed furnaces which were described in the Directory for 1892 was 25,572 gross tons, and the average annual capacity of the 519 furnaces which are described in the present edition is 31,351 gross tons.

The aggregate annual capacity of the 519 completed furnaces which are now described is 1,720,319 tons more than the capacity of the 569 completed furnaces which were described in January, 1892. The total annual capacity of the 118 charcoal furnaces which are described in the present Directory is 1,285,440 gross tons, and the total annual capacity of the 138 charcoal furnaces which were described in 1892

was 1,254,375 gross tons. It will be noted that, while the aggregate furnace capacity of the country increased 1,720,319 tons from 1892 to 1894, that of the charcoal furnaces alone increased only 31,065 tons.

The average annual capacity of the charcoal furnaces described in 1892 was 9,090 gross tons, and the average annual capacity of the charcoal furnaces described in 1894 is 10,894 gross tons. The average annual capacity of all the furnaces using mineral fuel in 1892 was 30,850 gross tons, and the average annual capacity of all the mineral fuel furnaces in 1894 is 37,371 gross tons.

Rolling Mills and Steel Works.—In the present edition of the Directory we enumerate and describe 487 completed rolling mills and steel works in the United States, of which 446 contain trains of rolls and 41 have no rolls. In the edition of two years ago we described 460 completed rolling mills and steel works. In the intervening time 57 new rolling mills and steel works have been built, 1 has been revived, and 31 have been abandoned, the net increase in the period mentioned being 27. In January, 1894, there were 8 rolling mills and steel plants in course of erection and 1 rebuilding, against a total of 18 works which were in course of erection at the beginning of 1892.

Puddling Furnaces.—The number of puddling furnaces attached to rolling mills in January, 1894, each double furnace being regarded as the equivalent of two single furnaces, was 4,715, against 5,120 in January, 1892, a decrease of 405 furnaces, or about 8 per cent. This is the first edition of the Directory in late years that has noted a decrease in the number of puddling furnaces, each previous edition having noted an increase.

Bessemer Steel Works.—Since the appearance of our last Directory we have built 4 new standard Bessemer steel plants—one at Garwood, New Jersey, to make steel car wheels, but which has recently been abandoned; one at Shenango, Pa., to make steel billets; one at McKeesport, Pa., to make steel slabs and billets; and one at Indianapolis, Indiana, to make steel bars and miscellaneous shapes. In the same time 7 standard Bessemer steel plants have been burned or abandoned—2 in Massachusetts, 1 in New Jersey, 1 in Tennessee, 2 in Illinois, and 1 in Missouri, and in the same period 1 Clapp-Griffiths steel plant has been abandoned. We now have 43 standard Bessemer plants, with 95 converters, against 46 in 1892, with 95 converters. One new standard Bessemer plant is being erected at Youngstown, Ohio, to contain two 10-gross-ton converters, for the production of rails, structural shapes, etc. The construction of one 4-gross-ton converter for the production of castings was commenced at Sharon, Pa., in 1891, but work upon it has been suspended. In addition to the Bessemer plants above mentioned we now have 4 Clapp-Griffiths and 4 Robert-Bessemer steel plants, the former with 7 converters and the latter with 6 converters. No new Clapp-Griffiths or Robert-Bessemer plants have been built since 1889.

The annual converting capacity of all the standard Bessemer steel plants in 1894, built and building, is 7,740,900 gross tons of ingots and direct castings, against 5,857,143 tons in January, 1892. These figures exhibit a remarkable increase in converting capacity in two years. While the demand for steel rails of standard sections for steam railroads has greatly fallen off in recent years, the demand for Bessemer steel for girder rails for street railways, structural shapes, axles, springs, wire rods, and many other miscellaneous uses has greatly increased. The production of Bessemer billets, slabs, and blooms to supply these uses has greatly interfered with the demand for puddled iron.

Open Hearth Steel.—Since the appearance of the Directory for 1892 we have built 15 new open-hearth steel plants, while 5 have been burned or abandoned, showing a net increase of 10 plants. We now have 81 completed open-hearth steel plants, and in addition 1 new plant is in course of erection at Chicago by the Illinois Steel Company.

The annual capacity in ingots and direct castings of the open-hearth steel plants in 1894, built and building, is 1,740,000 gross tons, against 1,383,929 tons in January, 1892. These figures show a very healthy growth in two years. There has been in the last few years an increased demand in this country for open-hearth steel for boiler plates and ship plates, armor plates, gun forgings for the army and navy, heavy and light castings, locomotive tires, tools, structural shapes, machinery generally, and many other purposes. Like Bessemer steel, open-hearth steel has become a formidable competitor of puddled iron. But the open-hearth is also a formidable competitor of iron foundries. In 1892 there were 18 open-hearth plants which made direct castings, and in 1894 there are 28 plants which are prepared to make these castings.

Basic Steel.—The manufacture of basic steel in this country is virtually confined to four works in Pennsylvania, three using the open-hearth and one using the Bessemer process. Outside of Pennsylvania basic steel has been made only experimentally or on a very small scale. The industry has made no progress in the South.

Crucible Steel Works.—Three more crucible plants are enumerated in the present edition than in the edition of two years ago, 4 plants having been abandoned in the meantime and 7 having been built. We now have 48 completed crucible steel plants and 1 in course of erection, against 45 completed and 1 building two years ago.

Cut Nail Machines.—In January, 1892, there were 65 rolling mills which were devoted in whole or in part to the manufacture of cut nails and spikes, and which contained 5,546 nail machines. In January, 1894, the number of rolling mills which manufactured cut nails and spikes was 55, with 5,094 nail machines. These figures show a decrease of 452 cut-nail machines in two years. The Directory for 1892 showed a decrease of 520 cut-nail machines from 1889 to 1892.

Wire Rods and Wire.—There are now in this country 23 works which roll iron or steel wire rods, and we have 64 completed iron or steel wire-drawing plants and 1 additional plant in course of erection.

Wire Nail Works.—In the Directory for 1892 we enumerated 49 completed wire-nail works and 2 additional works in course of erection. In the present edition we enumerate 54 completed wire-nail works and 1 partly erected works, located in 17 States. Their average capacity is much greater than that of the works described two years ago.

Tinplate Works.—In the Directory for 1892 we enumerated and described 20 works which were either making or were prepared to make tinplates or terne plates, and 10 additional tinplate works which were in course of erection. In the present edition we describe 56 completed, 2 building, and 1 partly erected tinplate works. Nearly all of these works have been built since the passage of the McKinley tariff in 1890.

Forges and Bloomaries.—Under this classification we enumerate only the works which make wrought iron direct from the ore and works which make blooms from pig iron or scrap iron for sale. Works which make blooms in connection with rolling mills and for use exclusively in these rolling mills are not separately classified, as they are auxiliary and not independent enterprises. In the Directory for 1892 we enumerated 30 forges and bloomaries, and we now enumerate 25.

Miscellaneous Works.—In the present edition, in addition to the works which have already been mentioned, we enumerate 133 plate and sheet mills, 29 stamping works, 66 iron and steel bridgebuilding works, 30 iron and steel shipbuilding yards, 13 horse-nail works, 21 locomotive works, 64 cast-iron pipe works, 32 wrought iron and wrought steel pipe works, 66 car-axle works, 113 car-wheel works, and 109 carbuilding works.

Natural Gas.—Natural gas is still used in a large number of our rolling mills and steel works. In the present Directory we enumerate 79 works which use this fuel in whole or in part—42 in Allegheny county, Pa., 15 in other counties of Western Pennsylvania, 5 in Ohio, and 17 in Indiana. One works now being rebuilt in West Virginia and 2 works in course of erection in Indiana will also use natural gas. In the Directory for 1892 there were enumerated 74 works which used natural gas, but their consumption of this fuel was much larger than that of the 79 works which now use it. It is only in Indiana that the consumption of natural gas has increased during the last two years. In January, 1892, only 6 works in that State used natural gas.

Canada and Mexico.—In the present edition we have revised the lists of blast furnaces, rolling mills, and steel works in Canada and Mexico which were first given in the Directory for 1892. Canada now has 7 completed blast furnaces and 13 rolling mills and steel works, while Mexico is credited with 13 blast furnaces and 6 rolling mills and steel works. Another furnace is being built in Canada.

No. 261 South Fourth Street, Philadelphia, May 15, 1894. J. M. S.

SUMMARY BY STATES.

Blast Furnaces.

States.	Furnaces Completed January, 1894.				Furnaces Partly Erected January, 1894.				Annual Capacity of Completed Furnaces January, 1894, in gross tons.			
	Anthracite.	Bituminous.	Charcoal.	Total.	Anthracite.	Bituminous.	Charcoal.	Total.	Anthracite.	Bituminous.	Charcoal.	Total. Gross tons.
Massachusetts,	. .	. .	4	4	. .	. .	. .	. .	. . . .	. . . .	17,600	17,600
Connecticut,	. .	. .	7	7	. .	. .	. .	. .	. .	. .	31,200	31,200
New York,	19	2	6	27	. .	. .	. .	. .	492,900	155,000	41,900	689,800
New Jersey,	14	. .	. .	14	. .	. .	. .	. .	250,662	. . . .	. .	250,662
Pennsylvania,	109	76	14	199	1	. .	. .	1	2,562,325	3,993,700	49,790	6,605,815
Maryland,	. .	5	6	11	. .	. .	. .	. .	. . . .	367,000	37,000	404,000
Virginia,	. .	24	8	32	. .	1	. .	1	. . . .	778,000	36,250	814,250
West Virginia,	. .	4	. .	4	. .	. .	. .	. .	. . . .	236,000	. . . .	236,000
Kentucky,	. .	6	3	9	. .	. .	. .	. .	. . . .	203,000	49,500	252,500
Tennessee,	. .	13	9	22	. .	1	. .	1	. .	448,000	142,800	590,800
North Carolina,	. .	2	. .	2	. .	. .	. .	. .	. . .	40,200	. .	40,200
Georgia,	. .	2	3	5	. .	. .	. .	. .	. . .	63,000	38,000	101,000
Alabama,	. .	38	14	52	. .	1	1	2	. . . .	1,485,400	194,500	1,679,900
Texas,	. .	. .	4	4	. .	. .	. .	. .	. . .	. . .	51,500	51,500
Ohio,	. .	55	10	65	. .	. .	. .	. .	. . . .	1,990,700	39,850	2,030,550
Indiana,	. .	2	. .	2	. .	. .	. .	. .	. . .	27,000	. . .	27,000
Illinois,	. .	19	. .	19	. .	. .	. .	. .	. . .	1,393,700	. . . .	1,393,700
Michigan,	. .	. .	20	20	. .	. .	. .	. .	. . . .	. . .	381,500	381,500
Wisconsin,	. .	4	6	10	. .	1	1	2	. . . .	189,000	116,050	305,050
Minnesota,	. .	1	. .	1	. .	. .	. .	. .	. . .	45,000	. . .	45,000
Missouri,	. .	3	2	5	. .	. .	. .	. .	. . . .	105,000	33,000	138,000
Colorado,	. .	3	. .	3	. .	. .	. .	. .	. . . .	160,000	. . . .	160,000
Oregon,	. .	. .	1	1	. .	. .	. .	. .	. .	. . . .	15,000	15,000
Washington,	. .	. .	1	1	. .	. .	. .	. .	.	. . . .	10,000	10,000
Total,	142	259	118	519	1	4	2	7	3,305,887	11,679,700	1,285,440	16,271,027

There were no new furnaces in course of erection on the 1st of January, 1894. From January, 1892, to January, 1894, we have transferred to the abandoned list 66 furnaces: 1 in Maine, 2 in Connecticut, 11 in New York, 1 in New Jersey, 20 in Pennsylvania, 2 in Maryland, 6 in Virginia, 1 in Kentucky, 4 in Tennessee, 1 in Georgia, 2 in Alabama, 7 in Ohio, 1 in Illinois, 3 in Michigan, 1 in Wisconsin, and 3 in Missouri. During the same period 16 new furnaces have been built: 1 in New York, 5 in Virginia, 7 in Tennessee, 1 in North Carolina, 1 in Alabama, and 1 in Wisconsin.

SUMMARY BY STATES.

Rolling Mills, Steel Works, Tinplate Works, etc.

States.	Rolling Mills and Steel Works.	Iron and Steel Rolling Mills.*	Cut-Nail Machines.	Steel Works.					Tinplate Works.	Forges and Bloomaries.
				Bessemer.	Clapp-Griffiths.	Robert-Bessemer.	Open-hearth.	Crucible.		
Maine,	1	1	. .	. .	.	. .	.	. .		.
New Hampshire,	1	1	.	. .	. .	.	1	. .		. .
Massachusetts,	13	12	291	. .	1	. .	4	1	1	.
Rhode Island,	1	1		. .	. .	. .	.	. .		. .
Connecticut,	7	7	.	. .	.	. .	.	3	. .	. .
New York,	23	20	. . .	1	.	. .	3	4	8	8
New Jersey,	19	18	193	. .	. .	. .	3	6	3	3
Pennsylvania,	221	201	1,392	20	2	1	42	25	25	10
Delaware,	9	9	. .	. .	. .	.	.	.	. .	. .
Maryland,	6	6	.	1	.	. .		1	3	1
Virginia,	10	10	146	1	.		.	. .	. .	
West Virginia,	6	6	856	2	.	.	. .	. .	. .	.
Kentucky,	9	9	126	1	.	. .	2	. .	. .	. .
Tennessee,	5	4	41	1		. .	1	1	. .	1
North Carolina,	.		. .	. .	.		.	. .	. .	1
Georgia,	2	1	. . .	.	. .	.	.	. .	.	
Alabama,	10	9	77		. .	. .	2	. .	.	1
Texas,	2	2	. . .	. .			. .		. .	
Ohio,	61	56	1,164	6	.	. .	12	1	6	.
Indiana,	26	24	316	2	.	1	3	1	3	. .
Illinois,	28	24	346	6	1	1	5	3	5	.
Michigan,	4	4	. . .	. .	.	1	1	1	1	. .
Wisconsin,	3	3	. .	1	. .			. .	. .	.
Minnesota,	2	2	. .		. .	.	.	. .	. .	.
Missouri,	7	6	50		.	. .	1	. .	1	. .
Iowa,	3	2	. . .	.		. .	.	1		
Colorado,	2	2		1		. .	. .	. .	. .	.
Oregon,	1	1	.	. .		. .	.	. .	. .	. .
Wyoming,	1	1	. . .	. .	.	.	. .	. .	.	. .
California,	4	4	96	. .		.	1	. .	.	. .
Total,	487	446	5,094	43	4	4	81	48	56	25

Number of rolling mills building, 8. Number of rolling mills rebuilding, 1. Number of steel plants building, 3, (1 Bessemer, 1 open-hearth, and 1 crucible,) all connected with rolling mills. Number of tinplate works building, 2 and 1 partly built.

* Excludes all steel works that contain no hot-rolling trains of rolls.

The number of wire-nail works in the United States is 54 completed and 1 partly built, located in 17 States, as follows: Massachusetts, 8; Rhode Island, 1; Connecticut, 3; New York, 5; New Jersey, 1; Pennsylvania, 9 completed and 1 partly built; Virginia, 1; West Virginia, 1; Ohio, 7; Indiana, 3; Illinois, 6; Wisconsin, 2; Missouri, 1; Iowa, 1; Kansas, 1; Washington, 2; and California, 2.

GRAND SUMMARY.

Iron and Steel Works.	January, 1894.	January, 1892.
Number of completed Blast Furnaces—259 Bituminous, 142 Anthracite and Coke, and 118 Charcoal: total,	519	569
Number of Blast Furnaces building,	. . .	11
Annual capacity of completed Blast Furnaces, gross tons,	16,271,027	14,550,708
Annual capacity of the Bituminous Furnaces, gross tons,	11,679,700	10,097,946
Annual capacity of the Anthracite Furnaces, gross tons,	3,305,887	3,198,387
Annual capacity of the Charcoal Furnaces, gross tons,	1,285,440	1,254,375
Number of completed Rolling Mills and Steel Works,	487	460
Number of Rolling Mills and Steel Works building and rebuilding,	9	18
Number of Single Puddling Furnaces, (a double furnace counting as two single ones,)	4,715	5,120
Number of Heating Furnaces,	3,054	2,913
Number of Trains of Rolls,	1,690	1,592
Annual capacity of completed Rolling Mills, gross tons,	12,477,890	10,563,655
Number of Rolling Mills having Cut-nail Factories,	55	65
Number of Cut-nail Machines,	5,094	5,546
Number of Wire-nail Works,	54	49
Number of completed standard Bessemer Steel Works,	43	46
Number of Bessemer Steel Works building,	1	2
Number of standard Bessemer Converters—95 completed, 2 building, and 1 partly built,	95	95
Annual capacity (built and building) in ingots and direct castings, gross tons,	7,740,900	5,857,143
Number of completed Clapp-Griffiths Steel Works,	4	5
Number of Clapp-Griffiths Converters,	7	9
Annual capacity in ingots, gross tons,	146,500	151,786
Number of completed Robert-Bessemer Steel Works,	4	4
Number of Robert-Bessemer Converters—6 completed and 2 partly built,	6	6
Number of completed Open-Hearth Steel Works,	81	71
Number of Open-Hearth Steel Works building,	1	4
Number of Open-Hearth Furnaces—189 completed, 4 building, and 5 partly built,	189	164
Annual capacity (built and building) in ingots and direct castings, gross tons,	1,740,000	1,383,929
Number of completed Crucible Steel Works,	48	45
Number of Crucible Steel Works building,	1	1
Number of Steel-melting Pots which can be used at each heat,	3,103	2,934
Annual capacity in ingots and direct castings, gross tons,	99,000	93,750
Number of completed Tinplate Works,	56	20
Number of Tinplate Works building—2 and 1 partly built,	2	10
Number of Forges making wrought iron from ore,	11	10
Annual capacity in blooms and billets, gross tons,	17,870	18,929
Number of pig and scrap iron Bloomaries,	14	20
Annual capacity in blooms, gross tons,	30,925	32,143

THE IRON AND STEEL WORKS

OF

THE UNITED STATES.

BLAST FURNACES.

NOTE.—The following furnaces are either active or can readily be put in blast. The telegraph address is given only when it is not the same as the post-office address. The dimensions given relate to the present size of furnaces. When the power is not mentioned steam-power is understood. A list of recently abandoned furnaces or furnaces which are likely to remain long inactive will be found beginning on page 67.

MASSACHUSETTS.

CHARCOAL.

Lanesborough Furnace, E. T. Slocum, Trustee for creditors, Pittsfield. Furnace at Lanesborough, Berkshire county. One stack, 33 x 9½, built in 1847, burned in 1882, and rebuilt in 1882–3; hot blast; ore, local brown hematite; specialty, car-wheel pig iron; annual capacity, 4,100 gross tons. Idle since the spring of 1889, and for sale.

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; steam-power. Van Deusenville Furnace, at Van Deusenville, 32 x 9, built in 1834, and rebuilt in 1858; water-power. Cheshire Furnace, at Cheshire, 32 x 9, built in 1850, and rebuilt in 1870; steam-power. All use warm blast; iron stoves; ore, local brown hematite from mines owned by the works; total annual capacity, 13,500 gross tons of foundry pig iron for cannon, car-wheels, and machinery. Brand, "Richmond." Main office at Richmond Furnace P. O. George Church, President, Great Barrington, Mass.; M. H. Robbins, Vice-President, Lakeville, Conn.; John H. C. Church, Secretary, Great Barrington, Mass.; R. A. Burget, Treasurer, General Manager, and selling agent, Richmond Furnace.

Number of furnaces in Massachusetts: 4 charcoal stacks.

CONNECTICUT.

CHARCOAL.

Canaan Furnaces, Barnum Richardson Company, Lime Rock, Litchfield county. Main office, Lime Rock. Furnaces at East Canaan, Litchfield county. Two stacks: No. 1, 40 x 9½, built in 1840, and rebuilt in 1880; No. 3, 35 x 9, built in 1872; No. 1 has closed top and No. 3 open top; hot blast; steam and water power; ore, Salisbury brown hematite; product, pig iron for car-wheels and malleable castings, known as "Salisbury" iron; total annual capacity, 10,000 gross tons. (Stack No. 2, 32 x 9, built in 1847, is not likely to make iron again.) Milo B. Richardson, President; Charles W. Barnum, Vice-President; Sidney P. Ensign, Secretary; Porter S. Burrall, Treasurer.

Cornwall Bridge Iron Company, Cornwall Bridge, Litchfield county. One stack, 32 x 9, built in 1833; hot blast; water-power; ore, Salisbury; product, car-wheel pig iron; annual capacity, 5,000 gross tons. Brand, "Salisbury." Milo B. Richardson, President, Lime Rock; Wm. W. Bierce, Secretary, and Russell Bierce, Treasurer, Cornwall Bridge. Selling agents, C. R. Baird & Co., Philadelphia.

Kent Furnace, Kent Iron Company, Kent Furnace P. O., Litchfield county. Telegraph address, Kent. One stack, 34 x 10, built in 1849; rebuilt in 1884; hot blast; water-power; open top; ore, Salisbury brown hematite; product, car-wheel pig iron; annual capacity, 4,100 gross tons. Brands, "Salisbury" and "Kent." D. J. Warner, President, Salisbury; George R. Bull, Secretary; John Hopson, Treasurer and Manager.

Landon Furnace, The Landon Iron Company, Chapinville, Litchfield county. One stack, 32 x 9, built in 1825, burned in 1879, and rebuilt in 1881 and 1890; one Gifford stove; steam and water power; ore, for car-wheel iron, brown hematite from the Salisbury district, Conn., and from Amenia, N. Y., and for special "carbonate" iron, with a tensile strength of from 30,000 to 40,000 pounds per square inch, roasted carbonate ore; product, car-wheel and special "carbonate" pig iron; annual capacity, 4,000 gross tons. Brand, "Salisbury-Landon, 1825." Formerly called Chapinville Furnace. F. Kingsbury Curtis, President; F. J. Kingsbury, Vice-President; Albert M. Card, Secretary and Treasurer; Thomas W. Stiles, Assistant Secretary. Selling agents, Thomas W. Stiles, 130 Water st., New York; Wm. F. Jarvis & Co., Newberry Building, Detroit.

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; open top; ore, Salisbury brown hematite; product, pig iron for car-wheels and malleable castings; annual capacity, 3,600 gross tons. Samuel S. Robbins, President; Milo B. Richardson, Secretary and Treasurer.

Sharon Valley Iron Company, Sharon Valley, Litchfield county. One stack, 31 x 9½; very old; rebuilt in 1863; open top; hot blast; water-power; ore, Salisbury; product, Salisbury car-wheel pig iron; annual capacity, 4,500 gross tons. George B. Burrall, President, Lakeville; Charles W. Barnum, Treasurer, and Milo B. Richardson, Secretary, Lime Rock.

Number of furnaces in Connecticut: 7 charcoal stacks.

NEW YORK.

ANTHRACITE AND MIXED ANTHRACITE AND COKE.

Albany City Iron Works, Albany, Albany county. Two stacks on Van Rensselaer Island, each 60 x 16, built in 1873–4; fuel, anthracite coal and coke; total annual capacity, 27,000 gross tons. Owned by P. J. McArdle, Albany. Idle for several years, and for sale.

Burden Iron Works, The Burden Iron Company, Troy, Rensselaer county. Two stacks, each 60 x 14½, built in 1865 and 1867; three Gordon-Whitwell stoves; ores, magnetic from Northern New York, hematite and carbonate from Eastern New York, and Lake Superior; fuel, anthracite coal and coke; product, forge pig iron; total annual capacity, 50,000 gross tons. *See Rolling Mills.*

Cedar Point Furnace, Witherbee, Sherman & Co., Port Henry, Essex county. One stack, 71 x 15, built in 1872–3, and first put in blast August 12, 1875; four 22-foot Whitwell stoves; fuel, anthracite coal and coke; ores, Old Bed Lake Champlain and New Bed Bessemer Lake Champlain; product, foundry, mill, and Bessemer pig iron; annual capacity, 23,200 gross tons. Brand, "Cedar Point."

Charlotte Furnace, Charlotte Iron Works, P. O. Box 704, Rochester, Monroe county. Office and works at Charlotte, 7 miles from Rochester, at the mouth of the Genesee river. One stack, 65 x 15, built in 1868, and rebuilt in 1884; three 18-pipe ovens; fuel, anthracite coal and coke; ores, local hematite, with a mixture of Lake Champlain and Lake Superior magnetic; product, foundry pig iron, especially adapted for stove plates and suitable for general foundry purposes; annual capacity, 18,000 gross tons. Brand, "Charlotte." A. G. Yates, President; J. E. Roberts, Vice-President; A. S. Clarke, Secretary and Treasurer.

Crown Point Furnaces, Crown Point Iron Company, Crown Point, Essex county. Two stacks, situated on the bank of Lake Champlain, 60 x 17 and 70 x 18, built in 1872–3; the second stack rebuilt in 1881; six Siemens-Cowper-Cochrane stoves, three 45 x 15 and three 60 x 16; fuel, anthracite coal and coke; product, Bessemer pig iron, produced from Crown Point (or Penfield) and Chateaugay ores; total annual capacity, 40,500 gross tons. Brand, "Crown Point." Chester Griswold, President, F. J. Dominick, Vice-President and General

Manager, and H. M. Olmsted, Secretary and Treasurer, 21 Cortlandt st., New York. Selling agent, F. J. Dominick, 21 Cortlandt st., New York.

Elmira Iron and Steel Rolling Mill Company, Elmira, Chemung county. Two stacks, each 57 x 16, built in 1872, and first blown in October 5, 1872; six iron hot-blast stoves; fuel, anthracite coal and coke; ores, hematite from Jefferson county, N. Y., and Centre county, Pa., and magnetic from Lake Superior and Canada; product used principally at the mills of the company for bar iron, angles, and plates; total annual capacity, 32,100 gross tons. Idle since the latter part of 1890, and for sale. *See Rolling Mills.*

Franklin Iron Works, Franklin Iron Manufacturing Company, Franklin Iron Works P. O., Oneida county. One stack, 70 x 14, built in 1871, and remodeled in 1883, three fire-brick stoves having been added; fuel, anthracite coal and coke; ore, local fossil; product, pig iron for stove plates and small castings; annual capacity, 32,100 gross 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 50 x 15, completed and put in operation in 1851; two five-section Ford stoves; ores, brown hematite from West Stockbridge, Mass., red hematite from Antwerp, N. Y., red specular from Lake Superior, and magnetic from Port Henry and Forest of Dean mines, New York; fuel, anthracite coal; product, principally best grades of foundry iron, although it is also used for best grades of bar iron; total annual capacity, 24,000 gross tons. Brand, "Hudson." John E. Gillette, President; F. H. Stott, Vice-President; Samuel R. Rainey, Secretary and Treasurer; S. C. McArthur, General Agent.

Kirkland Furnace, Kirkland, Oneida county. One stack, 65 x 14, built in 1873, reconstructed in 1882, and changed from water to steam power; fuel, anthracite coal and coke; ores, local fossiliferous, Northern New York hematite, and Lake Champlain magnetic; annual capacity, 18,000 gross tons. Specialty, foundry pig iron. Brand, "Kirkland." Owned by I. A. Williams and the estate of T. W. Dwight. Address all communications to I. A. Williams, Utica. Idle since the fall of 1890.

Poughkeepsie Iron Company, A. E. Tower, Agent, Poughkeepsie, Dutchess county. Two stacks, one, 60 x 15½, built in 1860, and the other, 70 x 16, built in 1860, and rebuilt in 1893; five Gordon stoves; ores, ⅕ Dutchess county brown hematite, ⅗ Port Henry magnetic, and ⅗ Forest of Dean, Orange county; fuel, anthracite coal; product, foundry and forge pig iron; total annual capacity, 68,000 gross tons. Brand, "Poughkeepsie." A. E. Tower, President, Treasurer, and Agent; H. N. Brinsmade, Secretary. Selling agents, Crocker Brothers, 32 Cliff st., New York.

Troy Steel and Iron Company, Troy. Furnaces on Breaker island, Albany county, opposite Troy. Three stacks, each 80 x 18, built in 1886-7; twelve Whitwell stoves; fuel, anthracite coal and coke; ores, magnetic from Essex and Clinton counties and Lake Superior; product, Bessemer pig iron; total annual capacity, 160,000 gross tons. *See Rolling Mills and Steel Works.*

Number of anthracite and mixed anthracite and coke furnaces in New York: 19 stacks.

COKE.

Buffalo Furnace, Buffalo Furnace Company, Buffalo, Erie county. One stack, 80 x 18, built in 1892, and blown in February 25, 1893; three Cowper-Kennedy stoves; ore, Lake Superior hematite; fuel, coke; product, strong foundry pig iron; annual capacity, 80,000 gross tons. Brand, "Buffalo." L. C. Hanna, President; F. B. Baird, Vice-President; A. S. Hubbell, Secretary; C. C. Bolton, Treasurer; F. E. Bachman, Manager. Selling agents, M. A. Hanna & Co., Cleveland, Ohio.

Niagara Furnace, Tonawanda Iron and Steel Company, North Tonawanda, Niagara county. One stack, 76 x 17, built in 1873, and rebuilt by the present company in 1890-1; three Cowper-Kennedy stoves, each 70 x 18; ores, hematite and specular from Lake Superior; fuel, coke; product, foundry pig iron; annual capacity, 75,000 gross tons. Brand, "Niagara." William A. Rogers, President; Archer Brown, Vice-President; George G. Hamilton, Secretary; William A. Gamble, Treasurer; W. B. Kerr, Superintendent. Selling agents, Rogers, Brown & Co., Buffalo, Boston, and Cincinnati; Rogers, Brown & Warner, New York and Philadelphia.

Number of coke furnaces in New York: 2 stacks.

CHARCOAL.

Chateaugay Ore and Iron Company, Plattsburgh, Clinton county. Two stacks in Clinton county: Plattsburgh Furnace, at Plattsburgh, 55 x 9¼, first blown in in April, 1878, and rebuilt in 1885; Standish Furnace, at Standish, 60 x 11, first blown in in February, 1887; iron stoves; ore, Chateaugay magnetic; product, pig iron for car-wheels and malleable castings; total annual capacity, 18,000 gross tons. Brand, "Chateaugay." Smith M. Weed, President, M. F. Parkhurst, Cashier, and J. N. Stower, General Manager, Plattsburgh; F. J. Dominick, Vice-President, and H. M. Olmsted, Treasurer, 21 Cortlandt st., New York. *See Forges.*

Chatham Furnace, Kelley Mining Company, lessee, Holland Building, 1440 Broadway, New York City. Furnace at Chatham, Columbia county. One stack, 32 x 9, built in 1873; put in blast in July, 1873; open top; warm blast; ores, brown hematite from West Pittsfield, Mass., and "Harlem Valley" hematite from Columbia and Dutchess

counties; product, pig iron for car-wheels, cannon, chilled rolls, etc.; annual capacity, 4,500 gross tons. Brand, "Kelley Superior Quality Salisbury." Formerly called Beckley Iron Works. J. J. Morehouse, President and Treasurer; A. M. Card, Vice-President; George A. Fielding, Secretary. Owned by the Chatham Furnace Company, Chatham.

Copake Iron Works, Frederick Miles, Copake Iron Works P. O., Columbia county. One stack, 32 x 9, built in 1872; open top; iron stoves; ore, limonite from Clove Spring mine, Dutchess county; specialty, car-wheel and gun-metal pig iron; annual capacity, 3,600 gross tons.

Millerton Iron Company, Irondale, Dutchess county. Telegraph address, Millerton. One stack, 55 x 9½, built in 1885, and blown in February 1, 1886, taking the place of the old stack destroyed by fire May 15, 1885; two Cooper stoves; ore, Salisbury; annual capacity, 10,800 gross tons; specialty, car-wheel pig iron. Brand, "Salisbury." M. B. Richardson, Lime Rock, Conn., in charge of property for Bondholders' Committee. Idle for several years.

Phenix Furnace, Estate of Caleb S. Maltby, Millerton, Dutchess county. One stack, 32 x 9, rebuilt in 1840; open top; warm blast; ore, Salisbury from the old Salisbury mine at Ore Hill and neighboring mines; annual capacity, 5,000 gross tons; specialty, car-wheel pig iron. Brand, "Phenix." Edward H. Townsend, Superintendent, Millerton. Idle for several years.

Number of charcoal furnaces in New York: 6 stacks. Total number of furnaces in New York: 27 stacks.

NEW JERSEY.

ANTHRACITE AND MIXED ANTHRACITE AND COKE.

Andover Iron Works, Andover Iron Company, Phillipsburg, Warren county. Three stacks, one 75 x 18, one 75 x 17, and one 60 x 18, built in 1848; remodeled since that date; one furnace has Siemens-Cowper-Cochrane stoves and the other two have iron stoves; ores, magnetite from the company's mines and Lake Superior red hematite; fuel, anthracite coal and coke; product, all grades of pig iron, with special qualities for plates, sheets, wire, nails, and car-wheel chill; total annual capacity, 45,000 gross tons. Brand, "Andover." Philadelphia office, 240 South Third st. John R. Fell, President; Charles Gilpin, Jr., Treasurer; Joseph C. Kent, Superintendent, Phillipsburg.

Franklin Iron Company, Franklin Furnace P. O., Sussex county. One stack, 67 x 20½, completed in October, 1873, and blown in January 1, 1874; Cooper stoves; fuel, anthracite coal and coke; ores, New Jersey, New York, and some foreign; product, Bessemer pig iron; an-

nual capacity, 26,000 gross tons. Walter Scranton, President, Moses Taylor Pyne, Vice-President, and H. V. Vultee, Secretary and Treasurer, 52 Wall st., New York; W. W. Pierce, Superintendent, at the works.

Musconetcong Furnaces, Musconetcong Iron Works, Stanhope, Sussex county. Two stacks, 70 x 17½ and 80 x 20, built in 1841 and 1843, and rebuilt in 1866 and 1869; No. 1 furnace has iron stoves and No. 2 has one single and one double Cooper-Durham stove; fuel, anthracite coal and coke; ore, magnetic, mined in Morris and Sussex counties; total annual capacity, 51,000 gross tons. Specialty, No. 2 foundry and gray forge pig iron. Brand, "M. I. W." J. R. Fell, President, Philadelphia; H. H. Wilson, Secretary and Treasurer, 237 South Third st., Philadelphia; I. P. Pardee, Superintendent, Stanhope, N. J. Selling agents, Crocker Brothers, 32 Cliff st., New York; J. Wesley Pullman, 238 South Third st., Philadelphia.

New Jersey Zinc and Iron Company, Newark, Essex county. Sales office, 98 William st., corner Platt st., New York. Two stacks: A, 31 x 8, built in 1885 to take the place of two stacks built in 1855 and 1863; and B, 30 x 8, built in 1883 to take the place of a stack built in 1871; fuel, anthracite coal; product, spiegeleisen, from zinc residuum; total annual capacity, 7,000 gross tons. Stephen S. Palmer, President, and A. P. Cobb, Acting Treasurer, 52 Wall st., New York; W. P. Hardenburgh, Manager, Newark.

Oxford Iron Works, Oxford Iron and Nail Company, Oxford, Warren county. Main office, 52 Wall st., New York. One stack, 63 x 17, built in 1871; two Kent and one Durham iron pipe ovens; fuel, anthracite coal; ore, magnetic, mined near the works; product, mill pig iron; annual capacity, 19,000 gross tons. Product is worked up into nails, etc., by the company, only a small quantity of foundry pig iron being made and sold. J. S. Scranton, sales agent, 83 Washington st., New York. *See Rolling Mills.*

Passaic Zinc Company, Jersey City. Furnace in Hudson county. One stack, built in 1883, and first put in blast in February, 1884; rebuilding, to be 45 x 10 when completed; four 21-pipe Cooper-Durham stoves; fuel, anthracite coal; product, spiegeleisen, from zinc residuum; estimated annual capacity, 7,300 gross tons. William Reynolds Brown, President; Charles B. Squier, Secretary and Treasurer; Fritz Gleim, Superintendent. Selling agents, Manning & Squier, 111 Liberty st., New York.

Pequest Furnace, Cooper & Hewitt, Oxford, Warren county. New York office, 17 Burling Slip. One stack, 67 x 16, built in 1874, and rebuilt in 1883; Durham iron pipe stoves; ores, New Jersey magnetic and foreign; fuel, ⅞ anthracite coal and ⅛ Connellsville coke; product, foundry, gray forge, and Bessemer pig iron; iron actually made in one year, 24,862 gross tons. Brand, "Pequest." B. F. Fack-

enthal, Jr., General Manager, Riegelsville, Pa. (Ringwood Furnace, at Hewitt, abandoned in 1893.) *See Durham Iron Works, Lehigh Valley, Pennsylvania.*

Secaucus Iron Company, Secaucus, Hudson county. Telegraph address, Kingsland. One stack, 65 x 17, completed in 1877, and first blown in in June, 1879; Cooper iron pipe stoves; ores, foreign hematite and New York and New Jersey magnetic; fuel, anthracite coal; product, Bessemer pig iron; annual capacity, 27,000 gross tons. Brand, "Secaucus." F. Pardee, President, Hazleton, Pa.; I. P. Pardee, Secretary and Treasurer, Stanhope, N. J. Selling agents, Crocker Brothers, 32 Cliff st., New York.

Warren Furnace, Warren Iron Company, Hackettstown, Warren county. One stack, 56 x 16, built in 1874-5, and put in blast in 1875; closed top; Kent stoves; ores, $\frac{2}{3}$ magnetic and $\frac{1}{3}$ hematite; fuel, anthracite coal; product, foundry pig iron; annual capacity, 13,500 gross tons. Brand, "Warren." Eugene Davis, President; John R. Bennett, Secretary and Treasurer.

Wharton Furnace, Edward Kelly, Manager, Port Oram, Morris county. One stack, 75 x 16, built in 1868, first blown in in 1869, remodeled in 1889, and old stack replaced by new steel shell stack in 1892; improved Durham hot-blast stoves; ores, North Jersey magnetic and Lake Superior hematite; fuel, anthracite coal and coke; product, neutral foundry and forge pig iron; annual capacity, 30,000 gross tons. Brand, "Wharton." Formerly called Port Oram Furnace. Joseph Wharton, proprietor, Philadelphia. Selling agents, Hugh W. Adams & Co., 15 Beekman st., New York.

Number of furnaces in New Jersey: 14 anthracite and mixed anthracite and coke stacks. No charcoal stacks.

PENNSYLVANIA.

LEHIGH VALLEY—ANTHRACITE AND MIXED ANTHRACITE AND COKE.

Allentown Iron Works, Allentown Iron Company, Allentown, Lehigh county. Philadelphia office, 226 South Third st. Two stacks: No. 4, 60 x 16½, built and blown in in 1886; and No. 5, 60 x 17, built in 1872, and blown in in 1873; fuel, anthracite coal and coke; ores, New York, New Jersey, and Pennsylvania magnetic and local hematite; specialty, foundry pig iron; total annual capacity, 60,000 gross tons. Brand, "Allentown." (Four stacks, built in 1846 and 1853, have been abandoned.) E. B. Leisenring, President, and C. F. Howell, Secretary and Treasurer, Philadelphia; Edward T. Clymer, Manager, Allentown.

Allentown (The) Rolling Mills, 237 South Third st., Philadelphia. Works at Allentown. Two stacks, each 65 x 16, built in 1864; two old style cast-iron stoves; open tops; fuel, anthracite coal; ores,

local hematite and New Jersey and New York magnetic; product, mill and foundry pig iron; total annual capacity, 24,000 gross tons. *See Rolling Mills.*

Bethlehem (The) Iron Company, South Bethlehem, Northampton county. Seven stacks, six owned and one leased, five at South Bethlehem and two at other places, all in Northampton county: No. 1, 61 x 15½, built in 1863; No. 2, 70 x 16, built in 1867 and rebuilt in 1877; No. 4, 70 x 16, built in 1874–5; No. 5, 70 x 16, built in 1874–5; No. 6, 70 x 16, built in 1881; No. 7, (Bingen,) 65 x 16, situated at Bingen, built in 1870; Nos. 2 and 6 are equipped with Siemens-Cowper-Cochrane stoves; the others have iron stoves. Lucy Furnace, 65 x 14, leased from the Lucy Iron Company, situated at Glendon, built in 1872, and rebuilt in 1880. Product, Bessemer pig iron, from local and foreign hematite and magnetic ores; fuel, anthracite coal and Connellsville coke; total annual capacity, 135,000 gross tons. Foundations for Furnace No. 8 built in 1892; work suspended. (No. 3 Furnace, built in 1868, abandoned.) *See Rolling Mills and Steel Works.*

Carbon Iron Works, Carbon Iron and Steel Company Limited, Mauch Chunk, Carbon county. Works at Parryville, in the same county. Two stacks, 52 x 14 and 65 x 14, built in 1864 and 1869, respectively; one elliptical 60-pipe and three 18-foot Cowper-Foote brick stoves; fuel, anthracite coal and coke; ores, hematite from Lehigh, Northampton, and Carbon counties, magnetic from New Jersey and Lake Champlain, and foreign; total annual capacity, 48,000 gross tons. Product, "Carbon" foundry iron, "Parry" Bessemer iron, and "Viking" and "Vasa" low-phosphorus iron. (One stack, built in 1855, dismantled in 1893.) M. S. Kemmerer, Chairman, and H. A. Butler, Secretary and Treasurer, Mauch Chunk; H. R. Hall, Superintendent, Parryville.

Coleraine Iron Works, Estate of William T. Carter, deceased, Redington, Northampton county. Two stacks, each 60 x 17, built in 1869 and 1872, and rebuilt in 1891–2; two hot-blast stoves; fuel, anthracite coal; ores, ⅝ hematite and ⅜ magnetic, from Pennsylvania, New Jersey, and the Lake Superior region; product, foundry pig iron; total annual capacity, 40,500 gross tons. Brand, "Coleraine." Selling agents, C. L. Peirson & Co., Boston and New York.

Coplay Iron Company, Coplay, Lehigh county. Two stacks: one, 55 x 16, built in 1862, open top, and one, 70 x 15, built in 1868, and rebuilt in 1889, closed top; two Thomas and one Cooper pipe stoves; fuel, anthracite coal and coke; ores, Lehigh county hematite and New Jersey magnetic; product, principally foundry pig iron; total annual capacity, 34,000 gross tons. Brand, "Coplay." (One stack, built in 1853, abandoned in 1892.) E. P. Wilbur, President, W. A. Wilbur, Secretary, and R. M. Gummere, Treasurer, Bethlehem; Horace Boyd, Superintendent, Coplay.

Crane Iron Works, Crane Iron Company, 224 South Fourth st., Philadelphia. Works at Catasauqua, Lehigh county. Four stacks: two 75 x 18 and two 60 x 16. Original furnaces were built in 1839, 1842, and 1846; first iron made on July 4, 1840; present furnaces built in 1850, 1867, and 1881; one has iron stoves and three have Whitwell stoves; fuel, anthracite coal and coke; ores, New Jersey magnetic, Pennsylvania hematite, Lake Superior, and foreign; specialties, foundry, open-hearth, and Bessemer pig iron; total annual capacity, 135,000 gross tons. Brands, "Crane," "Castle," and "Mohican." Robert F. Kennedy and Leonard Peckitt, Assignees.

Crumwold Furnace, Robert H. Coleman, Trustee and Lessee, Lebanon. Furnace at Emaus, Lehigh county. One stack, 66 x 16, completed and first put in blast October 10, 1872; rebuilt in 1879–80; remodeled in 1890, and equipped with three 60 x 18 Gordon-Whitwell-Cowper fire-brick stoves; fuel, anthracite coal and coke; ore, Cornwall; product, Cornwall Bessemer pig iron; annual capacity, 29,000 gross tons. Formerly called Emaus Furnace. A. Hess, Business Manager, Lebanon; Albert Broden, General Manager, Reading. Selling agents, Pancoast & Rogers, 28 Platt st., New York. Owned by The Philadelphia and Reading Coal and Iron Company. *See Colebrook and Cornwall Anthracite Furnaces, Lower Susquehanna Valley.*

Durham Iron Works, Cooper & Hewitt, Riegelsville, Bucks county. New York office, 17 Burling Slip. One stack, 75 x 19, built in 1874, and first blown in in February, 1876; six Cooper-Durham iron stoves; fuel, anthracite coal and Connellsville coke; ores, local hematite and magnetic, New Jersey magnetic, and foreign; specialties, gray forge and Bessemer pig iron; iron actually made in one calendar year, 38,525 gross tons. Brand, "Durham." B. F. Fackenthal, Jr., General Superintendent. Selling agents, J. Tatnall Lea & Co., 125 South Fourth st., Philadelphia. *See Pequest Furnace, New Jersey.*

Glendon Iron Works, Glendon Iron Company, Easton, Northampton county. Established in 1843. Furnaces situated at Glendon, near Easton. Four stacks: No. 1, 63 x 15; No. 2, 81 x 18; No. 3, 80 x 18; and No. 5, 72 x 18. Original furnaces were first blown in in 1844, 1845, 1850, and 1869; rebuilt since then, and Nos. 1, 2, and 3 remodeled in 1888, 1889, and 1890; ores, hematite from Northampton county, Pa., and the Lake Superior region, and magnetic from Morris county, N. J.; fuel, a mixture of $\frac{3}{4}$ anthracite coal and $\frac{1}{4}$ coke; specialty, forge pig iron; total annual capacity, 90,000 gross tons. Brand, "Glendon." (No. 4 Furnace, at South Easton, built in 1852, was torn down in 1890.) Principal office at 18 Post Office square, Boston, Mass. Augustus Lowell, President, and Thomas T. Bouvé, Secretary and Treasurer, Boston; John S. Fackenthal, Superintendent, Easton. Selling agents, J. Tatnall Lea & Co., 125 South Fourth st., Philadelphia; C. L. Peirson & Co., Boston and New York.

Lehigh Steel and Iron Company, Allentown, Lehigh county. Two stacks: No. 1, 65 x 16, completed July 22, 1869, rebuilt in 1886; No. 2, 60 x 15, completed October 21, 1872, rebuilt in 1888; closed tops and fronts; fuel, anthracite coal and coke; ores, Lehigh county and Lake Superior hematites and New Jersey magnetics; specialty, high-grade foundry pig iron; total annual capacity, 37,000 gross tons. Brand, "Lehigh." Formerly operated by the Lehigh Iron Company. W. H. Ainey, President; H. J. Foster, Treasurer.

Lehigh Zinc and Iron Company, Bethlehem, Northampton county. Main office, 925 Chestnut st., Philadelphia. One stack, 33 x 8½, first put in blast in February, 1882; two Durham stoves; fuel, anthracite coal and coke; product, spiegeleisen, from zinc residuum; annual capacity, 2,700 gross tons. Brand, "Lehigh." Richard Heckscher, President; S. P. Wetherill, Vice-President; J. Price Wetherill, General Manager; August Heckscher, Treasurer; J. H. Troutman, Assistant Treasurer; T. Lewis Thomas, Secretary.

Macungie Furnace, Macungie Iron Company, 505 Chestnut st., Philadelphia. Furnace at Macungie, Lehigh county. One stack, 56 x 16, completed in 1874, and blown in September 14, 1874; use old pattern Kent stoves; fuel, anthracite coal and coke; product, foundry pig iron; annual capacity, 20,000 gross tons. James Singmaster, President; Charles Y. Audenried, Secretary and Treasurer. For lease.

Northampton Furnace, Northampton Iron Company, Freemansburg, Northampton county. One stack, 65 x 15, blown in July 17, 1873. W. A. Wilbur, President, and R. M. Gummere, Secretary and Treasurer, South Bethlehem.

Thomas Iron Works, The Thomas Iron Company, Hokendauqua, Lehigh county. Eleven stacks, located as follows: six at Hokendauqua; two (Lock Ridge) at Alburtis, Lehigh county; two (Saucon) at Hellertown, Northampton county; and one (Keystone) at Glendon, Northampton county. At Hokendauqua there are two stacks, Nos. 1 and 2, each 60 x 16, built in 1855; two, Nos. 3 and 4, each 60 x 17, built in 1863; and two, Nos. 5 and 6, each 65 x 17, built in 1873. No. 1 will be rebuilt in 1894 and enlarged to 80 x 17. Of the Lock Ridge Furnaces, at Alburtis, one stack, No. 7, is 60 x 14, and was built in 1867, and one stack, No. 8, is 60 x 16, and was built in 1869. The Keystone Furnace, at Glendon, (No. 9,) is 65 x 16, and was first put in blast April 17, 1876. Of the Saucon Furnaces, at Hellertown, one stack, No. 10, 60 x 16, was first put in blast March 25, 1868, and No. 11, 60 x 16, was first put in blast May 25, 1870. No. 10 will be rebuilt during 1894 and enlarged to 75 x 16. The Keystone Furnace (No. 9) has Siemens-Cowper-Cochrane regenerative stoves, and Hokendauqua No. 6 has Taws & Hartman regenerative stoves; all the others have iron pipe stoves. No. 1, at Hokendauqua, and No. 8, at Alburtis, have

Durham iron pipe stoves. Fuel, anthracite coal, and occasionally some coke; ores, Lake Superior, local brown hematite, and New Jersey magnetic; total annual capacity, 200,000 gross tons. Brand, "Thomas." B. F. Fackenthal, Jr., President, and James W. Weaver, Secretary and Treasurer, Easton, Pa.; David H. Thomas, General Superintendent; S. Norton, Assistant General Superintendent; Daniel Davis, Superintendent of Lock Ridge Furnaces; Fletcher H. Knight, Superintendent of Keystone Furnace; Lee S. Clymer, Superintendent of Saucon Furnaces. Sales made by W. R. Thomas, 50 Wall st., New York; George T. Johnson, 319 Willings alley, Philadelphia; and at the main office of the company at Easton, Pa.

Number of anthracite and mixed anthracite and coke furnaces in the Lehigh Valley: 43 completed stacks and 1 stack partly erected.

SCHUYLKILL VALLEY—ANTHRACITE, MIXED ANTHRACITE AND COKE, AND COKE.

Anvil Furnace, Pottstown Iron Company, Pottstown, Montgomery county. (Operated by Jacob Fegely and Wm. M. Gordon, Receivers.) One stack, 80 x 17, built in 1867, and blown in in December, 1867; remodeled in 1889; three fire-brick stoves, 75 x 19; fuel, anthracite coal and coke; ores, magnetic and hematite; product, special pig iron, consumed by the company in manufacturing steel; annual capacity, 45,000 gross tons. Brand, "Anvil." *See Rolling Mills and Steel Works.*

Henry Clay Furnaces, Eckert & Brother, Reading, Berks county. Two stacks, each 57 x 13: one built in 1842, and blown in in August, 1844, and the other built in 1855, and blown in in September, 1856; rebuilt several times; two Gordon-Whitwell fire-brick and three iron stoves; fuel, anthracite coal and coke; ores, hematite and magnetic from Berks and Lebanon counties; product, No. 2 foundry and gray forge pig iron; total annual capacity, 36,000 gross tons. Brand, "Henry Clay."

Keystone Furnaces, E. and G. Brooke Iron Company, Birdsboro, Berks county. Three stacks: one, 50 x 12, built in 1853; one, 57 x 15, built in 1871; one, 66 x 15, built in 1873; three Durham and three Whitwell hot-blast stoves; fuel, anthracite coal and coke; ores, magnetic, with a large mixture of hematite; product, foundry and forge pig iron; total annual capacity, 63,000 gross tons. Brand, "Keystone." N. B. Wittman, Superintendent. Selling agent, J. J. Mohr, Bullitt Building, Philadelphia. *See Rolling Mills and Steel Works.*

Leesport Furnace, Leesport Iron Company, Leesport, Berks county. One stack, 58 x 16, built in 1852, and first blown in in 1853; rebuilt in 1871; two Gordon, Strobel & Laureau stoves; fuel, anthracite coal; ores, local hematite and magnetic; specialty, foundry pig iron; annual capacity, 18,000 gross tons. Brand, "Leesport." R. T. Leaf,

President, and P. R. Stetson, Secretary and Treasurer, Reading. Selling agent, J. J. Mohr, Bullitt Building, Philadelphia.

Lucinda Furnace, Lucinda Furnace Company, Norristown, Montgomery county. One stack, 55 x 14, built in 1856; rebuilt and enlarged in 1888–9; one Durham and two iron stoves; fuel, anthracite coal and coke; ore, foreign; product, Bessemer pig iron; annual capacity, 16,500 gross tons. Brand, "Lucinda." C. K. Lippincott, President, and Samuel C. Le Maistre, Secretary and Treasurer, 235 South Third st., Philadelphia.

Montgomery Furnace, Montgomery Iron Company, Port Kennedy, Montgomery county. One stack, built in 1854, and first blown in in 1856; remodeled in 1863, 1869, and 1890; rebuilding; stack to be 80 x 16½, and to have an annual capacity of from 45,000 to 50,000 gross tons; three Taws & Hartman stoves; fuel, anthracite coal and coke; ore, foreign; product, Bessemer pig iron and low-phosphorus pig iron for crucible and open-hearth steel purposes. Brands: for Bessemer iron, an arrow, on the shaft of which are M * B; for low-phosphorus iron, an arrow, on the shaft of which are three circles, each containing the letter P. Philadelphia office, 330 Walnut st. Abraham S. Patterson, President; Joseph Storm Patterson, Secretary and Treasurer. Selling agents, Pilling & Crane, Bullitt Building, Philadelphia.

Norristown Iron Works, Norristown Furnace Company, lessees, Norristown, Montgomery county. One stack, 55 x 16, built in 1869, and rebuilt in 1871; closed top; four Player iron stoves; fuel, anthracite coal and coke; ore, principally foreign; product, low-phosphorus pig iron; annual capacity, 25,200 gross tons. Brand, "Acme." James Pollock, President; Paul Thompson, Secretary and Treasurer, 206 South Fourth st., Philadelphia; A. A. McHose, Superintendent. James Hooven, owner. Selling agents, E. R. Mann & Co., 147 South Fourth st., Philadelphia.

Phœnix Iron Works, Phœnix Iron Company, 410 Walnut st., Philadelphia. Works at Phœnixville, Chester county. Three stacks: No. 1, 59 x 15, built in 1845, and rebuilt in 1871; No. 2, 58¾ x 15, built in 1845, and rebuilt in 1871; No. 3, 59 x 15, built in 1849, and rebuilt in 1890; cast iron stoves; fuel, anthracite coal and coke; ores, magnetic and hematite, from Berks and Chester counties, and New Jersey and foreign; specialty, gray forge pig iron; total annual capacity, 41,000 gross tons. Brand, "Phœnix." *See Rolling Mills and Steel Works.*

Pioneer Furnaces, Pottsville Iron and Steel Company, Pottsville, Schuylkill county. Philadelphia office, 226 South Fourth st. Two stacks: No. 2, 60 x 13, built in 1866; and No. 3, 65 x 14, built in 1872; two Player and two Cooper iron stoves; fuel, anthracite coal; ores, foreign, Lake Superior, and New Jersey magnetic; product, Bessemer

and mill pig iron; total annual capacity, 40,000 gross tons. Brand "Pioneer." *See Rolling Mills and Steel Works.*

Reading Iron Company, Reading, Berks county. Branch office, 417 Walnut st., Philadelphia. Four stacks: Reading Furnaces, two stacks, each 55 x 14½, built in 1854 and 1873, respectively; remodeled in 1886; and Keystone Furnaces of Reading, two stacks, 65 x 14½ and 50 x 15, built in 1869 and 1872–3, respectively; eight Durham and three Player stoves; fuel, anthracite coal and coke; ores, Lake Superior, local hematite, and New Jersey and New York magnetic; product, foundry and mill pig iron; total annual capacity, 76,500 gross tons. *See Rolling Mills.*

Robesonia Furnace, Robesonia Iron Company Limited, Robesonia, Berks county. One stack, 80 x 18, built in 1855, enlarged in 1873, and rebuilt in 1885; four Whitwell stoves; fuel, coke; ore, Cornwall exclusively; product, Bessemer pig iron; annual capacity, 48,000 gross tons. Brand, "Robesonia." (The old Robesonia Furnace, built in 1792 and rebuilt in 1845, was blown out for the last time in 1874 and dismantled in 1884.) W. C. Freeman, Chairman, Cornwall; William R. White, Secretary, Philadelphia; George R. Taylor, Manager, Robesonia. Selling agents, J. Tatnall Lea & Co., 125 South Fourth st., Philadelphia.

Sheridan Furnaces, Wm. M. Kaufman & Co., Sheridan, Lebanon county. Two stacks: No. 1, 76 x 14½, built in 1862 to use charcoal, and changed to anthracite in 1867; iron stoves; No. 2, 75 x 15, built in 1874–5; two Ford & Moncur brick stoves; ores, Cornwall and local; fuel, anthracite coal and coke; product, principally foundry pig iron; total annual capacity, 56,000 gross tons. Brand, "Mill Creek." Selling agent, J. J. Mohr, Bullitt Building, Philadelphia.

Swede Furnaces, R. Heckscher & Sons, Swedeland, Montgomery county. Main office, 238 South Third st., Philadelphia. Two stacks: No. 1, 73 x 14, built in 1850, and rebuilt in 1881 and 1887; No. 2, 80 x 15½, built in 1890–1; No. 1 has four Durham iron stoves and No. 2 three Taws & Hartman regenerative stoves, each 70 x 18; fuel, anthracite coal and coke; ores, Lake Superior specular and New Jersey magnetic and highest grades of foreign low-phosphorus; product, "Swede" standard neutral mill pig iron from native ores and "Swede special" low-phosphorus pig iron from foreign ores; annual capacity of No. 1, 34,000 gross tons; No. 2, 45,000 tons. Brand, "Swede." A. Watters, Superintendent.

Temple Furnace, Temple Iron Company, Reading. Furnace at Temple, Berks county. One stack, 60 x 15, built in 1867, and rebuilt in 1875; two Durham stoves; ores, Lake Superior and local hematite and New Jersey magnetic; fuel, anthracite coal and coke; specialty, foundry pig iron; annual capacity, 25,000 gross tons. Brand, "Temple." George F. Baer, President; Albert Broden, Manager; F. C. Smink, Treasurer.

Topton Furnace Company, Isaac Eckert, Manager, Topton, Berks county. One stack, 70 x 16, built in 1873, remodeled in 1888, and rebuilt in 1892; three Gordon fire-brick stoves; ores, Lake Superior and local hematite; fuel, anthracite coal and coke; product, "Sheridan" foundry pig iron; annual capacity, 35,000 gross tons. Henry S. Eckert and Isaac Eckert, owners. Selling agent, J. J. Mohr, Bullitt Building, Philadelphia.

Warwick Furnace, Warwick Iron Company, Pottstown, Montgomery county. One stack, 70 x 16, built in 1875, and first blown in in April, 1876; enlarged to present size in 1889; three 20 x 60 Kennedy fire-brick stoves; ores, New Jersey and New York magnetites and Lake Superior and foreign; fuel, ¾ anthracite coal and ¼ coke; specialty, mill pig iron; annual capacity, 50,000 gross tons. Brand, "Warwick." Edgar S. Cook, President; V. P. McCully, Secretary; Jacob Fegely, Treasurer. Selling agent, J. Wesley Pullman, 238 South Third st., Philadelphia.

Wellman Furnace, Wellman Iron and Steel Company, Thurlow, Delaware county. Philadelphia office, 220 South Fourth st. One stack, 70 x 17, first blown in in November, 1881; rebuilt in 1892; three Whitwell stoves; fuel, anthracite coal and coke; ore, foreign; product, Bessemer pig iron; annual capacity, 40,000 gross tons. Iron consumed in the Bessemer works of the company. Formerly called Chester Furnace. *See Rolling Mills and Steel Works.*

Number of mineral fuel furnaces in the Schuylkill Valley: 28 stacks.

UPPER SUSQUEHANNA—ANTHRACITE AND MIXED ANTHRACITE AND COKE.

Bloom Furnace, Wm. Neal & Sons, Bloomsburg, Columbia county. One stack, 56 x 14, built in 1853–4, and blown in April 14, 1854; rebuilt in 1881, 1886, and 1891; three iron stoves; fuel, anthracite coal and coke; ores, fossil, mined in the vicinity, hematite from Lake Superior, and magnetic from New Jersey and New York; product, gray forge and No. 2 foundry pig iron; annual capacity, 16,000 gross tons. Brand, "Bloom."

Columbia Furnace, Grove Brothers, Danville, Montour county. One stack, 50 x 14, built in 1860; two iron stoves; open top; fuel, anthracite coal and coke; ore, chiefly native Clinton fossil; product, foundry pig iron; annual capacity, 9,000 gross tons. Brand, "Columbia." (One stack, built in 1840, abandoned.)

Duncannon Furnace, Duncannon Iron Company, Duncannon, Perry county. Office, 122 Race st., Philadelphia. One stack, 60 x 15, built in 1853, and rebuilt in 1880; fuel, anthracite coal and coke; iron stoves; ores, Cornwall magnetic from Lebanon county and Lake Superior hematite; specialty, mill pig iron; annual capacity, 18,000 gross tons. Brand, "Duncannon." *See Rolling Mills.*

Irondale Furnaces, Bloomsburg Iron Company, Bloomsburg, Columbia

county. Two stacks, 36 x 12 and 36 x 14, built in 1844 and 1845; open tops; water-power; fuel, anthracite coal; ores, local fossil and New Jersey magnetic; product, principally No. 2 foundry and mill pig iron, made from ore only; total annual capacity, 16,000 gross tons. The foundry pig iron is very soft, open-grained, and strong; the mill pig iron is nearly neutral, and has great tensile strength. Brand, "Irondale." L. S. Wintersteen, President; J. J. Brower, Secretary and Treasurer.

Lackawanna Furnaces, Lackawanna Iron and Steel Company, Scranton, Lackawanna county. New York office, 52 Wall st. Five stacks: two built in 1849, one in 1852, one in 1854, and one in 1872; sizes, 75 x 20, 75 x 17, 75 x 18, 75 x 17, and 75 x 18; one fire-brick and four iron stoves; fuel, anthracite coal and coke; ores, chiefly magnetic from Lake Champlain and Putnam county, N. Y., with some Lake Superior; product, Bessemer pig iron; total annual capacity, 180,000 gross tons. Brand, "Lackawanna." A. H. Lee, Superintendent of Furnaces. *See Rolling Mills and Steel Works.*

Montour Iron and Steel Company, Danville, Montour county. Philadelphia office, northeast corner Twelfth and Market sts. Two stacks, each 52 x 15, built in 1842; iron stoves; fuel, anthracite coal and Clearfield coke; ores, local fossil and Lake Superior; product, foundry and forge pig iron; total annual capacity, 34,000 gross tons. *See Rolling Mills.*

North Branch Furnaces, North Branch Steel Company, Danville, Montour county. Philadelphia office, Twenty-fifth and Washington ave. Two stacks: one, 43 x 13, built in 1867, and one, 61 x 16, built in 1869 and remodeled in 1884; three Grove iron stoves; fuel, anthracite coal and coke; ores, soft fossil, mined in Montour county, and hematite and magnetic from New York, New Jersey, and the Lake Superior region; product, foundry and mill pig iron; total annual capacity, 36,000 gross tons. *See Rolling Mills and Steel Works.*

Number of mineral fuel furnaces in the Upper Susquehanna Valley: 14 stacks.

LOWER SUSQUEHANNA—MIXED ANTHRACITE AND COKE AND COKE.

Aurora Furnace, Steacy and Denney Company, (incorporated,) Wrightsville, York county. Main office, York. One stack, 65 x 14½, built in 1867, rebuilt in 1874, and remodeled in 1886–7 and in 1891–2; two Whitwell stoves; fuel, anthracite coal and coke; ores from York, Lancaster, and Lebanon counties; product, neutral forge and foundry pig iron; annual capacity, 25,000 gross tons. Brand, "Aurora." *See Rolling Mills.*

Bird Coleman and North Cornwall Furnaces, W. C. Freeman, Chairman, Cornwall, Lebanon county. Three stacks: Bird Coleman Furnaces, owned by Cornwall Iron Company Limited: No. 1, 75 x 18, built in

1872–3, and rebuilt in 1885; No. 2, 75 x 18, built in 1879–80, and rebuilt in 1885. North Cornwall Furnace, owned by Mrs. M. C. Freeman: one stack, 80 x 18, built in 1872–4, and rebuilt in 1890. Equipped with Whitwell stoves; ore, Cornwall exclusively; fuel, coke; specialty, Bessemer pig iron; total annual capacity, 120,000 gross tons. Selling agents, J. Tatnall Lea & Co., 125 South Fourth st., Philadelphia. *See Charcoal Furnaces.*

Chestnut Hill Furnaces, Chestnut Hill Iron Ore Company, Columbia, Lancaster county. Two stacks: one, 60 x 14, built in 1854, and remodeled in 1881; and one, 60 x 14, built in 1868, and remodeled in 1886; iron stoves; fuel, anthracite coal and coke; ores, Cornwall, Chestnut Hill, Ebbvale, (Maryland,) and New Jersey; specialty, foundry pig iron; total annual capacity, 40,500 gross tons. Brand, "Chestnut Hill." Main office, 52 Wall st., New York. Stephen Palmer, Receiver; A. P. Cobb, Secretary and Treasurer; Jerome L. Boyer, Superintendent, Reading.

Chickies Furnaces, Chickies Iron Company, (successors to E. Haldeman & Co.,) Chickies, Lancaster county. Two stacks: No. 1, 65 x 12, rebuilt in 1887; original stack built in 1845, and blown in January 15, 1846; No. 2, 66 x 12, rebuilt in 1889; original stack built in 1854, and blown in in 1855; iron stoves; ores, magnetic from Cornwall, Lebanon county, and Chestnut Hill brown hematite from Silver Spring, Lancaster county; fuel, anthracite coal and coke; product, foundry, mill, and Bessemer pig iron; total annual capacity, 33,500 gross tons. Brand, "Chickies." C. Ross Grubb, President; Horace L. Haldeman, Secretary, Treasurer, and Superintendent. Selling agents, Justice Cox, Jr., & Co., Philadelphia; R. C. Hoffman & Co., Baltimore; James B. Scott & Co., Pittsburgh.

Colebrook and Cornwall Anthracite Furnaces, Robert H. Coleman, Lebanon, Lebanon county. Four stacks: Colebrook Furnaces, at Lebanon: No. 1, 80 x 18, built in 1881, and remodeled and enlarged in 1887; No. 2, 80 x 14, completed in November, 1882; Whitwell stoves. Cornwall Anthracite Furnaces, at Cornwall: No. 1, 38 x 12, built in 1854; No. 2, 38 x 13, remodeled in 1885 and 1889; Gordon-Whitwell-Cowper stoves. All use Cornwall ore; fuel, anthracite coal and coke; product, principally Bessemer pig iron; total annual capacity, 100,000 gross tons. Selling agents, Pancoast & Rogers, 28 Platt st., New York. *See Crumwold Furnace, Lehigh Valley.*

Conestoga Furnace, Peacock & Thomas, Lancaster, Lancaster county. Philadelphia office, 242 South Third st. One stack, 39 x 11½, built in 1846, and remodeled in 1872 and 1889; iron stove; fuel, anthracite coal and coke; ore, Lancaster county hematite exclusively; specialty, foundry pig iron, known as "Conestoga" iron; annual capacity, 5,900 gross tons.

Katherine Furnace, C. W. Ahl's Son, Carlisle. Works at Boiling

Springs, Cumberland county. One stack, 50 x 11, built in 1881–2; one Durham iron stove; fuel, anthracite coal and coke; ore, local brown hematite; product, neutral foundry and forge pig iron; annual capacity, 12,500 gross tons. Brand, "Carlisle."

Lebanon Furnaces, B. D. and E. R. Coleman, Managers, Lebanon, Lebanon county. Two stacks: one, 80 x 17, built in 1845, rebuilt in 1868, and again in 1885; the other, 65 x 17, built in 1872–3, put in blast in August, 1873; two sets of Whitwell stoves; fuel, anthracite coal and coke; ore, Cornwall; product, Bessemer pig iron; total annual capacity, 63,000 gross tons. Mrs. Debbie B. Coleman, owner.

Lebanon Valley Furnace, J. & R. Meily, Lebanon, Lebanon county. One stack, 60 x 13, built in 1867, and blown in December 23, 1867; remodeled in 1884; two Whitwell stoves; fuel, anthracite coal and coke; ore, principally Cornwall; specialty, red-short gray forge pig iron; annual capacity, 20,000 gross tons. Brand, "Lebanon Valley."

Lochiel Furnace, Lochiel Furnace Company, Harrisburg, Dauphin county. One stack, 65 x 14, built in 1872, first put in blast in April, 1873, and remodeled in 1886; three Whitwell stoves; fuel, anthracite coal and coke. Henry McCormick, President; Henry B. McCormick, Secretary and Treasurer.

Paxton Furnaces, McCormick & Co., Harrisburg, Dauphin county. Two stacks: one, 75 x 14, built in 1855 and rebuilt in 1886, and one, 60 x 14, built in 1872; six Whitwell stoves; fuel, anthracite coal and coke; ores, various kinds; product, mill and Bessemer pig iron; total annual capacity, 55,000 gross tons. Brand, "Paxton." Owned by The McCormick Company. *See Swatara Furnace. See Harrisburg Nail Works and Paxton Rolling Mills.*

Pennsylvania Steel Company, Steelton, Dauphin county. Office, 208 South Fourth st., Philadelphia. Four stacks: No. 1, 60 x 14, built in 1872–3, and put in blast in October, 1873; remodeled in 1883, and supplied with two Whitwell stoves. No. 2, 80 x 20, built in 1874–6, put in blast in June, 1876; remodeled in 1877, and supplied with three Whitwell stoves. Nos. 3 and 4, each 70 x 18; No. 3 first put in operation in February, 1884, and No. 4 first put in operation in April, 1884; each has three Whitwell stoves. Fuel, anthracite coal and coke; ores, foreign and domestic hematite and magnetite; product, Bessemer pig iron and spiegeleisen; total annual capacity, 200,000 gross tons. *See Rolling Mills and Steel Works.*

Ruby Furnace, Albert Ferguson & Co., Colebrook, Lebanon county. One stack, 30 x 6½, built and blown in in 1885; suspended pipe stove; fuel, Connellsville coke; product, red-short pig iron reduced from furnace slag; annual capacity, 6,000 gross tons. John H. Scott, Manager. Selling agents, L. & R. Wister & Co., 257 South Fourth st., Philadelphia.

St. Charles Furnace, Charles B. Grubb, Lancaster. Furnace at Colum-

bia, Lancaster county. One stack, No. 1, 52 x 14, built in 1853; fuel, anthracite coal and coke; ores, Cornwall, Chestnut Hill, and Conestoga; product, pig iron for boiler plate, bars, nails, or foundry work; annual capacity, 15,500 gross tons. Brand, "Grubb." (No. 2 stack abandoned in 1889.)

Swatara Furnace, The McCormick Company, 223 Market st., Harrisburg. Furnace at Union Deposit, Dauphin county. One stack, 50 x 11, built in 1854, and remodeled in 1880; one iron pipe oven; fuel, anthracite coal and coke; ores, magnetite, brown hematite, and fossil, from Lebanon, Dauphin, and Juniata counties; product, gray forge pig iron; annual capacity, 14,000 gross tons. Formerly called Union Deposit Furnace. Idle since 1887. Owned by the McCormick Estate. *See Paxton Furnaces. See Harrisburg Nail Works and Paxton Rolling Mills.*

Vesta Furnace, Columbia Rolling Mill Company, Columbia. Furnace at Vesta, Lancaster county. One stack, 65 x 14, built in 1868, rebuilt in 1881, and remodeled in 1886 and 1890; two Whitwell stoves; fuel, anthracite coal and coke; ores, hematite and magnetite from Lebanon, Cumberland, and York counties; product, neutral forge and foundry pig iron; annual capacity, 22,500 gross tons. Brand, "Vesta." *See Rolling Mills.*

Number of mineral fuel furnaces in the Lower Susquehanna Valley: 28 stacks.

JUNIATA VALLEY—COKE AND MIXED ANTHRACITE AND COKE.

Bellefonte Furnace, Thomas A. Shoemaker & Co., lessees, Bellefonte, Centre county. One stack, 70 x 16, built in 1887, and put in blast February 1, 1888; three Whitwell stoves; fuel, coke; ore, native hematite; product, foundry and forge pig iron; annual capacity, 30,000 gross tons. Thomas A. Shoemaker, Superintendent. Selling agents, E. M. Valentine & Co., 402 Walnut st., Philadelphia; Cudlipp & Hollister, 15 Cortlandt st., New York. Owned by the Bellefonte Furnace Company, Bullitt Building, Philadelphia.

Blair Iron and Coal Company, Hollidaysburg, Blair county. General office, 218 South Fourth st., Philadelphia. One stack, 59 x 13½, built in 1856, and rebuilt in 1883–4; fuel, Bennington coke; ores, local hematite, Menominee hematite, and foreign; annual capacity, 14,000 gross tons. (One stack, built in 1856, dismantled in 1892.) John W. Townsend, President, and W. S. Robinson, Secretary and Treasurer, Philadelphia; C. S. Price, General Manager, Johnstown.

Emma Furnace, Logan Iron and Steel Company, Lewistown, Mifflin county. Telegraph address, Burnham. Philadelphia office, 216 South Fourth st. One stack, 52 x 9, built in 1867; formerly operated with charcoal, but enlarged in 1879 to be run with coke; remodeled in 1888; one Durham iron pipe stove; ores, Lake Superior red hematite, carbonate, and red fossiliferous; product, gray forge pig iron;

annual capacity, 8,200 gross tons. *See Greenwood (charcoal) Furnace. See Rolling Mills.*

Everett Furnace, Joseph E. Thropp, Everett, Bedford county. Philadelphia office, 119 South Fourth st. One stack, 75 x 18, built in 1883–4, and first blown in December 9, 1884; three Siemens-Cowper-Cochrane stoves; fuel, Broad Top coke, from coal mined and coked on the furnace property at Kearney; ores, Juniata fossil and hematite and Lake Superior hematite; product, soft and strong foundry pig iron; annual capacity, 45,000 gross tons. Brand, "Everett." Selling agents, Jerome Keeley & Co., Philadelphia Bank Building, 421 Chestnut st., Philadelphia.

Gap Furnace, Hollidaysburg and Gap Iron Works, Hollidaysburg. Furnace at McKee, Blair county. One stack, 49½ x 11½, built in 1840, and remodeled in 1877 and 1881; fuel, coke; ores, native hematite and soft fossil; annual capacity, 8,000 gross tons. Owned by the First Mortgage Bondholders, who are represented by Aug. S. Landis, of Hollidaysburg. Idle; for sale or lease. *See Rolling Mills.*

Juniata Furnace, Juniata Furnace and Foundry Company, Newport, Perry county. Philadelphia office, Beach and Marlborough sts. One stack, 60 x 13, built in 1871, and blown in in July, 1872; remodeled in 1888–9; two Durham iron stoves; fuel, anthracite coal and coke; ores, local magnetite, fossil, and hematite; product, foundry pig iron; annual capacity, 18,000 gross tons. Brand, "Marshall." Formerly called Marshall Furnace. Alfred Marshall, President; Edward T. Adams, Secretary; J. Howard Marshall, Treasurer; P. Hiestand, Superintendent. Selling agent, Charles T. Holbrook, Beach and Marlborough sts., Philadelphia.

Kemble Furnaces, Kemble Iron Company, Riddlesburg, Bedford county. Two stacks, each 60 x 13, built in 1868 and 1870; the first was put in blast July 4, 1869, and the second March 4, 1871; four Player stoves; fuel, Broad Top coke; ores, local fossil and Lake Superior hematites; product, principally a soft, strong, fluid foundry pig iron; total annual capacity, 27,500 gross tons. Brand, "Kemble." Alex. Nimick, President; Wm. H. Connell, Vice-President; Charles H. Scott, Secretary and Treasurer; William Lauder, General Manager. Selling agents, L. & R. Wister & Co., 257 South Fourth st., Philadelphia; T. D. Hazard, 80 Wall st., New York.

Powelton Furnaces, Saxton, Bedford county. Two stacks: No. 1, 70 x 18, built in 1880–1, and blown in October 16, 1882, has three 70 x 18 Whitwell stoves; No. 2, 71 x 17, built in 1886–7, and blown in November 30, 1889, has three Whitwell stoves, each 60 x 18; fuel, Broad Top coke; ores, ⅞ native, from mines on property, and ⅛ Lake Superior; product, No. 1 foundry pig iron; total annual capacity, 45,000 gross tons. Test of No. 1 pig iron by Baldwin Locomotive Works showed 23,582 pounds' tensile strength per square inch and a shrink-

age of $\frac{12}{100}$ of an inch per foot. Idle. For information concerning furnaces address W. W. Kurtz, attorney for bondholders, Bullitt Building, Philadelphia.

Rockhill Furnaces, Rockhill Iron and Coal Company, Rockhill Furnace, Huntingdon county. Telegraph address, Rockhill via Mount Union. Office, 320 Walnut street, Philadelphia. Two stacks, 65 x 17 and 65 x 15, built in 1875, and blown in January 1, 1876; one stack rebuilt in 1886; four hot-blast stoves; fuel, Rockhill coke; ores, $\frac{2}{3}$ soft fossil and $\frac{1}{3}$ hematite from the company's mines and from Shoenberger; specialty, foundry and gray forge pig iron; total annual capacity, 30,000 gross tons. Brand, "Rockhill." William A. Ingham, President; Edward Roberts, Jr., Vice-President; J. E. Haverstick, Secretary and Treasurer; Alfred W. Sims, Manager.

Valentine (The) Iron Company, Bellefonte, Centre county. One stack, 70 x 15, built in 1887, and blown in in March, 1888; three Whitwell stoves, 50 x 18; fuel, Connellsville coke; ore, hematite from Centre county; product, foundry pig iron, specially adapted for fine machinery castings, builders' hardware, piano plates, and fine stove work; annual capacity, 33,000 gross tons. Brand, "Nittany." J. W. Gephart, President; Robert Valentine, Secretary and Treasurer. *See Rolling Mills.*

Number of coke and mixed anthracite and coke furnaces in the Juniata Valley: 13 stacks.

SHENANGO VALLEY—COKE.

Atlantic Furnaces, Atlantic Iron and Steel Company, New Castle, Lawrence county. Two alternate stacks, each 75 x 16, originally built in 1868; one rebuilt in 1882–3, and one rebuilt in 1886; four Whitwell stoves, each 65 x 18, added in 1889; fuel, coke; ore, Lake Superior; specialty, gray forge pig iron; total annual capacity, 65,000 gross tons. Brand, "Etna." Formerly called Etna Furnaces. *See Rolling Mills.*

Claire Furnace Company Limited, Sharpsville, Mercer county. One stack, 75 x 15½, built in 1869, and rebuilt in 1886; four brick stoves; fuel, coke; ore, Lake Superior; product, Bessemer and foundry pig iron; annual capacity, 60,000 gross tons. Branch office with M. A. Hanna & Co., Cleveland, Ohio. M. A. Hanna, Chairman; A. C. Saunders, Treasurer; A. M. Robbins, Secretary and General Manager, all at Cleveland; J. W. Robbins, Superintendent, Sharpsville.

Douglas Furnaces, Sharpsville, Mercer county. Two alternate stacks: one stack, 60 x 14, built in 1870, put in blast in March, 1871, and rebuilt and enlarged in 1879; the other stack, 60 x 15, built in 1872, put in blast in February, 1873, and enlarged in 1881; iron stoves; fuel, Connellsville coke; ore, Lake Superior; product, neutral foundry and forge pig iron; total annual capacity, 45,000 gross tons.

Brand, "Douglas." Owned by Pierce, Kelly & Co.; Frank Pierce, Assignee.

Mabel Furnaces, Perkins & Co. Limited, Sharpsville, Mercer county. Two alternate stacks, each 65 x 14: No. 1 built in 1872 and No. 2 in 1880; both rebuilt in 1883; Pollock iron stoves; fuel, Connellsville coke; ore, Lake Superior; product, foundry and Bessemer pig iron; total annual capacity, 65,000 gross tons. Brand, "Mabel." S. Perkins, Jr., Chairman and Manager; L. C. Hanna, Secretary and Treasurer; George D. Devitt, Superintendent. Selling agents, M. A. Hanna & Co., Cleveland, Ohio.

Neshannock Furnace, Shenango Valley Steel Company, New Castle, Lawrence county. One stack, 78 x 17, built in 1872; first put in operation December 1, 1872; remodeled in 1883; four Whitwell stoves, three 60 x 16 and one 60 x 18; fuel, coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 75,000 gross tons. Brand, "Neshannock." Formerly operated by the Crawford Iron and Steel Company. *See Rolling Mills and Steel Works.*

Raney and Berger Iron Company, New Castle, Lawrence county. Two alternate stacks, each 80 x 17: one, built in 1872, and put in blast in May, 1872, entirely rebuilt in 1891; and one, built in 1889, and put in blast September 6, 1889; three Cowper stoves; fuel, coke; ore, Lake Superior; product, Bessemer and "Norway" foundry pig iron; annual capacity of each stack, 66,000 gross tons. Brands, "Norway," "Crown," and "Hecla." L. Raney, President; George B. Berger, Treasurer. Eastern sales agent for "Norway" foundry iron, Henry H. Adams, 177 Broadway, New York.

Rosena Furnace, Rosena Furnace Company, New Castle, Lawrence county. One stack, 75 x 18, built in 1872, first put in blast in June, 1873, and rebuilt in 1893; four Massicks & Crooke stoves, each 65 x 18; fuel, coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 80,000 gross tons. Brand, "Rosena." H. W. Oliver, President; C. D. Fraser, Secretary; E. D. Reis, Treasurer and Superintendent.

Sharon Furnace, P. L. Kimberly & Co., lessees, Sharon, Mercer county. One stack, 60 x 13½, built in 1845, and rebuilt in 1882 and 1891; four iron pipe stoves; fuel, Connellsville coke; ore, Mesabi; product, Bessemer pig iron; annual capacity, 36,000 gross tons. Brand, "Sharon." Norman Hall, Manager. Boyce, Rawle & Co., owners, Sharon. *See Rolling Mills.*

Sharon Iron Company Limited, Sharon, Mercer county. Two stacks: one, 72 x 15½, built in 1865, and rebuilt in 1887; and one, 72 x 15, built in 1866, and enlarged in 1883; Whitwell stoves; fuel, coke; ore, Lake Superior; specialty, No. 1 mill pig iron; total annual capacity, 70,000 gross tons. Brand, "Shenango." *See Rolling Mills.*

Sharpsville Furnace, Sharpsville Furnace Company, Sharpsville, Mercer

county. One stack, built in 1847, and torn down in 1882; new iron stack, 65 x 13, blown in October 15, 1882; three iron stoves; fuel, coke; ore, Lake Superior; product, Bessemer, foundry, and red-short mill pig iron; annual capacity, 36,000 gross tons. Brand, "Sharpsville." James B. Pierce, Manager.

Spearman Furnaces, Spearman Iron Company, Sharpsville, Mercer county. Two alternate stacks, each 63 x 14, built in 1872, blown in January 15, 1873, and September 20, 1875, and remodeled in 1882 and 1885; four Whitwell stoves; fuel, coke; ore, Lake Superior; product, foundry pig iron; total annual capacity, 45,000 gross tons. Brand, "Spearman." J. J. Spearman, Manager.

Stewart Furnaces, Stewart Iron Company Limited, Sharon, Mercer county. Two stacks: No. 1, 66 x 13, built in 1870, and enlarged in 1882; No. 2, 75 x 16, built in 1872, enlarged in 1883, and rebuilt in 1892; three Kennedy-Cowper fire-brick stoves, 70 x 18; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer, low-phosphorus, foundry, and gray forge pig iron; annual capacity, No. 1 stack, 36,000 gross tons; No. 2 stack, 72,000 tons. Runs only one stack at a time. Formerly called Valley Furnaces. S. McClure, Agent. *See Rolling Mills.*

Wheeler Furnace Company, Sharon, Mercer county. Three stacks in Mercer county: Ella Furnace, at West Middlesex, 70 x 15, built in 1882 and remodeled in 1892; Fannie Furnace, at West Middlesex, 60 x 12½, first put in blast October 13, 1873, and remodeled in 1885; Alice Furnace, at Sharpsville, 60 x 12, built in 1868, put in operation in October, 1868, and remodeled in 1882 and 1890. Furnaces equipped with iron stoves; fuel, coke; ore, Lake Superior; product, principally Bessemer pig iron; annual capacity of Ella Furnace, 45,000 gross tons, of Fannie Furnace, 30,000 tons, and of Alice Furnace, 36,000 tons. Brand, "Wheeler." E. A. Wheeler, Manager. Proprietors and selling agents, Pickands, Mather & Co., Cleveland, Ohio.

Number of coke furnaces in the Shenango Valley · 22 stacks.

ALLEGHENY COUNTY—COKE.

Carnegie Steel Company, Limited, 42–48 Fifth avenue, Pittsburgh. Eleven stacks in Allegheny county. Edgar Thomson Furnaces, at Bessemer, on Pennsylvania, Baltimore and Ohio, and Pittsburgh and Lake Erie railroads. Nine stacks, four built by the Edgar Thomson Steel Company Limited and five by Carnegie Brothers & Co. Limited: Furnace A, 65 x 15, built in 1879, has four Siemens-Cowper-Cochrane stoves, each 65 x 15; Furnaces B, 80 x 18, and C, 80 x 20, built in 1880, have eight Siemens-Cowper-Cochrane stoves, six 75 x 20 and two 75 x 21; Furnaces D and E, each 80 x 21, built in 1881, have six Siemens-Cowper-Cochrane stoves, each 78 x 21, and one Whitwell stove, 78 x 20; Furnaces F and G, each 90 x 22, built in 1886–7, and enlarged in 1892, have seven Siemens-Cowper-Cochrane

stoves, each 78 x 21; Furnaces H and I, each 90 x 22, built in 1889–90, have seven Cowper stoves, each 79 x 21; fuel, Connellsville coke; ores, Pennsylvania, Lake Superior, and foreign; product, Bessemer pig iron, spiegeleisen, and ferromanganese; James Gayley, General Superintendent; D. G. Kerr, Superintendent. Lucy Furnaces, at Fifty-first st., Pittsburgh. Built by Lucy Furnace Company and enlarged by Carnegie, Phipps & Co. Limited. Two stacks, each 85 x 20: No. 1 first put in blast in May, 1872, and No. 2 first put in blast September 27, 1877; eight fire-brick stoves; fuel, Connellsville coke; ores, Pennsylvania, Lake Superior, and foreign; product, Bessemer, forge, and foundry pig iron; James Scott, Superintendent. Annual capacity of Edgar Thomson Furnaces, 1,000,000 gross tons; of Lucy Furnaces, 200,000 tons: total, 1,200,000 tons. *See Edgar Thomson, Duquesne, and Homestead Steel Works, Upper and Lower Union Mills, and Beaver Falls Mills.*

Carrie Furnaces, Carrie Furnace Company, Rooms 603–6 German National Bank Building, Pittsburgh. Two stacks at Rankin Station, one 90 x 18 and the other 80 x 18; one removed from Ohio in 1883, blown in February 29, 1884, and rebuilt in 1893; the other built in 1888–9, and blown in July 19, 1889; seven Massicks & Crooke stoves, each 70 x 19½; fuel, coke; ore, Lake Superior; product, mill, foundry, and Bessemer pig iron; total annual capacity, 150,000 gross tons. Brand, "Carrie." E. S. Fownes, Secretary; H. C. Fownes, Treasurer; W. C. Fownes, Manager.

Clinton Furnace, Clinton Iron and Steel Company, 208 Wood st., Pittsburgh. One stack, 72½ x 16, built in 1859, and rebuilt in 1889–90 and in 1893; two C. H. Foote hot-blast stoves; fuel, coke; ore, Lake Superior; product, Bessemer, foundry, and mill pig iron; annual capacity, 63,500 gross tons. Brand, for special foundry iron, "Hector." *See Rolling Mills.*

Edith Furnace, Hainsworth Steel Company, Pittsburgh. Telegraph address and location of furnace, Allegheny City. One stack, 75 x 16, built in 1882, and put in operation in November, 1882; rebuilt in 1891; three Cowper-Kennedy stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer and mill pig iron; annual capacity, 60,000 gross tons. Brand, "Edith." John Reis, Manager. *See Rolling Mills and Steel Works.*

Eliza Furnaces, Laughlin & Co. Limited, Pittsburgh. Three stacks: one, 75 x 15, built in 1861, and enlarged in 1874 and in 1890; one, 80 x 20, built in 1886–7, and blown in in June, 1887; and one, 80 x 23, built in 1888–9, and blown in in May, 1889; eleven Siemens-Cowper stoves; fuel, coke; ore, Lake Superior; total annual capacity, 144,000 gross tons of Bessemer and 45,000 tons of mill pig iron. Brand, "Eliza." Henry A. Laughlin, Chairman; James Laughlin, Jr., Secretary and Treasurer.

Isabella Furnaces, Isabella Furnace Company, Etna. Three stacks: two, each 75 x 20, built in 1872, and equipped with six 70 x 21 Whitwell stoves; and one, 75 x 16, built in 1890; three Kennedy stoves; fuel, coke; ore, Lake Superior; product, Bessemer, foundry, and mill pig iron; total annual capacity, 215,000 gross tons. Brand, "Isabella." Hugh Kennedy, Superintendent.

Monongahela Furnaces, Department of National Tube Works Company, McKeesport. Two stacks: Furnaces A and B, each 80 x 20, built in 1889–90; Furnace A blown in December 1, 1890, and Furnace B June 1, 1891; seven Cowper-Kennedy stoves, each 79½ x 21; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer, gray forge, and foundry pig iron; total annual capacity, 160,000 gross tons. Brand, "Monongahela." William B. Schiller, Manager; T. B. Walker, Superintendent of Blast Furnaces. *See Rolling Mills and Steel Works.*

Shoenberger Furnaces, Shoenberger, Speer & Co., Pittsburgh. Two stacks: one 75 x 14 and one 75 x 16, built in 1865, and rebuilt in 1890; six Massicks & Crooke stoves; fuel, coke; ore, Lake Superior; product, Bessemer, foundry, and gray forge pig iron; total annual capacity, 102,000 gross tons.

Soho Furnace, Moorhead-McCleane Company, Pittsburgh. One stack, 80 x 19, built in 1872; put in blast November 22, 1872; remodeled in 1888; improved Cowper stoves; fuel, Connellsville coke; ore, Lake Superior; product, gray forge, Bessemer, and special low-phosphorus pig iron; annual capacity, 70,000 gross tons. Brand, "Soho." *See Rolling Mills and Steel Works.*

Number of coke furnaces in Allegheny county: 26 stacks.

MISCELLANEOUS COKE—WESTERN PENNSYLVANIA.

Cambria Iron Company, Johnstown, Cambria county. Office, 218 South Fourth st., Philadelphia. Six stacks: Nos. 1, 2, 3, and 4 were built in 1853 and 1854; Nos. 1 and 2 were rebuilt in 1883, and are each 76 x 16; Nos. 3 and 4 were rebuilt in 1886, and are each 76 x 16; No. 5, 76 x 19, called also Centennial Furnace, was built in 1873–6, and blown in December 22, 1876; No. 6 is 76 x 19, and was first blown in July 20, 1879. The furnaces are equipped with twenty Whitwell stoves. Fuel, Connellsville and Conemaugh coke; ore, red hematite from the Menominee range, Michigan; specialty, Bessemer pig iron, spiegeleisen, and ferromanganese; total annual capacity, 313,000 gross tons. The furnace of the Blair Iron and Coal Company, which is practically under the same management, adds 14,000 gross tons to this capacity, making the total 327,000 gross tons. *See Rolling Mills and Steel Works.*

Charlotte Furnace, Scottdale, Westmoreland county. Trustees of Nimick & Co. Pittsburgh office, 96 Water st. One stack, 65 x 16½, built in 1872–3, and put in blast October 14, 1873; iron stoves; fuel, Con-

nellsville coke; ore, Lake Superior; annual capacity, 23,500 gross tons. Brand, "Charlotte." Idle; for sale or lease.

Dunbar Furnaces, Dunbar Furnace Company, Dunbar, Fayette county. Two stacks: Furnace No. 1, 77 x 19, built in 1790, and rebuilt in 1870, 1876, and 1880; four Whitwell stoves, three 50 x 18 and one 50 x 22. Furnace No. 2, 78 x 19, first put in blast in May, 1880; three Whitwell stoves, 60 x 18. Fuel, Connellsville coke; ore, Lake Superior specular, with a small quantity of mill cinder to insure free working; product, mill and foundry pig iron, strong and of dark color; also some Bessemer pig iron; total annual capacity, 90,000 gross tons. Frank A. Hill, President and Superintendent, and C. H. Kimball, Treasurer, Dunbar; Harry W. Hazard, Vice-President, 224 South Fourth st., and W. C. Harris, Secretary, Bullitt Building, Philadelphia; Charles McCrery, Superintendent of Furnaces. L. & R. Wister & Co., general agents, 257 South Fourth st., Philadelphia; A. H. Childs, agent, Pittsburgh.

Emporium Furnace, Sinnemahoning Iron and Coal Company, Emporium, Cameron county. One stack, 75 x 16, built in 1887-8, and blown in in November, 1888; three Siemens-Cowper stoves, each 70 x 18; fuel, coke; ore, brown hematite; product, foundry pig iron; annual capacity, 36,000 gross tons. Iron-ore and coal mines and coke ovens belong to the property. Formerly called Cameron Furnace. E. M. Parrott, President, 43 Wall st., New York. Idle.

Rebecca Furnace, Kittanning Iron Company Limited, Kittanning, Armstrong county. One stack, 65 x 14½, first put in blast June 20, 1880; three Massicks & Crooke stoves; fuel, coke; ores, native and Lake Superior; product, forge and foundry pig iron; annual capacity, 45,000 gross tons. Brands, "Kittanning" and "Rebecca." *See Rolling Mills.*

Number of coke furnaces in Western Pennsylvania outside of Allegheny county and the Shenango Valley: 11 stacks.

CHARCOAL.

Berlin Iron Works, Jackson Iron Company, Glen Iron, Union county. One stack, 35 x 8, built in 1827; abandoned in 1856; revived in July, 1880; cold blast; ores, hematite and fossil; product, car-wheel and malleable pig iron; annual capacity, 2,500 gross tons. B. F. Crispin and F. R. Jackson, Berwick, and H. O. Silkman, Maplewood, owners. Idle.

Boiling Springs Iron Company, Boiling Springs, Cumberland county. One stack, 30 x 9, built in 1798 by Michael Ege, and rebuilt in 1815; cold blast; water-power; ore, foreign as a basis; specialties, pig iron low in sulphur and phosphorus, having a tensile strength of from 33,000 to 40,000 pounds, and pig iron for car-wheels and chilled rolls; annual capacity, 3,000 gross tons. Brand, "South Side." Company formerly called South Side Iron Company Limited. Furnace

formerly known as Carlisle Iron Works. Owned and operated by J. C. Bucher. *See Bloomaries.*

Chestnut Grove Furnace, John C. Long, Carlisle. Furnace at Idaville, Adams county. One stack, 32 x 8½, built in 1830; cold blast; open top; ores, magnetite and hematite from the neighborhood; product, charcoal pig iron, warranted strictly cold blast, for car-wheels, chilled rolls, malleable castings, and open-hearth steel; annual capacity, 1,500 gross tons. Brand, "Chestnut Grove C. B."

Cornwall Furnace, (charcoal,) Cornwall Iron Company Limited, Cornwall, Lebanon county. One stack, 31 x 8, built in 1742; cold blast; annual capacity, 1,350 gross tons. Idle, but in excellent condition. *See Bird Coleman and North Cornwall Furnaces, Lower Susquehanna Valley.*

Eagle Furnace, Curtins & Co., Roland, Centre county. One stack, 29 x 8½, built in 1848; the original furnace was built in 1817, half a mile south of the present site; open top, open hearth, and closed tuyere; ore, Nittany Valley brown hematite; cold blast; water-power; annual capacity, 2,000 gross tons. All the pig iron made is turned into blooms by charcoal forges and used for flange iron. Idle. *See Rolling Mills. See Bloomaries.*

Falling Spring Furnace, Bonebrake, Burkhart & Co., Chambersburg, Franklin county. One stack, 40 x 8½, built in 1880, and remodeled in 1883–4; cold or warm blast; ore, local hematite; specialty, car-wheel pig iron; annual capacity, 3,000 gross tons. Brand, "Falling Spring."

Greenwood Furnace, Logan Iron and Steel Company, Lewistown, Mifflin county. Works at Greenwood, Huntingdon county. Philadelphia office, 216 South Fourth st. One stack, 46 x 8, built in 1864; remodeled in 1889; cold blast; ore, red fossiliferous, obtained in the vicinity; product, pig iron for car-wheels and chilled rolls; annual capacity, 3,200 gross tons. *See Emma (coke) Furnace, Juniata Valley. 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; product, forge and foundry pig iron; annual capacity, 1,800 gross tons. (Old Hecla Furnace, built in 1820, was abandoned in 1864.) *See Rolling Mills. See Bloomaries.*

Isabella Furnace, Estate of Joseph D. Potts, Wyebrooke, Chester county. Philadelphia office, 267 South Fourth st. One stack, 60 x 7¾, built in 1835, and rebuilt in 1864, 1881, and 1886; cold blast; product, car-wheel pig iron, made from magnetic and hematite ores mined in Lancaster and Chester counties, with a mixture of foreign and Lake Superior ores; annual capacity, 5,400 gross tons. Brand, "Wyebrooke." William M. Potts, Manager. Selling agents, L. & R. Wister & Co., 257 South Fourth st., Philadelphia.

Jefferson Furnace, J. M. Kaufman, Auburn, Schuylkill county. Fur-

nace at Jefferson Station, same county. One iron stack, 33 x 8, first put in blast May 20, 1880; cold blast; ore, hematite from Berks and Lehigh counties; specialty, pig iron for car-wheels and heavy rolls; weekly capacity, 45 gross tons. For sale.

Joanna Furnace, L. Heber Smith, Joanna Furnace, Berks county. One stack, 45 x 8¾, built in 1792 by Potts & Rutter, and rebuilt in 1847; remodeled in 1889; hot or cold blast; Weimer blowing engine; bell and hopper top; ores, local magnetite and hematite; specialty, car-wheel pig iron; annual capacity, 4,000 gross tons. Brand, "Joanna."

Maiden Creek Furnace, Jacob K. Spang, Lenhartsville, Berks county. One stack, 33 x 9, built in 1854; equipped for hot blast in 1890; open top; ores, Moselem hematite and local magnetite; product, pig iron for car-wheels and chilled rolls; annual capacity, 3,500 gross tons. Brand, "Maiden Creek."

Mont Alto Furnace, Mont Alto Iron Company, David Knepper, Receiver, Mont Alto, Franklin county. Telegraph in office connecting with Western Union office at Chambersburg. One stack, 30 x 9, built in 1807–8, and size increased to 45 x 9½ in 1881; burned in April, 1889, and rebuilt in same year to 50 x 10; cold and warm blast; ore, exclusively brown hematite from the furnace property; product, pig iron for car-wheels, chilled rolls, and best charcoal blooms; annual capacity, 10,800 gross tons. Brand, "Mont Alto." Edward B. Wiestling, General Manager, Secretary, and Treasurer, Chambersburg. Selling agents, L. & R. Wister & Co., 257 South Fourth st., Philadelphia. *See Bloomaries.*

Pine Grove Furnace, South Mountain Mining and Iron Company, Pine Grove Furnace P. O., Cumberland county. One stack, 53 x 9, built in 1770; remodeled in 1877 and 1883; hot blast; ore, hematite from the furnace property; product, forge pig iron, for flange and fire-box iron, and car-wheel iron; annual capacity, 5,400 gross tons. Brand, "Pine Grove." The company contemplates erecting a large anthracite and coke furnace. J. C. Fuller, President; Wm. H. Woodward, Treasurer; S. R. Still, Superintendent. *See Bloomaries.*

Number of charcoal furnaces in Pennsylvania: 14 stacks. Total number of furnaces in Pennsylvania: 199 completed stacks, 1 stack partly erected, and 1 stack projected.

MARYLAND.

COKE.

Deborah Furnace, Catoctin Mountain Iron Company, Catoctin Furnace P. O., Frederick county. One stack, 50 x 11½, built in 1873–4; two Raymond & Campbell stoves; fuel, Connellsville coke; ore, local hematite; product, mill and foundry pig iron; annual capacity, 9,000 gross tons. Brand, "Catoctin." Thomas Gorsuch, President; Harry P. Gorsuch, Secretary; George Houck, Treasurer. Selling agents, L.

& R. Wister & Co., 257 South Fourth st., Philadelphia. *See Isabella (charcoal) Furnace.*

Maryland Steel Company, Sparrow's Point, Baltimore county. Philadelphia office, 208 South Fourth st. Four stacks: Furnaces A, B, C, and D, each 85 x 22; commenced building in August, 1887, and completed in 1889, 1890, and 1891; first stack blown in in November, 1889; each stack equipped with four Whitwell stoves; fuel, coke from West Virginia, the mountain district of Pennsylvania, and Connellsville, Pa.; ores, hematite from Cuba, Spain, and Africa; product, Bessemer pig iron; total annual capacity, 358,000 gross tons. *See Rolling Mills and Steel Works.*

Number of coke furnaces in Maryland: 5 stacks.

CHARCOAL.

Isabella Furnace, Catoctin Mountain Iron Company, Catoctin Furnace P. O., Frederick county. One stack, 32 x 9, built in 1856; open top; cold blast; steam and water power; ore, local hematite; product, foundry pig iron; annual capacity, 3,300 gross tons. Brand, "Isabella." Selling agent, J. H. Hillman, Pittsburgh. *See Deborah (coke) Furnace.*

Muirkirk Furnace, Charles E. Coffin, Muirkirk, Prince George's county. One stack, 36 x 8½, built in 1847; burned and rebuilt in 1888; open top; warm blast; ore, carbonate, mined in the neighborhood, roasted and crushed before using; product, pig iron for car-wheels, guns, flange iron, and shot and shell; annual capacity, 5,000 gross tons. Brand, "Muirkirk." Selling agents, Robinson & Orr, Pittsburgh; Arthur W. Howe, Philadelphia; C. L. Peirson & Co., Boston and New York.

Principio Furnaces, Whitaker Iron Company, Wheeling, West Va. Furnaces at Principio Furnace P. O., Cecil county; telegraph address, Perryville. Two stacks: No. 1, 35 x 9, first built in 1723, and rebuilt in 1836; No. 2, 60 x 10, built in 1889–90, and blown in August 20, 1890; warm blast; ores, from the company's mines in Baltimore county, Md., and Iron Hill, New Castle county, Del.; specialty, car-wheel pig iron; annual capacity of No. 1, 2,600 gross tons; No. 2, 12,600 tons. Brand, "Principio." *See Rolling Mills in West Virginia.*

Stickney (The) Iron Company, 11 South Gay st., Baltimore. Furnaces at Canton, Baltimore county. Two stacks: Furnace A, 50 x 9½, built in 1854; rebuilt in 1871; hot blast; Furnace B, 48 x 11, completed and put in blast May 15, 1882; ore, Baltimore carbonate; product, pig iron used in the manufacture of malleable iron castings and car-wheels and known as "Stickney" iron; annual capacity of Furnace A, 4,500 gross tons; of Furnace B, 9,000 tons. George H. Stickney, President; William Harvey, Secretary. Selling agents, Reed, Stickney & Co., Baltimore.

Number of charcoal furnaces in Maryland: 6 stacks. Total number of furnaces in Maryland: 11 stacks.

VIRGINIA.

COKE.

Alleghany Furnace, Alleghany Iron Company, Iron Gate, Alleghany county. Main office, Richmond; New York office, 29 Broadway. One stack, 65 x 13, built in 1891–2, and blown in December 1, 1892; two Taws & Hartman improved Whitwell stoves; fuel, New River coke; ore, brown, from Craig creek; product, foundry pig iron; annual capacity, 25,000 gross tons. Expects to add a third stove in 1894. Brand, "Alleghany." F. C. Dininny, Jr., President, New York; T. C. Jones, Manager, Iron Gate. Selling agent, Meriwether Jones, Richmond.

Appalachian Steel and Iron Company, Big Stone Gap, Wise county. One completed stack (Jennie) and one stack not completed, (Polly.) Jennie, 75 x 18, built in 1890–2, and blown in May 4, 1892; three Whitwell stoves; fuel, Pocahontas Flat Top coke, but will use Big Stone Gap coke as soon as any is made; ore, local fossil; product, foundry pig iron; annual capacity, 21,000 gross tons. Brand, "B. S. G." Polly, to be 75 x 18, is partly erected, and is to have three Whitwell stoves; work stopped in 1892; when completed will produce low-phosphorus pig iron from Cranberry, N. C., ores. E. J. Bird, Jr., President; Edward J. Bird, Vice-President and General Manager; M. T. Ridenour, Secretary and Treasurer. Selling agents, S. P. Bacon & Co. and Rogers, Brown & Co., Cincinnati; Thomas J. Pope's Sons & Co., New York.

Bristol Furnace, Bristol Iron and Steel Company, Bristol, Tenn. Philadelphia office, Bullitt Building. Furnace at Bristol, but on Virginia side of State line, in Washington county. One stack, 75 x 17, built in 1890–1; first iron made October 24, 1891; three Whitwell stoves; fuel, Pocahontas coke; ores, brown hematite, magnetite, and Gossan from Virginia, Tennessee, and North Carolina; product, high-grade foundry pig iron; annual capacity, 45,000 gross tons. Brand, "Bristol." Comly B. Shoemaker, President, Room 68, Bullitt Building, Samuel R. Shipley, Vice-President, Provident Building, and J. H. Dingee, Secretary, 333 Walnut st., Philadelphia; Edgar S. Cook, Treasurer, Pottstown, Pa.

Buena Vista Iron Company, Buena Vista, Rockbridge county. Philadelphia office, Bullitt Building. One stack, 70 x 16, built in 1889–90, and blown in December 12, 1890; three Whitwell stoves; fuel, Pocahontas coke; ore, local hematite; product, foundry pig iron; annual capacity, 36,000 gross tons. Brand, "Buena Vista." Logan M. Bullitt, President, Charles S. Thorne, Secretary and Treasurer, and Frank A. Hill, General Manager, Philadelphia; A. T. Barclay, Vice-President, Buena Vista. Selling agent, Frank Samuel, 136 South Fourth st., Philadelphia.

Crozer Furnaces, Crozer Iron Company, Roanoke, Roanoke county. General office of the President, Secretary, and Treasurer, Upland, Delaware county, Pa. Two stacks at Roanoke: Furnace A, 70 x 16, built in 1882-3, and first put in operation May 29, 1883; Furnace B, 70 x 14, built in 1889, and blown in October 19, 1889; six Whitwell stoves; fuel, Pocahontas coke; ore, local hematite; product, foundry and forge pig iron; total annual capacity, 75,000 gross tons. Brand, "Crozer." Samuel A. Crozer, President; John P. Crozer, Treasurer; Francis E. Weston, Secretary; D. I. Bachman, General Manager, Roanoke. Selling agents for New York and New England, N. S. Bartlett & Co., 125 Milk st., Boston; for Philadelphia and adjacent territory, Jerome Keeley & Co., Philadelphia Bank Building, 421 Chestnut st., Philadelphia.

Dora Furnace, Dora Furnace Company, Pulaski, Pulaski county. One stack, 75 x 17, built in 1891-92 and blown in in May, 1892; three Whitwell stoves; fuel, Pocahontas coke; ores, limonite and hematite from Cripple creek; product, No. 1x foundry pig iron; annual capacity, 50,000 gross tons. Brand, "Dora." John W. Robinson, President; George L. Carter, Vice-President and Manager; L. S. Calfee, Secretary and Treasurer. Selling agents, Crocker Brothers, 32 Cliff st., New York.

Gem Furnace, Shenandoah Furnace Company, Shenandoah, Page county. Philadelphia office, Bullitt Building. One stack, 70 x 16, built in 1882, and first blown in February 8, 1883; remodeled in 1889 and again in 1891; three Whitwell stoves; fuel, Pocahontas coke; ore, brown hematite, mined on the furnace property; product, foundry and gray forge pig iron; annual capacity, 36,000 gross tons. Brand, "Gem." Selling agents, J. W. Hoffman & Co., Bullitt Building, Philadelphia. *See Rolling Mills.*

Graham Furnace, Graham Furnace Company, Graham, Tazewell county. Philadelphia office, 330 Walnut st. One stack, 70 x 16, built in 1890, and blown in December 12, 1891; three Whitwell stoves; fuel, Pocahontas coke; ores, local hematite and Gossan; product, foundry pig iron; annual capacity, 36,000 gross tons. Brand, "Graham." Abraham S. Patterson, President; J. H. Dingee, Secretary and Treasurer. Selling agents, C. L. Peirson & Co., Boston and New York.

Ivanhoe Furnace, New River Mineral Company, Ivanhoe Furnace P. O., Wythe county. Main office, 9 Cliff st., New York. One stack, 70 x 13½, built in 1881-2 to use charcoal, and first put in blast in March, 1882; rebuilt to use coke in 1887-8, and blown in January 2, 1889; stack raised in 1893; two Whitwell stoves; ores, local brown hematite and limonite; fuel, Pocahontas coke; product, foundry and forge pig iron; annual capacity, 25,000 gross tons. George H. Seeley, President; Jordan L. Mott, Vice-President; J. T. Pearson, Secretary and Treasurer; George M. Seeley, General Manager, at the works. Sell-

ing agents, George H. Hull & Co., Louisville and New York; E. R. Mann & Co., Philadelphia; N. S. Bartlett & Co., New York and Boston.

Longdale (The) Iron Company, Longdale, Alleghany county. Two stacks: one stack, (formerly Lucy Selina,) 59 x 14, built in 1827, and rebuilt in 1873 and 1889; the other stack, 60 x 16, first blown in in February, 1881, and enlarged in 1890; four iron pipe stoves; fuel, West Virginia coke; ore, brown hematite, mined near the furnace; product, principally gray forge pig iron; total annual capacity, 36,000 gross tons. Brand, "Longdale." H. Firmstone, President, and J. E. Johnson, Manager; H. H. Wilson, Treasurer, 237 South Third st., Philadelphia. Sole sales agents, Matthew Addy & Co., Cincinnati.

Low Moor Iron Company of Virginia, Low Moor, Alleghany county. Three stacks in Alleghany county. Two stacks at Low Moor: one, 74 x 18, built in 1880, and one, (alternate stack,) 80 x 18, built in 1887; seven Whitwell stoves; fuel, New River coke, made at the furnaces in 150 ovens; ore, local brown hematite; product, foundry pig iron; brand, "Low Moor." Covington Furnace, at Covington, one stack, 75 x 18, built in 1891–3, and not yet blown in; three Gordon-Whitwell-Cowper stoves; fuel, New River coke; ore, native hematite; product, to be foundry pig iron. Total annual capacity, 90,000 gross tons. E. C. Means, President, Frank Lyman, Vice-President, Edward A. Low, Treasurer, and A. Aug. Low, Assistant Treasurer, 31 Burling Slip, New York; H. M. Bell, Secretary, Staunton, Va.; Henry G. Merry, General Superintendent, Low Moor.

Lynchburg Furnace, E. Burd Grubb, lessee, Lynchburg, Campbell county. One stack, 60 x 11¾, first put in blast in December, 1880; remodeled in 1882 and 1884; two hot-blast stoves; fuel, Pocahontas and New River coke; ores, local brown hematite and magnetite; product, foundry and forge pig iron; annual capacity, 12,500 gross tons. Louis S. Kite, Secretary and Treasurer, Edgewater Park, N. J.; W. N. Wellford, Superintendent, Lynchburg. Selling agents, Edmund D. Smith & Co., 208 South Fourth st., Philadelphia. Owned by the Lynchburg Iron Company, Philadelphia.

Max Meadows Iron Company, Max Meadows, Wythe county. Philadelphia office, Bullitt Building. One stack, 75 x 17, built in 1890–1; not yet blown in; three Whitwell stoves; fuel, Pocahontas coke; ore, local brown hematite; product, foundry pig iron; annual capacity, 40,500 gross tons. Logan M. Bullitt, President, Frank A. Hill, Vice-President, and Charles S. Thorne, Secretary and Treasurer, Philadelphia; M. H. Maury, Manager, Max Meadows. Selling agent, Frank Samuel, 136 South Fourth st., Philadelphia.

Nannie B. Furnace, Virginia Nail and Iron Works Company, N. B. Handy, Receiver, Lynchburg. Furnace at Reusens, Campbell county, on the Chesapeake and Ohio Railroad. One stack, 65 x 12½, built

in 1887–8, and blown in June 12, 1888; water-power; two iron pipe stoves; fuel, coke; ores, specular and brown hematite; product, foundry pig iron; annual capacity, 15,000 gross tons. Brand, "Virginia." *See Rolling Mills.*

Princess Furnace, D. S. Cook, Glen Wilton, Botetourt county. Main office, Wrightsville, Pa. One stack, 60 x 12½, built in 1883–4; four Gordon-Whitwell-Cowper stoves; fuel, New River coke; ore, hematite, mined on the furnace property; product, soft, strong, and very fluid foundry pig iron; annual capacity, 15,000 gross tons. Brand, "Princess." T. D. Kauffelt, Manager.

Pulaski Iron Company, Pulaski City, Pulaski county. Main office, 330 Walnut st., Philadelphia. One stack, 75 x 17, built in 1887, and blown in in February, 1888; three Whitwell stoves; fuel, Pocahontas coke; ores, brown hematite and limonite from the Cripple creek region, Va., and Gossan from the Virginia Mining Company's mines; product, high-grade foundry pig iron; annual capacity, 45,000 gross tons. A. J. Dull, President, Harrisburg, Pa.; E. P. Borden, Vice-President; Abraham S. Patterson, Secretary and Treasurer, Philadelphia; John W. Eckman, General Manager. Selling agents, C. L. Peirson & Co., Boston and New York; Horace L. Brooke, Baltimore; Hall Brothers & Co., Louisville.

Radford-Crane Furnace, Radford-Crane Iron Company, Radford, Montgomery county. Main office, Bullitt Building, Philadelphia. One stack, 75 x 18, begun in 1890, and completed in 1892; not yet blown in; four Whitwell stoves; fuel, Pocahontas coke; ore, Virginia hematite; product, foundry pig iron; annual capacity, 50,000 gross tons. Brand, "Radford-Crane." Logan M. Bullitt, President; W. S. Pilling, Secretary and Treasurer.

Roanoke Furnace, Roanoke Iron Company, Roanoke, Roanoke county. One stack, 82 x 16½, built in 1890, and blown in December 1, 1890; four Massicks & Crooke stoves; fuel, Pocahontas coke; ores, brown hematite from Botetourt and Roanoke counties, Gossan from Carroll county, and limonite from Pulaski county; product, foundry and forge pig iron; annual capacity, 40,000 gross tons. Brand, "Roanoke." Selling agents, Crocker Brothers, 32 Cliff st., New York. *See Rolling Mills.*

Rockbridge Furnace, Virginia Iron and Railway Company, Goshen Bridge, Rockbridge county. One stack, 76 x 18, built in 1882–3; first put in blast May 1, 1883; rebuilt in 1892; three Siemens-Cowper-Cochrane stoves; fuel, New River coke; ore, brown hematite; product, foundry and forge pig iron; annual capacity, 50,000 gross tons. Brands, "Rockbridge" for foundry and forge and "Goshen" for soft silvery. Formerly called Victoria Furnace. Henry D. Turney, President; C. J. Johnston, Secretary and Treasurer; W. J. Mahoney, Superintendent. Selling agents, Lee Chamberlain & Co., Philadelphia and Columbus.

Salem (The) Furnace Company, Salem, Roanoke county. Philadelphia office, Bullitt Building. One stack, 75 x 14½, built in 1889–91, and blown in in October, 1891; three Whitwell stoves; fuel, Pocahontas coke; ore, local hematite; product, foundry pig iron; annual capacity, 35,000 gross tons. Brand, "Salem." D. B. Strouse, President, and M. H. Maury, Superintendent, Salem; Logan M. Bullitt, Vice-President, Frank A. Hill, General Manager, and Charles S. Thorne, Secretary and Treasurer, Philadelphia. Selling agent, Frank Samuel, 136 South Fourth st., Philadelphia.

Number of coke furnaces in Virginia: 24 completed stacks, and 1 stack partly erected.

CHARCOAL.

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; daily capacity, 7 gross tons. D. P. Graham, part owner and General Manager. Selling agents, R. C. Hoffman & Co., Baltimore, Maryland.

Foster's Falls Furnace, Foster's Falls Mining and Manufacturing Company, Foster's Falls, Wythe county. Furnace on the Cripple Creek branch of the N. & W. R. R. One stack, 35 x 8, built in 1881; open top; cold blast; water-power; ore, local hematite; product, car-wheel pig iron; annual capacity, 2,250 gross tons. Brand, "Foster's Falls." D. P. Graham, President, and J. W. Robinson, Secretary and Treasurer, Graham's Forge; J. A. Dyer, Manager. Selling agents, R. C. Hoffman & Co., Baltimore.

Liberty Furnace, Liberty Iron Company, Liberty Furnace P. O., Shenandoah county. Telegraph address, Edinburg. Main office, 415 Drexel Building, Philadelphia. One stack, 55 x 11, built in 1890–1 on site of old stack built in 1821 and torn down in 1890; new stack blown in early in 1891; Durham stove; warm blast; ore, local limonite; product, car-wheel pig iron; annual capacity, about 15,500 gross tons. Brand, "Liberty." A new railroad, 3 feet gauge, connects Liberty Furnace with Edinburg, 12 miles distant. (Columbia Furnace, built in 1809, torn down in 1890.) H. H. Yard, President; S. L. Gillin, Secretary. Selling agents, L. & R. Wister & Co., 257 South Fourth st., Philadelphia.

Lobdell Car Wheel Company, Wilmington, Delaware. Two stacks: Brown Hill Furnace, at Red Bluff, Wythe county, 40 x 8½, built in 1870–4; rebuilt in 1882; cold blast. White Rock Furnace, in Smyth county, 5 miles from Rural Retreat Station, Wythe county, 38 x 8½, built in 1875, and blown in August 9, 1875; one stove erected in 1891. Ore, local brown hematite; total annual capacity, 9,000 gross tons. Brands, "Brown Hill" and "White Rock." George G. Lobdell, President; William W. Lobdell, Vice-President; George G. Lob-

dell, Jr., Secretary and Treasurer; J. H. Wissler, Superintendent, Rural Retreat.

Radford Furnace, Radford Iron Company, Radford Furnace P. O., Pulaski county. One stack, 35 x 10, built in 1868; warm blast; annual capacity, 2,500 gross tons. Richard Wood, President, 400 Chestnut st., Philadelphia. Idle since 1887, but in good condition. Will probably be started up with coke as fuel when a projected railroad reaches the furnace.

Reed Island Furnace, Reed Island Iron Company, Reed Island, Wythe county. Furnace in Pulaski county, on Reed Island branch of Norfolk and Western Railroad. One stack, 33 x 9, put in blast April 28, 1881; cold blast; open top; water-power; ore, local hematite; product, car-wheel pig iron; annual capacity, 2,250 gross tons. R. C. Hoffman, President; J. W. Robinson, Secretary and Treasurer; W. R. Tipton, Superintendent. Selling agents, R. C. Hoffman & Co., Baltimore.

Van Buren Furnace, Van Buren Furnace P. O., Shenandoah county. Telegraph address, Woodstock. One stack, 37½ x 9, built in 1850, and rebuilt in 1870; hot blast; ore, local hematite; annual capacity, 2,250 gross tons. George W. Chipman, Assignee for Dudley C. Hall, owner, 116 Tremont st., Boston, Massachusetts. Idle for several years.

Number of charcoal furnaces in Virginia: 8 stacks. Total number of furnaces in Virginia: 32 completed stacks, and 1 stack partly erected.

PROJECTED.

Basic City Mining, Manufacturing, and Land Company, Basic City, Augusta county. Foundation laid in 1890 for one coke stack; work suspended. J. A. Wise, Secretary and Treasurer. For sale.

WEST VIRGINIA.

COKE.

Irondale Furnace, F. Nemegyei, Independence, Preston county. Telegraph address, Newburg. New York office, 60 New st., care De Billier & Co. One stack, 60 x 13½, built in 1861, and rebuilt in 1886; Gordon-Whitwell-Cowper stoves; fuel, coke, manufactured from coal mined on the furnace property; ores, a mixture of ½ limonite and ½ hematite, also obtained on the property; product, slightly cold-short pig iron; annual capacity, 16,000 gross tons. Brand, "F. N." For sale.

Riverside Furnace, Riverside Iron Works, Wheeling, Ohio county. Furnace at Benwood, Marshall county. One stack, 75 x 17, built in 1871–2, and first blown in February 14, 1872; remodeled in 1876, and entirely rebuilt in 1889; three Massicks & Crooke stoves; fuel, Con-

nellsville coke; ores, Missouri, Lake Superior, and foreign; product, Bessemer pig iron; annual capacity, 70,000 gross tons. Brand, "Riverside." *See Steubenville (miscellaneous bituminous) Furnace in Ohio. See Rolling Mills and Steel Works.*

Wheeling Steel and Iron Company, Wheeling, Ohio county. Two stacks: Belmont Furnace, 70 x 16, blown in September 4, 1875; remodeled in 1893; three Gordon fire-brick stoves; brand, "Belmont;" N. Riester, Furnace Manager. Top Mill Furnace, 80 x 18, built in 1873–4, and blown in October 3, 1878; remodeled in 1888 and 1893; three Massicks & Crooke stoves; brand, "Top Mill;" James McCahan, Furnace Manager. Fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; total annual capacity, 150,000 gross tons. *See Martin's Ferry (miscellaneous bituminous) Furnace in Ohio. See Rolling Mills and Steel Works.*

Number of furnaces in West Virginia: 4 coke stacks.

KENTUCKY.

COKE AND BITUMINOUS COAL.

Ashland Furnaces, Ashland Coal and Iron Railway Company, Ashland, Boyd county. Two stacks: one, 62 x 16, first blown in August 31, 1869, and one, 64 x 16, built in 1887; seven Whitwell stoves and one Massicks & Crooke stove; fuel, raw coal and coke; ores from Bath county; product, American-Scotch (high-silicon) pig iron; total annual capacity, 36,000 gross tons. Brand, "Ashland." Douglas Putnam, Jr., President and General Manager; John G. Peebles, Vice-President; Robert Peebles, Secretary and Treasurer; E. C. Means, Superintendent.

Norton Iron Works, Ashland, Boyd county. One stack, 66 x 16, built in 1873, and blown in February 16, 1874; remodeled in 1877; four Whitwell stoves, each 60 x 16; ore, Lake Superior; fuel, coke; product, Bessemer pig iron; annual capacity, 50,000 gross tons. Brand, "Norton." *See Rolling Mills.*

Paducah Furnace, Paducah Iron Company, Paducah, McCracken county. One stack, 70 x 14, built in 1889–90; not yet blown in; two Massicks & Crooke stoves; fuel, Connellsville coke. Thomas Howard, President, W. W. Powell, Vice-President, E. C. Lackland, Secretary, and R. J. Lackland, Treasurer, St. Louis, Mo.; Thomas J. Scott, Superintendent, Paducah.

Watts (The) Steel and Iron Syndicate Limited, Middlesborough, Bell county. Two stacks, each 75 x 17, built in 1889–91; one stack blown in February 10 and the other March 10, 1893; seven Whitwell stoves; fuel, Middlesborough coke; ores, red fossiliferous and brown hematite from Claiborne county, Tenn.; product, pig iron suitable for conversion into basic open-hearth steel; total annual capacity, 90,000

gross tons. Brand, "Watts." Selling agents, Rogers, Brown & Co., Cincinnati. *See Rolling Mills and Steel Works.*

Number of bituminous furnaces in Kentucky: 6 stacks.

CHARCOAL.

Bellefonte Furnace, Means and Russell Iron Company, Ashland, Boyd county. Furnace in Greenup county. One stack, 33 x 10½, built in 1826, and rebuilt in 1854; open top; ore, limonite; product, "Bellefonte" warm-blast charcoal pig iron; annual capacity, 4,500 gross tons. John Russell, President; C. W. Means, Secretary; Wm. B. Seaton, General Manager. Selling agents, S. P. Bacon & Co., Cincinnati; Adams, Watkins & Co., Louisville; James Collord & Co., Pittsburgh.

Grand (The) Rivers Company, Grand Rivers, Livingston county. Financial and business office, Boston, Mass. Two stacks at Grand Rivers: No. 1, or Blood Furnace, and No. 2, or Lawrence Furnace, each 60 x 13½, built in 1890–1; No. 1 blown in January 12 and No. 2 March 12, 1892; eight Durham pipe stoves; ore, local brown hematite; total annual capacity, 45,000 gross tons. Brand, "Grand Rivers." Aretas Blood, President, Manchester, N. H.; Thomas W. Lawson, Vice-President and General Manager, Boston, Mass.; A. H. Breed, Treasurer, Lynn, Mass.; E. L. Moore, Local Manager. Selling agents, Lee Chamberlain & Co., Columbus.

Number of charcoal furnaces in Kentucky: 3 stacks. Total number of furnaces in Kentucky: 9 stacks.

TENNESSEE.

COKE.

Carnegie Iron Company, Johnson City, Washington county. One stack, 75 x 16; nearly completed; work suspended in 1892; three Whitwell stoves, each 65 x 18; will use Pocahontas coke and Cranberry ore; product to be "special Bessemer" pig iron; annual capacity, 36,000 gross tons. J. T. Wilder, President; J. W. Cure, Secretary and Treasurer; H. W. Hargreaves, Superintendent.

Chattanooga (The) Iron Company, Chattanooga, Hamilton county. The Georgia Mining, Manufacturing, and Investment Company, lessee. One stack, 61 x 13, completed in 1874, and blown in in September, 1874; rebuilt in 1885; fuel, Dade county (Ga.) coke; ore, brown hematite; specialty, foundry pig iron; annual capacity, 18,000 gross tons. Brand, "Chattanooga." Julius L. Brown, President, Elijah A. Brown, Vice-President, and C. T. Watson, Secretary and Treasurer, Atlanta, Ga.; F. H. Connor, General Manager, Chattanooga. Selling agents, Hosford & Pluemer, Cincinnati; A. P. DeCamp & Co., St. Louis. *See Rising Fawn (coke) Furnace in Georgia.*

Citico Furnace, Citico Furnace Company, Chattanooga, Hamilton county. One stack, 69 x 16, built in 1883, and first put in blast in April, 1884; three Whitwell stoves; fuel, coke, from New Soddy coal; ores, Tennessee and Georgia red and brown hematite; product, forge and foundry pig iron; annual capacity, 36,000 gross tons. Brand, "Citico." H. S. Chamberlain, President; W. E. Raht, Secretary; F. Nieland, Treasurer. Selling agents, C. R. Baird & Co., Philadelphia.

Dayton (The) Coal and Iron Company Limited, Dayton, Rhea county. Main office, 10 Johnston Building, Cincinnati, Ohio. Two stacks, one 75 x 20 and one 75 x 18, completed in 1885; seven Whitwell stoves; fuel, coke; ores, Tennessee fossil and Georgia hematite; product, foundry pig iron; total annual capacity, 72,000 gross tons. Brand, "Dayton." Charles Stead, Chairman Board of Directors, Saltaire, England; W. J. Isaacson, Managing Director, Cincinnati; George Jamme, General Manager, Dayton, Tenn.

Embreeville Freehold Land, Iron, and Railway Company Limited, Embreeville, Washington county. Telegraph address of furnace, "Nolachucky," Embreeville. Main office, Dashwood House, 9 New Broad st., London, England. One stack, (Embreeville No. 1,) 80 x 19, built in 1891, and blown in in 1892; three Cowper-Kennedy stoves, each 75 x 20; fuel, Pocahontas coke; ore, local brown hematite; product, foundry pig iron; annual capacity, 54,000 gross tons. Brand, "Embree." The Viscount Hampden, President, Lord Cloncurry, Vice-President, and G. W. Lakeman, Secretary, London; A. L. Estill, Secretary, at Embreeville; W. J. Love, Manager and Superintendent. Selling agents, Rogers, Brown & Co., Cincinnati.

Gracey-Woodward Iron Company, Clarksville, Montgomery county. One stack, 70 x 17, built in 1892; not yet blown in; three Whitwell stoves; fuel, coke; ore, local brown hematite; annual capacity, 36,000 gross tons. W. H. Woodward, President; F. P. Gracey, Vice-President; H. G. Woodward, Secretary, Treasurer, and Superintendent.

King Furnace, King Furnace Company, lessee, Rockdale, Maury county. Main office, Dayton, Ohio. One stack, 55 x 11, built in 1890, and blown in in that year, using charcoal as fuel; coke substituted for charcoal early in 1891; two pipe stoves; fuel, Pineville (Ky.) coke; ore, Tennessee brown hematite; product, soft non-shrinking pig iron; annual capacity, 16,000 gross tons. Brand, "King." Formerly called Rockdale Furnace. R. N. King, President, and Walter W. Smith, Vice-President, Dayton; Thomas Sharp, Secretary, Nashville, Tenn.; J. H. Short, Superintendent. Selling agents, Lee Chamberlain & Co., Columbus, Ohio. Owned by the Rockdale Mining and Manufacturing Company.

Rockwood Furnaces, Roane Iron Company, Rockwood, Roane county. Main office, Chattanooga. Two stacks, one 65 x 15, built in 1872, has three pipe stoves, and the other, 70 x 16, built in 1893, has three

Hugh Kennedy hot-blast stoves; fuel, coke; ore, red fossiliferous; product, foundry pig iron; total annual capacity, 60,000 gross tons. Brand, "Rockwood." (One stack, 65 x 15, built in 1869, abandoned and dismantled in 1893.) H. S. Chamberlain, President, Orion L. Hurlbut, Secretary, and F. Nieland, Treasurer, Chattanooga; Willard Warner, Jr., Superintendent of Furnaces, Rockwood. Selling agents, C. R. Baird & Co., Philadelphia.

Tennessee Coal, Iron, and Railroad Company, Nashville. Four stacks: The Sewanee Furnace, at Cowan, Franklin county, 75 x 16; first put in blast in June, 1880, and enlarged in 1891; three Whitwell stoves; ores, soft red fossiliferous from East Tennessee and brown hematite from Middle Tennessee; brand, "Sewanee." The South Pittsburg Furnaces, at South Pittsburg, Marion county, three stacks: No. 1, 70 x 18, first blown in in May, 1879; No. 2, 70 x 18, completed in 1881, and first blown in in March, 1882; No. 3, 75 x 17, built in 1887–8, and first blown in in March, 1888; ten Whitwell stoves; ores, brown hematite from Georgia and hard red fossiliferous from the Inman mines of the company near South Pittsburg; brand, "S. P." Fuel, coke, made in the company's ovens at Tracy City and Whitwell; product, foundry and forge pig iron; annual capacity, of Sewanee Furnace, 36,000 gross tons; of South Pittsburg Furnaces, 120,000 gross tons. N. Baxter, Jr., President, Nashville; H. F. DeBardeleben, 1st Vice-President, Bessemer, Ala.; T. H. Aldrich, 2d Vice-President and General Manager, Birmingham, Ala.; D. Roberts, 3d Vice-President, Bessemer, Ala.: James L. Gaines, Assistant General Manager for Tennessee, Nashville; G. B. McCormack, Assistant General Manager for Alabama, Birmingham, Ala.; James Bowron, Secretary and Treasurer, H. D. Cooper, Auditor and Assistant Secretary, and S. Kirkpatrick, Purchasing Agent for Tennessee, Nashville; Joseph Lodge, Superintendent South Pittsburg Division; A. P. Gaines, Superintendent Cowan Division. Selling agents, Rogers, Brown & Co., Cincinnati, and branch houses; Matthew Addy & Co., Cincinnati and St. Louis. *See Coke Furnaces in Alabama.*

Number of coke furnaces in Tennessee: 13 completed stacks, and 1 stack which is nearly completed.

CHARCOAL.

Butler Furnace, Doe Valley Association, 224 South Fourth st., Philadelphia. Furnace at Mountain City, Johnson county. One stack, 30 x 8, built in 1881, and first blown in in October, 1881; cold blast; ore, local brown hematite; product, car-wheel pig iron; annual capacity, 1,800 gross tons. Samuel R. Shipley, President; Thomas H. Spaulding, Vice-President; Justice Cox, Jr., Secretary and Treasurer. Not in blast since 1885.

Napier Iron Works, Nashville, Davidson county. Furnace at Napier,

Lewis county. One stack, 60 x 12, built in 1891, and blown in in February, 1892; two fire-brick stoves; ore, local brown hematite from furnace property; product, car-wheel pig iron; annual capacity, 18,000 gross tons. Brand, "Napier." E. C. Lewis, President; E. L. More, Secretary. Selling agents, Matthew Addy & Co., Cincinnati and St. Louis; J. H. Hillman, Pittsburgh; George H. Hull & Co., Louisville; Lee Chamberlain & Co., Philadelphia.

Southern (The) Iron Company, Nashville, Davidson county. Seven stacks: Aetna Furnace, at Aetna, Hickman county, 55 x 11, built in 1886, and first put in blast November 13, 1886; hot or cold blast; two Whitwell stoves; ore, local brown hematite; product, car-wheel pig iron; annual capacity, 18,000 gross tons; brand, "Aetna." Cumberland Furnace, at Cumberland Furnace P. O., Dickson county, 60 x 11, built on site of old furnace in 1892-3, and blown in March 25, 1893; two Gordon improved stoves; ore, local brown hematite; specialty, foundry and car-wheel pig iron; annual capacity, 15,000 gross tons; brand, "Warner." (The old Cumberland Furnace, 37 x 9½, built in 1825, dismantled in 1892.) La Grange Furnace, at Stribling, Stewart county, 65 x 12, built in 1832, and rebuilt in 1880 and 1884; hot blast; ore, local brown hematite; specialty, machinery and foundry pig iron; annual capacity, 18,000 gross tons; brand, "La Grange." Warner Furnaces, in Hickman county: No. 1, at Warner, 55 x 11, first put in blast November 12, 1881; No. 2, formerly called Standard Furnace, at Goodrich, 45 x 9, first blown in December 23, 1885; hot or cold blast; ore, local brown hematite; product, car-wheel pig iron; total annual capacity, 36,000 gross tons; brand, "Warner." Mannie Furnaces, at Mannie, Wayne county; telegraph address, Aetna, Hickman county; two stacks, 60 x 12, built in 1892-3, using machinery, etc., from the two abandoned coke furnaces at West Nashville; one stack blown in April 22d, and the other not yet blown in; two Gordon improved stoves; ore, local brown hematite; specialty, basic pig iron; total annual capacity, 36,000 gross tons; brand, "Mannie." Total annual capacity of the seven stacks, 123,000 gross tons. Selling agents, Rogers, Brown & Co., Cincinnati, Buffalo, and Boston; Rogers, Brown & Merwin, Chicago; Rogers, Brown & Meacham, St. Louis; Rogers, Brown & Warner, New York and Philadelphia; Hickman, Williams & Co., Louisville. *See Charcoal Furnaces in Alabama. See Rolling Mills and Steel Works in Tennessee.*

Number of charcoal furnaces in Tennessee: 9 stacks. Total number of furnaces in Tennessee: 22 completed stacks, and 1 stack nearly completed.

PROJECTED.

Cardiff Coal and Iron Company, Boyd Ewing, Receiver, Cardiff, Roane county. Began in 1890 to build one coke stack, 75 x 16; to have three fire-brick stoves. Foundation started; work suspended.

NORTH CAROLINA.

COKE.

Carolina Furnace, The North Carolina Steel and Iron Company, Greensboro, Guilford county. One stack, 70 x 16, built in 1892; not yet blown in; two Ford & Moncur stoves; fuel, Pocahontas coke; ores, local magnetites and hematites from company's mines; product, to be neutral foundry pig iron; annual capacity, 35,000 gross tons. J. A. Odell, President; D. W. C. Benbow, Vice-President; James D. Kase, Secretary, Treasurer, and General Manager.

Cranberry Furnace, Cranberry Iron and Coal Company, Cranberry, Mitchell county. Philadelphia office, 240 South Third st. One stack, 50 x 11½, built in 1883–4, and first put in blast April 16, 1884; hot and cold blast; fuel, coke, but formerly used charcoal; ore, magnetic, mined on the company's property; product, pig iron of Bessemer quality; annual capacity, 5,200 gross tons. Brand, "Cranberry." Frank Firmstone, President; J. S. Wise, Secretary and Treasurer; C. H. Nimson, General Manager. Selling agents, Matthew Addy & Co., Cincinnati.

Number of furnaces in North Carolina: 2 coke stacks.

GEORGIA.

COKE.

Cherokee Iron Works, Cherokee Iron Company, Cedartown, Polk county. One stack, 60 x 14, built in 1874–5, and first blown in on charcoal March 22, 1877; rebuilt and changed to coke in 1885; cast-iron stoves; fuel, Glen Mary and Flat Top (Va.) coke; ore, brown hematite, mined near the works; product, high grades of foundry and mill pig iron; daily capacity, 75 gross tons. Brand, "Cherokee." William C. Browning, President, and J. Hull Browning, Treasurer, 408 Broome st., New York; J. R. Barber, Secretary and General Manager, Cedartown. Selling agents, Hall Brothers & Co., Louisville. *See Bloomaries.*

Rising Fawn Furnace, Walker Coal and Iron Company, Rising Fawn, Dade county. The Georgia Mining, Manufacturing, and Investment Company, lessee. One stack, 75 x 17, built in 1873–5, put in blast June 18, 1875; four Whitwell stoves, each 60 x 16; fuel, coke; ore, brown hematite; product, foundry pig iron; annual capacity, 36,000 gross tons. Brand, "Rising Fawn." Julius L. Brown, President, Elijah A. Brown, Vice-President, and C. T. Watson, Secretary and Treasurer, Atlanta, Georgia; F. H. Connor, General Manager, Chattanooga, Tennessee. *See Chattanooga Iron Company (coke furnaces) in Tennessee.*

Number of coke furnaces in Georgia: 2 stacks.

CHARCOAL.

Etna Furnace, Etna Furnace Company, Etna P. O., Polk county. One stack, 43 x 9⅝, built in 1870; rebuilt in 1889; hot blast; ore, brown hematite, mined on the property; product, strictly first-class car-wheel pig iron; annual capacity, 9,000 gross tons. Brand, "Etna." D. B. Hamilton, President, and Harper Hamilton, Secretary and Treasurer, Rome, Ga.

Rome Furnace, The Rome Iron Company, Rome, Floyd county. One stack, 65 x 12, built in 1890–1, and blown in in May, 1891; three Whitwell stoves; ore, brown hematite from Floyd, Polk, and Chattooga counties; product, car-wheel pig iron; annual capacity, 15,500 gross tons. Brands, "Rome" and "Colyar." L. S. Colyar, President and Treasurer; Charles A. Lyerly, Vice-President; E. Shackleford, Secretary; Haskins Williams, Superintendent. Selling agents, J. E. Cartwright, St. Louis; Rogers, Brown & Co., Cincinnati, Buffalo, and Boston; Rogers, Brown & Merwin, Chicago; Rogers, Brown & Warner, Philadelphia and New York. *See Round Mountain Iron Works (charcoal furnaces) in Alabama.*

Tallapoosa Furnace, The North Georgia Land and Manufacturing Company, Tallapoosa, Haralson county. One stack, 60 x 11, built in 1888–9, and blown in in May, 1890; one Player iron stove; closed top; cold and warm blast; ore, local brown hematite; product, car-wheel and foundry pig iron; annual capacity, 13,500 gross tons. Brand, "Tallapoosa." O. F. Sampson, President; A. I. Head, Vice-President; C. W. Fox, Secretary; W. H. Kimball, Treasurer.

Number of charcoal furnaces in Georgia: 3 stacks. Total number of furnaces in Georgia: 5 stacks.

ALABAMA.

COKE.

Bay State Furnace Company, Fort Payne, DeKalb county. Began in 1890 the erection of one stack, 65 x 14; partly built; work suspended in 1891; three fire-brick stoves. A. Brown, President; H. B. Hill, Vice-President, Treasurer, and Manager; T. B. Pierie, Secretary. For sale. Address H. B. Hill, 84 Summer st., Boston, Mass.

Clara Furnace, The Vanderbilt Steel and Iron Company, Birmingham, Jefferson county. One stack, 65 x 14; commenced building February 9, 1890; blown in August 23, 1890; three Massicks & Crooke stoves; fuel, Alabama coke; ores, brown and soft and hard red from Alabama and Georgia; product, strong low-phosphorus foundry pig iron; annual capacity, 22,500 gross tons. Brand, "Vanderbilt." Company intends to enlarge furnace to 65 x 15½. George O. Vanderbilt, President; Carl A. Meissner, Vice-President and General Manager; Frederick T. Ackermann, Secretary and Treasurer. Sell-

ing agents, Rogers, Brown & Co., Cincinnati; Lee Chamberlain & Co., St. Louis.

Cole Furnaces, Alabama Iron and Railway Company, Sheffield, Colbert county. Three stacks, each 75 x 18, built in 1887-8; one stack blown in in September, 1888, and one blown in in October, 1889; Gordon-Whitwell-Cowper stoves; fuel, Alabama coke; ore, Alabama and Tennessee brown hematite; product, foundry pig iron; total annual capacity, 108,000 gross tons. A. W. Wills, President; E. W. Cole, Vice-President; W. S. Jones, Secretary; S. B. McTyer, Assistant Secretary; Safe Deposit, Trust, and Banking Company, Treasurer, Nashville, Tenn. Selling agents, Lee Chamberlain & Co., Columbus.

Edwards Iron Company, Woodstock, Bibb county. One stack, 70 x 15, first blown in June 10, 1880; remodeled in 1887 and in 1890; three hot blast stoves; ore, local red hematite; product, foundry and mill pig iron; annual capacity, 27,000 gross tons. Giles Edwards, President; J. L. Harrell, Secretary and Treasurer; T. J. Edwards, Superintendent.

Fort Payne Furnace Company, Fort Payne, DeKalb county. One stack, 65 x 14, built in 1889-90, and blown in September 3, 1890; three Siemens-Cowper-Cochrane stoves; fuel, coke, made at the furnace from coal mined on the property; ores, red and brown hematite from company's mines near the furnace; product, forge and foundry pig iron; annual capacity, 27,000 gross tons. Property in the hands of Charles Turner, Trustee for Bondholders.

Gadsden-Alabama Furnace, Gadsden, Etowah county. One stack, 75 x 15, built in 1887-8, and first blown in October 14, 1888; closed top; three Whitwell stoves; fuel, Birmingham, Tracy City, and Pocahontas coke; ores, local red and brown hematite; product, foundry and mill pig iron; annual capacity, 33,500 gross tons. Brand, "Etowah." Selling agents, Lee Chamberlain & Co., Columbus, Ohio; George H. Hull & Co., Louisville, Ky; C. R. Baird & Co., Bullitt Building, Philadelphia. Owned by T. T. Hillman, Mrs. Aileen Hillman, and George L. Morris, of Birmingham.

Lady Ensley Coal, Iron, and Railroad Company, Sheffield, Colbert county. Two stacks, each 75 x 17: Lady Ensley Furnace, built in 1887-9, and first blown in April 25, 1889; and Hattie Ensley Furnace, built in 1887-8; each stack has three Whitwell stoves; fuel, coke from company's ovens at Horse Creek, Walker county; ore, brown hematite from company's mines at Russellville; product, foundry and neutral forge pig iron; total annual capacity, 72,000 gross tons. John F. Martin, President; Martin Ensley, Vice-President; Thomas D. Radcliffe, Secretary and Treasurer. Selling agents, Matthew Addy & Co., Cincinnati.

Mary Pratt Furnace, W. T. Underwood, Birmingham, Jefferson county. One stack, 65 x 14, built in 1882, and first put in blast in April,

1883; rebuilt in 1889; three Whitwell stoves; fuel, coke; ores, local brown and red fossiliferous; annual capacity, 20,000 gross tons. Brand, "Mary Pratt." Idle.

Philadelphia Furnace, Florence Cotton and Iron Company, Florence, Lauderdale county. Main office, 330 Walnut st., Philadelphia. One stack, 75 x 17, commenced by the W. B. Wood Furnace Company in 1887, and completed by the present company in 1890–1; rebuilt in 1892; three Whitwell stoves, each 70 x 20; fuel, coke; ore, brown hematite from Lawrence county, Tenn.; product, foundry pig iron; annual capacity, 45,000 gross tons. Brand, "Philadelphia." Abraham S. Patterson, President; Robert Dornan, Vice-President; James Pollock, Secretary and Treasurer. Selling agents, Lee Chamberlain & Co., Columbus; C. L. Peirson & Co., Boston and New York.

Pioneer Furnaces, Pioneer Mining and Manufacturing Company, Thomas, Jefferson county. Two stacks, each 75 x 17: No. 1 built in 1886–8, and blown in May 15, 1888; No. 2 built in 1889–90, and blown in February 22, 1890; eight Siemens-Cowper-Cochrane stoves; fuel, Alabama coke; ores, red and brown hematite from company's mines near the furnaces; product, foundry pig iron; total annual capacity, 90,000 gross tons. Brand, "Pioneer." Edwin Thomas, President, and Samuel Thomas, Vice-President, Catasauqua, Pa.; George H. Myers, Secretary and Treasurer, Bethlehem, Pa. Selling agents, Matthew Addy & Co., Cincinnati; W. R. Thomas, New York.

Sloss Furnaces, Sloss Iron and Steel Company, Birmingham, Jefferson county. Four stacks: No. 1, 65 x 16, built in 1881–2, and put in blast April 12, 1882; No. 2, 70 x 16, built in 1882; No. 3, 75 x 17, built in 1887–8, and blown in in October, 1888; No. 4, 75 x 17, built in 1887–9, and blown in in February, 1889; five Whitwell, eight Gordon-Whitwell-Cowper, and three two-pair 18 x 70 stoves; fuel, coke; ores, red fossiliferous, hard and soft, and brown hematite; ores and coal mined on the company's property within 10 to 15 miles of furnaces; product, foundry and mill pig iron; total annual capacity, 157,000 gross tons. Brand, "Sloss." Thomas Seddon, President; E. W. Rucker, Vice-President; W. L. Sims, Secretary and Treasurer; E. A. Uehling, Furnace Manager. Selling agents, Forster, Hawes & Co., Chicago; William F. Jarvis & Co., Detroit; Tod, Stambaugh & Co., Cleveland; D. L. Cobb, Louisville; Hyatt, Mathews & Co., Cincinnati; Rogers, Brown & Warner, Philadelphia; Hugh W. Adams & Co., 15 Beekman st., New York.

Spathite Furnace, The Spathite Iron Company, Florence, Lauderdale county. Main office, Nashville, Tennessee. One stack, 75 x 14, completed in December, 1888, and blown in in October, 1889; rebuilt in 1893; three improved Pollock stoves; fuel, coke, from Pineville, Ky.; ores, spathite and brown hematite from Iron City, Tenn.; product, spathite pig iron; annual capacity, 20,000 gross tons. Brand, "Spath-

ite." Formerly called North Alabama Furnace. Thomas Sharp, President, and H. W. Buttorff, Secretary and Treasurer, Nashville, Tenn.; J. H. Short, Superintendent, Florence. Selling agents, George H. Hull & Co., Louisville, Ky.; Lee Chamberlain & Co., Columbus.

Talladega Furnace, Talladega Furnace Company, Talladega, Talladega county. One stack, 72 x 18, built in 1889, and blown in October 5, 1889; three Ford & Moncur stoves, each 62 x 26; fuel, Alabama and West Virginia coke; ore, local brown hematite; product, Bessemer, foundry, and forge pig iron; annual capacity, 40,000 gross tons. Brand, "Talladega." W. P. Armstrong, President; George Dunglinson, Secretary; R. L. Ivey, Treasurer.

Tennessee Coal, Iron, and Railroad Company, Nashville, Tennessee. Thirteen stacks in Jefferson county, Alabama. Five stacks at Bessemer: Nos. 1 and 2, each 75 x 17, built in 1886–7; No. 1 put in blast in 1888, and No. 2 in 1889; seven Whitwell stoves; Nos. 3 and 4, each 75 x 17, built in 1889–90; six Whitwell stoves and two building; No. 5, or Little Belle, 60 x 12, built in 1889–90; three Whitwell stoves. Eureka Furnaces, at Oxmoor, two stacks: No. 1, 75 x 17, completed in July, 1877, and rebuilt and blown in in December, 1885; No. 2, 75 x 17, first blown in in March, 1876, and rebuilt and blown in in August, 1886; seven Whitwell stoves. Fuel, Alabama coke; ores, local brown hematite and red fossiliferous; product, foundry pig iron; total annual capacity, 312,800 gross tons; brand, "DeBardeleben." Alice Furnaces, at Birmingham, two stacks: No. 1, 75 x 15, built in 1879–80, and put in blast November 23, 1880; raised to present height in 1890; three Gordon-Whitwell-Cowper stoves; No. 2, 75 x 18, built in 1883, and put in blast July 24, 1883; three Whitwell stoves; brand, "Alice." Ensley Furnaces, at Ensley: four stacks, each 80 x 20, built in 1887, 1888, and 1889; No. 1 blown in March 19, 1889, No. 2, December 1, 1888, No. 3, June 5, 1888, and No. 4, April 9, 1888; four Gordon-Whitwell-Cowper stoves to each furnace; brand, "Ensley." Fuel, coke, made in the company's ovens; ores, red and brown hematite from the company's mines at Hillman, Redding, and Woodstock; product, foundry and mill pig iron; annual capacity of Alice Furnaces, 81,600 gross tons; of Ensley Furnaces, 239,000 gross tons. Total annual capacity of the thirteen stacks, 633,400 gross tons. L. W. Johns, Superintendent Bessemer and Eureka Furnaces. G. Hillman, Superintendent Alice Furnaces. A. E. Barton, Superintendent Ensley Furnaces. *See Coke Furnaces in Tennessee for a full list of officers.*

Trussville Furnace, Trussville Furnace Company, Trussville, Jefferson county. One stack, 65 x 16½, built in 1887–9, and blown in in April, 1889; three Whitwell stoves; fuel, Alabama coke; ores, local red and brown hematite; product, foundry pig iron; annual capacity, 30,000 gross tons. Brand, "Trussville." R. D. Smith, General Manager; W. L. Smith, Secretary and Treasurer; C. D. Smith, Superintendent.

Williamson Furnace, Williamson Iron Company, Birmingham, Jefferson county. One stack, 65 x 13⅔, built in 1886, and first blown in in October, 1886; three Massicks & Crooke stoves; fuel, coke, made at Coalburg; ores, red fossil and brown hematite; product, foundry and mill pig iron; annual capacity, 18,000 gross tons. Brand, "Williamson." C. P. Williamson, President and Manager; H. D. Williamson, Vice-President; J. B. Simpson, Secretary and Treasurer.

Woodstock Furnaces, Woodstock Iron Company, Anniston, Calhoun county. Two stacks, each 75 x 16, built in 1887–9, and one blown in October 10, 1889; six Whitwell stoves; fuel, Blockton (Ala.) coke; ore, local brown hematite; product, foundry pig iron; total annual capacity, 72,000 gross tons. Brand, "Anniston." Property in the hands of the Bondholders' Committee; John D. Probst, Chairman, 50 Exchange Place, and George Glover, Secretary, 80 Broadway, New York City. Selling agents, Rogers, Brown & Co., Cincinnati; C. L. Peirson & Co., Boston; Warren, Wood & Co., New York. *See Woodstock (charcoal) Furnace.*

Woodward Iron Company, Woodward, Jefferson county. Two stacks, each 75 x 17, one built in 1882–3, and put in blast in August, 1883, and the other built in 1886; eight Whitwell stoves; fuel, coke, made from the company's coal; ore, red fossil, mined within 3 miles of the furnace; specialty, foundry pig iron; total annual capacity, 70,000 gross tons. Brand, "Woodward." J. H. Woodward, President; Frank M. Eaton, Secretary; Silas Hine, Treasurer.

Number of coke furnaces in Alabama: 38 completed stacks, and 1 stack partly erected.

CHARCOAL.

Attalla Furnace, The Southern Iron Company, Nashville, Tenn. Furnace at Attalla, Etowah county. One stack, 55 x 11, built in 1888–9, and blown in June 15, 1889; iron stoves; ores, red and brown hematite from Etowah and Cherokee counties; product, car-wheel pig iron; annual capacity, 18,000 gross tons. Brand, "Attalla." *See Charcoal Furnaces and Rolling Mills and Steel Works in Tennessee.*

Bibb Furnace, Alabama Iron and Steel Company, Brierfield, Bibb county. One stack, 55 x 12, built in 1864 to use charcoal; rebuilt in 1881, and remodeled in 1886 to use coke; returned to the use of charcoal in 1890; rebuilt in 1892; warm blast; ore, brown hematite, mined in the vicinity; product, car-wheel pig iron; annual capacity, 14,500 gross tons. Brand, "Bibb." Selling agents, Rogers, Brown & Co., Cincinnati, Ohio. *See Rolling Mills.*

Clifton Furnaces, Clifton Iron Company, Ironaton, Talladega county. Two stacks: No. 1, 55 x 12½, completed and blown in April 16, 1885; No. 2, 56 x 13½, built in 1889–90; cold and warm blast; ore, local brown hematite; product, car-wheel and malleable pig iron; total annual capacity, 30,000 gross tons. Brand, "Clifton." T. G. Bush,

President, Anniston; Paul Roberts, Secretary and Assistant Treasurer, Ironaton. Selling agents, Matthew Addy & Co., Cincinnati; C. L. Peirson & Co., Boston and New York.

Decatur Charcoal Iron Furnace, Decatur Land Company, New Decatur, Morgan county. One stack, 60 x 12, built in 1887–8, and blown in February 23, 1890; two Gordon-Whitwell-Cowper stoves; used coke as fuel for a short time; ores, red and brown hematite; annual capacity, 18,000 gross tons. Thomas Rutter, President, New York; W. T. Mulligan, Secretary, New Decatur. For lease.

Gadsden Furnace, Gadsden Iron Company, Gadsden, Etowah county. One stack, 64 x 12, built in 1882 with material from the Vigo Iron Company's No. 1 furnace at Terre Haute, Ind.; first blown in May 30, 1883; hot blast; ores, local red and brown hematite; product, foundry and car-wheel pig iron; annual capacity, 8,000 gross tons. Brand, "Stewart." Formerly called Coosa Furnace. A. J. Crawford, President, Terre Haute, Ind.; T. W. Stewart, Secretary, Treasurer, and General Manager. Selling agents, Hyatt, Mathews & Co., Cincinnati.

Jenifer Furnace, Jenifer Iron Company, Jenifer, Talladega county. One stack, 56 x 11, built in 1892, and blown in December 5, 1892, taking the place of the old stone stack built in 1863; two Hugh-Kennedy stoves, each 45 x 16; ore, local brown hematite; product, car-wheel pig iron; annual capacity, 12,000 gross tons. Brand, "Jenifer." (One stack, built in 1863, abandoned and dismantled in 1892.) John W. Noble, President, Anniston; George Noble, Secretary and Treasurer, and A. E. Noble, Superintendent, Jenifer. Selling agents, Rogers, Brown & Co., Cincinnati, and branch houses.

Langdon Furnace, Alabama Ore and Railroad Company, Langdon, Cherokee county. One stack, 46 x 11½, built in 1873, and rebuilt in 1889–90; blown in in May, 1890; one stove; ore, local brown hematite; product, car-wheel pig iron; annual capacity, 12,000 gross tons. Brand, "Langdon." Once known as Stonewall Furnace. P. D. Langdon, President; R. P. Sibley, Secretary. Selling agents, Hosford & Pluemer, Cincinnati.

Piedmont Land and Improvement Company, Piedmont, Calhoun county. Commenced in 1890 the erection of one stack, 60 x 12, with two Gordon-Whitwell-Cowper stoves; work suspended in 1891; will complete stack and erect a new one in 1894. W. F. Smalley, President; J. H. Ledbetter, Vice-President; R. L. Hurt, Secretary and Treasurer.

Rock Run Furnace, Bass Furnace Company, Rock Run, Cherokee county. One stack, 51½ x 10, built in 1873–4, enlarged in 1881, and again enlarged in 1892; hot blast; ore, local brown hematite; product, car-wheel pig iron; annual capacity, 11,000 gross tons. Brand, "Rock Run." J. H. Bass, President, J. I. White, Secretary, and F. S. Lightfoot, Treasurer, Fort Wayne, Indiana; J. M. Garvin, Superintendent, Rock Run.

Round Mountain Iron Works, The Rome Iron Company, lessee, Rome, Ga. Furnace at Round Mountain, Cherokee county. One stack, 45 x 9½, built in 1853, rebuilt in 1874, and remodeled in 1888; cold blast; ore, red fossiliferous; specialty, cold-blast pig iron for chilled rolls and car-wheels; annual capacity, 6,500 gross tons. Brand, "Round Mountain." E. B. Pennington, Superintendent. Selling agents, Rogers, Brown & Co., Cincinnati, Buffalo, and Boston; Rogers, Brown & Merwin, Chicago; Rogers, Brown & Warner, Philadelphia and New York; J. E. Cartwright, St. Louis. Owned by the Elliott Pig Iron Company, Gadsden. *See Rome (charcoal) Furnace in Georgia for list of officers.*

Shelby Furnaces, Shelby Iron Company, Shelby, Shelby county. Two stacks, Nos. 1 and 2, each 60 x 14, built in 1863 and 1873; No. 1 rebuilt in 1889; warm blast; ore, brown hematite, obtained on the furnace property; product, car-wheel pig iron; total annual capacity, 40,000 gross tons. Brand, "Shelby." T. G. Bush, President, Anniston; H. C. Cooper, Secretary, and W. S. Gurnee, Treasurer, 80 Broadway, New York; E. T. Witherby, Assistant Treasurer, Shelby. Selling agents, Matthew Addy & Co., Cincinnati; C. L. Peirson & Co., Boston and New York.

Tecumseh Furnace, Tecumseh Iron Company, Tecumseh, Cherokee county. One stack, 60 x 12, built in 1873, and put in blast February 19, 1874; hot blast; ore, local brown hematite; annual capacity, 13,500 gross tons. Brand, "Tecumseh." P. N. Moore, President; S. J. Fearing, Treasurer and General Manager. Idle since October, 1890.

Woodstock Furnace, Woodstock Iron Company, Anniston, Calhoun county. One stack, 50 x 12, blown in April 13, 1873; rebuilt in 1880; hot or cold blast; ore, local brown hematite; product, car-wheel pig iron; annual capacity, 11,000 gross tons. Brand, "Woodstock." (One stack partly destroyed by fire in 1891.) Property in the hands of the Bondholders' Committee. *See Woodstock (coke) Furnaces.*

Number of charcoal furnaces in Alabama: 14 completed stacks, 1 stack partly erected, and 1 stack projected. Total number of furnaces in Alabama: 52 completed stacks, 2 stacks partly erected, and 1 stack projected.

TEXAS.

CHARCOAL.

Jefferson Furnace, The Lone Star Iron Company, Jefferson, Marion county. One stack, 60 x 12, built in 1889–91, and blown in March 15, 1891; two Durham iron stoves; ores, local brown hematite, fossiliferous, and carbonate; product, car-wheel pig iron; annual capacity, 13,500 gross tons. Brand, "Lone Star." John A. Kruse, President and Manager; J. H. Cunningham, Vice-President; Edward Atfield, Secretary; Thomas L. Nelson, Treasurer. Selling agents, Cramer & Burt, Chicago, Ill. *See Rolling Mills.*

Old Alcalde Furnace, State of Texas, owner; R. W. Finley, Financial Agent, Rusk, Cherokee county. One stack, 55 x 9½, built in 1883, and put in blast February 27, 1884; hot blast; ore, brown hematite, mined near the furnace; product, car-wheel and foundry pig iron; annual capacity, 7,000 gross tons. Brand, "Old Alcalde." A pipe foundry is connected with the works. D. T. Jones, Superintendent of Furnace.

Star and Crescent Furnace, The Cherokee Iron Manufacturing Company, Rusk, Cherokee county. Furnace near Rusk, in same county. One stack, 60 x 11, built in 1890-1, and blown in November 26, 1891; iron stoves; ores, brown hematite and black laminated; product, car-wheel and foundry pig iron; annual capacity, 18,000 gross tons. Brand, "Star and Crescent." William Henderson, President, and E. S. Maunsell, Secretary and Treasurer, New Orleans, La.; E. C. Dickinson, Vice-President, and R. A. Barrett, General Manager, Rusk. Selling agents, A. P. DeCamp & Co., St. Louis, Mo.

Tassie Belle Furnace, The New Birmingham Iron and Improvement Company of Texas, New Birmingham, Cherokee county. One stack, 60 x 11, built in 1889-90, and blown in in November, 1890; two Weimer pipe stoves; ore, local brown hematite; product, car-wheel pig iron; annual capacity, 13,500 gross tons. Brand, "Tassie Belle." Richard L. Coleman, President and General Manager.

Number of furnaces in Texas: 4 charcoal stacks.

PROJECTED.

The Llano Improvement and Furnace Company, of Llano, Llano county, began the erection of a charcoal stack in 1892; excavations partly completed; work suspended; company in the hands of a receiver.

OHIO.

HANGING ROCK—CHARCOAL.

Bloom Furnace, Clare Iron Company, Bloom Switch, Scioto county. Telegraph address, Webster. One stack, 33 x 11, built in 1832, and rebuilt in 1846; burned December 7, 1887, and rebuilt in the spring of 1888; hot blast; open top; ore, hematite; product, No. 1 foundry pig iron; annual capacity, 2,700 gross tons. Brand, "Bloom." J. D. Clare, President and Treasurer; J. H. Simmons, Vice-President; E. H. Clare, Secretary and Manager. Selling agent, J. D. Clare, Portsmouth.

Centre Furnace, Centre Mining and Manufacturing Company, Ironton, Lawrence county. One stack, 40 x 10½, built in 1837; cold and warm blast; open top; ore, native limestone; product, car-wheel and extra strong machinery iron; annual capacity, 4,500 gross tons. (Grant Furnace, built in 1869, has been abandoned.) I. A. Kelly, President; Lindsey Kelly, Vice-President; O. Richey, Secretary. Leased by Lindsey Kelly. Selling agents, Rogers, Brown & Co., Cincinnati.

Hecla Furnace, Hecla Iron and Mining Company, Ironton, Lawrence county. One iron stack, 53 x 10½, built in 1887–90 to take the place of a stone stack built in 1833; cold blast; ores, local siderite and limonite, calcined in three ovens with wood and charcoal after being crushed; product, iron for car-wheels, chilled rolls, and machinery; annual capacity, 7,500 gross tons. Brand, "Hecla." Stops on Sunday. Albert Campbell, President; Charles Campbell, Secretary and Treasurer; Isaac N. Henry, Furnace Manager. Sales agents, James Collord & Co., Pittsburgh; Hosford & Pluemer, Cincinnati; Rogers, Brown & Warner, Philadelphia; George S. Burgess, Ironton.

Jefferson Furnace, Jefferson Furnace Company, Oak Hill, Jackson county. One stack, 40 x 11½, built in 1854; open top; cold blast; ore, local limestone; product, pig iron suitable for car-wheels and machinery; annual capacity, 2,700 gross tons. Joseph J. Jones, Secretary and Treasurer; Lot Davies, Superintendent. Selling agents, Lee Chamberlain & Co., Columbus, Ohio; James Collord & Co., Pittsburgh, Pa.

Madison Furnace, Clare, Duduit & Co., Rempel, Jackson county. One stack, 37 x 9½, built in 1854; hot blast; open top; ore, native red limestone, roasted in two ovens and charged hot; product, No. 1 foundry pig iron; annual capacity, 3,150 gross tons. Brand, "Madison." Linn Bentley, Financial Agent and General Superintendent; Andrew Henson, Clerk. Selling agents, C. R. Baird & Co., Philadelphia.

Mount Vernon Furnace, The Campbell Iron Company, Campbell, Lawrence county. Telegraph address, Mount Vernon Furnace. One stack, 32 x 10½, built in 1833; open top; ore, native hematite; product, warm-blast car-wheel pig iron; annual capacity, 3,150 gross tons. Brand, "Mt. Vernon." J. H. Moulton, President and selling agent, Ironton; J. W. Campbell, Manager, at the furnace. Selling agents for Philadelphia and vicinity, C. R. Baird & Co.

Olive and Buckhorn Furnaces, McGugin & Co., Olive Furnace P. O., Lawrence county. Telegraph address, Ironton. Furnaces situated on the Cincinnati, Dayton, and Ironton Railroad. Two stacks: Olive Furnace, 40 x 10, built in 1846, and remodeled in 1890; Buckhorn Furnace, 38 x 10, built in 1833, and rebuilt in 1852. Native limestone ore is used in both furnaces; open tops; hot or warm blast; product, foundry and car-wheel pig iron; total annual capacity, 8,000 gross tons. Brands, "Olive" and "Buckhorn." W. H. McGugin, Superintendent. Selling agents, Hosford & Pluemer, Cincinnati.

Pine Grove Furnace, Means, Kyle & Co., Hanging Rock, Lawrence county. One stack, 34 x 11, built in 1827, and rebuilt in 1844; open top; hot blast; ore, native limestone; product, strong foundry pig iron; annual capacity, 5,000 gross tons. Brand, "Pine Grove." E. B. Willard, President; James Bull, Secretary and Treasurer; A. R. Mackintosh, Manager. Selling agents, Rogers, Brown & Co., Cincinnati;

James Collord & Co., Pittsburgh. *See Hamilton Furnace, Hanging Rock Bituminous.*

Vesuvius Furnace, Ironton Coal and Iron Company, Ironton. Furnace at Pedro, Lawrence county. One stack, 32 x 10, built in 1832; rebuilt in 1886; cold blast; open top; ore, native limestone; product, car-wheel pig iron; annual capacity, 3,150 gross tons. Brand, "Vesuvius." *See Etna Iron Works, Hanging Rock Bituminous.*

Total number of charcoal furnaces in the Hanging Rock region of Ohio: 10 stacks. The Hanging Rock charcoal furnaces generally stop on Sunday, as do also some of the bituminous furnaces in this region.

HANGING ROCK—BITUMINOUS COAL OR COKE.

Belfont Furnace, Belfont Iron Works Company, Ironton, Lawrence county. One stack, 66 x 16, built in 1868; three Whitwell stoves; fuel, Pocahontas and West Virginia coke; ores, Lake Superior and native; product, foundry and forge pig iron; may run on Bessemer pig iron in 1894; annual capacity, 30,000 gross tons. *See Rolling Mills.*

Etna Iron Works, Ironton Coal and Iron Company, Ironton, Lawrence county. Two stacks: Alice Furnace, 86 x 18, first blown in September 13, 1875; and Blanche, (alternate stack,) 86 x 18, first blown in in 1888; four Whitwell stoves; fuel, New River coke; ores, Hanging Rock, Lake Superior, Virginia, and Kentucky; product, chiefly foundry pig iron; total annual capacity, 27,000 gross tons. Machinery is sufficient for operating only one furnace at a time. George N. Gray, Agent. *See Vesuvius Furnace, Hanging Rock Charcoal.*

Globe Iron Company, Jackson, Jackson county. Two stacks: Fulton Furnace, 50 x 13½, built in 1868, and rebuilt in 1886–7; one iron pipe stove; product, high-silicon softeners; brand, "Globe Silicon." Huron Furnace, 49 x 13, first blown in April 19, 1875, and rebuilt in 1889; two iron pipe stoves; product, foundry pig iron. Fuel, ¾ raw coal and ¼ coke; ore, native; total annual capacity, 12,000 gross tons. Eben Jones, President; E. Crandall, General Superintendent; J. E. Jones, Secretary; L. T. Murfin, Manager.

Hamilton Furnace, Means, Kyle & Co., Hanging Rock, Lawrence county. One stack, 65 x 16, built in 1883, and first blown in in March, 1886; three Whitwell stoves; fuel, raw coal and Kanawha and Connellsville coke; ores, native block and limestone; product, soft foundry pig iron; annual capacity, 18,000 gross tons. Brand, "Hamilton." *See Pine Grove Furnace, Hanging Rock Charcoal, for list of officers.*

Ironton Furnace, Ironton, Lawrence county. One stack, 58 x 16, built in 1873–4; fuel, raw coal and West Virginia coke; ores, Hanging Rock limestone, Lake Superior hematite, and Kentucky; product, foundry and neutral gray forge pig iron for special bars and chains; annual capacity, 13,500 gross tons. Brand, "Ironton." W. M. Hawkins, owner, Rockville Centre, Long Island, N. Y. For sale or lease.

Lawrence Furnace, John Peters Iron Company, lessee, Culbertson, Lawrence county. Main office, Ironton. One stack, 65 x 13, built in 1889–90, using machinery removed from Waldorf Furnace, W. Va., and blown in in March, 1891; two Gordon-Whitwell-Cowper stoves; ores, native and Bath county, Ky.; fuel, raw coal and West Virginia coke; product, high-silicon foundry pig iron; annual capacity, 9,000 gross tons. Brand, "Lawrence." John Peters, President; Charles Peters, Vice-President; George Peters, Secretary; John Peters, Jr., Manager and selling agent. Selling agents for Philadelphia, C. R. Baird & Co. Owned by the Lawrence Furnace Company.

Milton Furnace, C. H. Bunker, Royal Insurance Building, Chicago, Ill. Furnace at Wellston, Jackson county. One stack, 60 x 14, built in 1873–4; put in blast June 6, 1874; Whitwell stoves; fuel, raw coal; ore, Hanging Rock limestone; product, soft, open-grained foundry pig iron known as "American-Scotch;" annual capacity, 8,000 gross tons.

Sarah Furnace, Kelly Nail and Iron Company, lessee, Ironton, Lawrence county. One stack, 60 x 14, built in 1877, blown in March 18, 1878, and remodeled in 1886 and 1891; two Whitwell stoves; fuel, West Virginia coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 35,000 gross tons. Brand, "Sarah." Owned by the Bessemer Iron Company. *See Rolling Mills.*

Star Furnace, Star Furnace Company, Jackson, Jackson county. One stack, 54 x 14, built in 1866, and rebuilt in 1879; two iron pipe stoves; fuel, ¾ native raw coal and ¼ West Virginia coke; ores, native limonite and block; product, Nos. 1 and 2 silvery gray foundry pig iron; annual capacity, 11,000 gross tons. B. Kahn, President; C. O. Brown, Secretary; L. V. Brown, Manager.

Tropic Furnace, Tropic Iron Company, Jackson, Jackson county. One stack, 47 x 13, built in 1872–3, and rebuilt in 1879; hot blast; fuel, raw coal; ores, native limestone and block; product, high-silicon foundry pig iron; annual capacity, 6,500 gross tons. Brand, "Tropic." H. L. Chapman, President; J. C. Jones, Secretary and Treasurer; Miles Jones, Superintendent. Selling agents, Rogers, Brown & Co., Cincinnati, and branch houses.

Wellston Furnace, Wellston Furnace Company, Wellston, Jackson county. Two stacks: No. 1, 52 x 13, built in 1874–5, and remodeled in 1879 and 1889; No. 2, 52 x 13, built in 1874–5, and remodeled in 1889; one Thomas and two Pollock stoves; fuel, Pocahontas coke; ores, local limestone and high-grade Lake Superior; product, "American-Scotch" pig iron; total annual capacity, 22,500 gross tons. E. A. Hyde, President; Robert Vierling, Vice-President; J. F. Forsyth, Secretary and Treasurer; J. C. Clutts, General Manager, Wellston.

Number of bituminous coal or coke furnaces in the Hanging Rock region of Ohio: 14 stacks.

MAHONING VALLEY—COKE.

Brier Hill (The) Iron and Coal Company, Youngstown, Mahoning county. Two stacks: Grace Furnace No. 1, 80 x 18, built in 1861, torn down in 1873; rebuilt in 1882; Grace Furnace No. 2, 77 x 18¾, built in 1890; four Massicks & Crooke stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; total annual capacity, 100,000 gross tons. Brand, "Brier Hill." George Tod, President; Henry Tod, Vice-President; J. G. Butler, Jr., General Manager; H. H. Stambaugh, Secretary and Treasurer.

Brown Bonnell (The) Iron Company, Youngstown, Mahoning county. Two stacks in Mahoning county: Phœnix Furnace, at Youngstown, 60 x 15, built in 1854; product, forge pig iron. Anna Furnace, at Struthers, 75 x 16, built in 1869, rebuilt in 1881. Fuel, Connellsville coke; ore, Lake Superior; total annual capacity, 75,000 gross tons. (Falcon Furnace, 55 x 12⅔, abandoned in 1893.) *See Rolling Mills.*

Cherry Valley Furnace, Cherry Valley Iron Works, Leetonia, Columbiana county. One stack, 75 x 16, built in 1868, and rebuilt in 1883; five iron stoves; fuel, coke; ores, Lake Superior and native mixed; specialty, "American-Scotch" foundry pig iron; annual capacity, 55,000 gross tons. Brand, "Cherry Valley." *See Rolling Mills.*

Hannah Furnace, Mahoning Valley Iron Company, Youngstown. One stack, 75 x 16, first put in blast June 14, 1880; rebuilt in 1888; three Cowper-Kennedy stoves; fuel, Connellsville coke; ore, Lake Superior; product, mill pig iron, all used in the company's rolling mill; annual capacity, 65,000 gross tons. John Thompson, Manager. *See Rolling Mills.*

Haselton Iron Works, The Andrews Brothers Company, Youngstown, Mahoning county. Works at Haselton, now a part of Youngstown. One stack, 75 x 18, built in 1867, and rebuilt in 1880 and 1892; three Cowper-Kennedy stoves; fuel, coke; product, Bessemer, foundry, and mill pig iron from Lake Superior ores, and "American-Scotch" pig iron from a blackband ore obtained at Mineral Ridge, 12 miles from the furnace; annual capacity, 72,000 gross tons. Brand, "Haselton." *See Rolling Mills.*

Hubbard Furnaces, The Andrews and Hitchcock Iron Company, Youngstown, Mahoning county. Works at Hubbard, Trumbull county. Two stacks, 75 x 16 and 77 x 17, built in 1867 and 1872; one rebuilt in 1883, and the other rebuilt in 1886; three Cowper-Kennedy stoves; fuel, Connellsville coke; product, mainly foundry pig iron. "Hubbard strong foundry" is made from a mixture of Lake Superior specular and magnetic ores; "Hubbard Scotch" is from ¾ Trumbull county blackband and ¼ Lake Superior ore, and sells in place of Scotch pig iron. Total annual capacity, 130,000 gross tons. William J. Hitchcock, President; John A. Logan, Jr., Vice-President; Frank Hitchcock, Secretary and Treasurer.

Mary Furnace, The Ohio Iron and Steel Company, Lowellville, Mahoning county. One stack, 75 x 16, built in 1845, rebuilt in 1872, and remodeled in 1883; three hot-blast stoves; fuel, Connellsville coke; ores, Lake Superior and native blackband; product, strong neutral foundry pig iron; annual capacity, 58,000 gross tons. Specialty, "Ohio blackband Scotch." Brands, "The Mary" for lake ore iron and "Ohio Scotch" for blackband mix. Formerly called Ada Furnace. Thomas H. Wells, President; John C. Wick, Vice-President; F. H. Wick, Treasurer; Robert Bentley, Secretary and General Manager. Selling agents, Pickands, Brown & Co., Chicago; Pickands, Mather & Co., Cleveland; Arthur W. Howe, Drexel Building, Philadelphia; N. S. Bartlett & Co., Boston.

Mattie Furnace, Girard Iron Company, Girard, Trumbull county. One stack, 80 x 18, built in 1866, remodeled in 1879, stack raised in 1884, and rebuilt in 1892; four Pollock improved stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer, foundry, and forge pig iron; annual capacity, 68,000 gross tons. Brand, "Girard." Formerly called Girard Furnace. A. M. Byers, sole owner, Pittsburgh; Henry B. Shields, Manager, Girard.

Seneca Furnaces, The Salem Iron Company, Pittsburgh, Pa. Furnaces at Leetonia, Columbiana county. Two stacks, 54 x 13 and 54 x 15, built in 1866 and 1872; four iron stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer, foundry, and forge pig iron; total annual capacity, 60,000 gross tons. John McKeefrey, President; W. D. McKeefrey, Vice-President; N. J. McKeefrey, Secretary. Selling agents, C. L. Peirson & Co., Boston and New York; McKeefrey & Co., Leetonia and Pittsburgh.

Thomas Furnace, The Thomas Furnace Company, Niles, Trumbull county. One stack, 76 x 17; original stack built in 1870, enlarged in 1883, and torn down and rebuilt in 1890; entirely new equipment; four Massicks & Crooke stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer and foundry pig iron; annual capacity, 72,000 gross tons. Brand, "Thomas." J. R. Thomas, President; J. M. Thomas, Secretary and Treasurer.

Tod Furnace, The Youngstown Steel Company, Youngstown, Mahoning county. One stack, 70 x 15, built in 1889; three Massicks & Crooke stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer and foundry pig iron; annual capacity, 54,000 gross tons. Brand, "Youngstown Scotch." Formerly known as Tod Furnace No. 2 of Brier Hill Iron and Coal Company. Edward L. Ford, Superintendent. Selling agents, H. G. Dravo, Pittsburgh; John L. Hogan & Co., Philadelphia; Tod, Stambaugh & Co., Cleveland. *See Rolling Mills and Steel Works.*

Number of coke furnaces in the Mahoning Valley, including furnaces in Columbiana county: 15 stacks.

HOCKING VALLEY—BITUMINOUS COAL OR COKE.

Baird Furnace, Baird Iron Company, Gore, Hocking county. Furnace in Perry county. Telegraph address, Baird Furnace. One stack, 54 x 12½, built in 1874–5, and blown in October 9, 1875; rebuilt in 1886; two iron stoves; fuel, raw semi-bituminous coal; ore, native limestone; product, strong No. 1 foundry pig iron; annual capacity, 7,200 gross tons. Brand, "Baird." F. B. Baird, President; C. R. Baird, Treasurer; F. B. McElhuinie, Secretary. Selling agents, C. R. Baird & Co., Philadelphia. Idle since 1888.

Columbus and Hocking Coal and Iron Company, Columbus. New York office, 80 Broadway. Four stacks: Akron Furnace, at Buchtel, Athens county, one stack, 60 x 16, built at Akron in 1872, removed to Buchtel in 1877, and blown in November 30, 1877. Bessie Furnace, at New Straitsville, Perry county, one stack, 60 x 14, built in 1877–8, and blown in January 21, 1878; four Whitwell stoves. Winona Furnace, at Winona Furnace P. O., Hocking county, one stack, 50 x 12½, completed in 1878, and blown in February 20, 1878; three Whitwell stoves. Greendale Furnace, at Greendale, Hocking county, one stack, 58 x 15, first put in blast November 8, 1879; the machinery was formerly used at Kenton Furnace, at Newport, Ky.; three Player stoves; also called Craft's Furnace. Fuel, raw bituminous coal, obtained from the company's mines near the furnaces; ores, native and Lake Superior; product, foundry, silvery, and high-silicon pig iron, the latter branded "Pencost," and containing from 8 to 12 per cent. of silicon; total annual capacity, 85,500 gross tons. Brands, "Bessie and Winona" silvery and "Pencost." Jay O. Moss, President; R. H. Johnson, Vice-President and General Manager; S. A. McManigal, Secretary; E. M. Mancourt, Treasurer. Selling agents, Lee Chamberlain & Co., Columbus, Ohio; C. R. Baird & Co., Philadelphia.

Glasgow Furnace, The King, Gilbert, and Warner Company, Columbus. Furnace at Moxahala, Perry county. One stack, 70 x 16½, built in 1877–8, and rebuilt in 1887; fuel, Connellsville and New River coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 36,000 gross tons. W. S. Church, Superintendent. *See Franklin Furnace, Miscellaneous Bituminous. See Rolling Mills and Steel Works.*

New York and Western Coal Company, Room 50, Wesley Block, Columbus. New York office, 44 Broadway. Four stacks: Helen Furnace, at Orbiston, Hocking county, one stack, 52 x 15, built in 1877, and first blown in in December, 1877. XX Furnace, at Shawnee, Perry county, one stack, 50 x 14, built in 1876–7, and first blown in January 18, 1877; idle and for sale. A and B Furnaces, at Floodwood, Athens county, two stacks, each 75 x 17, completed in 1888. Fuel, mainly raw coal, mixed with some coke; ores, native limestone, with some Lake Superior; product, chiefly foundry pig iron;

total annual capacity, 100,000 gross tons. Francis K. Pendleton, President; William E. Stowe, Secretary and Treasurer.

New York Furnaces, Shawnee, Perry county. Two stacks: one, 50 x 14½, built in 1877, and blown in November 10, 1877; one cast-iron stove; the other, 65 x 15, built in 1887, and blown in December 15, 1887; two Gordon-Whitwell-Cowper stoves. Fuel, raw coal and coke; ores, native, from the company's property, and Lake Superior; product, No. 1 foundry pig iron; total annual capacity, 45,000 gross tons. Company being reorganized. William E. Davies, Secretary Bondholders' Committee, 44 Pine st., New York City.

Number of bituminous coal or coke furnaces in the Hocking Valley: 12 stacks.

MISCELLANEOUS—BITUMINOUS COAL OR COKE.

Bellaire Nail Works, Bellaire, Belmont county. One stack, 75 x 17, built in 1873, blown in September 22, 1873, and rebuilt in 1886; four Massicks & Crooke stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron, consumed in the manufacture of soft Bessemer steel; annual capacity, 75,000 gross tons. *See Rolling Mills and Steel Works.*

Cleveland Rolling Mill Company, Cleveland, Cuyahoga county. Three stacks: Central Furnaces, two stacks, one 75 x 20, built in 1881–2, three Whitwell stoves; and one, 80 x 20, built in 1887, four fire-brick stoves. Newburgh Furnace, 65 x 16, built in 1872, and remodeled in 1886. Fuel, coke; ore, Lake Superior; product, No. 1 Bessemer pig iron; total annual capacity, 160,000 gross tons. *See Rolling Mills and Steel Works.*

Dover Furnace, Penn Iron and Coal Company, Canal Dover, Tuscarawas county. One stack, 66 x 15, built in 1854, rebuilt in 1878–9; four iron pipe stoves; fuel, raw coal and Connellsville coke; ores, blackband, with a mixture of Lake Superior; product, foundry pig iron; annual capacity, 27,000 gross tons. Brand, "Tuscarawas." J. P. Burton, President, Massillon; S. W. Croxton, Treasurer and General Manager, Cleveland; O. H. S. Ream, Secretary, Canal Dover.

Emma Furnace, Union Rolling Mill Company, Cleveland, Cuyahoga county. One stack, 72 x 17, built in 1872; remodeled in 1882–3 and in 1890–1; three Ford & Moncur stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer, foundry, and forge pig iron; annual capacity, 50,000 gross tons. Brand, "Emma." Selling agents, The Condit-Fuller Company, Cleveland. *See Rolling Mills.*

Franklin Furnace, The King, Gilbert, and Warner Company, lessee, Columbus, Franklin county. One stack, 75 x 17, completed in November, 1873; rebuilt in 1884, 1886, 1890, and 1892–3; three Massicks & Crooke stoves, each 65 x 18; fuel, Pocahontas coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 70,000

gross tons. Brand, "Franklin." Owned by the Franklin Iron Works Company, Columbus. *See Glasgow Furnace, Hocking Valley. See Rolling Mills and Steel Works.*

Jefferson Iron Works, Steubenville, Jefferson county. One stack, 80 x 18, built in 1865, and rebuilt in 1889; four Gordon-Whitwell-Cowper stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 75,000 gross tons. Brand, "Jefferson." *See Rolling Mills.*

Martin's Ferry Furnace, Wheeling Steel and Iron Company, Wheeling, West Virginia. Furnace at Martin's Ferry, Belmont county. One stack, 60 x 14, built in 1866; two iron stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 30,000 gross tons. Formerly called Benwood Iron Works. *See Belmont and Top Mill (coke) Furnaces and Rolling Mills and Steel Works in West Virginia.*

Mingo Furnaces, Junction Iron Company, Wheeling, W. Va. Furnaces at Mingo Junction, Jefferson county. Two stacks: No. 1, 75 x 17, built in 1871, and rebuilt in 1886; No. 2, 75 x 17, built in 1872, and rebuilt in 1886; four Gordon-Whitwell-Cowper stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity of each furnace, 80,000 gross tons. Company has sufficient machinery to operate one furnace only at a time. *See Rolling Mills.*

River Furnace, Cleveland Iron Company, Cleveland, Cuyahoga county. One stack, 70 x 17, built in 1879, and remodeled in 1889; iron stoves; fuel, coke; ore, Lake Superior; product, high-grade foundry pig iron; annual capacity, 50,000 gross tons. Also called Proton Furnace. William Bingham, President; James Barnett, Vice-President; C. W. Bingham, Secretary and Treasurer. For lease.

Steubenville Furnace, Riverside Iron Works, Wheeling, W. Va. Furnace at Steubenville, Jefferson county. One stack, 75 x 16, built in 1872, and rebuilt in 1886 and 1890; three Massicks & Crooke stoves; fuel, Connellsville coke; ores, Missouri, Lake Superior, and foreign; product, Bessemer pig iron; annual capacity, 65,000 gross tons. Brand, "Riverside." *See Riverside Furnace and Rolling Mills and Steel Works in West Virginia.*

Zanesville Furnace, Ohio Iron Company, Zanesville, Muskingum county. One stack, 75 x 15½, built in 1870–1, blown in September 7, 1871, and rebuilt in 1883; three Whitwell stoves, each 65 x 17; fuel, Connellsville coke; ore, Lake Superior; product, forge, Bessemer, and foundry pig iron; annual capacity, 33,500 gross tons. *See Rolling Mills and Steel Works.*

Number of bituminous coal or coke furnaces in Ohio outside of the Hanging Rock, Mahoning Valley, and Hocking Valley districts: 14 stacks. Total number of furnaces in Ohio: 65 stacks.

INDIANA.

BITUMINOUS BLOCK COAL AND COKE.

Brazil Furnace, The Central Iron and Steel Company, Brazil, Clay county. One stack, 60 x 13, built in 1867, blown in in December, 1867, and remodeled in 1872; Pollock and Player iron stoves; fuel, raw block coal and coke; ores, Lake Superior and Iron Mountain; specialty, forge pig iron; annual capacity, 9,000 gross tons. Brand, "Brazil." *See Rolling Mills.*

Vigo Furnace, Vigo Iron Company, Terre Haute, Vigo county. One stack, 62½ x 13, built in 1872, and blown in in 1873; rebuilt in 1889; two iron stoves; fuel, raw coal; ore, Missouri; specialty, forge pig iron; annual capacity, 18,000 gross tons. Brand, "Vigo." A. J. Crawford, President; J. P. Crawford, Secretary and Treasurer.

Number of furnaces in Indiana: 2 bituminous stacks.

ILLINOIS.

COKE.

Calumet Furnace, Calumet Iron and Steel Company, Rookery Building, Chicago. Works at Cummings, Cook county. One stack, 75 x 18, built in 1880; one Massicks & Crooke and three Siemens-Cowper-Cochrane stoves; fuel, Connellsville coke; ores, Lake Superior and Menominee; product, Bessemer, foundry, and mill pig iron; annual capacity, 50,000 gross tons. Brand, "Calumet." *See Rolling Mills.*

Illinois Steel Company, Rookery Building, Chicago, Cook county. Seventeen stacks in Illinois: North Works, located at Chicago, on north branch of Chicago river, at the foot of Wabansia avenue, have two stacks, Nos. 1 and 2, each 66 x 15⅔, built in 1869; six fire-brick stoves of various types; product, chiefly spiegeleisen and foundry pig iron; annual capacity, 115,500 gross tons. South Works, located at South Chicago, have eight stacks, Nos. 1, 2, 3, and 4, each 75 x 19, built in 1880–1; fourteen Siemens-Cowper-Foote stoves; and Nos. 5, 6, 7, and 8, each 80 x 20, built in 1890–1; sixteen Massicks & Crooke stoves; product, Bessemer pig iron; annual capacity, 706,200 gross tons. Joliet Works, at Joliet, Will county, have three stacks, each 80 x 20, Nos. 1 and 2 built in 1873, and rebuilt in 1891, and No. 3 built in 1889–90; product, Bessemer pig iron; annual capacity, 264,000 gross tons. Union Works, located at Chicago, on south branch of Chicago river, at Ashland ave. and Thirty-first st., have four stacks, Nos. 1 and 2, each 72 x 14, built in 1869, and rebuilt in 1885, and Nos. 3 and 4, each 73 x 15½, built in 1881, and rebuilt in 1889; two Siemens-Cowper-Kennedy and ten Siemens-Cowper-Foote stoves; product, spiegeleisen, ferromanganese, and Bessemer pig iron; annual capacity, 198,000 gross tons. Fuel, Connellsville and Pocahontas Flat-

Top coke; ores, Lake Superior, Gogebic, and Minnesota for Bessemer pig iron, and foreign, Southern, and Western for spiegeleisen and ferromanganese; total annual capacity of all the furnaces, 1,283,700 gross tons. *See Coke Furnaces in Wisconsin. See Rolling Mills and Steel Works in Illinois and Wisconsin.*

Iroquois Furnace, The Iroquois Furnace Company, Rookery Building, Chicago. Furnace at Ninety-fifth st., South Chicago, Cook county. One stack, 80 x 17, built in 1890-1, and blown in September 21, 1891; four Cowper-Kennedy stoves; fuel, coke; ore, Lake Superior; product, foundry and Bessemer pig iron; annual capacity, 60,000 gross tons. Brands, "Iroquois" for strong iron, "Sterling Scotch" for soft iron, and "Peerless" for high-silicon soft iron. Hay Walker, Jr., President, and T. H. Given, Treasurer, Pittsburgh; Charles F. Forster, Secretary and General Manager, Rookery Building, Chicago; Jerome Zink, Superintendent, South Chicago. Selling agents, Forster, Hawes & Co., Rookery Building, Chicago.

Number of furnaces in Illinois: 19 coke stacks. No charcoal stacks.

MICHIGAN.

CHARCOAL.

Antrim Iron Company, Mancelona, Antrim county. General office, Grand Rapids. Two stacks, each 48 x 10; one put in blast December 25, 1882, burned May 29, 1883, and rebuilt; the other, built in 1887-8, and blown in in April, 1888; hot blast; charcoal supplied by 104 round brick kilns of an average capacity of 65 cords; wood cut from company's land; ore, Lake Superior; product, car-wheel and malleable pig iron; total annual capacity, 45,000 gross tons. Brand, "Antrim." T. J. O'Brien, President; J. M. Barnett, Vice-President; J. C. Holt, Secretary and Treasurer; Murray Morris Duncan, Manager, Mancelona. Iron sold from general office and by Thomas A. Mack, Cincinnati.

Carp Furnace, Carp River Furnace Company, Detroit. Furnace at Marquette, Marquette county. One stack, 47 x 10, built in 1872-3, burned in 1882, and rebuilt in 1889-90; two iron stoves; ore, Lake Superior; product, car-wheel and malleable pig iron; annual capacity, 11,000 gross tons. Brand, "Carp." H. A. Burt, President; Theo. H. Eaton, Vice-President; Solon Burt, Secretary and Treasurer.

Deer Lake Furnaces, Deer Lake Company, Ishpeming, Marquette county. Two alternate stacks: one, 49 x 8, built in 1868; the other, 47 x 9, built and put in blast in 1873; hot blast; steam and water power; ore, Lake Superior; product, car-wheel, malleable, and foundry pig iron: total annual capacity, 9,000 gross tons. Brand, "Deer Lake." W. H. Rood, President and Treasurer; J. N. St. Clair, Secretary. Selling agents, William F. Jarvis & Co., Detroit.

Detroit Iron Furnace Company, Newberry Building, Detroit. One stack, 50 x 11½, built in 1870; changed from bituminous coal to charcoal in 1879; hot blast; ore, Lake Superior; product, car-wheel and malleable pig iron; annual capacity, 20,000 gross tons. Brand, "D. I. F." James McMillan, President; Hugh McMillan, Vice-President; E. C. Wetmore, Secretary and Manager; W. K. Anderson, Treasurer. Selling agents, William F. Jarvis & Co., Detroit.

Elk Rapids Furnace, Elk Rapids Iron Company, Elk Rapids, Antrim county. One stack, 58 x 10½, first put in blast in July, 1873; hot blast; ore, Lake Superior entirely; specialty, Nos. 3 and 4 pig iron for car-wheels and malleable castings; daily average production, 75 gross tons. Brand, "Elk Rapids." The charcoal for this furnace is made in 20 round and 25 rectangular brick kilns, holding, respectively, 60 and 100 cords each; chemical works are connected with them. N. K. Fairbank, President, Chicago; H. H. Noble, Vice-President and General Manager, Elk Rapids. Selling agents, M. A. Hanna & Co., Perry-Payne Building, Cleveland.

Eureka Furnace, Eureka Iron and Steel Works, Detroit. Furnace at Wyandotte, Wayne county. One stack, 55 x 11, built in 1855, rebuilt in 1884–5, and remodeled since; hot blast; ores, Lake Superior and Menominee; product, car-wheel and malleable pig iron; annual capacity, 22,500 gross tons. (One stack, built in 1863, has been abandoned.) John Desmond, Superintendent of Furnace. *See Rolling Mills.*

Excelsior Furnace, Charles H. Schaffer, Marquette. Furnace at Ishpeming, Marquette county. One stack, 50 x 10, built in 1872, burned and rebuilt in 1880, and again rebuilt in 1890; two iron stoves; ore, Lake Superior; product, foundry, car-wheel, and malleable pig iron; annual capacity, 14,000 gross tons. Brand, "Excelsior." Selling agents, William F. Jarvis & Co., Detroit.

Fruitport Furnace, Spring Lake Iron Company, Fruitport, Muskegon county. One stack, 56 x 11, built in 1879–80, and remodeled in 1891; hot blast; ore, Lake Superior; product, foundry, car-wheel, and malleable pig iron; annual capacity, 29,000 gross tons. Brand, "Spring Lake." Irving M. Bean, President, and Samuel Marshall, Vice-President and Treasurer, Milwaukee; J. C. Ford, Secretary and General Superintendent, Fruitport.

Gaylord Iron Company, (successor to Detroit and Lake Superior Iron Manufacturing Company,) Detroit, Wayne county. One stack, 56 x 9½, built in 1857, and first put in blast March 16, 1857; remodeled in 1889; warm blast; ores, Lake Superior specular, magnetic, and hematite; product, pig iron specially adapted for malleable castings; annual capacity, 12,000 gross tons. Brand, "G. I. Co. DET." Charles A. Kent, President; William M. Gaylord, Vice-President, Treasurer, and General Manager; Frank B. Gaylord, Secretary.

Martel Furnace Company, Wm. B. Vance, Receiver, St. Ignace, Mackinac county. One stack, 53 x 10½, first put in blast August 15, 1881; two Whitwell stoves, each 60 x 15; ore, Lake Superior; product, car-wheel pig iron; annual capacity, 21,000 gross tons. Brand, "Martel."

Newberry Furnace Company, Newberry, Luce county. Furnace and general office at Newberry. One stack, 52¾ x 10, built in 1882–3, and blown in in May, 1883; rebuilt in 1892; four iron stoves; water jackets; closed top, with patent charger; ores, hard and soft Lake Superior; product, car-wheel and malleable pig iron; annual capacity, 27,000 gross tons. Brand, "Vulcan." The charcoal is made at the furnace in 64 kilns, chemical works being connected with them. James McMillan, President, Truman H. Newberry, Vice-President, and W. K. Anderson, Treasurer, Detroit; Claude W. Case, Secretary and Manager, Newberry. Selling agents, William F. Jarvis & Co., Detroit.

Northern Furnace Company, Marquette, Marquette county. Furnace at Chocolay, Marquette county; post-office address, Harvey. One stack, 50 x 10½, built in 1860, and rebuilt in 1890; hot blast; ore, Lake Superior; product, car-wheel, malleable, and foundry pig iron; annual capacity, 25,000 gross tons. Brand, "Northern." J. M. Longyear, President; N. M. Kaufman, Vice-President; J. G. Reynolds, Secretary; J. M. Wilkinson, Treasurer; F. B. Spear, Manager. Selling agents, William F. Jarvis & Co., Detroit.

Peninsular Furnace, The Peninsular Iron Company, Detroit, Wayne county. One stack, 42 x 9½, built in 1863, put in blast in February, 1864; warm blast; open top, covered by a plate when not filling; ore, exclusively Lake Superior; specialty, car-wheel and malleable pig iron; annual capacity, 10,000 gross tons. Brand, "P. I. Co., Det." Theodore H. Eaton, President; Robert Leete, Vice-President; Solon Burt, Secretary and Treasurer.

Pine Lake Furnace, Pine Lake Iron Company, Ironton, Charlevoix county. General office, Rookery Building, Chicago. One stack, 50 x 11, built in 1880–1, and put in blast in February, 1881; hot blast; ore, Lake Superior; specialty, malleable and car-wheel pig iron; annual capacity, 27,000 gross tons. Brand, "Champion." R. M. Cherrie, President; H. C. Dolph, Treasurer.

Pioneer Furnaces, Iron Cliffs Company, Negaunee, Marquette county. Two stacks: No. 1, 56 x 10, built in 1858; No. 2, 56 x 9, built in 1859; both stacks burned and rebuilt in 1877; hot blast; ores, Lake Superior, red specular, and soft hematite; product, malleable and car-wheel pig iron; total annual capacity, 40,500 gross tons. Brand, "Pioneer." Wm. G. Mather, President and Treasurer, J. H. Sheadle, Secretary, and Fred. A. Morse, Auditor, Mercantile Bank Building, Cleveland; Austin Farrell, Agent, Negaunee. Selling agents, Pickands, Mather & Co., Cleveland; Pickands, Brown & Co., Chicago.

Union Iron Company, Jefferson avenue east, Detroit, Wayne county.

One stack, 46 x 10, built in 1871–2, and blown in in July, 1872; warm blast; ore, Lake Superior; specialty, malleable and car-wheel pig iron; annual capacity, 13,500 gross tons. Brand, "U. I. Co., Det." Austin Burt, President; Wm. Gerhauser, Secretary, Treasurer, and Manager; W. C. Burt, Assistant Secretary and Assistant Treasurer.

Weston Furnace, Weston Furnace Company, Manistique, Schoolcraft county. Chicago office, Rookery Building. One stack, 60 x 12, built in 1890–1, and blown in March 4, 1891; two iron stoves; ore, Lake Superior; product, car-wheel and malleable pig iron; annual capacity, 28,000 gross tons. Brand, "Weston;" iron also largely sold under brand of "Champion." W. H. Hill, Vice-President; H. Duvall, Secretary; J. D. Mersereau, Treasurer.

Number of furnaces in Michigan: 20 charcoal stacks.

PROJECTED.

The Gogebic Furnace Company, of Milwaukee, Wisconsin, proposes to erect a charcoal stack, 60 x 12, at Ironwood, Gogebic county, Michigan, in the spring of 1894. The furnace is to be equipped with two fire-brick stoves, and will have an annual capacity of 40,000 gross tons of car-wheel, malleable, and foundry pig iron. Gogebic hematite ore will be used. I. M. Bean, President; James Gilbert, Vice-President; Charles Allis, Secretary; William Allis, Treasurer; Morris R. Hunt, Manager.

WISCONSIN.

COKE.

Illinois Steel Company, Rookery Building, Chicago, Ill., and New Insurance Building, Milwaukee. Milwaukee Works, located at Bay View, Milwaukee, Milwaukee county: Two stacks, Nos. 1 and 2, each 66 x 15¾, built in 1870–1; six Massicks & Crooke stoves; fuel, Connellsville coke; ores, Lake Superior, Gogebic, and Iron Ridge; product, mainly foundry and mill pig iron; total annual capacity, 115,500 gross tons. *See Furnaces in Illinois. See Rolling Mills and Steel Works in Illinois and Wisconsin.*

Mayville Furnace, The North Western Iron Company, New Insurance Building, Milwaukee. Furnace at Mayville, Dodge county. One stack, 67 x 14, built in 1848 as a charcoal furnace, rebuilt in 1872 and 1884, and remodeled and enlarged in 1887 to use coke; two Cowper-Foote stoves, each 60 x 18; fuel, Connellsville coke; ores, Menominee, Gogebic, and local; product, Bessemer, foundry, and mill pig iron; annual capacity, 33,500 gross tons. Brand, "Sidney." Irving M. Bean, President; James C. Spencer, Vice-President; W. K. Packman, Secretary; Chas. F. Ilsley, Treasurer; Chas. A. Grimes, Superintendent. Selling agents, Charles W. Goodrich & Co., Rookery Building, Chicago.

Minerva Furnace, Minerva Iron Company, 81 New Insurance Building, Milwaukee. Furnace at Milwaukee. One stack, 56 x 14½, built and put in blast in the spring of 1873; two Kennedy hot-blast stoves, 18 x 60; fuel, Connellsville coke; ore, Lake Superior; product, foundry pig iron; annual capacity, 40,000 gross tons. Brand, "Minerva." S. A. Harrison, President; R. W. Pierce, Vice-President; William Bloodgood, Secretary and Treasurer.

West Superior Iron and Steel Company, West Superior, Douglas county. Began in 1889 the erection of one stack, 80 x 18; four fire-brick stoves; work suspended. *See Rolling Mills and Steel Works.*

Number of coke furnaces in Wisconsin: 4 completed stacks, and 1 stack partly erected.

CHARCOAL.

Eagle Furnace, Eagle Iron Company, Spring Valley, Pierce county. One stack, 65 x 13, built in 1892–3, utilizing machinery formerly used by the Fannie Furnaces, at Shawnee, Ohio; not yet blown in; two Pollock stoves, each 60 pipes; ore, brown hematite, mined 1½ miles from furnace; annual capacity, 22,000 gross tons. S. Frank Eagle, President and Manager, and William S. Eagle, Secretary and Treasurer, Spring Valley; F. S. Wright, Vice-President, Newark, Ohio.

Florence Furnace, H. C. Dolph, Rookery Building, Chicago, Ill. Furnace at Florence, Florence county. One stack, 40 x 8, built in 1880, and first blown in November 13, 1881; hot blast; ore, Menominee range hematite; specialty, car-wheel pig iron; annual capacity, 5,400 gross tons.

Fond du Lac Furnace, Wisconsin Furnace Company, lessee, 68 and 70 Dearborn st., Chicago, Ill. Furnace at Fond du Lac, Fond du Lac county. One stack, 52 x 10½, built in 1873–4, and first put in blast in 1883; hot blast; ore, Lake Superior; product, foundry, car-wheel, and malleable pig iron; annual capacity, 20,500 gross tons. Brand, "Wisconsin." E. A. Hyde, President; J. F. Forsyth, Treasurer; W. H. Nelson, Secretary and Manager. Selling agents, Forsyth, Hyde & Co., Chicago. Owned by the Fond du Lac Iron Company.

Hinkle Furnace, Ashland Iron and Steel Company, Ashland, Ashland county. One stack, 60 x 12, built in 1887–8, and blown in in March, 1888; closed top; two Whitwell stoves; ore, Gogebic hematite; product, foundry, car-wheel, and malleable pig iron; annual capacity, 45,000 gross tons. Brand, "Hinkle." A. H. Hinkle, President; W. H. Hinkle, Secretary and Treasurer; Noah W. Gray, Manager; L. E. Dunham, Assistant Manager. Selling agents, Rogers, Brown & Co., Cincinnati, and branch houses.

National Furnace, National Furnace Company, De Pere, Brown county. One stack, 45 x 10½, built in 1869, and put in blast in February, 1870; hot blast; ores, Lake Superior, Menominee, and Gogebic; product, all grades of charcoal pig iron; annual capacity, 20,000 gross

tons. Brand, "National." (Green Bay Furnace, at Green Bay, built in 1870, and one stack at De Pere, built in 1872, have been abandoned.) Henry D. Smith, President; Eugene Smith, Secretary and General Manager; W. L. Brown, Treasurer. Selling agents, Pickands, Brown & Co., Chicago.

Sauk Furnace, Iron Mountain Ore and Furnace Company, Ironton, Sauk county. Telegraph address, La Valle. One stack, 30 x 8½, built in 1857; warm blast; open top; steam and water power; ore, native brown hematite; specialty, foundry and car-wheel pig iron; annual capacity, 3,150 gross tons. Brand, "Sauk." G. W. Andrews, President; H. C. Gridley, Secretary; J. C. O'Gorman, Treasurer. Selling agents, Forsyth, Hyde & Co., Chicago.

Number of charcoal furnaces in Wisconsin: 6 stacks. Total number of furnaces in Wisconsin: 10 completed stacks, and 1 stack partly erected.

PROJECTED.

York Iron Company, West Superior, Douglas county. Main office, Minneapolis, Minn. Began in 1892 the erection of a charcoal blast furnace at West Superior, utilizing machinery from the dismantled Minneapolis Furnace, of Black River Falls. Construction suspended in 1893. Furnace not likely to be completed by the present company.

MINNESOTA.

COKE.

West Duluth Furnace, Minnesota Blast Furnace Company, lessee, Rookery Building, Chicago. Furnace at West Duluth, St. Louis county. One stack, 75 x 16, built in 1889–90; three Gordon-Whitwell-Cowper stoves; fuel, coke, made principally at Duluth from Connellsville coal; ore, Mesabi; product, principally Bessemer pig iron; annual capacity, 45,000 gross tons. Brand, "Duluth." Charles Himrod, President; John Crerar, Vice-President; R. Floyd Clinch, Secretary; Kirk Himrod, Treasurer; S. A. Richards, General Manager. Owned by the Duluth Iron and Steel Company.

Number of furnaces in Minnesota: 1 coke stack.

MISSOURI.

COKE.

Jupiter Iron Works, Jupiter Furnace Company, lessee, St. Louis, St. Louis county. One stack, 75 x 20, finished in 1873, blown in for the first time in 1880, and remodeled in 1887; three Gordon-Whitwell-Cowper stoves; fuel, coke; ores, Iron Mountain, Pilot Knob, and about ¼ red hematite; product, Bessemer pig iron; annual capacity, 45,000 gross tons. Brand, "Jupiter." W. O. Garrison, Secretary.

Missouri Furnaces, The Missouri Furnace Company, 204 North Third st., St. Louis. Two stacks, built in 1869, blown in in 1870, and remodeled in 1887; one stack, now being enlarged to 76 x 15, and the other, now 56 x 15, to be made the same size in 1894; one Massicks & Crooke and two Gordon-Whitwell-Cowper stoves; fuel, Connellsville coke; ore, Iron Mountain; product, chiefly Bessemer pig iron; total annual capacity, 60,000 gross tons. Brand, "Missouri." One furnace only perated at time. Edwin C. Cushman, President; C. McKinley, Vice-President; Charles A. McNair, Secretary and Treasurer; E. B. Tenny, Superintendent.

Number of coke furnaces in Missouri: 3 stacks.

CHARCOAL.

Midland Furnace, Midland Blast Furnace Company, 411 Olive st., St. Louis. Furnace at Midland, Crawford county. One stack, 50 x 10, built in 1874–5, and blown in April 10, 1875; rebuilt in 1877; either cold or hot blast; ores, red and brown hematite; product, pig iron for steel purposes; annual capacity, 16,000 gross tons. Brand, "Midland." The furnace stack is wholly built of fire-brick 22½ inches thick. William H. Lee, President; E. A. Hitchcock, Vice-President; T. F. Turner, Secretary; B. B. Reagan, Superintendent.

Sligo Furnace Company, Sligo, Dent county. Branch office, 411 Olive st., St. Louis. One stack, 55 x 11, built in 1880, and rebuilt in 1891; warm or hot blast; ores, blue specular and red oxide, mined near the furnace; product, Bessemer, foundry, and mill pig iron; annual capacity, 17,000 gross tons. Brand, "Sligo." H. A. Crawford, President and Treasurer, St. Louis; E. L. Foote, Vice-President, Secretary, and Superintendent, Sligo.

Number of charcoal furnaces in Missouri: 2 stacks. Total number of furnaces in Missouri: 5 stacks.

COLORADO.

COKE.

Colorado Fuel and Iron Company, Pueblo, Pueblo county. Principal office, Boston Building, Denver; New York office, 18 Broadway; Chicago office, Rookery Building. Three stacks: one, 75 x 17, built in 1880–1, blown in September 7, 1881, and rebuilt and modernized in 1893; one, 75 x 18, completed in 1887, and rebuilt and modernized in 1893; and one, 75 x 17, built in 1890–1; ten Siemens-Cowper-Cochrane stoves; fuel, coke, produced at the company's coke ovens at Crested Butte, Sopris, and El Moro; ores, native magnetite and hematite; product, Bessemer, foundry, Scotch, and mill pig iron, and spiegeleisen; total annual capacity, 160,000 gross tons. *See Rolling Mills and Steel Works.*

Number of furnaces in Colorado: 3 coke stacks.

OREGON.

CHARCOAL.

Oswego Furnace, Oregon Iron and Steel Company, Oswego, Clackamas county. Main office and telegraph address, 106 Third st., Portland. One stack, 60 x 13, built in 1888, and first blown in in October, 1888; three Whitwell stoves; iron shell; fuel, charcoal, made exclusively from fir; ore, 35 per cent. brown hematite, worked part raw and part roasted, using a Davis & Colby kiln; product, No. 1 foundry pig iron; annual capacity, 15,000 gross tons. Brand, "Oregon." Theo. B. Wilcox, President; Martin Winch, Vice-President; J. Frank Watson, Secretary and General Superintendent; A. Evans, Jr., Furnace Superintendent. California selling agents, Falk & Saeger, San Francisco. The company owns and operates a cast-iron pipe foundry at Oswego.

Number of furnaces in Oregon: 1 charcoal stack.

WASHINGTON.

CHARCOAL.

Irondale Furnace, Puget Sound Iron Company, Irondale, Jefferson county. Main office, 328 Montgomery st., San Francisco, Cal. One stack, 50 x 10, built in 1880–1, and blown in January 27, 1881; rebuilt in 1882–3, and remodeled in 1884; iron stove; closed top, with patent bell and hopper; fuel, charcoal, made in 20 kilns, each of 75 cords' capacity; ores, bog and magnetic, mined in Jefferson county and on Texada Island, British Columbia; product, No. 1 foundry pig iron; annual capacity, 10,000 gross tons. Brand, "Texada." George W. Prescott, President; John F. Merrill, Vice-President; A. Halsey, Secretary and Treasurer. Idle since 1889.

Number of furnaces in Washington: 1 charcoal stack.

PROJECTED.

Great Western Iron and Steel Company, Room 8, Rangstaff Building, Seattle, King county. Contemplates erecting at Kirkland one coke stack, 75 x 17, to be equipped with three Ford & Moncur stoves. Peter Kirk, President; Jacob Furth, Treasurer; W. W. Williams, Secretary.

UNITED STATES.

Total number of furnaces in the United States on January 1, 1894, which were then active or might readily be put in blast: 519 stacks. Of these 118 use charcoal as fuel, 142 use anthracite coal or mixed anthracite coal and coke, and 259 use coke or raw bituminous coal. In addition there were 14 furnaces which were projected, some of which were partly built and work on them temporarily suspended.

FURNACES RECENTLY ABANDONED OR LIKELY TO BE LONG INACTIVE.

NOTE.—Some of the furnaces named in this list are supplied with fair machinery, and circumstances may at some time favor their revival. When companies or individuals are mentioned it is understood that they were the owners at the time the furnaces were first placed in this list. A list of furnaces which have been abandoned for many years will be found in the edition of the Directory for 1892.

MAINE.

CHARCOAL.

Katahdin Furnace, Katahdin Charcoal Iron Company, Bangor. Furnace at Katahdin Iron Works P. O., Piscataquis county. One stack, 50 x 11, built in 1846, rebuilt in 1874, burned in 1883, and rebuilt in 1885; abandoned in 1890, and dismantled in 1892. Machinery used in building a new furnace at Bridgeville, near New Glasgow, Nova Scotia.

CONNECTICUT.

CHARCOAL.

Canaan Furnace, Barnum Richardson Company, Lime Rock, Litchfield county. Main office at Lime Rock. Furnace at East Canaan, Litchfield county. One stack, No. 2, 32 x 9, built in 1847; likely to be long inactive.

Hunts Lyman Iron Company, Huntsville, Litchfield county. Telegraph address, Falls Village. One stack, 32 x 9, built in 1847; abandoned in 1893.

NEW YORK.

ANTHRACITE AND MIXED ANTHRACITE AND COKE.

Cold Spring Furnace, Cold Spring, Putnam county. One stack, 60 x 15¾, built in 1863; abandoned in 1893.

Dutchess Furnace, Clove Valley P. O., Dutchess county. One stack, built in 1873 for charcoal and enlarged and changed to anthracite in 1877; dismantled in 1890.

Peekskill Furnace, Peekskill, Westchester county. One stack, 60 x 16, built in 1853, rebuilt in 1874, and refitted in 1880–1; dismantled in 1893.

Port Henry Furnaces, Port Henry Furnace Company, Port Henry, Essex county. Two stacks, situated on the banks of Lake Champlain, each 66 x 16, built in 1853 and 1861, and rebuilt in 1868, 1871, and 1887; likely to be long inactive.

Sterling Iron and Railway Company, 51 Wall st., New York. Furnaces in Orange county. Two stacks: Southfield, 45 x 13, built as a charcoal furnace in 1806, converted to anthracite in 1868; and Sterling, 42 x 14, built as a charcoal furnace in 1848, converted to anthracite in 1866; both likely to be long inactive.

COKE.

Onondaga Iron Company, Syracuse. Works at Geddes, Onondaga county. Two stacks, each 65 x 15½; No. 1, built in 1869–70, blown in June 17, 1870; No. 2, built in 1872, blown in November 14, 1872; abandoned in 1893.

CHARCOAL.

Black River Iron and Chemical Company, Port Leyden, Lewis county. Office, Syracuse. Two stacks, Gracie and Fannie, 50 x 9½ and 50 x 10½, respectively, built in 1864, rebuilt in 1880, and burned and rebuilt in 1881; abandoned in 1893.

Clove Spring Furnace, Clove Valley P. O., Dutchess county. One stack, built in 1830; dismantled in 1890.

Wassaic Furnace, Estate of Noah Gridley, Miles K. Lewis, Receiver, Wassaic, Dutchess county. One stack, 32 x 9½, built in 1826, and rebuilt in 1863; abandoned.

NEW JERSEY.

ANTHRACITE AND MIXED ANTHRACITE AND COKE.

Boonton Furnaces, Boonton, Morris county. Two stacks, built in 1848 and 1868, respectively; torn down in 1890. Fuel, anthracite coal.

Chester Furnace, Chester, Morris county. One stack, built in 1878; torn down in 1891. Fuel, anthracite coal and coke.

Ringwood Furnaces, Cooper & Hewitt, Hewitt, Passaic county. Two stacks: one, 48 x 13, altered from charcoal to anthracite in 1872, and abandoned in 1893; and one unfinished stack, 65 x 16.

PENNSYLVANIA.

ANTHRACITE AND MIXED ANTHRACITE AND COKE.

Bethlehem Iron Company, South Bethlehem, Northampton county. One stack, No. 3 Furnace, built in 1868; abandoned.

Cameron Furnace, Cameron Furnace Company, Middletown, Dauphin county. One stack, 47½ x 13½, first put in blast December 26, 1853, and rebuilt in 1856; dismantled in 1892.

Carbon Iron Works, Carbon Iron and Steel Company Limited, Mauch Chunk, Carbon county. Works at Parryville, in the same county. One stack, 52 x 13, built in 1855; dismantled in 1893.

Chulasky Furnace, B. R. Gearhart, Chulasky, Northumberland county. One stack, 42 x 14, built in 1846; abandoned in 1893.

Columbia Furnace, Grove Brothers, Danville, Montour county. One stack, 39 x 14, built in 1840; abandoned.

Conewago Furnace, Conewago Iron Company, Middletown, Dauphin county. Formerly called Middletown Furnace. One stack, 45 x 11, built in 1853, and rebuilt in 1879; likely to be long inactive.

Coplay Iron Company, Coplay, Lehigh county. One stack, 48 x 14, built in 1853; abandoned in 1892.

Cordelia Furnace, Cordelia Iron Company, Cordelia, Lancaster county. One stack, 50 x 13, built in 1848, and rebuilt in 1859; dismantled.

Crane Iron Company, Catasauqua, Lehigh county. One stack, 55 x 18, torn down in 1890.

Donaghmore Furnace, Cornwall, Lebanon county. One stack, built in 1855; abandoned in 1891; dismantled in 1894.

East Penn Furnaces, Lyons Station, Berks county. Two stacks, built in 1874–5; dismantled in 1890.

Edge Hill Furnace, Edge Hill Furnace Company, 206 Walnut Place, Philadelphia. Furnace at Edge Hill, Montgomery county. One stack, 65 x 16½, built in 1869–72; first blown in in January, 1872; abandoned in 1893.

Glendon Iron Company, Easton, Northampton county. One stack, No. 4 Furnace, at South Easton, built in 1852; torn down in 1890.

Kutztown Furnace, Kutztown, Berks county. One stack, 55 x 14¾, built in 1875; partly dismantled.

Marietta Furnaces, Marietta, Lancaster county. Two stacks: one, 50 x 12½, built in 1847, and remodeled in 1880; and one, 38 x 12, built in 1849. Idle for a long time.

Marion Furnace, Minersville, Schuylkill county. One stack, first blown in September 5, 1873; dismantled in 1891, and part of machinery used in building a furnace at Covington, Va.

Merion and Elizabeth Furnaces, West Conshohocken, Montgomery county. Two stacks: Merion, 48 x 16, built in 1847, enlarged in 1876, remodeled in 1883, and abandoned in 1891; and Elizabeth, 50 x 16, built in 1872, put in blast October 24, 1872, remodeled in 1883, and abandoned in 1892. Dismantled in 1893.

Moselem Furnace, Sheble & Stelwagon, Moselem, Berks county. One stack, 49 x 12, built in 1823 for charcoal; rebuilt several times, and changed to anthracite; abandoned in 1892.

Mt. Laurel Furnace, Clymer Iron Company, Temple, Berks county. Furnace at Mt. Laurel. One stack, 50 x 12, built in 1836, rebuilt in 1847, and altered for anthracite in 1873; dismantled in 1892.

Norway Furnace, Philadelphia and Reading Coal and Iron Company, Philadelphia. Furnace at Bechtelsville, Berks county. One stack, 58½ x 15½, built in 1875; likely to be long inactive.

Philadelphia Furnace, Beach and Vienna sts., Philadelphia. One stack, built in 1873; dismantled in 1890.

Port Carbon Furnace, Philadelphia and Reading Coal and Iron Company, Philadelphia. Furnace at Port Carbon, Schuylkill county. One stack, 65 x 15, first put in blast in September, 1872; rebuilt in 1879 and 1881; dismantled in 1893.

Richmond Furnace, Richmond Furnace P. O., Franklin county. One stack, built in 1865, and rebuilt in 1875; part of machinery removed.

Ringgold Furnace, Philadelphia and Reading Coal and Iron Company, Philadelphia. Furnace at New Ringgold, Schuylkill county. One stack, 52 x 13, first blown in February 28, 1874; abandoned in 1893.

St. Charles Furnace No. 2, Columbia, Lancaster county; formerly known as the Henry Clay. One stack, built in 1845; abandoned in 1889.

Union Furnace, Beaver, Marsh & Co., Winfield, Union county. One stack, 50 x 15, built in 1854; abandoned in 1891.

BITUMINOUS COAL AND COKE.

Blair Iron and Coal Company, Hollidaysburg, Blair county. General office, 218 South Fourth st., Philadelphia. One stack, No. 2, 51 x 10½, built in 1856; dismantled in 1892.

Fairchance Furnaces, Fairchance Furnace Company, Fairchance, Fayette county. Office, 111 Broadway, New York. Two stacks: one, 44 x 12, built in 1804, rebuilt in 1871, and dismantled in 1887; and one, 61 x 12½, built in 1887, and dismantled in 1893.

Keel Ridge Furnace, Sharon, Mercer county. One stack, built in 1869; dismantled in 1891.

Lucy Furnace, G. W. R. Swoope and Owen J. Cassady, owners, Newton Hamilton, Mifflin county. Furnace at Mount Union, Huntingdon county. One stack, 42½ x 10, built in 1837, rebuilt in 1869, and remodeled in 1887; likely to be long inactive.

Oliphant Furnace, Fayette Coke and Furnace Company, Oliphant Furnace P. O., Fayette county. One stack, built in 1875–6, and rebuilt in 1886; dismantled in 1891.

Red Bank Furnace, David & John D. Reynolds, Red Bank Furnace P. O., Clarion county. One stack, 45 x 12, built in 1859; abandoned in 1893.

CHARCOAL.

Carrick Furnace, H. M. North, Columbia. Furnace at Metal, Franklin county. One stack, 37 x 9, built in 1828, and remodeled in 1880; likely to be long inactive.

Hopewell Furnace, Edward S. Buckley, 209 South Third st., Philadelphia. Furnace near Monocacy, Berks county. One stack, 30 x 7, built in 1759, and rebuilt in 1800; idle since 1884.

MARYLAND.

BITUMINOUS COAL AND COKE.

Antietam Iron Works, near Sharpsburgh, Washington county. One stack, built in 1845; idle since 1883, and dismantled in 1891. This was the third stack built on this site; the first one was built about 1775.

MIXED ANTHRACITE AND COKE.

Ashland Furnaces, Ashland, Baltimore county. Three stacks: Nos. 1 and 2, each 32 x 12, built in 1844; No. 3, 53 x 15, built in 1870. Owned by the Ashland Iron Company, Baltimore. Dismantled in 1893.

CHARCOAL.

Catoctin Mountain Iron Company, Catoctin Furnace P. O., Frederick county. One stack, built in 1775; torn down in 1890.

Laurel Furnace, Locust Point, Baltimore. One stack, built in 1846, and rebuilt in 1856, 1873, and 1882; torn down in 1890.

Maryland Furnaces, H. William Ellicott & Sons, Jackson and West sts., Baltimore. Two stacks, 48 x 11 and 49 x 10, built in 1853 and 1870, and rebuilt in 1872 and 1873; dismantled in 1893.

VIRGINIA.

CHARCOAL.

Cave Hill Furnace, Wytheville, Wythe county. One stack, 47 x 10, built in 1881-2. Owned by S. R. Sayers, Robert Sayers, and George W. Palmer.

Columbia Furnace, Columbia Furnace P. O., Shenandoah county. One stack, built in 1809, and rebuilt in 1829; torn down in 1890.

Dora Furnace Company, Pulaski City. Four stacks on Cripple creek, in Wythe county: Beverly Furnace, 33 x 9, built in 1880; Eagle Furnace, 34 x 9, built in 1863, rebuilt in 1881; Raven Cliff Furnace, 29 x 9, built in 1810, rebuilt in 1876; Speedwell Furnace, 32 x 9, built in 1873-4. All likely to be long inactive.

Liberty Furnace, Liberty Furnace P. O., Shenandoah county. One stack, built in 1821; torn down in 1890 to make room for a new stack.

Norma Furnace, Clinch Valley Coal and Iron Company, 134 South Fourth st., Philadelphia. Furnace on Cripple creek, Wythe county. One stack, 41 x 13, built in 1880, and blown in March 1, 1882; likely to be long inactive.

Salisbury Furnace, Salisbury Iron Manufacturing Company, Salisbury Furnace P. O., Botetourt county. One stack, 32 x 10, built in 1869. Eugene Kelly, owner, 45 Exchange Place, New York. Idle since 1883.

Sinking Creek Iron Works, J. Wilcox Brown, Newport, Giles county;

telegraph address, Christiansburg Depot. One stack, 35 x 9½, built in 1873; idle since 1882.

Walton Furnace, Walton Furnace P. O., Wythe county. One stack, 33 x 8½, built in 1872. Machinery which belonged to the Lobdell Car Wheel Company removed in 1890. Stack and furnace property for sale. Jerome Blair, owner, Walton Furnace.

Wythe Furnace, in Wythe county, 25 x 8, built in 1819, and rebuilt in 1873.

WEST VIRGINIA.

BITUMINOUS COAL OR COKE.

Bettie Furnace, Black Band Iron and Coal Company, Spring Hill, Kanawha county. One stack, 50 x 10½, built in 1882-3; not in blast since 1886.

Quinnimont Furnace, Quinnimont Coal and Iron Company, Quinnimont, Fayette county. Office, 240 South Third st., Philadelphia. One stack, 60 x 16, built in 1874; idle since 1884.

KENTUCKY.

COKE.

Licking Furnace, Newport Rolling Mill Company, Newport, Campbell county. One stack, 65 x 16, built in 1859, and enlarged in 1869; abandoned and dismantled in 1892.

CHARCOAL.

Cumberland Gap Iron Company, Middlesborough, Bell county. Began building a stack in 1890, to be 60 x 14; work suspended in that year; nothing done since. O. W. Davis, Jr., President and Manager.

Estill Furnace, Red River Iron Works, Estill county. One stack, built in 1831; abandoned and dismantled.

Hunnewell Furnace, Hunnewell, Greenup county. One stack, built in 1852, and rebuilt in 1870; dismantled in 1890.

TENNESSEE.

COKE.

Rockwood Furnace, Roane Iron Company, Rockwood, Roane county. Main office at Chattanooga. One stack, 65 x 15, built in 1869; dismantled in 1893.

Southern (The) Iron Company, Nashville, Davidson county. Nashville Furnaces, at West Nashville, same county. Two stacks, each 60 x 12, built in 1887-8; fuel, sometimes coke sometimes charcoal; dismantled in 1892, and machinery utilized by the company in erecting two charcoal furnaces at Mannie, Wayne county.

CHARCOAL.

Cumberland Furnace, The Southern Iron Company, Nashville. Furnace at Cumberland Furnace P. O., Dickson county. One stack, 37 x 9½, built in 1825; dismantled in 1892.

Speedwell Furnace, Knoxville Car Wheel Company, Knoxville. Furnace at Stony Creek, Carter county. One stack, 41 x 9, built in 1880.

NORTH CAROLINA.

CHARCOAL.

Rehoboth Furnace, J. E. Reinhardt, Iron Station, Lincoln county. One stack, 38 x 9½, built in 1810; idle since 1883. For sale.

Stonewall Furnace, in Lincoln county. Built during the civil war.

Vesuvius Furnace, in Lincoln county. Built in 1780; in operation down to 1873.

GEORGIA.

CHARCOAL.

Hermitage Furnace, Ridge Valley Iron Company, Hermitage, Floyd county. Located 8 miles north of Rome. One stack, 60 x 10, built in 1874; idle since 1884.

ALABAMA.

CHARCOAL.

Jenifer Furnace, Jenifer Iron Company, Jenifer, Talladega county. One stack, 55 x 10, built in 1863, and remodeled in 1884; dismantled in 1892.

Woodstock Furnace, Woodstock Iron Company, Anniston, Calhoun county. One stack, No. 2, first blown in August 27, 1879; partly destroyed by fire in 1891.

OHIO.

CHARCOAL.

Buckeye Furnace, Superior Coal Company, Jackson. Furnace at Riverton, Jackson county. One stack, 40 x 10, built in 1851; partly dismantled.

Hecla Furnace, Ironton, Lawrence county. One stone stack, built in 1833; replaced by an iron stack in 1887-90.

Scioto Furnace, Crawford & Leonard, Scioto Furnace, Scioto county. One stack, 32 x 10¾, built in 1826, and rebuilt in 1844; likely to be long inactive.

BITUMINOUS COAL OR COKE.

Cherry Valley Iron Works, Leetonia, Columbiana county. One stack, built in 1867; torn down in 1890.

Eliza Furnace, Wellston, Jackson county. Built in 1877 with material

from the abandoned Ophir Furnace; rebuilt in 1881, and remodeled in 1884; dismantled in 1891.

Falcon Furnace, The Brown Bonnell Iron Company, Youngstown, Mahoning county. One stack, 55 x 12⅞, built about 1850; abandoned in 1893.

Fannie Furnaces, Shawnee, Perry county. Two stacks: No. 1, 47 x 11⅝, built in 1874–5 at Newark, removed to Shawnee in 1876, and blown in September 15, 1876; No. 2, 65 x 15, first put in blast October 10, 1877; extensive improvements made in 1884 and 1886; dismantled in 1892, and machinery utilized in erecting Eagle Furnace, at Spring Valley, Wisconsin.

Gore Furnace, Gore, Hocking county. Built in 1876; dismantled in 1889.

Himrod Furnaces, Youngstown, Mahoning county. Three stacks: one, 70 x 15, and one, 70 x 16, built in 1859 and 1860, and rebuilt in 1876, abandoned in 1893; and one, 48 x 13, built in 1868, dismantled in 1887.

Jefferson Iron Works, Steubenville, Jefferson county. One stack, built in 1863, and rebuilt in 1877 and 1886; torn down in 1890.

Proton Furnace, Cleveland Iron Company, Cleveland, Cuyahoga county. One stack, built in 1869, and rebuilt in 1878; torn down in 1889.

ILLINOIS.

COKE.

Big Muddy Furnace, Grand Tower, Jackson county. Owners, Solon Humphreys and Amos Cotting, New York, and John W. Harrison, St. Louis. One stack, 69 x 17, built in 1871; likely to be long inactive.

Meier Furnaces, Meier Iron Company, Bessemer Station, near East Carondelet, St. Clair county. Two stacks, built in 1873–5; dismantled in 1890, and machinery removed to Big Stone Gap, Va.

MICHIGAN.

MIXED ANTHRACITE AND BITUMINOUS COAL.

Grace Furnace, Travers Iron Company, Chicago. Furnace at Marquette. One stack, 63 x 17, built in 1872; fuel, when last in blast, mixed anthracite and bituminous coal. Idle for many years.

CHARCOAL.

Bangor Furnace, Bangor, Van Buren county. First blown in October 29, 1872; dismantled in 1891.

Eureka Furnace, Eureka Iron and Steel Works, Wyandotte, Wayne county. One stack, 45 x 9, built in 1863; formerly known as Ward Furnace; abandoned.

Fayette Furnaces, Jackson Iron Company, Cleveland, Ohio. Furnaces

at Fayette, Delta county. Two stacks, built in 1867 and 1869, and rebuilt in 1881; dismantled in 1891.

Frankfort Furnaces, South Frankfort, Benzie county. Two stacks, built in 1870 and 1873; idle since 1885, and abandoned.

Gogebic Furnace, Iron River, Iron county. One stack, 56 x 11, built in 1885. Owner, E. D. Reis, New Castle, Pa. Idle since 1888.

Iron Star Furnace, Leland Lumber Company, Leland, Leelenaw county. One stack, 48 x 10, rebuilt in 1872; abandoned in 1892.

Lake Huron Furnace, Lake Huron Iron Company, Caseville, Huron county. One stack, 54 x 9½, built in 1873; dismantled in 1893.

Menominee Furnace, Menominee, Menominee county. Built in 1872–3; idle since 1884, and abandoned.

WISCONSIN.

CHARCOAL.

Minneapolis Furnace, York Iron Company, Black River Falls P. O., Jackson county. One stack, 55 x 11, built in 1885–6, and blown in in August, 1886; dismantled in 1892, and machinery utilized by the York Iron Company in the partly-erected furnace at West Superior.

MISSOURI.

COKE.

St. Louis Ore and Steel Company, E. A. Hitchcock, Receiver, Granite Building, St. Louis. Three stacks at South St. Louis, St. Louis county; formerly called Vulcan Iron Works. Two stacks, each 63 x 16, built in 1869, and one, 75 x 18, built in 1872, and rebuilt in 1886; dismantled.

CHARCOAL.

Pilot Knob Furnace, St. Louis Ore and Steel Company, E. A. Hitchcock, Receiver, Granite Building, St. Louis. Furnace at Pilot Knob, Iron county. One stack, 60 x 11, built in 1848; remodeled in 1879; dismantled in 1893.

OREGON.

CHARCOAL.

Oswego Furnace, Oswego, Clackamas county. One stack, built in 1866–7, and rebuilt in 1879; abandoned in 1888 for a new stack.

CALIFORNIA.

CHARCOAL.

California Furnace, Hotaling, Placer county. One stack, built in 1879–80; burned in September, 1882, and rebuilt in 1883; out of blast since 1886, and not likely to run again.

ROLLING MILLS AND STEEL WORKS.

NOTE.—The rolling mills and steel works named in the following list are either in operation or standing idle with machinery in good condition. The telegraph address is given only when it is not the same as the post-office address. A list of rolling mills and steel works which have been recently abandoned will be found separately printed at the end of this list.

MAINE.

Portland Rolling Mill, P. O. Box 1,386, Portland, Cumberland county. Built in 1866; 4 double puddling furnaces, one Siemens and 4 coal heating furnaces, and 3 trains of rolls (one 10 and two 18-inch); product, merchant bar iron, railroad spikes, angle and plain fish-plates, and angle and bridge iron; annual capacity, 12,000 gross tons. Brands, "Standard," "Extra," "Refined," "Special," and "Forest City." C. R. Milliken, President; John W. Leavitt, Secretary and Treasurer; Samuel Peters, Superintendent.

Number of rolling mills in Maine: 1.

NEW HAMPSHIRE.

Nashua Iron and Steel Company, Nashua, Hillsborough county. Built in 1848; steel-tire mill added in 1867; 20 heating furnaces, one 10-gross-ton 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, steel locomotive and car-wheel tires, bar steel, and bar iron. Brand, an Indian head. Aretas Blood, President and Treasurer, Manchester.

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

MASSACHUSETTS.

Bridgewater Iron Company, Bridgewater, Plymouth county. Built in 1785 and 1874; 5 scrap furnaces, 10 heating furnaces, one air and 2 cupola furnaces, and 7 trains of rolls; steam and water power; product, bar iron, tack plate, yellow metal sheathing, and all kinds of castings; annual production of rolled iron, about 5,500 gross tons.

Trustees, John E. Sanford, Luke P. Willard, and Arthur E. Denison. John M. Stetson, General Manager.

Danvers Iron Works, Sylvester & Co., 8 Oliver st., Boston. Works at Danversport, Essex county. Built in 1831; burned and rebuilt in 1883; 3 heating furnaces and 2 trains of rolls (one 8 and one 12-inch); product, merchant bar iron, bolt iron, scrap rods, railroad and ship spikes, and rerolled Norway and Swedish shapes; annual capacity, 4,500 gross tons. Brand, "Danvers."

Franconia Iron and Steel Works, George F. Blake, Jr., lessee, Wareham, Plymouth county. Built in 1866; 6 double puddling furnaces, 4 heating furnaces, and 3 trains of rolls (one 8, one 16, and one 18-inch); product, bar iron of all kinds and sizes; specialties, round, square, and flat iron, angles, ovals, half ovals, half rounds, axle and axe iron, and shafting; daily capacity, 27 gross tons. Owned by the Estate of James C. Warr.

General Electric Company, Steel Foundry Department, 42 Centre st., Lynn. General office, Schenectady, N. Y. Two 15-gross-ton open-hearth steel furnaces erected in 1892, and first steel made March 4, 1893; product, steel castings; annual capacity, 4,000 gross tons. G. E. Emmons, General Manager, and W. P. Darling, Manager, Steel Foundry Department Lynn Works.

Kinsley Iron and Machine Works, Kinsley Iron and Machine Company, Canton, Norfolk county. Established in 1787 by Leonard & Kinsley, who manufactured steel by the German process; stock company formed in 1855; 3 double puddling and 5 heating furnaces, 2 busheling and 2 scrap furnaces, 9 hammers, and 3 trains of rolls (one 8, one 14, and one 19-inch); steam and water power; product, merchant bar iron, shapes, splice bars, track bolts, building rods, bolts, hangers, wagon axles, and steam and street railroad supplies; annual capacity, single turn, 5,500 gross tons. Brands of bar iron, "Kinsley" and "G. K." A forge is connected with the works for the production of wagon axles, etc.; also a foundry and a machine shop. Edw. R. Eager, Treasurer; Frank M. Ames, Agent.

Mount Hope Iron Works, Mount Hope Iron Company, Somerset, Bristol county. Built in 1875; one single and 6 double puddling furnaces, 12 heating furnaces, 100 nail machines, and two 18-inch trains of rolls; product, nails, skelp iron, tack and shovel plate, etc.; annual capacity, 8,000 gross tons. Brand, "Mount Hope Iron Works." Job M. Leonard, Treasurer; Henry B. Leonard, Agent. Selling agents, F. P. Thayer, 141 Milk st., Boston; Carl Seelig, 52 South Water st., Providence, Rhode Island.

New England Steel Works, Worcester, Worcester county. Built in 1857, and remodeled in 1882; one 10-gross-ton and one 4-gross-ton open-hearth steel furnace, the latter erected in 1893; first open-hearth steel made March 25, 1885; merchant mill added in 1888; one 20-inch

train of rolls; product, steel castings. (Works were formerly called Worcester Steel Works, and were equipped with two 4-gross-ton Bessemer converters, Siemens heating furnaces, and trains of rolls for the manufacture of steel rails, wire billets, merchant steel, etc.; a considerable portion of this equipment, however, has lately been sold to various parties.) M. J. P. McCafferty, Agent.

Robinson Iron Company, Plymouth, Plymouth county. Built about 1800; 6 heating furnaces, 2 trains of rolls, and 18 nail machines; steam and water power; product, nails and tack plate; average yearly production, 2,700 gross tons. Increase Robinson, President; James Millar, Treasurer.

Tremont Nail Works, Tremont Nail Company, West Wareham, Plymouth county. Built about 1820, and rebuilt in 1846; Clapp-Griffiths steel plant, added in 1887, has one 3-ton converter and first made steel in December, 1887; one 20-gross-ton open hearth steel furnace, with producers, erected in 1893, and first steel made June 8, 1893; 3 blooming furnaces, 4 heating furnaces, and 4 trains of rolls, (one 24-inch blooming, one 24-inch finishing, one 18-inch nail plate, and one 17-inch tack,) and 173 nail machines; steam and water power; annual capacity, 30,000 gross tons of steel ingots, with mill facilities for finishing them, and 250,000 kegs of cut nails. Also owns and operates the nail department of the Parker Mills, at Wareham, the nail machines being included above. Brands, "Percha plates" and "Percha nails." Horace P. Tobey, Treasurer. Goods sold at factory and at company's store in Boston.

United States Navy Yard, Charlestown, Suffolk county. Mill built in 1868; 7 forge fires, 6 heating furnaces, and 2 trains of rolls (one 10 and one 18-inch); product, bar iron for chain cables, etc. Fuel used, bituminous coal.

Washburn and Moen Manufacturing Company, Worcester, Worcester county. Two mills: Quinsigamond, or South Works: rolling mill built in 1846; 13 heating furnaces and 8 trains of rolls; product, iron and steel wire rods and wire. One 12-gross-ton open-hearth furnace built in 1885, and first steel made September 26, 1885; one 20-gross-ton open-hearth furnace added in 1890. Grove Mill, or North Works, built in 1868; 2 heating furnaces and one train of rolls; product, wire rods for all kinds of wire. Total annual capacity of both works, 90,000 gross tons. The company also manufactures springs of all kinds, and operates galvanizing, barb wire, wire rope, and insulated wire and cable plants; also a plant for refining copper. Wm. E. Rice, President; Philip W. Moen, Treasurer and General Manager. Warehouses: 16 Cliff st., New York; 36 South Seventh st., Philadelphia; Scranton, Pa.; 26 Seventh ave., Pittsburgh; 107 Lake st., Chicago; 8-10 Pine st., San Francisco; 1015 Franklin ave., Houston, Texas. *See Rolling Mills in Illinois.*

Washburn Car-Wheel Company, Hartford, Conn. Steel works at Worcester, erected in 1864; sixteen 4-pot steel furnaces, 3 heating furnaces, one train of tire rolls, and one hammer; product, crucible steel car-wheel tires used by the company at its works at Hartford; annual capacity, 1,000 gross tons. William M. Barnum, President; Salisbury Hyde, Vice-President and Treasurer; Alfred W. Dodd, Secretary.

Number of rolling mills and steel works in Massachusetts: 13. Of these 1 makes Clapp-Griffiths steel, 4 make open-hearth steel, and 1 makes crucible steel.

RHODE ISLAND.

Rhode Island Horse Shoe Works, Rhode Island Perkins Horse Shoe Company, Providence. Works at Valley Falls, 6 miles from Providence. Built in 1867, and rebuilt in 1874; burned January 7, 1887, and rebuilt and running in full June 1, 1887; 7 scrap and 7 heating furnaces, 10 trains of rolls, (seven 8 and three 18-inch,) and 28 horse-shoe machines; product, bars for the horse-shoe machines, and toe calks; annual capacity, single turn, 18,000 gross tons. Brands, "Perkins' United States Standard Horse and Mule Shoes," "Perkins' XL Steel Shoes," "Perkins' New Toe-weight Shoe," "Perkins' New Side-weight Shoe," "Perkins' Cow-boy Shoe," etc., and "Perkins Patent Toe Calks." F. W. Carpenter, President; C. H. Perkins, General Manager; R. W. Comstock, Secretary; Charles R. Stark, Treasurer.

Number of rolling mills in Rhode Island: 1.

CONNECTICUT.

Aetna Nut Company, Southington, Hartford county. Built in 1872-3; 2 single puddling furnaces, 4 scrap and busheling furnaces, 3 heating furnaces, and 3 trains of rolls; product, squares, rounds, nut shapes, bolt rods, butt iron, and nuts; annual capacity, 3,000 gross tons. H. H. Clark, President; Benjamin S. Porter, Secretary; George B. Finch, Treasurer.

Collins Company, Collinsville, Hartford county. Established in 1826; 2 scrap furnaces, 8 heating furnaces, one 12-inch and one 18-inch train of rolls, 2 hammers, two 20-ton steel cementing furnaces, and thirty 2-pot steel-melting holes; 180 pots can be used at each turn; steam and water power; product, bar iron and cast steel, consumed wholly in these works in the production of "Collins" edge tools, steel plows, etc.; annual capacity of finished iron, 2,250 gross tons; of steel, 675 gross tons. Edward H. Sears, President; Meigs H. Whaples, Secretary and Treasurer; William Hill, Agent. Treasurer's and transfer office, Hartford. General selling agents, Collins & Co., 212 Water st., New York.

Farist (The) Steel Company, Bridgeport, Fairfield county. Built in 1868; enlarged since; 2 single puddling and 4 heating furnaces, 2 trains of rolls, (12 and 15-inch,) 6 hammers, and one 24-pot Siemens gas steel-melting furnace; product, crucible steel, rolled and hammered; also rerolls and hammers open-hearth steel; annual capacity, 3,500 gross tons. Added in 1883 a spring shop for the manufacture of spiral springs and elliptic railroad springs. Brand, "The Farist Steel Co." Joel Farist, President; George Windsor, Secretary and Treasurer. Selling agents, John S. Brewer, Chicago; J. H. Wyeth, St. Louis.

New Haven Rolling Mill, New Haven Rolling Mill Company, New Haven, New Haven county. Completed in August, 1871; 4 charcoal forge fires, 9 heating furnaces, 4 trains of rolls, (one 8, one 10, one 16, and one 18-inch,) and one hammer; uses scrap iron and rerolls steel billets; product, bars, small nut and bolt rods, and refined and charcoal wire rods; annual capacity, 10,000 gross tons. Brand, "N. H." Pierce N. Welch, President and Treasurer; E. S. Wheeler, Secretary; C. S. Poronto, Superintendent; Frank E. Williams, Agent.

Thames Iron Works, Norwich, New London county. Built in 1863; 4 double puddling furnaces, 2 heating furnaces, and 2 trains of rolls (10 and 18-inch); product, merchant bar iron and spike rods; annual capacity, 4,000 gross tons. John Mitchell, President; Albert G. Mitchell, Secretary and Treasurer; Charles Mitchell, Superintendent.

Wilmot (The) and Hobbs Manufacturing Company, (Hot Rolling Mill Department,) Bridgeport, Fairfield county. Built in 1887; product, hoop, band, and plate and sheet steel; annual capacity, 30,000 gross tons. Brand, "Swedoh." (Formerly operated by The Stanley Works.) S. R. Wilmot, President; F. A. Wilmot, Secretary; Willis F. Hobbs, Treasurer.

Windsor Locks (The) Steel Company, E. N. Sperry, Receiver, Bridgeport. Works at Windsor Locks, Hartford county. Built in 1860; 2 Stubblebine heating furnaces, 3 trains of rolls, (one 10, one 12, and one 16-inch,) and ten 4-pot steel-melting holes; steam and water power; product, merchant steel, tack plate, and tool and die steel; annual capacity, 5,500 gross tons. For sale.

Number of rolling mills and steel works in Connecticut: 7. Of these 3 make crucible steel and 1 makes blister steel.

NEW YORK.

Auburn Iron Works, C. W. Tuttle & Co., Auburn, Cayuga county. Built in 1853; 2 heating furnaces, one 10-inch train of rolls, and one hammer; use scrap iron only; product, merchant bar and horse-shoe iron; annual capacity, 2,300 gross tons. Brand, "Auburn."

Buffalo Steel Foundry, Pratt & Letchworth, Buffalo, Erie county. Two open-hearth steel furnaces, used in connection with the firm's business for the production of castings.

Burden Iron Works, The Burden Iron Company, Troy, Rensselaer county. Founded in 1813; 35 double and 30 single puddling furnaces, 15 heating furnaces, and 15 trains of rolls (nine 9-inch, one 14-inch, and five 20-inch); steam and water power; product, bar and other merchant iron, horse shoes, and boiler rivets; annual capacity, 45,000 gross tons. Brands of merchant iron, "H. B. & S." and "Burden Best." James A. Burden, President; John L. Arts, General Manager; Nicholas J. Gable, Secretary. *See Furnaces.*

Chrome Steel Works, Kent ave., Hooper, and Keap sts., Brooklyn. Kings county. Built in 1869; 7 heating furnaces, 7 hammers, nine 6-pot steel-melting holes, and 2 trains of rolls (one 12 and one 18-inch); 54 pots can be used at each heat in the steel works; product, tool steel and burglar-proof welded chrome steel and iron, 5-ply, for safes, jails, etc.; also adamantine shoes and dies for crusher stamp mills and crucible chrome steel castings; annual capacity, 2,300 gross tons. Brand, "Chrome." S. H. Kohn, President; C. P. Haughian, Vice-President; J. G. Dunscomb, Secretary.

Cohoes Rolling Mill, Morrison, Colwell & Page, 253 River st., Troy. Works at Cohoes, Albany county. Built in 1864; burned and rebuilt in 1883; 12 double puddling furnaces, 3 scrap and 5 Swindell gas heating furnaces, and 4 trains of rolls; water-power; product, band iron and bar iron; specialty, high-grade iron for edge tools, butts, hinges, and boiler flues; annual capacity, 8,100 gross tons. Brands, "Cohoes Refined" for regular, "Hatchet" for extra refined, and "Adze" for best.

Elmira Rolling Mills, Elmira Iron and Steel Rolling Mill Company, Elmira, Chemung county. Mill originally built as a rail mill in 1860; puddle mill built in 1868; rail mill converted into puddle mill in 1883; 26 single puddling furnaces, one hammer, and two 18-inch trains of rolls. Bar mill erected in 1864; 4 heating furnaces and 4 trains of rolls, (one 9, one 12, and one 18-inch, and one 22-inch for 6 x 4 inch and 6 x 6 inch angles.) Universal mill, built in 1884 to roll plates from 6 to 30 inches wide and of any thickness, has 2 Siemens heating furnaces, 9 x 12 feet, with a daily capacity of 18 gross tons. Annual capacity, 18,000 gross tons of bar, angle, plate, and band iron. James B. Rathbone, President and General Superintendent; Jesse L. Cooley, Secretary and Treasurer. The works are operated under lease by N. D. Doxey and C. J. Root, under the title of N. D. Doxey & Co. Entire plant for sale. *See Furnaces.*

Johnson (Isaac G.) & Co., Spuyten Duyvil, New York City. Crucible steel plant erected in 1880; four 5-pot steel-melting holes; annual capacity, 180 gross tons of crucible steel castings. Open-hearth steel plant erected in 1882; one 8-gross-ton open-hearth steel furnace; annual capacity, 1,800 gross tons of open-hearth steel castings.

Kilmer Manufacturing Company, Newburgh, Orange county. Built in

1890; 2 gas heating furnaces and 4 trains of rolls (9, 10, 12, and 16-inch); product, wire rods, consumed in the works in the manufacture of wire, bale ties, and fencing; annual capacity, 30,000 gross tons. T. S. Kilmer, President; D. S. Waring, Vice-President; E. E. Kilmer, Secretary; M. D. Kilmer, Treasurer; W. A. Kilmer, Superintendent.

Manhattan Rolling Mill, John Leonard, 452 West st., New York City. Built in 1881; 2 heating furnaces and 2 trains of rolls (one 8 and one 18-inch); product, horse-shoe iron and small flats and rods; annual capacity, 1,800 gross tons of horse-shoe iron and 900 gross tons of flats and rods. Brand for horse-shoe iron, a horse-shoe inclosing the letters "J. L."

Monhagen Steel Works, Wheeler, Madden, and Clemson Manufacturing Company, Middletown, Orange county. Operated by the National Saw Company, Newark, New Jersey. Built in 1862-3; 48 two-pot steel-melting holes, 4 heating furnaces, one train of rolls, and one hammer; product, saw steel; annual capacity, 2,500 gross tons. George N. Clemson, President; S. S. Battin, Vice-President; F. B. Earle, Secretary; Robert J. Johnson, Treasurer.

New York City Rolling Mill, John F. Hanley, 362 Avenue A., New York City. Built in 1892 and first put in operation September 1, 1892; 1 double puddling furnace, 2 heating furnaces, and 2 trains of rolls (one 10 and one 18-inch); product, rounds, flats, squares, and horse-shoe bars; annual capacity, 6,000 gross tons.

Onondaga Steel Works, Sweet's Manufacturing Company, Syracuse, Onondaga county. Built in 1863 and enlarged several times; 15 heating furnaces, 6 hammers, (from 200 to 2,000 pounds each,) 8 trains of rolls, (four 9 and four 12-inch,) and 3 steel-cementing furnaces; use Sweet's patent gas furnaces, burning semi-bituminous coal; manipulate old Bessemer steel rails and locomotive tires, and convert iron into blister steel; product, bar steel, steel crow-bars, seat springs, tire and spring steel, and steel for various other purposes; annual capacity, 18,000 gross tons. Special products, "Sweet's Excelsior" tire steel, "Sweet's" seat springs, "Sweet's" steel crow-bars, and "Favorite" toe-calk steel. William A. Sweet, President and Manager; Francis H. Nye, Jr., Secretary; Anson N. Palmer, Treasurer; Peter Eckel, Superintendent; M. Cunningham, Purchasing and Sales Agent.

Osborne (D. M.) & Co., Auburn, Cayuga county. Built in 1881; 5 heating furnaces, 2 trains of rolls, (one 10 and one 16-inch,) and one hammer; use scrap iron and steel billets; product, merchant bar of all sizes and shapes, part of which is used by the firm in the manufacture of agricultural machinery; annual capacity, 7,500 gross tons. T. M. Osborne, President; J. H. Osborne, Secretary; Edwin D. Metcalf, Treasurer.

Phœnix Horse Shoe Company, Poughkeepsie, Dutchess county. New York office, 20 Reade st. Built in 1873; one single puddling furnace, 2 gas and 4 coal heating furnaces, and 5 trains of rolls; specialty, horse shoes; annual capacity, 7,200 gross tons. Charles Miller, President and Manager; Charles H. Holton, Secretary and Treasurer. *See Rolling Mills in Illinois.*

Rome Merchant Iron Mill, Rome, Oneida county. Built in 1869; 8 double puddling furnaces, 5 heating furnaces, and 3 trains of rolls (8, 12, and 18-inch); product, best grades of merchant puddled bar, stay-bolt, plow-bolt, horse-shoe, snow-ball horse-shoe, hexagon and beveled-edge tire, screw, hoop, and band iron; refined iron branded "Rome," and a superior quality branded "J. G.;" annual capacity, double turn, 18,000 gross tons. Jim Stevens, President; S. B. Stevens, Vice-President; Charles W. Lee, Secretary and Treasurer; Samuel Southall, Superintendent.

Sanderson Brothers Steel Company, Syracuse, Onondaga county. Branch house, 11-13 South Jefferson st., Chicago. Established in 1876; 11 heating furnaces, 3 forge fires, 2 annealing furnaces, 2 steel cementing furnaces, 10 hammers, 3 trains of rolls, (9, 10, and 12-inch,) and one 30-pot and four 12-pot Siemens gas melting furnaces; product, hammered and rolled crucible steel of every description, shear steel, and blister steel; specialty, the finest quality of tool steel; annual capacity, 4,500 gross tons. Brand, "Sanderson Bros. & Co." C. H. Halcomb, President and Treasurer; W. F. Belknap, Secretary. Selling agents, Hawkridge Brothers, Boston; D. G. Gautier & Co., New York.

Somerton Tin Plate Works, Somers Brothers, Third st. and Third ave., Brooklyn. Rolling mill built in 1891 as an addition to their tin-box establishment; first put in operation in October, 1892; 6 heating furnaces, 3 annealing furnaces, and 6 trains of rolls for hot rolling and 3 trains for cold rolling; product, iron or steel black sheets for tinplates, from No. 26 to No. 36 gauge; annual capacity, 4,500 gross tons. Fuel used, petroleum. *See Tinplate Works.*

Standard Rolling Mills, M. J. Dempsey, Fortieth st. and Eleventh ave., New York City. Built in 1891; 2 heating furnaces and 2 trains of rolls (10 and 18-inch); product, merchant bar and horse-shoe iron; annual capacity, 6,000 gross tons. Brand, "Standard." William S. Dempsey, Superintendent.

Syracuse Steel Foundry Company, 351 West Fayette st., Syracuse. Works at Geddes, Onondaga county. Built in 1886; open-hearth steel plant added in 1890 and enlarged in 1891; first castings made on November 26, 1890; burned in 1892, and rebuilt and enlarged same year; two 10-ton Siemens furnaces; product, open-hearth steel castings; annual capacity, 3,000 gross tons. (Crucible steel plant, built in 1886, abandoned.) Fred. Frazer, President; George P. Hier,

Vice-President; R. W. Jones, Secretary; George S. Hier, Treasurer. Selling agent, F. Wayland Smith, 26 Cortlandt st., New York.

Troy Steel and Iron Company, Troy, Rensselaer county. New York office, 26 Broadway. Property formerly owned by the Albany and Rensselaer Iron and Steel Company. Albany Iron Works established in 1819; 14 single and 7 double puddling furnaces, 23 heating furnaces, 7 trains of rolls, 4 steam and 2 trip hammers, and 2 bolt, 8 rivet, and 2 nut machines; steam and water power; product, bars, car axles, bands, hoops, finger-bars, crow-bars, fish-plates, bolts and nuts, and boiler rivets; annual capacity, 33,500 gross tons. Brands of iron, "A. I. W.," "Corning's Best Best," and "Troy." Rensselaer Iron Works established in 1846; three-high steel rail mill and merchant mill built in 1866 and 1867; first steel rail rolled in 1866; new merchant mill built in 1877 and 1878; 23 heating furnaces, 5 trains of rolls, and 2 steam and 2 trip hammers; product, steel rails, steel shapes and sheets, and special and agricultural steels; annual capacity of rail mill, 110,000 gross tons; capacity of merchant mill, 22,500 gross tons. Brands of steel, "XX Gun," "XX Special Dead Soft," "XX Gun Barrel," and a variety of other special grades. Bessemer steel works were built in 1864; first blow made February 15, 1865; two 10-gross-ton converters, 4 cupolas, and 2 spiegel cupolas; annual capacity, 270,000 gross tons of ingots; blooming department contains 6 heating furnaces and an adjustable train of 31½-inch rolls; capacity to roll full product of converting department; steam-power. William Kemp and James Keenan, Receivers. *See Furnaces.*

Westerman Rolling Mill, Westerman & Co., Lockport, Niagara county. Built in 1870; 4 heating furnaces and 2 trains of rolls; steam and water power; product, horse-shoe iron, rounds, squares, hexagons, and fancy shapes of all kinds; annual capacity, double turn, 8,000 gross tons. Brand, for horse-shoe iron, "W" inside of a horse shoe.

Wurster (F. W.) & Co., 375 Kent ave., Brooklyn, Kings county. Built in 1890 and put in operation in 1891; 2 heating furnaces and 2 trains of rolls (one 10 and one 18-inch); product, merchant bar iron; annual capacity, single turn, 4,000 gross tons. Brand, "F. W. W. & Co." F. W. Wurster, Manager.

Number of rolling mills and steel works in New York: 23. Of these 1 makes Bessemer steel, 3 make open-hearth steel, 4 make crucible steel, and 2 make blister steel.

PROJECTED.

Gatling Ordnance Company, 14 White Building, Buffalo. Contemplates erecting at Gatling, Erié county, an open-hearth steel plant and other machinery for the manufacture of heavy ordnance, structural steel, car-wheels, etc. Robert C. Wood, President; F. S. Hubbard, Vice-President; V. P. Kinne, Secretary.

NEW JERSEY.

American Sheet Iron Works, American Sheet Iron Company, Phillipsburg, Warren county. Built in 1867; enlarged in 1870, 1873, 1882, and 1892; 3 double puddling furnaces, one heating furnace, 3 sheet-finishing furnaces, one pair furnace, 3 annealing furnaces, 6 trains of 22-inch rolls, and one hammer; product, best qualities of sheet iron and sheet steel; annual capacity, 5,000 gross tons. Brand, "American R. G. cleaned." Joseph C. Kent, President; George Danby, Secretary and Treasurer; William Boofman, Superintendent.

Benjamin (The) Atha and Illingworth Company, Newark. (This company was formed June 1, 1891, by the consolidation of Benjamin Atha & Co. and John Illingworth & Co.) Two works: Newark Steel Works, located at Newark, Essex county, began operations in 1864; two 30-pot Siemens melting furnaces, one 7 and one 15-gross-ton Siemens open-hearth steel furnace, 12 hammers, and 5 trains of rolls, (two 8, one 9, one 12, and one 16-inch.) New Jersey Steel Works, located at Harrison, Hudson county, built in 1888–9, and put in operation in April, 1889; 7 forge fires, 6 heating furnaces, 5 trains of rolls, (8, 9, 12, and 16-inch bar, and one 9-inch rod,) 9 hammers, and one 30-pot crucible steel-melting furnace. Product, tool, die, spring, and cutlery steel, all grades of merchant bar, wire rods in coils, forgings, and steel castings; total annual capacity, 27,000 gross tons. Brands, "Star Special," "Champion," and "Champion Special." Fuel used, coal and petroleum. (The Jersey City Steel Works, at Jersey City, formerly operated by Benjamin Atha & Co., have been abandoned.) Benjamin Atha, President and Treasurer; John Illingworth, Vice-President and Manager; A. C. Denman, Secretary; Robert H. Illingworth, Superintendent.

Boonton Iron Works, Boonton Iron and Steel Company, lessee, Boonton, Morris county. Built originally in 1825 and enlarged since; 9 double puddling furnaces, 3 heating furnaces, and 3 trains of rolls; steam and water power; product, bar iron and angles; annual capacity, 11,000 gross tons. Brand, "Boonton." (Nail department dismantled.) John Barker, President; Charles Brock, Treasurer. Owned by the Estate of J. Couper Lord, Benjamin Nicoll, Secretary, 68 Wall st., New York.

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 90 nail machines; steam and water power; product, nails and gas tubes; annual capacity, 140,000 kegs of cut nails and 2,700 gross tons of gas tubes. Robert J. Buck, President; Chester J. Buck, Vice-President; John M. Reeves, Secretary and Treasurer, 43 North Water st., Philadelphia.

Delaware Rolling Mill, F. P. Howe, Phillipsburg, Warren county. Tele-

graph address, Easton, Pa. Built in 1865; 7 double puddling furnaces, 2 heating furnaces, (2 more partly constructed,) and 3 trains of rolls (one 8-inch guide, one 16-inch puddle, and one 18-inch bar); product, flats, rounds, squares, small angles, and a superior grade of muck bar; specialty, low-phosphorus and low-sulphur muck bar for melting purposes; annual capacity, 9,500 gross tons of muck bar and 18,000 gross tons of finished iron. J. L. Barber, Business Manager. Selling agent, Arthur W. Howe, Drexel Building, Philadelphia.

Dover Iron Works, The Dover Iron Company of New Jersey, Dover, Morris county. Built about 1770 and rebuilt several times; 5 double puddling furnaces, 2 heating furnaces, and 2 trains of rolls (one 10 and one 18-inch); steam and water power; product, bar iron, boiler rivets, socket bolts, and brace jaws; annual capacity, 5,500 gross tons. Brand of merchant bar, "Dover;" brand of rivets, "D." This company also manufactures "Ulster" iron for C. R. Mulligan. George Richards, President; H. W. Crabbe, Secretary and Treasurer.

Harvey Steel Company, Brills Station, Newark, Essex county. New York office, 52 Wall st. Built in 1889; 6 heating furnaces, one 10-inch train of rolls, 3 hammers, (one 700-lb., one 1,000-lb., and one 1,800-lb.,) two 4-pot crucible steel-melting holes for experimental purposes, and 14 treating furnaces. Treats armor plate and other iron and steel products by the "Harvey process." Thomas W. Harvey, President; Stephen S. Palmer, Vice-President; William Allen Smith, Secretary and Treasurer.

Heller & Brothers, Newark, Essex county. Crucible steel works built in 1882; 18 two-pot crucible steel-melting holes, 6 heating furnaces, and one 10-inch train of rolls; product, crucible steel, used by the firm in manufacturing tools, rasps, and files; annual capacity, 600 gross tons.

Jersey City Spike and Bolt Works, W. Ames & Co., 312 Washington st., Jersey City, Hudson county. Built in 1850; 2 heating furnaces, using producer gas, and one 10-inch train of rolls; use scrap iron only; product, spikes, splice joints, bolts, rivets, and round, flat, and square bar iron; annual capacity, 8,000 gross tons.

Oxford Iron and Nail Company, Oxford, Warren county. New York office, 52 Wall st. Built in 1866; 26 puddling furnaces, 2 reverberatory heating furnaces, one regenerative gas heating furnace, 4 Smith gas producers using anthracite coal, 4 spike furnaces, 103 nail machines, and 4 trains of rolls (one 10, one 12, and two 23-inch); product, iron cut nails; annual capacity, 300,000 kegs. Brand, "Oxford." Samuel Sloan, President; John I. Blair, Vice-President; A. D. Chambers, Secretary and Treasurer, 26 Exchange Place, New York; Edmund T. Lukens, General Manager, at the works. Sales agent, J. S. Scranton, 83 Washington st., New York. *See Furnaces.*

Passaic Rolling Mills, Passaic Rolling Mill Company, Paterson, Passaic county. New York office, 45 Broadway. Built in 1867 and incorpo-

rated in 1869; 8 double puddling furnaces, (4 coal and 4 gas,) 9 gas heating furnaces, and 5 trains of rolls, (one 9, one 18, one 22, and one 28-inch, and one 30-inch universal.) Steel department, added in 1889–90, contains two 20-ton open-hearth furnaces, 2 reheating furnaces, blooming mill, shears, and other hydraulic machinery; product, structural material, including beams, channels, angles, tees, universal mill plates, and merchant bars; annual capacity, 13,500 gross tons of iron and 20,000 gross tons of open-hearth steel. The plant includes a bridge-building department, with modern outfit, including steel eye-bar plant; annual capacity of bridge shops, 13,500 gross tons. Brand, "Passaic." Watts Cooke, President; W. O. Fayerweather, Vice-President and Treasurer; A. C. Fairchild, Secretary; John K. Cooke, Superintendent.

Pompton Steel and Iron Company, Pompton, Passaic county. Built in 1863; 5 single puddling furnaces, 6 heating furnaces, 42 crucible steel-melting furnaces, 2 trains of rolls, and 5 hammers; steam and water power; 160 pots can be used at each heat in steel works; product, crucible cast steel and railway car springs; annual capacity, 2,700 gross tons. Erastus Corning, President; William E. Ludlum, Treasurer; J. G. Ludlum, Secretary; Joseph W. McElroy, Superintendent.

Roebling's (John A.) Sons Company, Trenton. Established in 1852; rolling mill rebuilt in 1873 and again in 1887; now used exclusively for rolling wire rods; it is a modified Garrett mill and has 2 Siemens gas heating furnaces. In addition to iron and steel wire department the works consist of a wire rope and cable department, a wire-cloth department, a barb-wire and wire-nail department, and a copper wire and insulated wire and cable department. Number of wire-nail machines, 21. Annual capacity for iron, steel, and copper wire, 32,000 gross tons; of rolling mill, 18,000 gross tons. Charles G. Roebling, President; F. W. Roebling, Secretary and Treasurer. Branch stores, 117 Liberty st., New York; 173 Lake st., Chicago; 27 Fremont st., San Francisco.

Taylor Iron and Steel Company, High Bridge, Hunterdon county. Original works built about 1720 and abandoned about 1785; a portion of the present works built in 1851 and enlarged in 1866–70; rolling mill added in 1883; 2 double puddling furnaces, 7 heating furnaces, one 2-high 18-inch train of muck rolls, one large steam helve hammer, and 3 water-power belt hammers; product, muck and scrap bar for car axles, other axles, and similar forgings; annual capacity, 4,000 gross tons. Steel department for making Hadfield steel added in 1892 and first steel made in September, 1892; product, manganese and Hadfield steel castings. Lewis H. Taylor, President; T. F. Budlong, Secretary and Treasurer.

Trenton Iron Company, Trenton, Mercer county. New York office, Cooper, Hewitt & Co., 17 Burling Slip. Built in 1845; 11 forge fires,

2 double puddling furnaces, 6 heating furnaces, 2 hammers, (one 2½ and one 3-ton,) and 4 trains of rolls (one 8, one 10, one 12, and one 20-inch); wire works, with 965 blocks; product, wire rods, merchant rods, iron and steel wire, wire rope, and wire-rope tramways (Bleichert system) for transportation of material; annual capacity of rods, 16,000 gross tons. Fuel used, bituminous coal and petroleum. Abram S. Hewitt, President, and James Hall, Treasurer, New York; William Hewitt, Vice-President, and E. Hanson, Secretary, Trenton; E. Gybbon Spilsbury, Managing Director. Selling agents, Cooper, Hewitt & Co., New York.

Trenton Iron Works, New Jersey Steel and Iron Company, Trenton, Mercer county. New York office, Cooper, Hewitt & Co., 17 Burling Slip. Built in 1845; 12 double puddling and 13 heating furnaces, 7 trains of rolls, (one 8, one 12, three 20, and two 26-inch,) and one 3-ton hammer; product, iron and steel structural shapes, including beams, channels, angles, tees, and zees, merchant bars, chains of all sizes, rivets, bolts, etc.; annual capacity, 22,500 gross tons. Brand, "Trenton." Works contain a complete plant for the construction of bridges, roofs, and other iron and steel structures. Edward Cooper, President, and Edwin F. Bedell, Secretary, New York; Charles E. Hewitt, Treasurer, and Joseph Stokes, Superintendent, Trenton.

Trenton Steel Company, Trenton, Mercer county. Built in 1891; one 7-ton open-hearth furnace; to be put in operation in 1894; product, to be cast steel vises. Peter Wilkes, President; Wm. E. Snedeker, Secretary; Samuel K. Wilson, Treasurer.

West Bergen Steel Works, Spaulding, Jennings & Co., Jersey City, Hudson county. Telegraphic address, West Bergen. Built in 1880; 17 heating furnaces, 6 trains of rolls, (one 9, one 10, one 12, and one 18-inch, and two 12-inch cold rolling trains,) one wire-drawing plant with 2 blocks, 6 hammers, and 24 four-pot steel-melting holes; product, crucible cast steel, drawn wire, and flat cold rolled steel; also reroll Bessemer and open-hearth billets; annual capacity, 8,000 gross tons.

Number of rolling mills and steel works in New Jersey: 19. Of these 3 make open-hearth steel, 6 make crucible steel, and 1 makes Hadfield steel.

PENNSYLVANIA.

PHILADELPHIA AND VICINITY.

Davis Brothers Rolling Mill, 995 North Second street, Philadelphia. Works, Canal st. near Germantown ave. Built in 1874; rebuilt in 1890; one heating furnace, 2 trains of rolls, and 5 spike machines; product, bar iron, all consumed in the works in the manufacture of railroad, ship, bridge, and wharf spikes; annual capacity, 1,350 gross tons. (Formerly called Winch's Rolling Mill.)

Fair Hill Forge and Rolling Mill, Gaulbert, McFadden & Caskey, York

and America sts., Philadelphia. Built in 1855; one double and 3 single puddling furnaces, 4 heating furnaces, and 3 trains of rolls; product, merchant bar iron; annual capacity, 11,000 gross tons. Brand, "Fair Hill Best." Ishmael James, Superintendent.

Fairmount Steel Works, Alexander Foster & Co., 2325 Spring Garden st., Philadelphia. Built in 1866; 3 heating furnaces, six 4-pot steel-melting furnaces, and 3 hammers; product, frog plates and points, all kinds of steel forgings, and best American cast steel, suitable for shear knives, dies, lathe tools, etc.; annual capacity, 450 gross tons.

Frankford Steel Company, Frankford, Philadelphia. Built in 1865; 5 heating furnaces, 5 hammers, (600 pounds to 2 tons,) 7 forge fires, and 20 two-pot steel-melting holes; product, steel axles, locomotive and general steel forgings, and tool steel; annual capacity, 1,000 gross tons. Machine shop for rough-finishing forgings added in 1892-3. Adam Tindel, proprietor.

Hughes & Patterson, Richmond and Otis sts., Kensington, Philadelphia. Two works in Kensington, Philadelphia: Delaware Rolling Mill, at Richmond and Otis sts., operated by Hughes & Patterson, built in 1870; 10 single puddling furnaces, 6 heating furnaces, and 5 trains of rolls. Philadelphia Iron and Tinplate Works, at Beach and Vienna sts., operated by Hughes & Patterson, Incorporated, built in 1858; 9 single puddling furnaces, 5 heating furnaces, and 3 trains of rolls; works being remodeled and enlarged for the manufacture of black plates. Product, bar iron specialties, skelp, bands, hoops, and rods; total annual capacity, 27,000 gross tons. Brands, "H. & P. Best," "H. & P. Best-best," and "H. & P. Staybolt." Officers of Hughes & Patterson, Incorporated: Walter Hatfield, Vice-President and Treasurer; R. J. Hughes, Secretary. *See Tinplate Works.*

Keystone Horse Shoe Company, Seventeenth and Clearfield sts., Philadelphia. Works first put in operation January 1, 1873; rebuilt in 1884; 4 heating furnaces and 3 trains of rolls; trains arranged to make the rolling partly continuous; product, merchant bar, band, hoop, and skelp iron; annual capacity, 13,500 gross tons. Thomas Evans, President; William Gerhard, Secretary and Treasurer; W. G. Howell, Superintendent.

Keystone Saw, Tool, Steel, and File Works, Henry Disston & Sons, (incorporated,) Tacony, Philadelphia. Manufacture of saws started in 1840 and steel in 1854; one 30-ton cementing furnace, one 30-pot and three 24-pot crucible steel-melting furnaces; first rolling mill built in 1866; 2 forge fires, 4 trains of rolls, (two 16 and one 20-inch sheet and one 28-inch plate,) 12 coal and 2 gas (Loomis gas) heating furnaces, and 2 hammers (one 2-ton and one 1,200-lb.); product, principally saw steel of every description, engravers' plates, and sheet steel for all other purposes; annual capacity, 5,380 gross tons. The works have also an 18-inch train for band saws and a 9-inch guide mill;

product, bar steel of all kinds; annual bar and rod rolling capacity, 2,700 gross tons. The steel works were originally built in Philadelphia, and were removed to Tacony in 1879, 1881, 1883, and 1884. Brand, "Disston." Horace C. Disston, President; William Disston, Vice-President; Hamilton Disston, 2d Vice-President; Jacob S. Disston, Treasurer; Robert J. Johnson, Secretary; Samuel Disston, Agent.

Midvale (The) Steel Company, Nicetown, Philadelphia. This company declines to give a description of its works for publication.

Oxford Iron and Steel Works, William & Harvey Rowland, Frankford, Philadelphia. Built in 1835 on Tacony creek, 2 miles west of Frankford, and removed to present location in 1849; began making steel in 1845; 5 heating furnaces, 3 trains of rolls, (12, 16, and 18-inch,) one hammer, 2 cementing furnaces, and 16 two-pot crucible steel-melting furnaces; product, crucible, Bessemer, and open-hearth sheet, machinery, spring, hammer, fork, rake, and hoe steel; reroll Norway iron and nail rods; also manufacture carriage and wagon springs of every description; annual capacity, 4,500 gross tons. Brand for springs, "W. & H. Rowland." Edward Rowland, Charles Rowland, and Henry J. Rowland, general partners; Estate of Harvey Rowland, special partner.

Pencoyd Iron Works, A. & P. Roberts & Co., 261 South Fourth st., Philadelphia. Works in Montgomery county, opposite Manayunk. Built in 1852; one single and 16 double puddling furnaces, 6 regenerative gas heating furnaces, 9 coal-fired heating furnaces, 4 regenerative gas-pit furnaces, and 6 trains of rolls, (one 12, one 18, two 20, one 23, and one 2-high 36-inch reversing.) Steel department, added in 1887 and since enlarged, contains four 22-gross-ton open-hearth furnaces. Forge shop has 6 hammers, (two 2-ton, two 3-ton, one 4-ton, and one 20-ton.) Product, iron and steel channel bars from 2 to 15 inches, beams from 3 to 15 inches, deck beams from 5 to 12 inches, tees from 1 to 5 inches, angles from 1 to 7 inches, flats from 1 to 12 inches wide, rounds from ½ inch to 7 inches in diameter, hammered or rolled axles, bar and bridge iron, shafting, and steel blooms; annual capacity, 60,000 gross tons of finished material. Specialties, structural shapes, axles, shafting, and bar and bridge iron. Brand, "Pencoyd." Bridge and construction department contains equipments for all classes of bridge and architectural work; also standard railroad turntables; also hydraulic forge shop for the manufacture of solid forged steel eye-bars from 3 to 8 inches wide; annual capacity, 30,000 gross tons.

Pennsylvania Steel Refining Company, Frederick Brown Building, Fifth and Chestnut sts., Philadelphia. Works, 50 North Twenty-third st. Two reheating furnaces, 2 hammers, (one 1,100-lb. and one 600-lb.,) one forge, and 21 treating tanks; product, high-grade tool steel made from open-hearth and low-grade Bessemer steel. (Formerly operated

by the Bates Steel Company.) John A. Wilson, President; B. K. Jamison, Vice-President; R. M. Smith, Secretary and Treasurer; Walter J. Scott, Superintendent. Selling agents, Ohl & Co., Philadelphia.

Penn Treaty Iron Works, Marshall Brothers & Co., Beach and Marlborough sts., Philadelphia. Built in 1856; 4 single puddling furnaces, 6 heating furnaces, and 8 trains of rolls (one 3-high puddle, one 3-high bar, one 3-high plate, two sheet, two tinplate, and one cold rolling); product, sheet and plate iron and tinplates; annual capacity, 10,000 gross tons. Brands, "Penn Treaty" and "Keystone" for sheets and "M. B." for plates. *See Tinplate Works.*

Philadelphia Steel Works, Hallahan, Gross & Frank, South Second st. and Stone House Lane, Philadelphia. Built in 1890–1 and first steel made in 1891; five 2-pot crucible steel-melting holes; product, tool steel; annual capacity, 400 gross tons.

Number of rolling mills and steel works in Philadelphia and vicinity: 14. Of these 2 make open-hearth steel, 6 make crucible steel, 2 make blister steel, and 1 makes special steel.

EASTERN PENNSYLVANIA, EXCEPT PHILADELPHIA.

Allentown (The) Rolling Mills, Drexel Building, Philadelphia. Two mills at Allentown, Lehigh county: Allentown Rolling Mills built in 1860; 2 single and 23 double puddling furnaces, 9 heating furnaces, (7 coal and 2 fuel oil,) and 8 trains of rolls; product, iron I beams, channels, angles, merchant bars, spikes, bolts, nuts, rivets, axles, machinery, bridge work, and mine and flat cars; annual capacity, 18,000 gross tons. Glen Iron Works 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, tops and bottoms, and spike rods; annual capacity, 7,000 gross tons. J. R. Fell, President; H. W. Allison, Secretary and Treasurer. *See Furnaces in the Lehigh Valley.*

Allentown Works, Consolidated Steel and Wire Company, Allentown, Lehigh county. General office, Rookery Building, Chicago; branch offices, New York City, Pittsburgh, St. Louis, San Francisco, New Orleans, and Portland, Oregon. Built in 1889; 2 gas heating furnaces and 4 trains of rolls (9, 10, 14, and 16-inch); product, wire rods drawn into wire and chiefly used by the company in the manufacture of barb wire and wire nails; annual capacity, 50,000 gross tons of wire rods; fuel used, anthracite coal and oil gas; F. E. Patterson, Manager, New York. (Formerly operated by the Iowa Barb Wire Company.) William Edenborn, President; J. W. Gates, General Manager; John Lambert, Vice-President; Alfred Clifford, Treasurer; F. E. Patterson, Secretary. *See Pittsburgh Works in Allegheny County.*

Bethlehem (The) Iron Company, South Bethlehem, Northampton county. Established in 1860. Iron mills started in 1863; Bessemer steel

works started in 1873; one single and 7 double puddling furnaces, 16 heating furnaces, 45 gas producers, 9 trains of rolls, (10, 12, 15, 21, 22, 25, 28, 32, and 48-inch,) and 7 hammers ranging from 1,500 pounds to 10 tons each; four 7-gross-ton Bessemer steel converters; first blow made October 4, 1873; first steel rail rolled October 18, 1873; 8 iron cupolas, 4 spiegel cupolas, and 4 soaking pits; product, iron and steel rails, billets, beams, tees, angles, puddled bars, merchant iron and steel, ingots, and axle, spring, screw, and wire steel, etc., and castings; annual capacity, 205,000 gross tons of rails, 55,000 gross tons of merchant forms, and 250,000 gross tons of ingots. Forging and Plate Department, making open-hearth steel: first steel melted August 11, 1888; 4 open-hearth-steel melting furnaces (one 10, one 20, and two 40-gross-ton); an ingot weighing 110 gross tons can be cast; annual capacity of ingots, about 60,000 gross tons. Connected with the open-hearth furnaces is a plant for the fluid compression of steel, containing 3 hydraulic forging presses, (one 2,000, one 5,000, and one 14,000-tons' capacity,) one hammer with a falling weight of 125 gross tons, three hammers for making small forgings, one 7,000-ton bending press, 3 oil-tempering and annealing plants, (two for gun and other forgings and one for armor plate,) and one plant for treating armor by the "Harvey process." This department also contains 46 gas producers and 44 heating furnaces, 2 machine shops, (one for general work, rough-machining and finishing forgings, and for finishing heavy ordnance, and one for trimming and machining armor plates,) and a blacksmith shop and steel foundry. Product, steel forgings of all descriptions and of the largest dimensions and weight, including marine and stationary engine cranks, (forged solid or built-up,) shafting, (forged solid or hollow,) heavy ordnance of all calibres, and forged armor plates, including conning towers, shields, etc.; also billets of low-phosphorus steel of all grades. The department is fully equipped with all necessary appliances and machinery for filling the requirements of the Government and ship and engine builders of the country for heavy steel shafting and miscellaneous forgings of the best quality. Robert P. Linderman, President; Robert H. Sayre, Sr., Vice-President and General Manager; R. W. Davenport, 2d Vice-President; Abraham S. Schropp, Secretary; C. O. Brunner, Treasurer; Owen F. Leibert, General Superintendent; Robert H. Sayre, Jr., Assistant Superintendent. Main office, South Bethlehem; Philadelphia office, 421 Chestnut st.; New York office, 80 Broadway. *See Furnaces in the Lehigh Valley.*

Birdsboro Nail Works, E. and G. Brooke Iron Company, Birdsboro, Berks county. Built in 1848; 16 double puddling furnaces, 4 heating furnaces, 2 trains of rolls, and 118 nail machines; steam and water power; product, nails and muck bar; annual capacity, 250,000 kegs of nails and 16,500 gross tons of muck bar. Brand, "Anchor."

Bessemer steel department contains two small tilting converters; first blow made September 21, 1885; idle; annual capacity, 18,000 gross tons of ingots. George Brooke, President; Wm. deB. Brusstar, Secretary; George W. Harrison, Treasurer; Elisha Brown, Superintendent. *See Keystone Furnaces, Schuylkill Valley.*

Blandon Rolling Mill, Simon Seyfert, Reading. Works at Blandon, Berks county. Built in 1867 and enlarged and improved in 1880, 1887, 1890, 1891, and 1892; 3 double and 6 single puddling furnaces, 3 heating furnaces, rotary squeezers, and 3 trains of rolls; product, merchant bars, horse-shoe iron, rods, ovals, half ovals, half rounds, hoops, bands, cotton-ties, grooved skelp, angles, channels, and special shapes; annual capacity, 9,000 gross tons. Also rolls all sizes and kinds of soft steel. (Formerly operated by the Blandon Iron and Steel Company.) *See Gibraltar Iron Works.*

Brandywine Rolling Mills, Worth Brothers, Coatesville, Chester county. Built in 1881-2 and put in operation in February, 1882; 3 double puddling furnaces, 3 heating furnaces, and 2 trains of rolls, (20 and 28-inch.) Commenced rolling steel in January, 1885, and have constantly increased this branch; product, steel and iron plates for best boiler and locomotive work, machine-flanged heads, and muck bar; annual capacity, 12,000 gross tons of plates. *See Viaduct Iron Works.*

Bristol Rolling Mill, Rodman Wister, Trustee, 257 South Fourth st., Philadelphia. Works at Bristol, Bucks county. Built in 1875-6; 2 puddling furnaces, 4 heating furnaces, and 3 trains of rolls (one 8, one 12, and one 18-inch); product, bar, band, hoop, and scroll iron, and cotton-ties; annual capacity, 9,000 gross tons of finished iron. Brand, "Bristol."

Bryden Horse Shoe Works, Bryden Horse Shoe Company, Catasauqua, Lehigh county. Philadelphia office, 224 South Fourth st. Built in 1888 and put in operation in January, 1889. Rolling mill department, added in 1889-90, contains 2 heating furnaces and two 9-inch trains of rolls. Press and forge departments contain 9 heating furnaces, 8 benders, 8 presses, two 1,200-lb. hammers, trimming, clipping, punching, and cleaning machinery. Product, "Boss" and "Bryden" forged horse and mule shoes, made from purchased muck bar; annual capacity, 6,000 gross tons. Charles K. Barns, President, Philadelphia; T. F. Frederick, Secretary, Oliver Williams, Treasurer, and Jacob Roberts, Superintendent, Catasauqua.

Carpenter Steel Company, Reading, Berks county. New York office, No. 1 Broadway. Original plant, containing 8 steel-melting holes, built in 1889 and first steel made in July, 1889; removed to present site in 1889-90 and works destroyed by fire on December 26, 1891; rebuilt and put in operation in 1892; 5 double puddling furnaces, 10 heating furnaces, 5 trains of rolls, (one 7, one 10, and one 16-inch for hot rolling, and one 4 and one 10-inch for cold rolling,)

7 hammers, (one 400-lb., one 750-lb., one 1,000-lb., one 1,500-lb., one 1-ton, one 3-ton, and one 7½ ton,) and 36 four-pot steel-melting holes. Product, crucible steel for tool steel, cutlery, springs, etc., forgings and armor-piercing projectiles for the Government, and air-hardening steel for general tool-making purposes; also manipulates Bessemer and open-hearth steel; annual capacity, 5,000 gross tons of crucible steel, 3,000 tons of projectiles, and 2,000 tons of air-hardening steel. Brand, "Carpenter's Steel." Also operates machine shop with 52 lathes. Contemplates erecting one 5-ton open-hearth steel furnace in 1894. John C. Barron, M. D., President; Henry M. Hawkesworth, Vice-President; Robert W. Hawkesworth, Secretary; Louis Gregory, Treasurer; J. H. Carpenter, General Manager.

Catasauqua Manufacturing Company, Catasauqua, Lehigh county. Company organized in 1864. Four mills: A and C at Catasauqua and B and D at Ferndale; 30 single and 10 double puddling furnaces, 14 reverberatory heating furnaces, one Smith gas reheating furnace, 11 trains of rolls, (one 8, two 10, one 15, three 18, and two 21-inch bar, and one 22-inch 3-high and one 31-inch 3-high plate,) and one 10-ton hammer: product, high-grade tank, ship, bridge, and boiler plates, merchant bars, bands, shapes, axles, angles, and skelp iron or steel; annual capacity, 40,000 gross tons. Brands of bar iron, "Catasauqua Refined," "Catasauqua Rivet," and "Catasauqua Staybolt;" of plates, "Refined," "Shell," "Flange," and "Fire-box." J. W. Fuller, President; Henry Davis, Secretary and Treasurer. Selling agents, Charles K. Barns & Co., 224 South Fourth st., Philadelphia; E. T. Day, 192 Broadway, New York; and home office, Catasauqua.

Chester Steel Castings Company, 407 Library st., Philadelphia. Works at Chester, Delaware county. Built in 1871; two 1-gross-ton Robert-Bessemer converters erected in 1889; first blow made in November, 1889; one 15-gross-ton open-hearth furnace erected in 1893 and first steel made in May, 1893; product, steel castings of every description from 1 to 40,000 lbs.; also produces castings by the McHaffie process; annual capacity, 7,000 gross tons. E. P. Dwight, President and Treasurer; A. G. Lorenz, Secretary; J. J. Deemer, Superintendent.

Conshohocken, Pennsylvania, and Corliss Iron Works, J. Wood and Brothers Company, Conshohocken, Montgomery county. General office, 223 North Second st., Philadelphia. Built in 1832, 1852, and 1864, respectively; rebuilt in 1882–3; 7 double puddling furnaces, 7 heating furnaces, and seven 20-inch trains of rolls; steam and water power; product, sheet, flue, and plate iron of all kinds; corrugated iron a specialty; annual capacity, 10,500 gross tons. Brands, "Anchor," "Hope," "Soft Steel," "R. G.," "Blue Annealed," and "Common Red." John Wood, President; George W. Wood, Vice-President and General Manager; Charles M. Wood, Secretary; William M. Wood, Treasurer. *See Plymouth Rolling Mill.*

Crum Lynne Iron and Steel Works, J. Jones Hudson, 216 South Third st., Philadelphia. Works at Crum Lynne, Delaware county. Built in 1887–8; one double and 4 single puddling furnaces, 3 heating furnaces, 2 trains of rolls, (one 12 and one 18-inch,) one 5-ton hammer, and one rotary squeezer; product, muck bar, bar iron, and skelp iron; annual capacity, 9,500 gross tons. Contemplate enlarging works in 1894. (Formerly operated by the Crum Creek Iron and Steel Company.)

Diamond Steel Company, Reading, Berks county. Built in 1892 and first put in operation in March, 1893; 2 forge fires, 6 heating furnaces, 3 trains of rolls, (one 10, one 12, and one 14-inch,) 2 hammers, (one 1,000-lb. and one 3,000-lb.,) and twelve 4-pot crucible steel-melting holes; product, special steel, for cutlery, tools, dies, files, springs, machinery, etc.; annual capacity, 11,000 gross tons. Adding a cold rolling mill with 6 sets of rolls. P. W. Hawman, President; S. Y. Reigner, Secretary and Treasurer; Walter Steel, General Manager.

Douglassville Iron Company Limited, Douglassville, Berks county. Built as a forge in 1878; rolling mill added in 1887 and enlarged in 1890; 6 double puddling furnaces, one hammer, one rotary squeezer, and one train of rolls; product, muck bar; annual capacity, 7,000 gross tons. D. K. Flannery, President and Manager; F. R. Gerhart, Secretary; John H. Egolf, Treasurer.

Easton Sheet Iron Works, Theodore Oliver, Easton, Northampton county. Started February 1, 1872; one single and one double puddling furnace, one heating furnace, one anthracite coal sheet furnace, one bituminous coal annealing furnace, and one train of 22-inch rolls; product, bloom and refined sheet iron; annual capacity, 1,000 gross tons. Brand, the letter "R" in a diamond. Selling agents, Marshall Lefferts & Co., 100 Beekman st., New York.

Eureka Cast Steel Company, Chester, Delaware county. Works at Lamokin, one mile south of Chester. Built in 1877. Crucible steel plant added in 1885 and first steel made November 13, 1885; three 4-pot steel-melting holes; annual capacity, 45 gross tons of castings. Open-hearth steel plant added in 1891 and first steel made June 25, 1891; one 20-gross-ton open-hearth furnace; annual capacity, 5,000 gross tons of castings. The company also produces "Eureka Steel" castings; annual capacity, 700 gross tons. Specialty, all forms of railroad and machinery castings. Works partly destroyed by fire on August 8, 1893; rebuilt in same year and put in operation December 2, 1893, electric steam cranes of 25 tons' capacity and a large machine shop being added. Amos Gartside, President and Treasurer; H. B. Faunce, Secretary; Wm. B. Reaney, Manager. Selling agent, Robert C. Appleby, Chester.

Gibraltar Iron Works, Simon Seyfert, Reading, Berks county. Built in 1846 and rebuilt in 1883–4; 2 heating furnaces and one 18-inch train

of rolls; product, boiler plate and boiler tube and pipe iron; annual capacity, 3,600 gross tons. A forge connected with the works was rebuilt in 1846 and again in 1891; it has 6 charcoal forge fires and one 4-ton steam hammer; steam and water power; product, charcoal blooms, all consumed in the rolling mill; annual capacity, 3,000 gross tons. *See Blandon Rolling Mill.*

Glasgow Iron and Steel Works, Glasgow Iron Company, Pottstown, Montgomery county. Works in Ninth ward. Main office, Pottstown; Philadelphia office, Bullitt Building. Puddle mill built in 1874; 8 double puddling furnaces and one train of muck rolls; rotary squeezer; steam and water power. Plate mill No. 1 built in 1875; 3 heating furnaces and one train of rolls 96 inches long; annual capacity, 12,000 gross tons of steel plates. Plate mill No. 2 completed in 1889; one train of rolls; rotary shears; annual capacity, 10,000 gross tons of iron and steel plates. Complete flanging and dishing plant and plant for making buckled plates connected with this mill. Product, muck bar, iron and steel bridge, tank, and boiler plate, flanged and dished boiler heads, man holes, man-hole saddles for boilers, etc., and buckle plates. Specialties, "Glasgow" marine steel and "Glasgow" extra locomotive steel. (Clapp-Griffiths steel plant, built in 1885–6, abandoned.) Comly B. Shoemaker, President; Richard W. Bailey, Treasurer; L. Fred. Nagle, Secretary. Selling agents, D. F. Cooney, 88 Washington st., New York; Harrington, Robinson & Co., 10 Oliver st., Boston.

Keystone Iron Works Limited, Reading, Berks county. Built in 1857; 6 single puddling furnaces, 2 heating furnaces, and one 18-inch train of rolls; product, boiler plate, skelp, tank, chute, boat, and car iron, and muck bar; annual capacity, 5,500 gross tons. J. H. Craig, Secretary and Treasurer.

Keystone Nail Works, The Ellis and Lessig Steel and Iron Company Limited, Pottstown, Montgomery county. Built in 1884–5; 22 double puddling furnaces, 2 gas heating furnaces, one 9-inch and four 22-inch trains of rolls, and 105 nail machines; product, muck bar, nail and tack plate, and "Keystone" iron and steel cut nails; annual capacity, 27,000 gross tons of muck bar, 14,500 gross tons of nail and tack plate, and 300,000 kegs of nails. George B. Lessig, President; J. B. Lessig, Secretary; W. S. Ellis, Treasurer.

Laurel Iron Works, Laurel, Chester county. Built in 1825; one annealing furnace, 3 heating furnaces, and 2 trains of rolls; steam and water power; product, flue and tube iron; annual capacity, 5,500 gross tons. (Formerly operated by Coatesville Iron Works.) H. A. DuPont, attorney for owners, 100 Maryland ave., Wilmington, Delaware. Idle and for sale.

Longmead Iron Works, Jawood Lukens, Conshohocken, Montgomery county. Built in 1882 and put in operation in November, 1882; 6

double puddling furnaces and one train of 20-inch rolls; product, muck bar; annual capacity, 7,500 gross tons.

Lukens Iron and Steel Company, Coatesville, Chester county. Philadelphia office, Bullitt Building; Boston office, 8 Oliver st.; New York office, 29 Broadway. Built in 1810; 3 double puddling furnaces, 9 heating furnaces, (5 reverberatory and 4 specially large Siemens,) 8 gas producers, 3 trains of rolls, (one being a 3-high mill with chilled rolls 120 in. x 34 in. and hydraulic automatic tables,) large guillotine shears with knives 110 inches long, and one hammer; steam and water power; product, all kinds of boiler and ship plates, bridge iron, and homogeneous steel plates; also machine-flanged boiler heads and patent hydraulic-pressed boiler braces; annual capacity, 60,000 gross tons. The puddle mill, operated by steam and water power, occupies the site of the mill which first made boiler plates in the United States. Two 20-gross-ton open-hearth furnaces, with hydraulic ladle, ingot cranes, and 8 gas producers, erected in 1891; first steel made early in 1892; product, ingots for steel plates; annual capacity, 25,000 gross tons. Charles Huston, President; A. F. Huston, Vice-President; Charles L. Huston, General Manager; Robert B. Haines, Jr., Secretary; Joseph Humpton, Treasurer. Selling agents, Scully Steel and Iron Company, Chicago; Western Iron and Supply Company, St. Louis; S. L. Mitchel, New Orleans; R. C. Hoffman & Co., Baltimore; J. F. Corlett, Cleveland; T. C. Adams & Co., Cincinnati; Sales Brothers, Detroit; Thomas Robertson & Co., Montreal, Canada.

McIlvain (William) & Sons' Boiler Plate Mill, Wm. McIlvain & Sons, Reading, Berks county. First put in operation in 1857; 2 double and 4 single puddling furnaces, 3 heating furnaces, 2 trains of rolls, (break-down rolls 52 in. x 25 in. and finishing rolls 81 in. x 25 in.,) and one 3-ton hammer; product, every variety of steel and iron plates; annual capacity, 5,500 gross tons. Brand, "McIlvain." *See Bloomaries.*

Norristown Iron Works, James Hooven, Norristown, Montgomery county. Built in 1846; 6 double puddling furnaces, 3 heating furnaces, 3 trains of rolls, (one 10 and two 18-inch,) one hammer, and 2 butt-welded-pipe furnaces, both using petroleum for fuel; product, skelp iron, part of which is made by the works into butt-welded pipes and the remainder sold; annual capacity, 5,000 gross tons.

Norristown Steel Company, Norristown, Montgomery county. General office and works at Earnest Station. Built in 1890–1 and first steel made September 3, 1891; two 15-gross-ton open-hearth steel furnaces; product, open-hearth steel castings of every description and ingots; annual capacity, 5,400 gross tons. Brand, "Norristown." H. H. Haines, President; E. M. Daniels, Vice-President; C. C. Highley, Treasurer; Joseph H. Hampton, Secretary; George J. Humbert, General Manager.

Parkesburg Iron Works, The Parkesburg Iron Company, Parkesburg, Chester county. First started in April, 1873; enlarged in 1887 and 1889; 4 double puddling furnaces, 8 charcoal finery fires, 8 heating furnaces, one 20-inch train of 3-high muck rolls, three 2-high plate trains, (two 23 in. x 50 in. and one 22 in. x 60 in.,) and 2 hammers; product, boiler tube skelp and iron and steel boiler plate; annual capacity, 11,000 gross tons. Brand, "P. I. Co." Horace A. Beale, President; William H. Gibbons, Vice-President; Amos Michener, Secretary; Samuel R. Parke, Treasurer; A. J. Williams, General Manager.

Penn Steel Castings and Machine Company, Chester, Delaware county. Built in 1892 and first steel made September 25, 1892; two 20-gross-ton open-hearth steel furnaces and 2 annealing furnaces; product, steel castings; annual capacity, 6,500 gross tons. M. H. Bickley, President; John T. Dickson, Secretary; Hugh Shaw, Treasurer; Frederick Baldt, Manager.

Phœnix Iron Works, Phœnix Iron Company, 410 Walnut st., Philadelphia. Works at Phœnixville, Chester county. Built in 1808; 16 double puddling furnaces and 3 trains of rolls, (one 3-high 26-inch and two 3-high 20-inch.) New mill built in 1873; 3 small, 10 large, and 3 double Siemens heating furnaces, 24 Siemens and 39 other gas producers, using anthracite coal, and 5 trains of rolls, (one 9, one 13, two 20, and one 24-inch.) Steel works built in 1888-9; four 15-gross-ton open-hearth steel furnaces and blooming mill; first steel made in February, 1889. Product, bars, beams, channels, angles, tees, and miscellaneous structural shapes of iron and steel; total annual capacity, 50,000 gross tons. David Reeves, President; W. H. Reeves, General Superintendent; George Gerry White, Secretary; James O. Pease, Treasurer. *See Furnaces in the Schuylkill Valley.*

Pine Iron Works, Joseph L. Bailey & Son, lessees, Pine Iron Works P. O., Berks county; telegraph address, Manatawny Station. Glendale Mill built in 1881; 2 heating furnaces and one train of 84-in. x 24-in. rolls; product, iron and steel plates of all kinds; annual capacity, 5,000 gross tons. Brands, "Pine" iron and "Pine" steel, for the most severe requirements. Owned by Joseph L. Bailey. (Pine Mill, built in 1845, and run by water-power, has been abandoned.)

Plymouth Rolling Mill, J. Wood and Brothers Company, lessee, Conshohocken, Montgomery county. Built in 1881-2; 8 double puddling furnaces, 6 heating furnaces, 4 trains of rolls, and 12 nail machines; product, muck bar, plate and sheet iron, and plate and sheet steel; annual capacity, 9,000 gross tons of muck bar and 10,500 gross tons of finished material. Owned by R. D. Wood & Co., Philadelphia. *See Conshohocken, Pennsylvania, and Corliss Iron Works.*

Pottsgrove Iron Works, Potts Brothers Iron Company Limited, Potts-

town, Montgomery county. Built in 1846; 8 double puddling furnaces, 4 heating furnaces, and 2 trains of rolls; product, boiler plate, tank, flue, and pipe iron, and muck bar; annual capacity, 9,000 gross tons of muck bar and 11,000 gross tons of plate iron. Specialties, pipe and flue iron. George H. Potts, Chairman; H. C. Hitner, Secretary and Treasurer.

Pottstown Iron Company, Pottstown, Montgomery county. Philadelphia office, 400 Chestnut st. (Operated by Jacob Fegely and William M. Gordon, Receivers.) Built in 1863 and enlarged in 1867; 22 double puddling furnaces, 12 Siemens heating furnaces, 95 nail machines, one hammer, and 7 trains of rolls (18-inch muck, 21-inch muck, 23-inch muck, 23-inch nail plate, 24-inch universal, 25-inch plate, and 31-inch plate); product, muck bar, nails, and boiler, ship, bridge, and tank plate; annual capacity, 35,000 gross tons of muck bar, 50,000 gross tons of plates, and 250,000 kegs of cut nails. Steel works, built in 1885–6, contain three 10-gross-ton Bessemer converters and a 36-inch blooming mill; first blow made July 1, 1886; one 12-ton Siemens open-hearth furnace built in 1885–6; product used in making nail plate and other plate and merchant steel. Uses the basic process, the slag being converted into fertilizing material. Andrew Wheeler, President; Benjamin S. Janney, Jr., Vice-President; Andrew Wheeler, Jr., Secretary; Charles H. Ashburner, Treasurer. *See Anvil Furnace, Schuylkill Valley.*

Pottsville Rolling Mills, Pottsville Iron and Steel Company, Pottsville, Schuylkill county. Philadelphia office, 226 South Fourth st. Original mill built to make rails in 1852; rebuilt and altered to make shapes in 1877; 10 double puddling furnaces, 12 heating furnaces, and 4 trains of rolls (one 12, two 19, and one 23-inch); product, iron and steel beams, channels, angles, tees, bars, and shafting; annual capacity, 31,500 gross tons. Steel department contains two 20-gross-ton open-hearth steel furnaces built in 1890; first cast made in August, 1890; product, billets, blooms, and ingots for company's use and for sale; annual capacity, 21,500 gross tons. Blooming mill, built in 1887, contains 32-inch rolls for blooming ingots. (Clapp-Griffiths converters, built in 1886, torn out in 1890.) William Atkins, President; Gifford V. Lewis, Treasurer; John M. Callen, Secretary. *See Pioneer Furnaces, Schuylkill Valley.*

Reading Bolt and Nut Works, (not incorporated,) J. H. Sternbergh & Son, Reading, Berks county. Bolt and nut works established in 1865, rolling mill department organized in 1871, and the whole enlarged in 1872, 1881, and 1886; entire works, except rolling mill, destroyed by fire February 6, 1891, and rebuilt on a larger scale in the same year; 3 heating furnaces and 3 trains of rolls (one 9, one 10, and one 12-inch); petroleum used for fuel in forging department; product, refined merchant bar and bolt iron, and, more es-

pecially, bolts, nuts, washers, rivets, rods, and irons for bridges and buildings, etc.; annual capacity, 15,000 gross tons. Brand, "S." *See Kansas City Bolt and Nut Company, Kansas City, Mo.*

Reading Iron Company, Reading, Berks county. Branch office, 417 Walnut st., Philadelphia. Rolling mill built in 1836; 8 single and 2 double puddling furnaces, 3 heating furnaces, 2 scrap furnaces, and 3 trains of rolls; product, grooved skelp iron; annual capacity, 10,000 gross tons. Sheet mill built in 1863; 10 double puddling furnaces, 4 heating furnaces, and 3 trains of rolls; product, sheared skelp and plate iron; annual capacity, 15,000 gross tons. Also operates four tube works for the production of wrought-iron pipe, boiler tubes, oil-well casing, etc.; annual capacity, 60,000 gross tons. Also foundry and machine shop for the production of all classes of rolling-mill and blast-furnace machinery, large castings, cotton compressors, sugar mills, and all other general machinery. Also a steam forge for the production of all classes of marine, engine, and general forgings. George F. Baer, President; F. C. Smink, Treasurer and General Manager. *See Reading and Keystone Furnaces, Schuylkill Valley.*

Reading (The) Rolling Mill Company, lessee, Reading, Berks county. General office, 257 South Fourth st., Philadelphia. Built in 1868 and remodeled in 1889; operated by present company since 1890; 15 double puddling furnaces, 10 heating furnaces, 7 forge fires, and 4 trains of rolls (one 14 and three 23-inch); product, iron and steel structural shapes, including beams, channels, angles, tees, and bars; annual capacity, 45,000 gross tons. (Formerly called Philadelphia and Reading Rolling Mill.) Joseph H. Cofrode, President; Francis H. Saylor, Vice-President; P. R. Foley, Secretary and Treasurer; J. L. Rake, Manager. Selling agents, J. F. Bailey & Sons, 257 South Fourth st., Philadelphia. Owned by The Philadelphia and Reading Railroad Company.

Schuylkill Haven Rolling Mill, Schuylkill Haven Iron Company, 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, railroad spikes, bolts, and rivets; specialty, refined bar iron; annual capacity, 5,500 gross tons. L. W. Weissinger, President; Samuel H. Kaercher, Secretary; W. J. Matz, Treasurer; James W. Ziebach, Manager.

Schuylkill Iron Works, Alan Wood Company, 519 Arch st., Philadelphia. Works at Conshohocken, Montgomery county. Built in 1858; 15 double puddling furnaces, 14 heating and 4 grate furnaces, 8 trains of rolls, and one hammer; product, sheet and plate iron and steel; annual capacity, 18,000 gross tons. Howard Wood, President; Jona. R. Jones, Secretary and Treasurer.

Seyfert Rolling Mills, Samuel R. Seyfert & Brother, Reading, Berks county. Works at Seyfert Station, W. & N. R. R. Built in 1880–1 and started in March, 1881; 7 double puddling furnaces, 5 heating furnaces, one 4-ton hammer, one rotary squeezer, and three 22-inch trains of rolls; product, boiler plate, boiler-tube skelp, pipe skelp, and puddled bar; annual capacity, 11,000 gross tons of plate iron and 9,000 gross tons of puddled bar.

Slatington Rolling Mill, Slatington Rolling Mill Company, Slatington, Lehigh county. Built in 1890; 6 single puddling furnaces, one busheling furnace, 2 heating furnaces, and 2 trains of rolls (10 and 16-inch); product, merchant bar iron; annual capacity, 7,500 gross tons. Henry Kuntz, President; S. DeLong, Secretary; H. F. Hall, Treasurer and Business Manager; Wm. P. Hopkins, Superintendent.

Standard Steel Casting Company, Thurlow, Delaware county. Built in 1883–4 and first put in operation in March, 1884; enlarged in 1890 and 1893; two 8-gross-ton and two 20-gross-ton open-hearth steel furnaces; product, open-hearth steel castings; annual capacity, 6,500 gross tons. Robert Wetherill, President; Richard Wetherill, Secretary and Treasurer.

Stony Creek Rolling Mill, Norristown, Montgomery county. Built in 1849 and rebuilt in 1879 and 1887; 6 double puddling furnaces, 3 heating furnaces, and 3 trains of rolls; product, grooved and sheared skelp, merchant bars, ovals, half ovals, rounds, and horse-shoe iron; annual capacity, 6,700 gross tons. Idle and for sale. Apply to Jas. S. Swartz, 307 Walnut st., Philadelphia.

Thorndale Iron Works, Thorndale Iron Works Company, Thorndale P. O., Chester county. Telegraph address, Downingtown. Built in 1847; 4 double puddling furnaces, 2 heating furnaces, and one train of rolls; product, muck bar; annual capacity, 5,000 gross tons. Brand, "Thorndale." Charles L. Bailey, President, and Edward Bailey, Vice-President, Harrisburg; William L. Bailey, Treasurer and Manager, Thorndale.

Tidewater Steel Works, (Combination Steel and Iron Company, proprietor,) Chester, Delaware county. Built in 1880; 10 heating furnaces and 3 trains of rolls (12, 20, and 23-inch); product, street rails and railway joints, light T rails, angles, bars, and shapes; annual capacity, 40,000 gross tons. Brand, "Tidewater." C. A. Weed, President and General Manager; T. S. Weed, Secretary and Treasurer. Selling agents, Minnigerode & Co., 40 Broadway, New York.

Valley Iron Works, W. W. Kurtz & Sons, Coatesville, Chester county. Philadelphia office, Bullitt Building. Built in 1837 and rebuilt in 1888; 5 double puddling furnaces, 4 heating furnaces, and 4 trains of rolls (one 18 x 72-inch muck, and one 24 x 72-inch, one 30 x 96-inch, and one 30 x 110-inch plate); product, iron and steel boiler, bridge, ship, and tank plate; annual capacity, 10,000 gross tons.

Viaduct Iron Works, Coatesville Rolling Mill Company, Coatesville, Chester county. Built in 1838; 3 double puddling furnaces, 8 heating furnaces, 4 trains of rolls, and one hammer; product, boiler tube skelp and iron and steel plates and sheets; annual capacity, 15,000 gross tons. *See Brandywine Rolling Mills.*

Wellman Iron and Steel Company, (formerly Chester Rolling Mills,) Thurlow, Delaware county. Philadelphia office, 220 South Fourth st. Built in 1874–5; 5 gas heating furnaces, 1 hammer, and 3 trains of rolls (one 3-high mill with rolls 132 inches x 34 inches, one 3-high mill with rolls 80 inches x 30 inches, and one 3-high mill with rolls 72 inches x 25 inches); product, steel plates; annual capacity, 35,000 gross tons. Open-hearth steel plant, containing two 15-gross-ton open-hearth steel furnaces, added in 1881–2; two 20-gross-ton furnaces added in 1892; annual capacity, 30,000 gross tons of ingots, chiefly worked into plates. Bessemer steel plant, added in 1889, contains two 3-gross-ton converters and a blooming mill; daily capacity, 300 gross tons of ingots, worked into wire billets, slabs, and miscellaneous blooms. S. T. Wellman, President; S. H. Chauvenet, Vice-President; J. H. Roop, Treasurer; R. Peters, Jr., Secretary. William B. Broomall, Receiver. *See Wellman Furnace, Schuylkill Valley.*

Number of rolling mills and steel works in Eastern Pennsylvania except Philadelphia: 53. Of these 4 make Bessemer steel, 1 makes Robert-Bessemer steel, 11 make open-hearth steel and 1 open-hearth steel plant is projected, 3 make crucible steel, and 2 make special steel.

CENTRAL PENNSYLVANIA.

Altoona Iron Company, Altoona, Blair county. First put in operation in April, 1873; 11 double and 6 single puddling furnaces, 4 heating furnaces, 4 trains of rolls, (two 8, one 16, and one 18-inch,) and one 3-ton hammer; product, refined bar, band, hoop, oval, half oval, half round, and scroll iron; annual capacity, double turn, 13,500 gross tons. Brand, "Altoona." John Fullerton, President; H. K. McCauley, Secretary and Treasurer; Robert Smiley, Manager of mill.

Bellefonte Iron and Nail Company, Bellefonte, Centre county. Built in 1881–2; put in operation March 1, 1882; 10 single and 2 double coal puddling furnaces, one double gas puddling furnace, 3 heating furnaces, 4 trains of rolls, (one 9 and one 15-inch bar train, one 16-inch nail-plate train, and one 17-inch muck train,) and 53 nail machines; product, muck bar, bar iron, nails, and spikes; annual capacity, 4,500 gross tons of bar iron and 125,000 kegs of cut nails. Brand, "Bellefonte." James A. Beaver, President; L. T. Munson, Secretary, Treasurer, and General Superintendent. Idle and for sale.

Central Iron Works, Harrisburg, Dauphin county. First mill built in 1853; new boiler plate mill built in 1878; new universal mill built in 1892; puddle mill contains one single and 7 double puddling fur-

naces; boiler plate mill contains one gas and 6 coal burning heating furnaces. Entire works have 6 trains of rolls, (one muck, one 25-inch and one 31-inch roughing, one Lauth 3-high 25-inch chilled finishing, with rolls 72 inches long, one Lauth 3-high 31-inch chilled finishing, with rolls 96 inches long, and one universal 48-inch train, complete, capable of making plates 42 inches wide.) Boiler plate mill has 2 large Morgan guillotine shears, one large circle shear for shearing boiler heads, and all other necessary machinery for rolling plates, sheared and universal, of almost any size and quality required; product, boiler plate and tank iron and boiler plate steel; annual capacity, 24,000 gross tons of boiler plates, 25,000 gross tons of universal plates, and 9,000 gross tons of muck bar. Charles L. Bailey, President; Edward Bailey, Vice-President; G. M. McCauley, Secretary and Treasurer; John N. Binnix, Superintendent.

Chesapeake Nail Works, Charles L. Bailey & Co., (incorporated,) Harrisburg, Dauphin county. Built in 1867; 18 single puddling furnaces, 3 heating furnaces, 2 trains of rolls, (one 20-inch puddle and one 16-inch plate,) and 103 nail machines; product, iron and steel nails and muck bar; annual capacity, 260,000 kegs of nails and 11,000 gross tons of muck bar. Brand, "Chesapeake." Charles L. Bailey, President; Edward Bailey, Vice-President; John C. Harvey, Secretary and Treasurer.

Columbia Iron Company, Columbia, Lancaster county. First put in operation July 13, 1886; 9 double puddling furnaces, 3 heating furnaces, and 3 trains of rolls (one 3-high 18-inch puddle, one 2-high 18-inch bar, and one 3-high 9-inch guide); product, bar iron, socket, oval, etc.; annual capacity, 11,000 gross tons. Brand, "C. I. C." Frank A. Bennet, President; J. W. Yocum, Secretary and Treasurer; C. S. Kauffman, General Manager. Selling agent, Christian C. Kauffman, Columbia.

Columbia Rolling Mill Company, Columbia, Lancaster county. Built in 1854 and remodeled and enlarged in 1885; 12 double puddling and 4 heating furnaces and 4 trains of rolls; product, skelp and tube iron; annual capacity, 13,500 gross tons. Brand, "Columbia." John Q. Denney, President and General Manager; J. W. Steacy, Secretary and Treasurer. *See Vesta Furnace, Lower Susquehanna Valley.*

Danville Nail Works, Danville, Montour county. Built in 1883 and first nails made August 31, 1883; 3 double puddling furnaces, 2 large heating furnaces, 2 trains of rolls, (18-inch puddle and 3-high 20-inch plate,) and 92 nail machines; product, muck bar and iron and steel nails; annual capacity, 250,000 kegs of nails. Idle and for sale. Apply to L. S. Wintersteen, Bloomsburg.

Duncannon Iron Company, Duncannon, Perry county. Office, 122 Race st., Philadelphia. Built in 1836; 20 single puddling furnaces, 7 heating furnaces, 4 trains of rolls, (8, 16, 18, and 20-inch,) and 50

nail machines; product, bar iron and iron and steel nails; annual capacity, 10,000 gross tons of bar iron and 125,000 kegs of nails. John Wister, President and Treasurer; William E. S. Baker, Secretary and Assistant Treasurer. *See Duncannon Furnace, Upper Susquehanna Valley.*

Eagle Iron Works, Curtins & Co., Roland, Centre county. Telegraph address, Bellefonte. Built in 1830; one single puddling furnace, one heating furnace, and two 15-inch trains of rolls; water-power; product, wire billets, boiler-plate pile covers, and assorted bar iron from half-inch round and square to 4-inch tire; annual capacity, 2,700 gross tons. *See Eagle (charcoal) Furnace. See Bloomaries.*

East Lebanon Iron Company, Lebanon, Lebanon county. Built in 1891; destroyed by fire in 1893 and rebuilt and put in operation the same year; 8 double puddling furnaces, 2 heating furnaces, and 2 trains of rolls (20-inch muck and 10-inch guide); product, merchant bar iron; annual capacity, 9,000 gross tons. H. H. Light, President and Manager; H. O. Nutting, Secretary; Wm. P. Nutting, Treasurer.

Green Ridge Iron Works, A. L. Spencer, Scranton, Lackawanna county. Built at Providence, Pa., in 1876; removed to Green Ridge, Scranton, in 1879; enlarged in 1887; 2 heating furnaces, 3 spike machines, and 2 trains of rolls (10 and 12-inch); product, bar iron, mine-car axles, strap rails, railroad spikes, and toe-calk steel; annual capacity, 5,500 gross tons. Fuel used, anthracite culm. D. B. Atherton, General Manager; I. M. Vought, Foreman.

Harrisburg Nail Works, Harrisburg, Dauphin county. Works at Fairview, Cumberland county, on the Northern Central Railway. Built in 1810; 9 double puddling furnaces, 4 heating furnaces, two 19-inch trains of rolls, and 83 nail machines; steam and water-power; product, iron and steel nails and muck bar; annual capacity, 200,000 kegs of nails and 1,800 gross tons of muck bar. Brand, "Harrisburg." Henry McCormick, Jr., Treasurer. Owned by The McCormick Company. *See Paxton Rolling Mills. See Paxton Furnaces, Lower Susquehanna Valley.*

Harrisburg Rolling Mill Company, Harrisburg, Dauphin county. Original works built in 1865 to roll rails; 2 single and 12 double puddling furnaces, 10 heating furnaces, and 3 trains of rolls (9, 16, and 19-inch); product, skelp iron; annual capacity, 40,000 gross tons. (Formerly called Lochiel Iron and Steel Works.) R. C. Neal, President and Treasurer; John Y. Boyd, Vice-President; J. W. Covert, Secretary.

Hollidaysburg Iron Works, Hollidaysburg Iron and Nail Company, Hollidaysburg, Blair county. Built in 1860; one double and 7 single puddling furnaces, 2 heating furnaces, 4 trains of rolls, (one 8, one 16, and two 18-inch,) and 23 nail machines; product, merchant

bar, angle, channel, skelp, and hoop iron, flat and small T rails, and cut nails and spikes; annual capacity, 6,000 gross tons of bar iron. Brand, "IXL." J. D. Hemphill, President; J. W. Bracken, Treasurer and General Manager; Thomas F. Johnston, Secretary.

Howard Rolling Mills, Jenkins Brothers & Lingle, Bellefonte. Works at Howard, Centre county. Built in 1840; 3 double and 2 single puddling furnaces, 2 heating furnaces, and 2 trains of rolls (12 and 16-inch); steam and water power; product, muck bar and bar iron; annual capacity, 5,500 gross tons. Brand, "Juniata." *See Bloomaries.*

Jackson (The) and Woodin Manufacturing Company, Berwick, Columbia county. Built in 1872; 7 single and 5 double puddling furnaces, 5 heating furnaces, and 3 trains of rolls (one 9 and two 3-high 18-inch); product, merchant bar iron and forgings; annual capacity, 15,000 gross tons. Brand, "Berwick." Also manufactures cars and car-wheels and cast-iron gas and water pipe. C. H. Zehnder, President; Frederick H. Eaton, Vice-President; Wm. F. Lowry, Secretary and Treasurer; H. F. Glenn, General Manager.

Janson Iron Company, Columbia, Lancaster county. Building a rolling mill, to be equipped with 2 heating furnaces and 2 trains of rolls (one 12 and one 18-inch); product, to be merchant bar iron and steel; estimated annual capacity, 6,000 gross tons. Joseph Janson, President; Valentine Janson, Secretary and Treasurer; Frank Janson, Manager.

Juniata Rolling Mill, Hollidaysburg and Gap Iron Works, Hollidaysburg, Blair county. Built in 1866; 15 single puddling furnaces, rotary squeezer, 2 heating furnaces, 2 trains of rolls, and 30 nail machines; product, bar and pipe iron and cut nails and spikes; annual capacity, 7,200 gross tons. Owned by First Mortgage Bondholders, who are represented by Aug. S. Landis, of Hollidaysburg. For sale or lease. *See Gap Furnace, Juniata Valley.*

Lackawanna Iron and Steel Company, Scranton, Lackawanna county. New York office, 52 Wall st. Two works: North Works, formerly operated by the Lackawanna Iron and Coal Company, commenced in 1840; 33 heating furnaces and 10 trains of rolls, (one 12, two 18, two 20, three 23½, and two 36-inch,) and 2 hammers; product, light and heavy railroad steel rails, blooms, billets, angle bars, and merchant bars; annual capacity, 200,000 gross tons of steel rails and 30,000 tons of blooms, billets, angle bars, and merchant bars. Bessemer steel plant added in 1875; three 7-gross-ton converters, 6 pig-melting and 3 spiegel-melting cupolas; first blow made October 23, 1875; first rail rolled December 29, 1875; product, ingots for rails, billets, etc.; annual capacity in ingots, 260,000 gross tons. South Works, formerly operated by the Scranton Steel Company, built in 1881–3; two 9-gross-ton Bessemer steel converters, 9 pig-melting and 3 spiegel-melting cupolas; first blow made March 29, 1883, and first

steel rail rolled May 4, 1883; 8 heating furnaces and 3 trains of 32-inch rolls; product, steel rails; annual capacity, 260,000 gross tons of ingots and 235,000 gross tons of rails. Both works use anthracite culm for fuel under boilers. Brand, "Lackawanna." Walter Scranton, President, Warren Delano, Jr., Vice-President, H. V. Vultee, Treasurer, and J. P. Higginson, Secretary, New York; A. Williams, Assistant Secretary, C. W. McKinley, General Manager, and Henry Wehrum, Chief Engineer and Superintendent, Scranton, Pa. *See Lackawanna Furnaces, Upper Susquehanna Valley.*

Lalance (The) and Grosjean Manufacturing Company, Harrisburg, Dauphin county. Main office, 19 Cliff st., New York. Built in 1892–3 and first put in operation February 22, 1893; 4 forge fires, (2 run-out and 2 double hollow,) 10 heating furnaces, (2 bar and 8 sheet,) 5 trains of rolls, (one 22 and four 24-inch,) and one 5,000-lb. hammer; product, sheet iron and sheet steel; annual capacity, 8,000 gross tons. Brand, "L. & G." Florian Grosjean, President; Aug. J. Cordier, Vice-President; E. W. Martin, Secretary and Treasurer; J. J. Thomas, Manager.

Lebanon Iron Company, Lebanon, Lebanon county. Built in 1882–3; 7 double puddling furnaces, 2 heating furnaces, and 3 trains of rolls (20-inch puddle and 8-inch and 12-inch finishing); product, muck bar and refined iron; annual capacity, 13,500 gross tons of refined iron. Brands, "Titan," "Titan B," and "Titan BB." J. M. Shenk, President; A. Hess, Secretary and Treasurer; Thomas Evans, Superintendent; H. T. Hecht, Assistant Superintendent.

Lebanon Rolling Mills, Lebanon, Lebanon county. Built in 1867; 10 double puddling furnaces, 9 heating furnaces, 7 trains of rolls, and one hammer; product, boiler plates, sheets, skelp, merchant bar, washers, and muck bar; annual capacity, 15,000 gross tons of plates and skelp iron. A forge was added to the works in 1885–6; it has 6 fires and one hammer; product, charcoal scrap blooms, all consumed in the works; weekly capacity, 80 gross tons. Samuel E. Light, President; Richard Meily, Treasurer; J. H. Roberts, Secretary.

Lewisburg Rolling Mill, The Lewisburg Iron and Steel Company, Lewisburg, Union county. Built in 1884 and first put in operation November 10, 1884; 5 double puddling furnaces, one heating furnace, one 18-inch train of rolls, and 41 nail machines. W. D. Himmelreich, President; Alfred Hayes, Secretary and Treasurer.

Lickdale Iron Company, Lebanon. Works at Lickdale, Lebanon county. Built in 1886–7 and put in operation September 5, 1887; two 3-gross-ton Bessemer steel converters and one 24-inch blooming mill; product, soft steel billets for boiler, tank, shovel, and nail plate and miscellaneous purposes; annual capacity, 20,000 gross tons. Samuel Weiss, President; C. Penrose Sherk, Managing Director; J. L. Rutter, Secretary and Treasurer; Samuel Groh, Superintendent.

Lock Haven Nail Works, Charles M. O'Connor, Lock Haven, Clinton county. Built in 1886–7; first put in operation May 20, 1887; 4 double puddling furnaces, one heating furnace, 2 trains of rolls, (one 20-inch muck and one 22-inch plate,) and 20 nail machines; annual capacity, 50,000 kegs of nails. Idle and for sale.

Logan Iron and Steel Works, Logan Iron and Steel Company, Burnham, Mifflin county, 4 miles from Lewistown, on the M. & C. C. R. R. Office, 216 South Fourth st., Philadelphia. Started in 1869; one single and 10 double puddling furnaces, 5 heating furnaces, 3 hammers, and 5 trains of rolls (one 8, one 12, one 16, and two 18-inch); one 100,000-lb. and one 300,000-lb. testing machine for testing all kinds of iron, coupling links, chains, etc.; steam and water power; product, charcoal and refined bar iron, staybolt, crown bar, bridge iron, angles, bent truck sides, coupling links and pins, and switch iron. A chain works in process of erection. H. T. Townsend, President; R. F. Kennedy, Treasurer; S. H. Pitcher, Secretary; R. H. Lee, Superintendent. *See Emma Furnace, Juniata Valley. See Greenwood (charcoal) Furnace.*

Mahoning Rolling Mill, Mahoning Rolling Mill Company, Danville, Montour county. Philadelphia office, 330 Walnut st. Built in 1847 and rebuilt since; 10 double puddling furnaces, 6 heating furnaces, and 3 trains of rolls (two 16-inch skelp, fitted with Price automatic tables, and one 19-inch puddle and breaking down train); product, skelp iron; annual capacity, 27,000 gross tons. Also owns a large machine shop and foundry with a capacity of 250 tons per week. Abraham S. Patterson, President; William C. Frick, Treasurer and General Manager.

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 of bar iron; also soft wire rods for wire, flat and round head screws, and best grade of carriage bolts; annual capacity of bar mill, 2,250 gross tons; rod mill, 1,350 gross tons. Also operate wire-drawing plant and factory for the manufacture of all kinds of polished and cable chains. *See Hecla (charcoal) Furnace. See Bloomaries.*

Milton (The) Manufacturing Company, (incorporated,) Milton, Northumberland county. (Successor to Milton Manufacturing Company.) Built in 1886–7 and first put in operation in February, 1889; fitted with machinery for making wrought-iron washers cut from new plates rolled expressly for the purpose; 4 double puddling furnaces, 4 heating furnaces, 2 heavy steam forge hammers, 2 trains of rolls, (one muck and one 10-inch guide,) and automatic washer-cutting machines; also operates foundry and machine shops; also a bolt and nut factory, in which oil is used for fuel in the heating furnaces; product, muck bar, forgings, bar iron, washers, and bolts and nuts;

annual capacity of rolled iron, 9,000 gross tons. S. J. Shimer, President; E. S. Shimer, Secretary and Treasurer; G. S. Shimer, Superintendent.

Milton Nail Works, The C. A. Godcharles Company, Milton, Northumberland county. Built in 1875 and enlarged in 1889; 4 single and 9 double puddling furnaces, 3 heating furnaces, rotary squeezer, one 3-high puddle and one 20-inch finishing train of rolls, and 88 nail machines; product, iron and steel cut nails and spikes; annual capacity, 200,000 kegs. H. W. Fuller, Agent, New York.

Milton Rolling Mill and Forge, Milton Iron Company, Milton, Northumberland county. Put in operation December 1, 1872; 5 single and 3 double puddling furnaces, 4 coal and one gas heating furnace, rotary squeezer, 5 trains of rolls, (8, 10, 15, 18, and 20-inch,) 2 hammers, and other machinery for the production of car axles and iron and steel forgings; product, merchant bar iron, car axles, and forgings; annual capacity, 12,000 gross tons of bar iron, 3,500 gross tons of forgings, and 7,500 axles. Brand, "Milton." W. A. Schreyer, President; John Jenkins, General Manager; John M. Young, Treasurer; P. C. Johnson, Secretary and Assistant Treasurer.

Montour Iron and Steel Works, Montour Iron and Steel Company, Danville, Montour county. Built in 1845; 20 double puddling furnaces, 12 heating furnaces, 5 trains of rolls, (one 12, one 16, and three 20-inch,) and one 5-ton hammer; product, iron and steel rails, bar iron, spikes, splice bars, and structural shapes; annual capacity, 45,000 gross tons. S. P. Wolverton, President, Sunbury; T. F. McGinnes, General Superintendent, Danville; F. P. Kaercher, Secretary and General Manager, and W. A. Church, Treasurer, Twelfth and Market sts., Philadelphia. *See Furnaces in the Upper Susquehanna Valley.*

North Branch Steel Works, North Branch Steel Company, Danville, Montour county. Philadelphia office, Twenty-fifth st. and Washington ave. Mill formerly known as the Co-operative Iron and Steel Works; established in 1871; open-hearth steel plant added in 1882–3 and first steel made February 15, 1883; one 15-gross-ton open-hearth steel furnace; annual capacity, 11,000 gross tons. Bessemer steel works built in 1887–8; two 4-gross-ton converters, 2 Hainsworth soaking pits, and one 32-inch reversing blooming train; annual capacity, 120,000 gross tons of ingots. Rolling mill contains 6 coal and 2 gas heating furnaces and 2 trains of rolls, (22-inch shape and rail and 28 x 84 inch plate.) Product, steel boiler, ship, and tank plates, shovel plates, light and heavy T and street rails, blooms, slabs, shapes, machinery and agricultural steel, and sheared skelp iron; annual capacity, 75,000 gross tons of rails and shapes and 11,000 gross tons of plates and skelp iron. Edward Samuel, President; F. P. Howe, Vice-President and General Manager; William Selfridge, Treas-

urer; Charles M. Griffith, Secretary; R. K. Polk, Manager. *See North Branch Furnaces, Upper Susquehanna Valley.*

Northumberland Iron and Nail Works, Van Alen & Co., Northumberland, Northumberland county. Built in 1867; one double and 8 single puddling furnaces, one large regenerative gas heating furnace, one 16-inch train of muck and plate rolls, and 53 nail machines having Coyne's patent automatic nail assorters and Morrison's spike rejecter attached; product, iron and steel nails, axe bar, nail plate, and muck and scrap bar; annual capacity, 6,000 gross tons of muck bar, 8,000 gross tons of nail plate, and 150,000 kegs of nails. Also have a foundry and machine shop. Brand, "Van Alen & Co."

Paxton Rolling Mills, Harrisburg, Dauphin county. Old mill built in 1869; 7 double puddling furnaces, 5 coal heating furnaces, 3 trains of rolls, (one 22-inch puddle, one 30 x 72 inch plate, and one 30 x 96 inch plate,) and one 3-ton hammer. New mill, built in 1892–3; 3 gas heating furnaces and one train of 3-high rolls, 34 inches x 126 inches. Product, plate iron and steel; total annual capacity, 48,000 gross tons. Brand, "Paxton." John Q. Denney, Superintendent. Owned by The McCormick Company. *See Harrisburg Nail Works. See Paxton Furnaces, Lower Susquehanna Valley.*

Penn Iron Works, Penn Iron Company Limited, Lancaster, Lancaster county. First put in operation in April, 1873; 7 double puddling furnaces, 4 heating furnaces, 4 trains of rolls, (18-inch puddle, 8 and 10-inch guide, and 16-inch bar,) and 2 hammers; product, merchant bar iron, hammered and rolled axles, car forgings, bridge work, fish joints, bolts, railroad, ship, and wharf spikes, bolt ends, etc.; annual capacity, 15,000 gross tons. Brand, "Penn." A. J. Steinman, Chairman; C. S. Foltz, Secretary and Treasurer.

Pennsylvania Bolt and Nut Company, Lebanon, Lebanon county. First put in operation in January, 1883; burned and rebuilt in 1886; 10 double puddling furnaces, 5 coal and one Smith gas heating furnace, and 6 trains of rolls (one 20-inch puddle, and one 8, one 10, two 12, and one 16-inch finishing); product, bar iron, bolts, nuts, washers, etc.; annual capacity, 35,000 gross tons. Arthur Brock, President; Edward R. Coleman, Vice-President; James Lord, Secretary and Treasurer; W. B. Middleton, Superintendent.

Pennsylvania Steel Works, Pennsylvania Steel Company, Steelton, Dauphin county. Office, 208 South Fourth st., Philadelphia; New York office, 2 Wall st.; Boston office, 70 Kilby st. Bessemer steel works built in 1865–7; two 7-gross-ton and three 8-gross-ton converters; first blow made in June, 1867; annual capacity, 320,000 gross tons of ingots, worked into blooms and slabs for structural purposes, plates, nail slabs, rails of all sections, street rails, railroad axles, crossings, frogs, switches, steel castings, and merchant steels generally. Rail mill built in 1867–8; blooming mill added to the rail mill

in 1875–6 and put in operation in December, 1876; annual capacity, 180,000 gross tons of rails. No. 2 blooming mill, reversing, built in 1885–6 and put in operation in 1886. Hammer mill contains 4, 6, and 12-ton hammers. Open-hearth steel plant, containing two 15-gross-ton furnaces, erected in 1875; furnaces removed in 1883 and two 30-ton furnaces erected; one 5-ton furnace added in 1889, two 15-ton furnaces added in 1890, one 7-ton furnace added in 1892, and six 50-ton furnaces added in 1893, three furnaces being put in operation in that year; annual capacity, 75,000 gross tons of ingots, worked into boiler, structural, and special steels. Merchant mill, erected in 1883, contains one 13 and one 20-inch train of rolls; billet mill, erected in 1887, contains one 20-inch train; slabbing mill, erected in 1893, contains one set of housings and includes two horizontal rolls 26 inches in diameter and two vertical rolls 20 inches in diameter. There are also machine shops and the necessary repair shops connected with the works. Luther S. Bent, President; Edmund Smith, 1st Vice-President; F. W. Wood, 2d Vice-President; E. F. Barker, Secretary; Edmund N. Smith, Treasurer; E. C. Felton, General Manager; H. H. Campbell, Superintendent; Frank Tenney, Assistant Superintendent. Luther S. Bent and the Girard Life Insurance, Annuity, and Trust Company, of Philadelphia, Receivers. Selling agents, S. W. Baldwin, New York; Charles S. Clark, Boston. *See Furnaces in the Lower Susquehanna Valley.*

Portage Iron Company Limited, Duncansville, Blair county. New York office, A. R. Whitney & Co., 29 Broadway. Built in 1839 and rebuilt in 1882–3; enlarged in 1890; 37 single puddling furnaces, 6 heating furnaces, and 6 trains of rolls (18 and 20-inch muck, 15-inch bar, 7 and 10-inch hoop, and 8-inch guide); product, iron and steel bars, bands, angles, hoops, and cotton-ties; annual capacity, 25,000 gross tons of finished iron and steel. Brand, "Portage." A. R. Whitney, President, J. P. Meday, Vice-President, R. K. Hance, Secretary, and D. A. Nesbitt, Treasurer, New York; W. G. Merriman, General Manager, Duncansville.

Rohrerstown Rolling Mill, Rohrerstown, Lancaster county. Enlarged in 1872 and 1890; 7 double puddling furnaces, rotary squeezer, and one train of rolls; product, muck bar; annual capacity, 8,000 gross tons. (Formerly known as the Franklin Iron Works.) Owned by the Estate of Henry S. Eckert, Reading. Idle and for sale.

Safe Harbor Rolling Mill, Safe Harbor, Lancaster county. Built in 1848; one single and 18 double puddling furnaces, 8 heating furnaces, and 2 trains of rolls; product, muck bar. Idle and for sale. Address, David Reeves, 410 Walnut st., Philadelphia.

Standard Steel Works, 220 South Fourth st., Philadelphia. Works at Burnham, Mifflin county. Built in 1869; 12 heating furnaces, 5 hammers, (10-ton and 15-ton Tannet & Walker, 7-ton Sellers, 30-cwt. Mor-

ris, and 25-cwt. Sellers,) and 2 tire mills; product, steel locomotive and car tires, forgings, wrought iron wheel centres, and wheels. Specialty, locomotive and car-wheel tires and steel-tired wheels. Ingots obtained from the Otis Steel Company Limited, of Cleveland, Ohio. Brand, the word "Standard" between two anchors. William P. Henszey, President; Theo. J. Lewis, Secretary; William Burnham, Manager and Treasurer; J. P. Stevenson, Superintendent.

Sunbury Iron Works, Sunbury, Northumberland county. Built in 1883 and first put in operation in August, 1883; 3 single and 3 double puddling furnaces, one heating furnace, 2 trains of rolls, and 41 cut-nail machines; annual capacity, 120,000 kegs of cut nails. Brand, "Sunbury." (Formerly called Sunbury Nail Works.) James C. Packer, President; John F. Derr, Treasurer; N. W. Snyder, Secretary. Idle and for sale.

Susquehanna Iron Works, Susquehanna Iron Company, Columbia, Lancaster county. Built in 1860; 13 single puddling furnaces, 3 heating furnaces, and 3 trains of rolls; product, merchant bar iron; annual capacity, 10,500 gross tons. William Patton, President and General Manager; J. E. Schall, Secretary and Treasurer.

Taggarts & Howell, Northumberland, Northumberland county. Built in 1883 and first put in operation in January, 1884; 10 double puddling furnaces, 2 heating furnaces, two 20-inch trains of rolls, and 95 nail machines; product, iron and steel nails and muck bar; annual capacity, 200,000 kegs of cut nails and 12,000 gross tons of muck bar. Brand, "Taggarts & Howell's Mills."

Tyrone Forges, The Tyrone Iron Company, Tyrone, Blair county. Office, Harrisburg. Forges established in 1809; rebuilt in 1870; rolling mill added in 1883; 3 regenerative gas heating furnaces and one 16-inch train of rolls; product, charcoal boiler-tube skelp; annual capacity, 11,000 gross tons. Forges have 8 fires, one double run-out, and one hammer; the blast is operated by water-power and the hammer by steam-power; product, charcoal blooms, all consumed in the rolling mill; annual capacity, 6,000 gross tons. John Y. Boyd, President, and R. C. Neal, Secretary and Treasurer, Harrisburg; H. L. Sholly, Superintendent, Tyrone.

Valentine (The) Iron Company, Bellefonte, Centre county. Built in 1798; 4 double puddling furnaces and one train of rolls; water-power; product, muck bar; annual capacity, 4,000 gross tons. Brand, "Nittany." J. W. Gephart, President; Robert Valentine, Secretary and Treasurer. *See Furnaces in the Juniata Valley.*

Watsontown Nail Works, D. Frank Wagner, Watsontown, Northumberland county. Built in 1886–7 and put in operation in May, 1887; 3 double puddling furnaces, one heating furnace, one forge fire, one 2-high 18-inch train of rolls, and 25 nail machines; product, muck bar and iron and steel nails; annual capacity, 65,000 kegs of nails.

West End Rolling Mill Company Limited and Chain Works, Lebanon, Lebanon county. Built in 1872–4; 2 single and 2 double puddling furnaces, 2 heating furnaces, 3 trains of rolls, and one hammer; product, bar and horse-shoe iron, skelp, chains, and car links; annual capacity, 5,000 gross tons. Chain works erected in 1884. J. Henry Miller, Chairman; H. M. Capp, Secretary and Treasurer; John R. Evans, Superintendent of rolling mill; Jacob Capp, Superintendent of chain works.

Williamsport Iron and Nail Works, Williamsport Iron and Nail Company, Williamsport, Lycoming county. Built in 1873–4; 5 double puddling furnaces, one coal and one Smith gas heating furnace, 2 trains of rolls, (17 and 18-inch,) and 80 nail machines; product, iron and steel nails and muck bar; annual capacity, 150,000 kegs of nails and 3,600 gross tons of muck bar.

York Rolling Mill, Steacy and Denney Company, (incorporated,) York, York county. Built in 1869; 8 double puddling furnaces, 4 heating furnaces, 3 trains of rolls, (one 18 and two 22-inch,) and 2 hammers; product, plate and skelp iron; annual capacity, 8,000 gross tons. Brand, "York." John Q. Denney, President; J. W. Steacy, Treasurer and General Manager; Frank H. Steacy, Secretary. *See Aurora Furnace, Lower Susquehanna Valley.*

Number of rolling mills and steel works in Central Pennsylvania: 51 completed and 1 building. Of these 5 make Bessemer steel and 2 make open-hearth steel.

PITTSBURGH AND ALLEGHENY COUNTY.

Allegheny, Monongahela, and Birmingham Iron Works, Oliver Iron and Steel Company, Pittsburgh. Lower mills situated at Wood's Run Station, Allegheny City; upper mills situated on Tenth and Fifteenth sts., South Side, Pittsburgh. Operations first begun in 1863; 123 single puddling furnaces, 30 heating furnaces, 14 hammers, and 19 trains of rolls (five 8, three 10, four 16, four 20, one 25, one 32, and one 30-inch universal); product, iron and steel plates, angles, beams, channels, and structural shapes, skelp iron, light T rails, bar iron, etc.; part of the iron is used in the production of wrought-iron hardware, consisting of bolts, nuts, washers, hinges, etc.; annual capacity, 110,000 gross tons. Steel works, built in 1884, contain two 2-ton Clapp-Griffiths stationary converters for the production of steel for miscellaneous uses; first blow made March 25, 1884; annual capacity in ingots, 44,000 gross tons. Fuel used, natural gas and bituminous coal. Henry W. Oliver, President; John Phillips, Vice-President; E. G. Applegate, Secretary; James B. Oliver, Treasurer; John C. Oliver, General Manager.

American Iron and Steel Works, Jones & Laughlins Limited, Pittsburgh. Works in the Twenty-fourth and Twenty-fifth wards, South

Side. Built in 1852; 92 single puddling furnaces, 40 heating furnaces, 20 trains of rolls, and 3 hammers. Bessemer steel works built in 1886; two 9-gross-ton converters; first blow made August 19, 1886; product, iron and steel bars, rails, plates, sheets, structural shapes, steel billets, railroad splice bars and bolts, boat and railroad spikes, machine and bridge bolts, chains, railroad coupling links and pins, forgings, cold-rolled shafting, finger bars, couplings, hangers, pillow blocks, and pulleys; annual capacity, 350,000 gross tons of steel billets and blooms, 50,000 gross tons of muck bar, and 450,000 gross tons of finished materials. Connected with the works are two foundries, a chain factory, a bolt factory, and a machine shop. Annual capacity of the foundries, 20,000 gross tons of castings; of the cold-rolling department, 25,000 gross tons of shafting and finger bars; of the chain factory, 10,000 gross tons of chain and railroad coupling links; of the bolt factory, 8,000 gross tons of bolts, spikes, and railroad coupling pins; and of the shops for fitting structural materials, 24,000 gross tons. Machine shops are equipped with tools of modern design, and can produce pulleys and balance wheels up to 30 feet in diameter and handle masses weighing 50 tons. Brand, "American." Fuel used, natural gas, producer gas, and bituminous coal. B. F. Jones, Chairman; G. M. Laughlin, Secretary and Treasurer.

Anchor Nail and Tack Works and Central Expanded Metal Company, Chess Brothers, Pittsburgh. Two mills: Works on Nineteenth st., South Side, Pittsburgh, built in 1842; 24 single puddling furnaces, 6 heating furnaces, 4 trains of rolls, 90 cut nail machines, 76 tack machines, and 2 hammers; product, cut nails, tacks, shoe nails, etc.; fuel used, coal; rolling mill and nail machines idle. Works at Rankin Station built in 1886 and enlarged in 1888; one gas heating furnace and one 3-high 24-inch plate train; product, light steel plates for straps, nails, tacks, stamping, and die work; 3 expanded metal machines for producing steel fire-proof lathing, fencing, screens, etc.; fuel used, coal.

Black Diamond Steel Works, Park, Brother & Co. Limited, Pittsburgh. Decline to give information concerning their works.

Byers (A. M.) & Co., (incorporated,) Pittsburgh. Works on Sixth st., South Side. Built in 1862–3; 25 single puddling furnaces, 5 heating furnaces, one scrap furnace, and 3 trains of rolls; product, skelp iron, all consumed in the manufacture of pipe; annual capacity, 13,500 gross tons. Also a galvanizing department; also 2 pipe mills to make lap and butt-welded wrought-iron gas, steam, and water pipe, oil-well tubing, casing, boiler flues, etc. Fuel used, natural gas and coal.

Carbon Steel Company, Thirty-second st., Pittsburgh. New York office, Mills Building. Built in 1862 and rebuilt in 1888; 4 Siemens heating furnaces, 2 direct air heating furnaces, 5 soaking pits, two 15-gross-ton open-hearth steel furnaces built in 1888, two 30-ton furnaces

added in 1890, two 30-ton furnaces added in 1892, two 30-ton furnaces added in 1893, and 3 trains of rolls (one 22-inch sheet mill, one 36-inch universal mill, and one 124-inch plate mill); product, open-hearth steel ingots, universal rolled plates, and sheared plates and sheets of all sizes; annual capacity, 100,000 gross tons of ingots and 60,000 gross tons of finished plates and sheets. Fuel used, natural gas exclusively. C. M. Raymond, President; H. W. Lash, General Manager; A. H. Keith, General Agent.

Carnegie (The) Steel Company, Limited, general offices and post-office address, 42–48 Fifth ave., Pittsburgh. Five mills in Allegheny county: Edgar Thomson Steel Works, at Bessemer, on Pennsylvania, Baltimore and Ohio, and Pittsburgh and Lake Erie railroads; built in 1874–5 by the Edgar Thomson Steel Company, Limited, and enlarged by Carnegie Brothers & Co., Limited; first blow made August 25, 1875, and first steel rail rolled September 1, 1875; four 15-gross-ton Bessemer converters, 4 spiegel cupolas, (molten metal used, brought direct from Edgar Thomson Furnaces in ladles,) 22 Siemens heating furnaces, one 3-high 40-inch blooming mill, one power and one hydraulic shear, two 3-ton hammers for shearing and chipping blooms, two 3-high rail trains, (one 23-inch and one 24-inch,) and hot saws and finishing machinery; forge contains one 6-ton hammer and 2 heating furnaces; product, Bessemer steel rails and billets; annual capacity, 500,000 gross tons of ingots, 420,000 gross tons of rails, and 900 gross tons of billets; brand, "E. T.;" fuel, natural gas; James Gayley, General Superintendent. Duquesne Steel Works, at Cochran, on Pittsburgh, Virginia, and Charleston Railway; built in 1886–8 by the Allegheny Bessemer Steel Company and capacity increased in 1891–2 by Carnegie Brothers & Co., Limited; first blow made in February, 1889, and first rail rolled in March, 1889; two 10-gross-ton Bessemer converters, 14 soaking pits, and 4 trains of rolls (two 21-inch continuous and reversing, one 26-inch, and one 28-inch); rails and billets rolled from ingot at initial heat; annual capacity, 300,000 gross tons of rails or billets; fuel, natural gas; Thomas Morrison, Superintendent. Homestead Steel Works, at Munhall, on Pittsburgh, Virginia, and Charleston Railway; Bessemer department built in 1880–1 by The Pittsburgh Bessemer Steel Company, Limited, and enlarged by Carnegie, Phipps & Co., Limited; first blow made March 19, 1881; first steel rail rolled August 9, 1881; open-hearth department built by Carnegie, Phipps & Co., Limited; 7 furnaces completed in October, 1886, one in July, 1890, and 8 in September, 1890; two 10-gross-ton Bessemer converters, one 28-inch blooming mill, one 23-inch and one 33-inch train for structural shapes, one 10-inch mill, one 32-inch slabbing mill, one 40-inch cogging mill, one 35-inch beam mill, one 119-inch plate mill; one 12-gross-ton, six 20-gross-ton, eight 25-gross-ton, and one 35-gross-ton

open-hearth furnaces; press shop for forging and machine shop for finishing armor plate; product, blooms, billets, structural shapes, bridge steel, and boiler, armor, ship, and tank plate; annual capacity, 300,000 gross tons of Bessemer steel ingots and 180,000 gross tons of open-hearth steel ingots; fuel, natural gas; Charles M. Schwab, General Superintendent. Upper Union Mills, at Thirty-third st., Pittsburgh; built in 1863–4 by the Cyclops Iron Company and Carnegie, Kloman & Co.; enlarged by Carnegie Brothers & Co., Limited, and Carnegie, Phipps & Co., Limited; 3 coal, 11 single and 5 double gas heating furnaces, and 6 trains of rolls (one 8, one 12, one 18, and three 20-inch); product, structural steel, steel bars, and steel universal mill plates; annual capacity, 77,000 gross tons; fuel, natural gas and coal; P. R. Dillon, General Superintendent. Lower Union Mills, at Twenty-ninth st., Pittsburgh; built in 1861–2 by Kloman & Phipps and enlarged by Wilson, Walker & Co., Limited, and by Carnegie, Phipps & Co., Limited; 28 heating furnaces, 4 trains of rolls, (one 9, one 12, one 15, and one 78-inch,) 18 forge fires, and 14 hammers (700 to 7,000 lbs.); product, universal mill plates, car forgings, bridge work, angles, axles, links, pins, and bar steel; annual capacity, 45,000 gross tons; fuel, natural gas and coal; P. R. Dillon, General Superintendent. General officers of the company: H. C. Frick, Chairman; J. G. A. Leishman, Vice-Chairman; F. T. F. Lovejoy, Secretary and Auditor; H. M. Curry, Treasurer; L. C. Phipps, Assistant Treasurer. Sales offices: Atlanta, Gould Building; Boston, Bell Telephone Building; Buffalo, Chapin Block; Chicago, Home Insurance Building; Cincinnati, Neave Building; Cleveland, Perry-Payne Building; Denver, People's Bank Building; Detroit, 122 Griswold st.; Minneapolis, Guaranty Building; New York, 44–46 Wall st.; Philadelphia, 203 South Fourth st.; St. Louis, Bank of Commerce Building; San Francisco, 258 Market st. *See Beaver Falls Mills, Western Pennsylvania. See Furnaces in Allegheny County.*

Chartiers (The) Iron and Steel Company Limited, Iron Exchange, Wood and Water sts., Pittsburgh. Works at Carnegie, Allegheny county. Built in 1883–4 and put in operation August 13, 1884; 4 single puddling furnaces, 11 heating furnaces, 3 trains of rolls, and one 4-ton hammer; product, sheet iron and sheet steel; annual capacity, 4,500 gross tons. Brand, "Chartiers." Fuel used, natural gas exclusively. John C. Kirkpatrick, Chairman; D. A. Carter, Secretary; M. W. Leech, Treasurer; John Henry, Superintendent.

Clinton Rolling Mill, Clinton Iron and Steel Company, 208 Wood st., Pittsburgh. Mill on the South Side. Built in 1846; 7 double and 19 single puddling furnaces, 11 heating furnaces, and 6 trains of rolls; product, bars, sheets, and plates; total annual capacity, 31,500 gross tons. Fuel used, natural gas and coal. James W. Friend, President; F. N. Hoffstot, Treasurer. *See Clinton Furnace, Allegheny County.*

Crescent Steel Works, Crescent Steel Company, 136 First avenue, Pittsburgh. Works, Forty-ninth to Fifty-first sts. Built in 1865; 32 heating furnaces, 6 annealing furnaces, 9 trains of rolls, one 60-pot, two 36-pot, and two 24-pot crucible steel-melting furnaces, and 18 hammers; product, hammered and rolled bar steel, and cast, spring, and edge-tool steel; specialty, fine steel; annual capacity, 11,000 gross tons. Brand, "Crescent." Also has a forge for making iron for its own use, a drill-rod shop, a wire shop, and a shop for making coiled springs. Fuel, natural gas, coal, and coke. Works under the same management as when operated in the name of Miller, Metcalf & Parkin.

Eagle Rolling Mill and Tube Works, J. W. Friend & Co., Pittsburgh. Works, Thirty-fourth ward, South Side. Rolling mill built and put in operation in 1848; 21 single puddling furnaces, 4 steel-heating furnaces, and 3 trains of rolls (one 16 and two 20-inch); product, muck bar. Fuel used, coal and natural gas. Tube works built in 1884.

Elba Iron Works Department, Oil Well Supply Company, Pittsburgh. Works, Second ave., Twenty-third ward. Built in 1862; 30 single puddling furnaces, 6 heating furnaces, and 4 trains of rolls (one 8, one 10, one 18-inch, and one muck train); product, skelp iron, used at the company's tube works; annual capacity, 35,000 gross tons. Fuel used, bituminous coal. John Eaton, President; E. H. Cole, Vice-President; E. T. Howes, Treasurer; K. Chickering, Secretary.

Etna Iron Works, Spang, Chalfant & Co., Pittsburgh. Office, 66, 68, and 70 Sandusky st., Allegheny. Works at Etna, Allegheny county. Built in 1828; one double and 27 single puddling furnaces, 9 heating furnaces, 5 trains of rolls, (one 8, one 12, and one 16-inch, one sheet train, and one muck train,) and one hammer; product, bar and pipe iron; annual capacity, 25,000 gross tons. Also make all kinds of wrought-iron pipe. This was the first mill to use natural gas exclusively; it still uses it exclusively. George A. Chalfant, Manager.

Fort Pitt Foundry, Mackintosh, Hemphill & Co., Pittsburgh. Works, foot of Twelfth st. Open-hearth steel works added in 1882 and started in August of that year; new steel foundry erected in 1887 and started in September of that year; two 12-gross-ton and two 20-gross-ton open-hearth furnaces; product, steel castings; annual capacity, 16,500 gross tons. Fuel used, natural gas. James Hemphill, Chairman; W. Wade, Secretary; Pennock Hart, Treasurer; N. A. Hemphill, Superintendent.

Glendon Rolling Mill, Dilworth, Porter & Co. Limited, Pittsburgh. Works on the South Side. Built in 1857; 32 heating furnaces, 13 automatic and 21 hand spike machines, and 7 trains of rolls, (four 8, one 9, and two 16-inch,) 3 trains being continuous for spike steel and 2 for merchant steel; product, steel railroad and boat spikes and merchant steel; annual capacity, 45,000 gross tons of spikes and

13,500 gross tons of bar steel. Spike brand, "Dilworth, Porter & Co.;" merchant steel brand, "Glendon." Fuel used, natural gas exclusively. Charles R. Dilworth, Chairman; Samuel T. Owens, Vice-Chairman; Joseph R. Dilworth, Secretary and Treasurer.

Hainsworth Steel Company, Twenty-seventh and Smallman sts., Pittsburgh. Bessemer steel plant built in 1881 and remodeled in 1891; two 6-gross-ton converters; first blow made August 26, 1881; 3 heating furnaces and one train of 32-inch rolls; product, billets, blooms, and slabs, from 4 in. x 4 in. to 12 in. x 12 in.; annual capacity, 120,000 gross tons. Fuel used, natural gas and coal. (Formerly operated by the Pittsburgh Steel Casting Company.) George T. Oliver, President; Stephen W. Tener, Secretary. *See Edith Furnace, Allegheny County.*

Howe, Brown & Co. Limited, Penn ave. and Seventeenth st., Pittsburgh. Established in 1859; 13 single puddling furnaces, 40 heating furnaces, 17 hammers with 22 furnaces, 6 smith-shop fires and one smith-shop steam hammer, one double and 4 single annealing furnaces, six 24-pot and two 30-pot crucible steel-melting furnaces, 11 trains of rolls, (one 9, one 10, one 12, three 16, three 18, one 22, and one 28-inch,) one rake-tooth factory with 12 bending machines and 12 heating furnaces, one machine shop with 8 lathes, planers, etc.; product, crucible cast steel in bars, sheets, rods, plates, and special forgings; annual capacity, 11,000 gross tons of ingots. The open-hearth steel department has one 30-gross-ton furnace, built in 1886, and one 20-gross-ton furnace, built in 1890; product, spring, plow, and machinery steel, and plates for boilers, hulls of vessels, etc.; annual capacity, 7,200 gross tons of plates, 3,600 gross tons of machinery steel, 1,800 gross tons of plow steel, and 1,800 gross tons of spring steel. Fuel used, natural gas, oil, and coal. Brand, "Howe." James W. Brown, Chairman; W. R. Howe, Vice-Chairman; Geo. A. Howe, Secretary; T. H. Childs, Treasurer. Branch offices, 127 Oliver st., Boston; 55-59 North Jefferson st., Chicago; 93 John st., New York. Selling agents, The Condit-Fuller Company, Cleveland; Sligo Iron Store Company, St. Louis; F. I. Stone, Chattanooga; Todd-Donigan Iron Company, Louisville; Einwechter & Wyeth, Philadelphia; Charles H. Dodd & Co., Portland, Oregon.

Juniata Iron and Steel Works, Shoenberger & Co., Pittsburgh. Works, Fifteenth and Etna sts. Established in 1824; 17 gas producers; 13 single puddling furnaces, 13 heating furnaces, 1 soaking pit, 4 annealing furnaces, one 5-ton hammer, 12 trains of rolls, (1 muck train, one 8, two 9, and one 16-inch bar, one 36 x 24-inch, one 60 x 24-inch, and one 72 x 24-inch sheet train, one 31 x 112-inch plate train, one nail-plate train, one blooming-mill train, and one continuous train,) and 12 horse-shoe machines; two 12-gross-ton open-hearth steel furnaces, one built in 1879 and one built in 1881; two 6-gross-ton Bessemer converters with modern appliances; first blow made March

15, 1886. Product, steel plates, sheet steel, fire-box steel, iron and steel horse and mule shoes, steel blooms and billets, horse-shoe bar, and toe calks; annual capacity, 100,000 gross tons. Fuel used, natural gas, oil, and bituminous coal.

Kensington Iron Works, H. Lloyd's Sons Company, (incorporated,) Pittsburgh. Works on Second ave. Built in 1828; 20 single puddling and scrapping furnaces, 6 heating furnaces, and 4 trains of rolls; product, bar, sheet, and plate iron, flat rails, and 12 to 30-lb. T rails; annual capacity, 9,000 gross tons. Fuel used, coal.

Keystone Rolling Mill, Keystone Rolling Mill Company Limited, Pittsburgh. Works, Second ave. near Morris st., Soho. Built in 1865; 36 single puddling furnaces, 7 heating furnaces, and 4 trains of rolls; product, skelp, axe, and bar iron and cotton-ties; annual capacity, 22,500 gross tons. Brand, "Keystone." Fuel used, coal. James McCutcheon, Chairman; N. M. McDowell, Secretary; James H. McCutcheon, Treasurer; John D. Evans, Superintendent.

La Belle Steel Works, La Belle Steel Company, Pittsburgh. Works, Ridge ave. and Rebecca st., Allegheny. Built in 1863; two 25 and two 30-ton converting furnaces, one single and 2 double puddling furnaces, 22 forge fires, 21 heating furnaces, one large Swindell gas heating furnace, one 36-pot and two 42-pot crucible steel-melting furnaces, 13 hammers, 6 trains of rolls, (one 9, one 10, one 14, one 16, one 20, and one 24-inch,) and two 15-gross-ton open-hearth steel furnaces, one built in 1886 and one built in 1887; product, merchant steel of every description; also, rake teeth for sulky rakes, springs, and iron and steel axles; annual capacity, 15,000 gross tons. Brand, "La Belle." Fuel used, coal. (Formerly operated under the name of Smith Brothers & Co.) Andrew D. Smith, President; Frank B. Smith, Secretary; Hugh D. Smith, Treasurer; Severn P. Ker, Assistant Secretary. Selling agents, Wetherell Brothers, 31 Oliver st., Boston, and 93 Liberty st., New York.

Liggett Spring and Axle Company, Pittsburgh. Works, Spruce and Market sts., Allegheny. Built in 1865 and 1882; one 16-inch train of rolls, used to reroll iron and steel into shapes for the manufacture of axles; product, buggy and wagon axles. Fuel used, natural gas and coal. H. T. Collins, President; George Wright, Jr., Treasurer; W. F. Black, Secretary.

Linden (The) Steel Company, general office and works, Second ave., Pittsburgh. Open-hearth steel works, built in 1879, contain one 25-gross-ton and two 15-gross-ton open-hearth steel furnaces, 16 heating furnaces, one blooming mill, one 31 x 108-inch plate mill, one 18-inch bar mill, one 20-inch sheet train, two 10-inch trains, 6 hammers, and cold-condensed-shafting machinery; product, open-hearth steel ingots, blooms, billets, and slabs, rounds, squares, and flats, boiler, tank, armor, and ship plates, sheets, tool, spring, tire, and ag-

ricultural steel, and cold-condensed shafting; unusual shapes a specialty; daily capacity, double turn, 105 gross tons. Brand, "Linden." Fuel used, natural gas, coal, and oil. W. J. Lewis, President; Henry Lloyd, Vice-President and Treasurer; Cephas Taylor, Secretary; W. J. Lewis, Jr., Assistant Secretary.

Lockhart Iron and Steel Company, Pittsburgh. Works (Vulcan Forge and Iron Works) at Chartiers Station, P. & L. E. R. R., McKee's Rocks P. O. Forge built in 1877; rolling mill built in 1882; 31 single puddling furnaces, 5 forge fires, 2 upsetting machines, 7 heating furnaces, 3 trains of rolls, (9, 16, and 23-inch,) and 4 hammers; product, bar iron, bridge iron, soft steel in bars, and hexagon, grooved, and angle iron and steel; annual capacity, 16,500 gross tons of finished rolled iron and steel. Brands, "Vulcan" and "Lockhart." Fuel used, natural gas exclusively. Charles Lockhart, President; T. J. Gillespie, Secretary and Treasurer.

McKeesport Iron Works, W. Dewees Wood Company, general offices and works, McKeesport, Allegheny county. Branch office, 111 Water st., Pittsburgh. Built in 1851; 12 forge fires, 12 single puddling furnaces, 2 refinery fires, 7 annealing furnaces, 31 heating furnaces, 16 trains of rolls, (2 bar and 14 sheet,) and 10 hammers; open-hearth steel department contains two 20-gross-ton open-hearth furnaces built in 1889-90; product, sheet iron and sheet steel, both common and planished; specialty, patent planished sheet iron and sheet steel; annual capacity, 18,000 gross tons. Trade-mark, a Russian bear in the talons of an American eagle. Fuel used, natural gas and coal. W. Dewees Wood, President; Richard G. Wood, Vice-President; Alan W. Wood, Secretary and Treasurer; Thomas D. Wood, Superintendent.

Millvale Rolling Mill, Millvale Iron Company Limited, lessee, Bennett, Millvale borough, Allegheny county. Built in 1850, burned December 11, 1881, and rebuilt in 1882; 10 Danks rotary puddling furnaces, 4 double, one double-double, and 21 single puddling furnaces, 18 heating furnaces, 10 trains of rolls, and one hammer. Open-hearth steel plant built in 1886; two 15-gross-ton open-hearth furnaces; steel blooming mill, with one 31-inch, one 60-inch, and one 96-inch plate mill and a universal mill for reworking material for structural iron, built in 1887-8. Product, iron and steel plates; total annual capacity, 50,000 gross tons. Fuel used, bituminous coal and producer gas. J. W. Friend, Chairman; F. N. Hoffstot, Secretary and Treasurer; J. S. Scobey, Manager.

Monongahela Iron and Steel Company, Hay's Station, P. & L. E. R. R. Post-office address, Box 215, Pittsburgh. Built and put in operation in 1891; 20 single puddling furnaces and one train of rolls; product, muck bar and low-phosphorus bars for steel mills; annual capacity, 13,500 gross tons. Fuel used, coal. Robert A. Carter, President and Manager; H. L. Brunt, Secretary; Robert McKibbin, Treasurer.

National Tube Works Company, McKeesport, Allegheny county. Rolling Mill Department built from 1879 to 1890; equivalent of 120 single puddling furnaces, 25 heating furnaces, 13 trains of rolls, 4 steam hammers, 26 charcoal knobbling fires, 2 refinery fires, and one 18-gross-ton open-hearth steel furnace, the latter built in 1886; product, muck bar, refined charcoal metal, charcoal iron blooms, and boiler tube and pipe iron and steel; total annual capacity, 145,000 gross tons; fuel used, coal and producer gas; brand, "National;" C. I. O'Connor, Superintendent of Rolling Mill Department. Bessemer Steel Department built in 1892–3; two 8-gross ton converters, three 10-foot cupolas, three 5-hole soaking pits, and one 36-inch reversing blooming train of rolls; first blow made December 14, 1893; product, slabs and billets; annual capacity, 175,000 gross tons; William B. Schiller, Manager, and Taylor Allderdice, Superintendent, Steel Department. D. W. Hitchcock, President; P. W. French, Secretary; A. F. Luke, Treasurer; E. C. Converse, Vice-President and General Manager; J. H. Pierce and Horace Crosby, Assistant Managers. *See Republic Iron Works. See Monongahela Furnaces, Allegheny County.*

Oliver and Roberts Wire Company, 801 Bingham st., Pittsburgh. Rod mill built in 1884 and first put in operation June 12, 1884; 4 heating furnaces and 4 trains of rolls (two 9, one 12, and one 18-inch); product, wire rods; annual capacity, 70,000 gross tons. Wire department contains all necessary machinery for the manufacture of plain and barb wire and wire nails; number of wire nail machines, 137; annual capacity, 75,000 gross tons of drawn wire, 25,000 gross tons of barb wire and fencing specialties, and 700,000 kegs of wire nails. Fuel used, coal, oil, and natural gas. George T. Oliver, President; William H. Cassidy, Treasurer; Stephen W. Tener, Secretary.

Pittsburgh Forge and Iron Company, Tenth st. near Penn ave., Pittsburgh. Works in the Ninth ward, Allegheny. Built in 1864; 38 single puddling furnaces, 14 heating furnaces, 4 trains of rolls, (one 9, one 16, and two 20-inch,) and 11 hammers (three 800-lb., four 1-ton, two 3-ton, and two 4-ton); product, bolts, nuts, bar iron, splice bars, draw bars, links and pins, arch bars, hammered car and locomotive axles, and general railroad and heavy forgings; total annual capacity, 26,100 gross tons. Brands, "P. F. & I." and "Special." Fuel used, coal and manufactured gas. Calvin Wells, President and Treasurer; F. E. Richardson, Secretary; Joseph Kaylor, Manager.

Pittsburgh Iron and Steel Works, J. Painter and Sons Company, Pittsburgh. Works on the South Side. Built in 1836; 16 heating furnaces and 11 trains of rolls (seven 8, three 10, and one 16-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, 50,000 gross tons.

Brand "Painter." Fuel used, natural gas and coal. A. E. W. Painter, President; Jacob Painter, Jr., Secretary; C. K. Reppert, Treasurer. Selling agents, H. W. Rockener, Chicago; Evans & Robertson, Cincinnati; Bullard & Post, Boston.

Pittsburgh Steel Casting Company, Twenty-sixth and Railroad sts., Pittsburgh. Built in 1871; one 18-pot and two 24-pot crucible steel-melting furnaces and 11 annealing furnaces. Bessemer steel plant added in 1890; one 10-gross-ton converter; product, Bessemer and crucible steel castings; annual capacity, 6,500 gross tons. Fuel used, natural gas, coal, and coke. Wm. G. Johnston, President; Jas. J. Donnell, Vice-President; Augustus Trump, Secretary and Treasurer; Stewart Johnston, Superintendent.

Pittsburgh Steel Works, Anderson, DuPuy & Co., 8 Wood st., Pittsburgh. Works at Chartiers, Pittsburgh and Lake Erie Railroad; established in 1845; present works built in 1882–3; 15 heating furnaces, 3 trains of rolls, (20 and 16-inch and combined 10 and 12-inch,) and 8 hammers, ranging from 60 pounds to 7 tons; two 33-pot crucible steel-melting furnaces; first crucible steel melted April 11, 1883; one 20-gross-ton open-hearth steel furnace completed in June, 1886; spring and rake-tooth department attached to works; product, plow, saw, sheet, plate, best edge-tool, agricultural, and all other grades of crucible and open-hearth steel, and forgings and springs of all shapes and kinds; annual capacity, 13,500 gross tons. Fuel used, natural gas, obtained from their own territory, and coal. David Shaw, Superintendent. Sole proprietors, Herbert DuPuy and David Shaw. Selling agents, M. T. Miles, Chicago; E. E. McCargo, sole Eastern agent, Philadelphia and New York.

Pittsburgh Wire Company, Braddock, Allegheny county. Branch office, 33–43 Seventh ave., Pittsburgh. Built in 1891 and put in operation in February, 1892; 2 heating furnaces and 3 trains of rolls (9, 12, and 16-inch); product, copper and steel wire rods, wire, barb wire, and wire nails; annual capacity, 40,000 gross tons. Fuel used, bituminous coal. Alex. Dempster, President; W. H. Cochrane, Treasurer; Thomas W. Fitch, Superintendent. General agents, Bindley Hardware Company, Pittsburgh.

Pittsburgh Works, Consolidated Steel and Wire Company, general office, Rookery Building, Chicago. Works at Rankin Station, Allegheny county. Built in 1885–6; 3 heating furnaces and 4 trains of rolls (two 9, one 12, and one 18-inch); 4-inch billets rolled directly to No. 5 rods in 18 passes through 4 trains of rolls; product, steel wire rods, plain wire, barb wire, and wire nails; annual capacity, 50,000 gross tons of wire rods. Fuel used, bituminous coal and natural gas. T. B. Coles, Manager, Pittsburgh. (Formerly operated by the Braddock Wire Company.) *See Allentown Works, in Eastern Pennsylvania, for a full list of officers and branch offices.*

Reliance Steel Casting Company Limited, Pittsburgh. Works, cor. Thirty-sixth st. and A. V. R. R. Built in 1889; one 24-pot crucible steel-melting furnace; first steel made in September, 1889; product, crucible steel castings; annual capacity, 440 gross tons. Fuel used, natural gas exclusively. Charles Bailey, Chairman; Joseph A. Kelly, Secretary and Treasurer.

Republic Iron Works Department of National Tube Works Company, Twenty-fifth st., South Side, Pittsburgh. Built in 1863; 26 single and 12 double puddling furnaces, 16 heating furnaces, 5 sheet furnaces, and 10 trains of rolls (one 13, one 16, two 20, four 22, one 24-inch, and one 3-high plate train); product, boiler tube and pipe iron and sheet and plate iron; annual capacity, 37,000 gross tons of boiler tube and pipe iron, 7,300 gross tons of sheet iron, and 7,000 gross tons of plate iron. Brand, "Republic." An extensive galvanizing department is connected with the works. Fuel used, natural gas exclusively. Horace Crosby, Manager. *See National Tube Works Company. See Monongahela Furnaces, Allegheny County.*

Sable Iron Works, Zug & Co. Limited, Pittsburgh. Works, Thirteenth and Etna sts. Built in 1845; 42 single puddling furnaces, 11 heating furnaces, 6 trains of rolls (one 8, one 10, and one 16-inch, one universal mill, one 18-inch bar mill, and one 3-high 20-inch muck train, 3 sets); product, merchant bar iron, including heavy sizes of flat bars and squares made on the universal rolls, and fine grade horse-shoe bar; annual capacity, 22,500 gross tons of rolled iron. Brand, "Sable." Fuel used, natural gas and coal. Charles H. Zug, Chairman; Charles H. Reid, Secretary and Treasurer. Eastern sales agents, E. T. Day, New York; William M. Horne & Co., Boston.

Singer, Nimick & Co. Limited, 83 Water st., Pittsburgh. Works in the Thirty-fourth ward. Built in 1848; 8 single puddling furnaces, 8 converting furnaces, 14 steam hammers, one train of muck rolls, 4 trains of bar rolls, 5 trains of sheet and plate rolls, one cold rolling mill, and one band mill; one 10-gross-ton open-hearth steel furnace, with an annual capacity of 5,800 gross tons of ingots; crucible steel works, with an annual capacity of 15,000 gross tons of ingots; also operates a spring and axle factory and a harrow disc and rolling colter factory; product, tool, saw, sheet, plate, and agricultural steel; also carriage springs and axles and cold-rolled steel. Fuel used, natural gas and coal. W. H. Singer, Chairman; G. Bruce Harton, Assistant Chairman; George Singer, Jr., Secretary and Treasurer. Eastern agents, Hogan & Son, 243 Pearl st., New York; Chicago agent, W. E. Stockton, 16-18 West Lake st.

Sligo Rolling Mills, Phillips, Nimick & Co., Pittsburgh. Works on the South Side, below the Monongahela bridge. Built in 1825; 38 single puddling furnaces, 12 heating furnaces, 2 hammers, and 6 trains of rolls (12, 16, 18, 20, 24, and 32-inch); product, bars, angles, sheets

and plates, and light T rails; boiler plates a specialty; make "Sligo" bars and "Tyrone" refined iron; boiler heads and flue holes flanged to order; annual capacity, 24,000 gross tons. Fuel used, producer gas and coal.

Soho Iron and Steel Works, Moorhead-McCleane Company, Pittsburgh. Works, Second ave., near Brady st. Built in 1859; 30 single puddling furnaces, 2 scrap furnaces, 6 single and 2 double heating furnaces, 4 sheet furnaces, 4 pair furnaces, 5 annealing furnaces, 10 trains of rolls, (including a train capable of rolling plates 12 inches thick, 7 feet wide, and 15 tons in weight,) and 2 hammers; product, "C. H. B." galvanized iron, Juniata, charcoal, and common sheet and plate iron, and sheared and grooved skelp iron; annual capacity, 32,000 gross tons. Steel department contains two 15-gross-ton open-hearth steel furnaces; first steel made November 29, 1883; product, steel plate; annual capacity, 16,500 gross tons. Fuel used, natural gas and coal. George S. Griscom, President; M. K. Moorhead, Vice-President; Joseph M. Browne, Secretary; W. J. Moorhead, Treasurer. *See Soho Furnace, Allegheny County.*

Solar Steel Works, William Clark's Son & Co., Pittsburgh. Works, Thirty-fifth st., A. V. R. R., and Allegheny river. Built in 1869: 11 heating furnaces and 8 trains of rolls (one 7-inch, three 8-inch, one 9-inch, one 10-inch, one 12-inch, and one 20-inch); two 12-gross-ton open-hearth steel furnaces added in 1889-90; one cold-rolled steel mill; product, hoop, band, box, and scroll steel, merchant steel, cotton-ties, and cold-rolled steel; annual capacity, 35,000 gross tons. Brands, "Solar" and "Clark" for steel and "Delta" for cotton-ties. Fuel used, coal. General Western agents, Manufacturers and Merchants Warehouse Company, Chicago; Eastern office, William M. Horne & Co., managers, 6 Oliver st., Boston.

Spang (The) Steel and Iron Company, Pittsburgh. Office, 66-70 Sandusky st., Allegheny. Works at Etna, Allegheny county. Built in 1880-1; three 10-ton open-hearth steel furnaces, 7 heating furnaces, one 4-hole soaking pit, one hammer, and 4 trains of rolls (30-inch blooming, 30-inch universal, 18-inch bar, and 112 x 31-inch plate); two 3-ton Clapp-Griffiths steel converters built in 1886-7; first blow made March 1, 1887; product, steel boiler, ship, and tank plates, and machinery steel; annual capacity, 60,000 gross tons. Fuel used, natural gas and coal. Campbell B. Herron, President; John C. Porter, Secretary and Treasurer; George A. Chalfant, Manager. Selling agents, William H. Wallace & Co., New York; George O. Wales & Co., Boston; B. W. Cotton & Co., Philadelphia; Smith, Jameson & Keyser, Baltimore; Bassett, Presley & Train, Cleveland; Houston & Co., Cincinnati; Francis T. West, Chicago.

Star Iron and Steel Works, Lindsay & McCutcheon, Allegheny. Office and works, 88 Rebecca st. Built in 1862; 38 single puddling fur-

naces, 11 heating furnaces, and 8 trains of rolls (four 8, one 10, and one 12-inch, and two muck); product, hoops, bands, and horse-shoe iron; also strap and T hinges, wrought steel and iron washers, and cotton ties; annual capacity of rolled iron and steel, 12,000 gross tons. Brand, "Star." Fuel used, natural gas and coal.

Sterling Steel Company, Westinghouse Building, Pittsburgh. Works at Demmler, Allegheny county. Established in 1875; two 24-pot crucible steel-melting furnaces, 9 heating furnaces, and 5 hammers (800 lbs. to 5 tons); product, fine crucible tool steel and Wheeler-Sterling armor-piercing projectiles; sizes of projectiles made, 4-inch, 5-inch, 6-inch, 8-inch, 10-inch, 12-inch, and 13-inch; annual capacity of tool steel, 3,700 gross tons; of projectiles, eighteen 6-inch per single turn or its equivalent in other sizes. Brand, "Sterling." Fuel used, coal. (Formerly called Pitt Steel Works.) Also operates a machine shop, containing lathes, boring mills, etc. C. Y. Wheeler, President; C. W. Mackey, Vice-President; A. S. Beymer, Treasurer; John S. Lyon, Secretary. Selling agents, Vought & Williams, New York; Wm. J. Haines & Co., Philadelphia; McBarron & Co., Boston; William G. Wetherall, Baltimore; Church and Russell Company, Providence; Walbridge & Co., Buffalo; Cleveland, Brown & Co., Cleveland; S. D. Kimbark, Chicago; George W. Gibbs & Co., San Francisco.

Superior Steel Company, 500 Lewis Block, Pittsburgh. Works at Mansfield, (post-office address, Mansfield Valley; telegraph address, Mansfield,) Allegheny county. Built in 1892 and first put in operation January 3, 1893; 4 heating furnaces and 3 trains of rolls (one 6, one 10, and one 14-inch); product, hot and cold rolled strip steel; annual capacity, 7,500 gross tons. Brand, "Superior." Fuel used, natural gas and coal. Adding a small crucible steel plant, with eight 2-pot steel-melting holes. James H. Hammond, President; William H. Black, Secretary and Treasurer; H. J. Williams, Superintendent. Selling agents, Ely & Williams, 38 Park Row, New York, and 1239 Market st., Philadelphia.

Totten and Hogg Iron and Steel Foundry Company, Twenty-fourth st. and A. V. R. R., Pittsburgh. One 15-gross-ton open-hearth steel furnace purchased and removed from W. J. Hammond & Sons' works in 1890-1; product, steel castings.

United States Iron and Tin Plate Works, United States Iron and Tin Plate Manufacturing Company, Demmler, (Eighth ward, McKeesport,) Allegheny county. Branch office, 626 Liberty st., Pittsburgh. Built in 1873-4; burned and rebuilt in 1883; 4 single puddling furnaces, 3 heating furnaces, 2 scrap furnaces, 8 double sheet-mill furnaces, 7 annealing furnaces, 12 tinning stacks, one squeezer, one train of bar rolls, and 8 trains of sheet rolls; product, specialties in refined and cold rolled black sheet iron and Bessemer and open-

hearth steel sheets and common sheet iron, tin and terne plates, and sheet-iron dripping pans; annual capacity, for black plates, 11,000 gross tons. Black plates branded "Monongahela," "U. S. A. M.," and "J. H.;" tin and terne plates branded "U. S. Monongahela" terne, "U. S. Eagle" terne, "U. S. Redipped" terne, "U. S. Grant" terne, "U. S. bright," "Youghiogheny bright," and "Versailles bright;" and dripping pans branded "U. S." Fuel used, coal for boilers and heating and puddling furnaces, oil gas for sheet finishing department, and natural gas for tinning department. W. C. Cronemeyer, President; Edward Ely, 1st Vice-President; A. J. Demmler, 2d Vice-President; F. E. Schenck, Treasurer; W. A. Demmler, Auditor; Charles V. McLean, Secretary. Eastern agents, Ely & Williams, Philadelphia, New York, and Boston. *See Tinplate Works.*

Vesuvius Iron and Nail Works, Moorhead, Brother & Co., (incorporated,) German National Bank Building, Pittsburgh. Works at Sharpsburg, Allegheny county. Built in 1846; 28 single puddling furnaces, 10 heating furnaces, one 4-ton hammer, and 5 trains of rolls (one 8, one 15, two 18, and one 24-inch); product, skelp, plate, and bar iron; annual capacity, 22,500 gross tons. Brand, "Vesuvius."

Wayne Iron and Steel Works, Brown & Co., Incorporated, Pittsburgh. Works, cor. Tenth st. and Duquesne Way. Built in 1825; 34 single puddling and 12 heating furnaces, 5 trains of rolls, 5 hammers, one 36-pot and seven 18-pot steel-melting furnaces, and one 45-ton cementing furnace; product, merchant bar iron, iron boiler plate, and rolled and hammered crucible steel; annual capacity, 16,500 gross tons of iron and 6,500 gross tons of crucible steel. Brands, "Wayne" and "U. S." Fuel used, natural gas and coal. J. Stuart Brown, President and Treasurer; Henry Graham Brown, Vice-President and General Manager; James Neale, Secretary.

West Penn Steel Works, Jennings Brothers & Co. Limited, Pittsburgh. Office and steel plant on Preble ave., Allegheny. Built at Leechburg, Armstrong county, in 1881, and removed to present site in 1890; one 10-gross-ton open-hearth furnace, 3 heating furnaces, one 8-ton hammer, and one 14-inch train of rolls, the latter added in 1892; product, steel, principally consumed at the firm's rolling mill at Leechburg in the production of sheets and light plates; annual capacity, 6,500 gross tons of ingots. Brand, "West Penn." Fuel used, producer gas and natural gas. Benjamin F. Jennings, Chairman; John Davis, Treasurer; T. Dale Jennings, Secretary. *See West Penn Steel Works, Western Pennsylvania.*

Number of rolling mills and steel works in Pittsburgh and Allegheny county: 63. Of these 8 make Bessemer steel, 2 make Clapp-Griffiths steel, 18 make open-hearth steel, 10 make crucible steel and 1 crucible steel plant is being built, and 3 make blister steel.

WESTERN PENNSYLVANIA, EXCEPT ALLEGHENY COUNTY.

Aliquippa Steel Works, Aliquippa Steel Company, Room 39, Vandergrift Building, Pittsburgh. Works at Aliquippa, Beaver county. Built in 1892 and first put in operation October 1, 1892; 8 heating furnaces, 2 trains of rolls, (one 18-inch and one 26-inch,) and 3 hammers (one 700-lb., one 1,500-lb., and one 6-ton); one 12-gross-ton open-hearth steel furnace, with an annual capacity of 6,000 gross tons of ingots; one 36-pot crucible steel-melting furnace, with an annual capacity of 2,400 gross tons of ingots; product, special qualities of plate and sheet steel; annual capacity, 10,000 gross tons of finished products. Fuel used, natural gas and coal. Joseph S. Kaufman, President; C. D. Greenlee, Vice-President; B. Forst, Secretary and Treasurer.

Apollo Rolling Mills, Apollo Iron and Steel Company, Pittsburgh. Works at Apollo, Armstrong county. Built in 1850 and rebuilt in 1886; 3 bar, 18 heating, and 13 annealing furnaces, one 6-ton hammer, and 13 trains of rolls (one muck and bar, 11 double sheet, and one cold rolling, with 6 sets); two 20-gross-ton open-hearth steel furnaces and one ingot heating furnace built in 1885–6; first steel made June 15, 1886; product, galvanized and smooth-finished iron and steel sheets; annual capacity, 27,000 gross tons. Brand, "Apollo." Fuel used, natural gas exclusively. George G. McMurtry, President; Wm. B. Rhodes, Secretary; Wallace P. Bache, Treasurer. Selling agent, Charles D. Fuller, 139 Greenwich st., New York. *See Tinplate Works.*

Apollo Sheet Iron Works, P. H. Laufman & Co. Limited, Apollo, Armstrong county. Works in Westmoreland county. Pittsburgh office, Germania Bank Building. Built in 1886; new mill added in 1889; 8 heating furnaces, 4 annealing furnaces, 2 sets of roughing rolls, 3 sets of finishing rolls, 2 pairs of cold rolls, and one set of bar rolls; product, fine sheet iron, decarbonized sheet steel, and American roofing plate; annual capacity, 6,000 gross tons. Brands, for sheet iron, "No. 1 decarbonized;" for terne plates, "Laufman's Apollo." Fuel used, natural gas exclusively. P. H. Laufman, Chairman; S. M. Jackson, Secretary and Treasurer; Frank W. Jackson, Assistant Secretary. *See Tinplate Works.*

Arethusa Iron Works, George W. Johnson, New Castle, Lawrence county. Built in 1873; 3 double and 10 single puddling furnaces, 13 heating furnaces, 2 large double annealing furnaces, 3 large squaring shears, 6 trains of rolls, (one 36-inch, two 40-inch, one 48-inch, one 56-inch, and one muck train,) one hammer, and one squeezer; product, plate and sheet iron; annual capacity, 12,000 gross tons. Fuel used, natural gas exclusively. Frank Felton, Manager.

Aschman (The) Steel Casting Company, Sharon, Mercer county. Built in 1890–1 and first steel made June 5, 1891; one 5-gross-ton open-

hearth steel furnace; product, steel castings; annual capacity, 1,800 gross tons. Fuel used, producer gas. E. A. Wheeler, President; J. J. Spearman, Treasurer; Geo. A. Baird, Secretary; John W. Davies, Manager.

Atlantic Iron and Steel Company, (successor to Etna Iron Works Limited,) New Castle, Lawrence county. Consolidation, in November, 1874, of Etna Iron Company and Onondaga Iron and Nail Company; 3 double and 25 single puddling furnaces, 5 heating furnaces, 55 nail machines, and 4 trains of rolls (8, 16, 2-high 18, and 3-high 18-inch); product, merchant bar iron and pipe iron; annual capacity, 18,000 gross tons. Fuel used, coal, and slack with blast for puddling. (Nail factory idle since 1888 and not likely to be operated again.) Edwin N. Ohl, President; A. W. Thompson, Secretary and Treasurer. *See Atlantic Furnaces, Shenango Valley.*

Beaver Falls Mills, The Carnegie Steel Company, Limited, Beaver Falls, Beaver county. General office and post-office address, 42–48 Fifth ave., Pittsburgh. Built in 1883 by the Hartman Steel Company, Limited, and enlarged by Carnegie, Phipps & Co., Limited. Operations began September 1, 1883. Combination rod train run by 3 engines, 3 heating furnaces, 160 wire blocks run by 3 engines, and 142 wire nail machines run by 2 engines. Product, steel wire rods, wire, and wire nails; annual capacity, 65,000 gross tons of wire rods and 850,000 kegs of wire nails. Fuel, producer gas and coal. P. R. Dillon, General Superintendent. *See The Carnegie Steel Company, Limited, Allegheny County. See Furnaces in Allegheny County.*

Beaver Falls Steel Works, Beaver Falls, Beaver county. Built in 1875; one 24-pot crucible steel-melting furnace, one Siemens and 3 coal heating furnaces, 2 converting furnaces, 3 steam hammers, 4 forge fires, and 2 trains of rolls (one 9 and one 16-inch); steam and water power; product, plow, spring, cutlery, file, and tool steel; annual capacity, 1,500 gross tons. Brand, "Beaver." Fuel used, mainly coal. James M. May, Treasurer and Superintendent.

Blairsville Rolling Mill and Tin Plate Company, Blairsville, Indiana county. Built in 1892 and put in operation in November, 1892; 2 doubling furnaces, 2 pair and one annealing furnace, two 20-inch hot trains of rolls, and one 18-inch cold rolling train; product, black plates for tinning; annual capacity, 4,500 gross tons. Fuel used, coal. Jacob Graff, President; S. D. Stiffy, Secretary; Charles H. Rugg, Treasurer; A. E. Piper, Superintendent. Selling agents, J. B. Scott & Co., Pittsburgh. *See Tinplate Works.*

Cambria Iron Company, Johnstown, Cambria county. Office, 218 South Fourth st., Philadelphia. Two works: Cambria Iron and Steel Works built in 1853; 14 Siemens and 35 reverberatory heating furnaces, 8 hammers, (one 7-ton, one 5-ton, one 4-ton, three 6,000-lb., one 3,500-lb., and one 2,500-lb.,) and the following trains of rolls: One 24-inch

2 sets, and one 21-inch rail mill, 3 sets; two 21-inch bar mills, 3 sets each; one 12-inch splice bar mill, 4 sets; one 16-inch merchant mill, 3 sets; one 22-inch puddle mill, 4 sets; one rod train, 10 sets; one 48-inch blooming mill, one set; one 40-inch blooming mill, one set; one 28-inch billet and slab mill, 2 sets: total, 36 sets. Bessemer steel works made their first blow July 10, 1871; four 11½ gross-ton converters; annual capacity, 400,000 gross tons of ingots. Three 20-gross-ton open-hearth steel furnaces, with the Pernot improvement, built in 1878–9; one 15-ton Krupp washer; annual capacity, 36,000 gross tons of ingots. Product, steel rails, splice bars, angles, flats, channels, rounds, axles, billets, and wire rods; annual capacity of finished steel, 268,000 gross tons of steel rails and 90,000 gross tons of steel in other shapes. Fuel used, coal. Gautier Steel Department built in 1878; 7 reverberatory and 2 Siemens heating furnaces; 7 trains of rolls, (one 9-inch, 6 sets; one 10-inch, 8 sets; one 12-inch, 4 sets; one 14-inch, 8 sets; one 16-inch, 3 sets; one 20-inch, 3 sets; one 12-inch cold rolling train, and a cold drawing plant,) with full equipment of furnaces, shears, hammers, and special machinery; product, merchant bar steel of every size and for every purpose, the specialties being tire, spring, toe-calk, machinery, and plow steels, finger-bars, harrow discs, and rake teeth; annual capacity of rolling mill, 100,000 gross tons. Production of separate departments: Plow shapes and slabs, annual capacity, 9,000 gross tons; finished plow shapes, 2,700 gross tons; tire steel, 14,000 gross tons; spring steel, 18,000 gross tons; machinery steel, 9,000 gross tons; harrow discs, 9,000 gross tons; harrow teeth, 3,000 gross tons; horse-rake teeth, 150,000 sets; finger-bars, 125,000 bars; cold-rolled steel, 6,000 gross tons. Brand, "Gautier." Fuel used, coal. Officers in Philadelphia: Powell Stackhouse, President; John W. Townsend, Vice-President; J. Lowber Welsh, 2d Vice-President; William S. Robinson, Secretary and Treasurer. Officers at Johnstown: Charles S. Price, General Manager; Cyrus Elder, Solicitor and General Agent; Fred. Krebs, Superintendent Gautier Steel Department. Branch offices Gautier Steel Department: 102 Chambers st., New York; southwest corner Fifth and Commerce sts., Philadelphia; Phœnix Building, Chicago; Chattanooga, Tenn. *See Miscellaneous Coke Furnaces in Western Pennsylvania.*

Canonsburg Iron and Steel Company, Canonsburg, Washington county. Branch office, Germania Bank Building, Pittsburgh. Built in 1882; 7 single puddling furnaces, 2 knobbling fires, 10 heating furnaces, (3 double and 1 single sheet, 4 pair, and 2 pile,) 4 annealing furnaces, 3 trains of rolls for hot and cold rolling, and one 5-ton hammer; product, finest quality of sheet iron and steel for stamping and tinning purposes and tin and terne plates; annual capacity, 5,500 gross tons. Fuel used, natural gas, from the company's own wells. H. H. Niemann, President; H. S. Duncan, Vice-President and Business Man-

ager; L. A. Meyran, Secretary and Treasurer; Paul C. Herrosee, Auditor; John F. Budke, General Superintendent of works. *See Tin-plate Works.*

Cold Rolled Steel Company of Pittsburgh, (incorporated,) Room 501, Ferguson Block, Pittsburgh, (P. O. Box, 723.) Works at New Kensington, Westmoreland county. Built in 1891, destroyed by fire in August, 1892, and rebuilt in 1893; one heating furnace, 3 annealing furnaces, and 3 trains of rolls (one 18-inch hot and two 9-inch cold); product, hot and cold rolled band and strip steel; annual capacity, 5,000 gross tons. Fuel used, bituminous coal. W. H. Nimick, President; H. H. Jack, Secretary and Treasurer; James W. Tyson, Jr., Manager.

Columbia (The) Iron and Steel Works, Uniontown, Fayette county. Built in 1886-7; two 5-gross-ton Bessemer steel converters; first blow made September 1, 1887; 2 soaking pits, 4 heating furnaces, one 32-inch blooming mill, and one 26-inch and one 18-inch train of finishing rolls; product, blooms, billets, slabs, beams, channels, angles, tees, bars, and special shapes for architectural and engineering purposes; daily capacity in steel ingots, from 300 to 350 gross tons. Fuel used, coal and producer gas. Purchased at sheriff's sale by the Safe Deposit and Trust Company of Pittsburgh as trustee for the First Mortgage Bondholders. For sale.

Cyclops Steel Works, Charles Burgess, Titusville, Crawford county. Built in 1879; rebuilt in 1884; 3 single puddling furnaces, 4 heating furnaces, one 16-inch train of rolls, and 5 hammers; crucible steel department has six 6-pot steel-melting holes; product, special tool steel and refined hammered iron; annual capacity, 1,875 gross tons. Fuel used, natural gas exclusively.

Ellwood Tin Plate Company, Ellwood City, Lawrence county. Built in 1892-3 and first put in operation April 1, 1893; 8 heating furnaces and 5 trains of rolls (four 22-inch sheet and one cold rolling train); product, iron and steel plates for tinning purposes; annual capacity, 8,000 gross tons. Brand, "Ellwood." Fuel used, natural gas and coal. (Formerly operated by the Ellwood Steel Company.) Owned by A. W. Brown, Cambridge, Ohio.

Emmens Metal Company, Youngwood, Westmoreland county. Built in 1891; two 4-pot melting furnaces; product, castings in nickel-steel and other alloys and metals. Brand, "E. M. Co." Fuel used, coal and coke. Stephen H. Emmens, President; Cecil D. Landale, Secretary and Selling Agent, 52 William st., New York.

Emporium Steel Company, Emporium, Cameron county. Works for the manufacture of steel by a special process built in 1893; first steel made in December, 1893; product, tool steel; annual capacity, 500 gross tons. J. P. Felt, President; S. S. Smith, Vice-President; L. K. Huntington, Secretary; J. D. Logan, Treasurer; R. J. Watters, Superintendent.

Hussey, Binns & Co. Limited, 64 Fourth ave., Pittsburgh. Works originally built at Pittsburgh in 1875; new plant built in 1890–1 at Charleroi, Washington county, on Monongahela Division of Pennsylvania Railroad; one 24-pot crucible steel-melting furnace, 18 heating furnaces, 4 trains of rolls, 2 steam hammers, 2 helve hammers, and numerous machines used in shovel-making; product, crucible cast steel, used by the firm in making shovels, spades, and scoops; annual capacity, 1,350 gross tons of ingots. Fuel used, natural gas exclusively. Ralph H. Binns, Chairman; George V. Willson, Secretary, Treasurer, and General Manager; Frank B. Newton, Superintendent.

Johnson (The) Company, Johnstown, Cambria county. Built in 1887–8 and put in operation May 13, 1888; 4 gas heating furnaces and one 27-inch train of rolls. Open-hearth steel department started in 1889; one 2-gross-ton open-hearth furnace, using oil gas, and one 7-gross-ton open-hearth furnace, using coal producer gas; annual capacity, 6,500 gross tons of ingots and heavy castings. Product, girder rails and street railroad specialties entirely; annual capacity, 90,000 gross tons. Also operates switch and drop-forging works and an electric welding plant. Arthur J. Moxham, President; Tom L. Johnson and Daniel Coolidge, Vice-Presidents; Wm. McLain, Secretary; Max M. Suppes, Manager of rolling mill; Henry O'Shea, Manager of switch works; B. F. Watkins, Manager of steel and iron foundry; P. J. Lavelle, Manager of mechanical department. Selling agents, H. C. Evans, Mutual Life Building, New York; W. E. Boughton, Bullitt Building, Philadelphia; E. O. Evans, Exchange Building, Boston; Littlefield & Meysenburg, Monadnock Building, Chicago, and Bank of Commerce Building, St. Louis; O. C. Evans, Mitchell Building, Cincinnati; S. P. S. Ellis, Penn Building, Pittsburgh; Wm. W. Kingston, Equitable Building, Atlanta, Ga.; A. C. Dibert, Mills Building, San Francisco.

Kimberly (P. L.) & Co., Sharon, Mercer county. Two works: Atlantic Works, at Sharon, Mercer county, built in 1867; 32 puddling furnaces, 8 heating furnaces, 6 trains of rolls, and 40 nail machines; product, bar, plate, hoop, and rod iron, and nails; annual capacity, 27,000 gross tons. Greenville Rolling Mill, at Greenville, Mercer county, built in 1871; 30 single puddling furnaces, 4 heating furnaces, and 3 trains of rolls (one 8, one 10, and one 16-inch); product, hoop and band iron and steel and cotton-ties; annual capacity, 18,000 gross tons. Brand, "Atlantic." Use natural gas for fuel at Sharon. Selling agents, Edward Corning & Co., 29 Broadway, New York. *See Sharon Furnace, Shenango Valley.*

Kittanning Iron Company Limited, Kittanning, Armstrong county. Built in 1848; rebuilt in 1880; 33 single puddling furnaces, 5 heating furnaces, and one 3-high 22-inch train of rolls; product, muck bar; annual capacity, 20,000 gross tons. Fuel used, natural gas ex-

clusively. James Mosgrove, Chairman; Henry A. Colwell, Secretary and Treasurer; Charles T. Neale, General Manager. *See Rebecca Furnace, Western Pennsylvania.*

Latrobe Steel Works, Latrobe, Westmoreland county. Branch office, Bullitt Building, Philadelphia. Built in 1888–9 and put in operation in August, 1889; 7 heating furnaces, 2 trains of tire rolls, and 3 hammers, (1,150-lb., 7-ton, and 20-ton.) Open-hearth steel department contains two 20-gross-ton furnaces; first steel made August 5, 1889; annual capacity, 16,500 gross tons of ingots. Product, locomotive and car-wheel tires; annual capacity, 13,500 gross tons. Brand, "Latrobe." Fuel used, natural gas exclusively. Marriott C. Smyth, President; Walter H. Bryant, Secretary; Ellwood W. Kimber, Treasurer; Guilliaem Aertsen, Manager; Julian Kennedy, Chief Engineer; J. K. Griffith, Superintendent.

Leechburg Iron Works, Kirkpatrick & Co. Limited, Leechburg, Armstrong county. Branch office, Iron Exchange Building, Wood and Water sts., Pittsburgh. Built in 1872; 5 single puddling furnaces, 4 knobbling fires, 15 heating furnaces, 6 annealing furnaces, 5 trains of rolls, and one hammer; one 15-gross ton open-hearth steel furnace; product, finest quality of stamping irons, and tea-tray, show-card, spoon, shovel, trunk, Juniata, pan and elbow, and lock iron, and cold-rolled sheet steel; annual capacity, 10,000 gross tons. Fuel used, natural gas and coal. Brand, "Leechburg." John C. Kirkpatrick, Chairman; M. W. Leech, Secretary and Treasurer.

Myers (The H. M.) Company, Beaver Falls, Beaver county. New York office, 69 Beekman st. Rolling mill built in 1883; 2 heating furnaces and one train of 16-inch rolls; product, rolled shovel blanks, used by the company in its shovel works. Fuel used, coal slack and coke. H. M. Myers, President and Treasurer; C. H. Myers, Vice-President; C. S. Hubbard, Secretary.

National Separating and Manufacturing Company, West Bridgewater, Beaver county. Office, 702 Duquesne Way, Pittsburgh. Steel plant has one small open-hearth furnace for producing steel castings. Works also contain appliances for the manufacture of light castings of iron, solder, or Babbitt metal. Fuel used, natural gas. Wm. M. Brown, President; W. E. Griffiths, Vice-President; W. F. Miller, Secretary and Treasurer.

New Castle Steel and Tin Plate Company, (incorporated,) New Castle, Lawrence county. Built in 1892–3 and first put in operation in October, 1893; 12 heating furnaces, one Siemens-Martin improved gas heating furnace, and one 3-high bar and 6 plate trains of hot rolls and 6 stands of cold rolls; product, black plates, consumed in the company's tinplate works; annual capacity, 12,000 gross tons. Brand, "New Castle." Fuel used, bituminous coal. George Greer, President; Charles Greer, Secretary; W. S. Foltz, Treasurer. *See Tinplate Works.*

New Castle Steel Casting Company, New Castle, Lawrence county. Crucible steel plant, with a capacity of 22 pots at each heat, built in 1891; product, steel castings; annual capacity, 600 gross tons. Fuel used, coal. D. F. Balph, Manager. Idle.

New Castle Wire Nail Company, New Castle, Lawrence county. Nail factory and wire mill built in 1887 and enlarged in 1891; rod mill added in 1889; 2 gas heating furnaces, 4 trains of rolls, (9, 10, 12, and 16-inch,) one hammer, and 222 wire-nail machines; product, wire rods, wire, and wire nails; annual capacity, 45,000 gross tons of rods, 45,000 gross tons of wire, and 1,000,000 kegs of nails. Brand, "New Castle Wire Nail Co." Fuel used, coal. (Rod mill formerly owned by the New Castle Steel Company.) Wm. Patterson, President; Edward King, Vice-President; Rufus Patterson, Secretary; John P. H. Cunningham, Treasurer; John Stevenson, Jr., Manager.

Pittsburgh Tool Steel Company, Ferguson Building, Pittsburgh. Works at Greensburg, Westmoreland county. Built in 1889-90 by the Greensburg Steel Company; 1 forge fire, 3 heating furnaces, one welding furnace, 2 hammers, (one 600-lb. and one 1,500-lb.,) and one 10-inch train of rolls; product, forgings, tool steel, and merchant bar steel; annual capacity, 5,000 gross tons. Brand, "Damascus." Fuel used, bituminous coal. (Formerly operated by the Greensburg Rolling Mill Company. One 24-pot crucible steel-melting furnace, erected in 1889-90, abandoned.) J. C. Jamison, President; A. M. Johnston, Vice-President and Manager; C. C. Law, Secretary and Treasurer. Selling agent, D. P. Thomas, Ferguson Building, Pittsburgh; Western branch warehouse, 78 Twelfth st., Chicago.

Scottdale Iron and Steel Company Limited, Scottdale, Westmoreland county. Built in 1873; 6 single and 3 double puddling furnaces, 2 pile heating and 2 scrap furnaces, 6 sheet and 3 double pair heating furnaces, 5 box annealing furnaces, one sheet-bar mill, one muck mill, one cold rolling sheet mill, and 6 double sheet mills; product, muck bar and sheet iron; annual capacity, 9,500 gross tons of muck bar, 5,200 gross tons of scrap bar, and 10,800 gross tons of sheets. Brand, "Scottdale Iron and Steel Co." Fuel used, coal. P. S. Loucks, Chairman; J. R. Stauffer, Treasurer; C. Grazier, Secretary.

Sharon Iron Company Limited, Sharon, Mercer county. Built in 1850; 10 single and 14 double puddling furnaces, 12 heating furnaces, and 9 trains of rolls (one 8, one 12, one 16, one 18, one 20, three 22, and one 24-inch); product, bar, band, hoop, tank, and sheet iron and steel, and light T rails; annual capacity, 30,000 gross tons. Use producer gas in heating furnaces. Building a galvanizing plant. F. H. Buhl, President, General Manager, and Treasurer; David Adams, Secretary. *See Furnaces in the Shenango Valley.*

Sharon Steel Casting Company, Sharon, Mercer county. Built in 1887 and first steel made August 26, 1887; one 5-gross-ton and one 15-gross-

ton open-hearth furnace; product, open-hearth steel castings of all kinds; annual capacity, 9,000 gross tons. Use producer gas. (Commenced the erection of one 4-gross-ton Bessemer converter for the manufacture of castings in 1891; work suspended.) F. H. Buhl, President; S. McClure, Vice-President; Daniel Eagan, Secretary and General Manager: John Forker, Treasurer.

Shenango Valley Steel Works, Shenango Valley Steel Company, New Castle, Lawrence county. Two 8-gross-ton Bessemer converters built in 1892 and first blow made November 2, 1892; one 36-inch blooming mill and two 5-hole soaking pits; product, steel billets; annual capacity, 140,000 gross tons. Fuel used, coal and producer gas. Wm. E. Reis, President; William Patterson, Vice-President; George B. Berger, Secretary and Treasurer; John Stevenson, Jr., Superintendent. *See Neshannock Furnace, Shenango Valley.*

Stewart Iron Works, Stewart Iron Company Limited, Sharon, Mercer county. Built in 1870; 9 double puddling furnaces, one heating furnace, 2 hammers, (2½-ton and 5-ton,) and 2 trains of 3-high 18-inch rolls; product, muck bar and hammered blooms for steel purposes; annual capacity, 11,600 gross tons. Brand, "Stewart." Fuel used, coal. Fayette Brown, Chairman, Harvey H. Brown, Treasurer, and D. B. Chambers, Secretary, Perry-Payne Building, Cleveland, Ohio; Samuel McClure, Agent and Manager, Sharon. *See Stewart Furnaces, Shenango Valley.*

Tyler (The) Tube and Pipe Company, Washington, Washington county. Built in 1890–1 and first put in operation in January, 1891; 8 forge fires, one run-out fire, 4 heating furnaces, 2 trains of rolls, (16 and 18-inch,) and 2 hammers; product, charcoal blooms and charcoal skelp iron, used by the company in the manufacture of boiler tubes; annual capacity, 13,500 gross tons. Brands, "Algerite" and "Tyler." Fuel used, natural gas and charcoal. William P. Tyler, President and Manager; Walter Woodman, Vice-President; Nelson E. Whitaker, Treasurer; Charles S. Stone, Assistant Treasurer and Secretary; Peter Swanger, Superintendent.

West Penn Steel Works, Jennings Brothers & Co. Limited, Pittsburgh. Office and steel plant on Preble ave., Allegheny, Allegheny county. Rolling mill at Leechburg, Armstrong county. Built in 1886; 9 heating furnaces, 3 annealing furnaces, two 22-inch trains of rolls, and 3 stands of cold rolls; product, fine sheet steel, light plate steel, and pickled and cold rolled plates ready for tinning; annual capacity, 7,000 gross tons. Brand, "West Penn." Fuel used, natural gas and coal. (Open-hearth steel plant removed to Allegheny in 1890.) *See West Penn Steel Works, Allegheny County.*

Wheatland Iron Company, Wheatland, Mercer county. Pittsburgh office, 208 Wood st. Built to roll rails in 1872; 13 double puddling furnaces, 12 heating furnaces, and 3 trains of 24-inch rolls; product,

plate iron; annual capacity, 27,000 gross tons. Fuel used, bituminous coal. B. B. Reath, President; J. W. Friend, Vice-President; James T. Wood, Secretary and Treasurer.

Wilkes Rolling Mill, Wilkes Rolling Mill Company, Sharon, Mercer county. Built in 1891 and first put in operation in 1892; 5 double puddling furnaces and one 3-high 20-inch train of muck rolls; product, muck bar; annual capacity, 6,000 gross tons. Fuel used, bituminous coal. James B. Wilkes, President and Manager; Joseph H. Anderson, Vice-President; Samuel Wilkes, Secretary and Treasurer.

ROLLING MILLS BUILDING AND PARTLY BUILT.

Gourley (S. A.) and others are building a rolling mill at Saltsburg, Indiana county, to contain 2 heating furnaces, one scrap furnace, 3 sheet furnaces, 3 pair furnaces, 4 annealing furnaces, and 4 trains of rolls; product, to be black sheets for tin and terne plates; annual capacity, about 4,500 gross tons.

Iron City (The) and Hammondville Improvement Company, 217 Ferguson Building, Pittsburgh. Purchased at sheriff's sale on December 5, 1892, the partially completed rolling mill for the manufacture of black plates at Hammondville, Fayette county, which was in process of erection by the Blackshaw, Boycott, and Bayliss Iron Company; part of machinery in place; work suspended. Joseph Carr, President; John W. Grove, Vice-President; W. W. Giffen, Secretary; Samuel Eccles, Treasurer. For sale.

Number of rolling mills and steel works in Western Pennsylvania except Pittsburgh and Allegheny county: 40 completed, 1 building, and 1 partly built. Of these 3 make Bessemer steel and 1 Bessemer steel plant is partly built, 9 make open-hearth steel, 6 make crucible steel, 1 makes blister steel, and 1 makes special steel.

Total number of rolling mills and steel works in Pennsylvania: 221 completed, 2 building, and 1 partly built. Of these 20 make Bessemer steel and 1 Bessemer steel plant is partly built, 2 make Clapp-Griffiths steel, 1 makes Robert-Bessemer steel, 42 make open-hearth steel and 1 open-hearth steel plant is projected, 25 make crucible steel and 1 crucible steel plant is being built, 6 make blister steel, and 4 make special steel.

DELAWARE.

Diamond State Iron Company, Wilmington. New York office, Duncan Building, 11 Pine st.; Philadelphia office, 206 South Fourth st. Two mills: Diamond State Mill built in 1853; one single and 8 double puddling furnaces, 5 heating furnaces, and 3 trains of rolls, (one 10 and two 18-inch.) Old Ferry Mill built in 1868; burned and rebuilt in 1891; 2 single and 9 double puddling furnaces, 9 heating

furnaces, and 8 trains of rolls, (four 9, one 14, one 16, and two 18-inch.) Product, iron and steel splice bars, track bolts, railroad spikes, boat, wharf, and countersunk spikes, machine bolts, nuts and washers, boiler, boat, and bridge rivets, bridge rods, merchant bars, rivet rods, horse-shoe iron, horse and mule shoes, forgings, and castings; total annual capacity, 42,000 gross tons. Brand, the letter "S" inclosed in a diamond. George W. Todd, President and Treasurer; L. A. Bower, Vice-President; Howard T. Wallace, Secretary; John W. Todd, General Superintendent.

Edge Moor Iron Company, Edge Moor, New Castle county. Philadelphia office, 1600 Hamilton st. Rolling mill, partly built in 1882, contains 4 heating furnaces and 2 trains of rolls (one roughing train and one 26-inch plate train with rolls 104 inches wide); auxiliary machinery not finished. William Sellers, President; John Sellers, Jr., Vice-President; William H. Connell, Treasurer.

Johnson Forge Company, Wilmington. Built in 1889; 7 puddling furnaces, one heating furnace, and one 3-high train of rolls; product, muck bar; annual capacity, 10,000 gross tons. Operated in connection with a forge. John R. Johnson, President; DeHaven Morris, Treasurer.

Marshallton Iron Works, (incorporated,) Marshallton, New Castle county. Built in 1836; steam mill built in 1880; enlarged in 1884 and 1889; 3 double puddling furnaces, 4 grate heating furnaces, 2 reverberatory heating furnaces, 3 box annealing furnaces, and 4 trains of rolls (one 20 and three 22-inch); steam and water power; product, sheet iron; annual capacity, 3,000 gross tons. Brands, "Star" and "Delaware cleaned." A factory for the manufacture of pans and elbows added in 1889; daily capacity, 2 gross tons.

Minquas Iron Works, McCullough Iron Company, Wilmington. Built in 1873 and put in operation in 1875; 4 single puddling furnaces, one double puddling furnace, 2 heating furnaces, 3 grate heating furnaces, one gas furnace, 4 annealing furnaces, 6 trains of rolls, (two 16-inch, three 22-inch, and one 24-inch,) and one hammer; product, fine sheet steel and "Harvey's patent cleaned" sheet iron; annual capacity, 4,500 gross tons. E. A. Harvey, President; Enoch McCullough, Vice-President; John W. McCullough, Secretary; Huxley Harvey, Treasurer; Henry Whiteley, Managing Director. Selling agents, The McDaniel and Harvey Company, 1600 Washington avenue, Philadelphia. *See McCullough Iron Company, Maryland.*

Newport Rolling Mills, Marshall Iron Company, Newport, New Castle county. Built in 1873; one single and one double puddling furnace, one reverberatory heating furnace, 2 grate furnaces, 2 annealing furnaces, and three 22-inch trains of rolls; product, black sheet iron and sheet steel, numbers 18 to 28; annual capacity, 1,500 gross tons. Brands, a rooster and a diamond. Edward Mendinhall, Pres-

ident; John M. Mendinhall, Secretary; Joseph W. H. Watson, Treasurer.

Riverside Iron Works, Delaware Iron Company, New Castle, New Castle county. Philadelphia office, 222–24 South Third st. Mill removed from Bristol, Pa., to New Castle in 1874–5; enlarged in 1879; 4 double puddling furnaces, 3 forge fires, 3 heating furnaces, 2 trains of rolls, and one hammer; product, charcoal boiler plate, tank, and flue iron, and sheared skelp iron; annual capacity, 4,500 gross tons. (Formerly operated by the Riverside Iron Company.) Morton C. McIlvain, President; Jonathan Rowland, Secretary; William R. McIlvain, Treasurer. For lease.

Wilmington Rolling Mills, The Seidel and Hastings Company, Wilmington. First mill built in 1845, second in 1870, another in 1875; 6 forge fires, 5 heating furnaces, 3 trains of rolls, (17, 19, and 24-inch,) and 4 hammers; product, charcoal boiler plates and plate iron generally; annual capacity, day turn, 3,000 gross tons of blooms and 5,000 gross tons of plate iron. W. Hastings, President; E. T. Canby, Treasurer; W. P. Hastings, Secretary; H. B. Seidel, Consulting Director.

Number of rolling mills in Delaware: 9.

MARYLAND.

Baltimore (The) Iron, Steel, and Tinplate Company, Locust Point, Baltimore. Built in 1862 and enlarged since; 6 heating furnaces and 3 trains of rolls; product, black plates and tin and terne plates; annual capacity, 5,000 gross tons. (Formerly called Locust Point Iron and Steel Works.) James E. Ingram, President; E. Rice Daniel, Vice-President; John M. Ingram, Secretary; Robert Girvin, Treasurer and Manager. *See Tinplate Works.*

Cumberland Rolling Mill, Baltimore and Ohio Railroad Company, Cumberland, Allegany county. Main office, Mount Clare, Baltimore. First mill built in 1870 as an iron rail mill; bar mill added in 1873; 3 single and 15 double puddling furnaces, 16 heating furnaces, 8 trains of rolls, (one 9, three 12, one 16, two 23, and one 26-inch,) and 2 hammers; product, bar iron, beams and channels, flange and refined plate, rivets and bolts, spikes, fish plates, angles, and tees; annual capacity, 26,000 gross tons.

Cumberland Steel and Tin Plate Company, Cumberland, Allegany county. Built in 1873–4, rebuilt in 1884, and enlarged in 1889 and 1892; 3 forge fires, 9 heating furnaces, 5 hammers, (one 600 lb., one 1,000-lb., one 1,000-lb. drop, one 1,500 lb., and one 5,000 lb.,) and 5 trains of rolls (one 9-inch, one 16-inch, one 19-inch, and two 20-inch); product, all kinds of rolled and hammered tool, machinery, tire, and agricultural steel, shapes, forgings, rake teeth, crow bars, claw bars, etc., and pickled and cold rolled black sheets for tinning; annual capac-

ity, 12,000 gross tons of rolled steel, 1,200 tons of forgings, and 3,360 tons of black plates. One 24-pot crucible steel melting furnace; first steel made in 1872; product, tool and spring steel, agricultural steel, soft centre steel, etc.; annual capacity, 2,500 gross tons. Brand, for tool steel, "Crown." (Formerly operated by the Crown and Cumberland Steel Company.) W. C. Dickey, Vice-President; T. A. Hicks, Secretary; F. H. Bowen, Manager.

McCullough Iron Company, Northeast and Rowlandville, Cecil county. Two works in Cecil county: Northeast Works, at Northeast, and Octoraro Works, at Rowlandville. The Northeast Works were originally built in 1847; 4 single puddling and 6 heating furnaces, 5 trains of rolls, (two 16 and three 22-inch,) and 2 hammers; water and steam power; product, sheet iron for galvanizing and refined and best bloom bar iron; annual capacity, 2,700 gross tons of sheet and 5,400 gross tons of bar iron; brand, "McCullough's." A forge connected with the works was built in 1847 and 1875; 9 fires and 2 hammers; product, charcoal blooms made from pig iron, all consumed in the company's rolling mills; annual capacity, 2,700 gross tons. The Octoraro Works were originally built in 1829; 4 heating furnaces and 2 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, 1,800 gross tons. Represented in Philadelphia by The McDaniel and Harvey Company, 1600 Washington ave. Henry Whiteley, President; Enoch McCullough, Vice-President; John W. McCullough, Secretary; Huxley Harvey, Treasurer. *See Minquas Iron Works, Delaware.*

Maryland Steel Company, 208 South Fourth st., Philadelphia. Works at Sparrow's Point, Baltimore county. Built in 1889–92; two 20-gross-ton Bessemer steel converters, 10 pit heating furnaces, having a capacity of 12 ingots each, one 34-inch blooming mill, and one 27-inch rail train; first blow made August 1, 1891, and first steel rail rolled August 3, 1891; molten metal direct from the blast furnaces used in the converters; product, billets and standard sections of rails; annual capacity, 300,000 gross tons. Brand, "Maryland." Fuel used, bituminous coal and petroleum. An iron and steel shipbuilding plant is connected with the works. New York office, 2 Wall st.; Boston office, 70 Kilby st. F. W. Wood, President and Receiver, Sparrow's Point; Edmund N. Smith, Secretary and Treasurer, Philadelphia. Selling agents, Stephen W. Baldwin, New York; C. S. Clark, Boston. *See Furnaces.*

ROLLING MILL COMMENCED BUT NOT COMPLETED.

South Baltimore Rolling Mill Company, 44 South st., Baltimore. Began in 1892 the erection of a rolling mill at South Baltimore, Anne Arundel county, with machinery from the abandoned mill of the

Paterson Iron Company, of Paterson, N. J.; equipment to consist of heating furnaces, trains of rolls, and hammers, for the manufacture of plates and other products; nearly completed; work suspended.

Number of rolling mills and steel works in Maryland: 6 completed and 1 nearly completed. Of these 1 makes Bessemer steel and 1 makes crucible steel.

VIRGINIA.

Crescent Horse Shoe and Iron Company, Max Meadows, Wythe county. Philadelphia office, Bullitt Building. Built in 1892 and first put in operation November 8, 1892; 2 heating furnaces, one spike machine, and 2 trains of rolls (one 15-inch roughing and one 9-inch finishing); product, merchant bar, band, and hoop iron, horse and mule shoes, and railroad and boat spikes; annual capacity, 4,500 gross tons. Brand, "Crescent." Logan M. Bullitt, President, Frank A. Hill, Vice-President, and Charles S. Thorne, Secretary and Treasurer, Philadelphia; William Eynon, Superintendent, Max Meadows. Selling agent, C. T. Kensil, 338 Bullitt Building, Philadelphia.

Old Dominion Nail Works, Old Dominion Iron and Nail Works Company, Richmond, Henrico county. Works on Belle Isle, in the city of Richmond. Founded early in the present century. Owned, operated, and enlarged by present company since 1858; 15 double and 5 single puddling furnaces, 11 heating furnaces, including 2 gas heating furnaces with Siemens producers, 2 squeezers, 6 trains of rolls, (two 9, three 18, and one 20-inch,) and 146 nail machines. Bessemer steel plant built in 1887; two 3-ton converters and blooming mill; first blow made October 10, 1887; idle since 1888. Works operated by 10 turbine water wheels and by steam generated from waste heat of puddling furnaces; product, muck bar, iron and steel cut nails and spikes, merchant, car, and bridge iron, steel wagon tires, horse and mule shoes, etc.; annual capacity, 60,000 gross tons of iron and steel, exclusive of steel plant. Brand, "Old Dominion" nails, bar iron, and horse and mule shoes. Arthur B. Clarke, President; Douglas Baird, General Superintendent; John D. Baird, Assistant Superintendent.

Richlands Iron Company, Richlands, Tazewell county. Philadelphia office, 134 South Fourth st. Built in 1891 and first put in operation in June, 1891; 7 double puddling furnaces and one 21-inch train of rolls; product, muck bar; annual capacity, 13,500 gross tons. Evans R. Dick, President; Saunders Lewis, Jr., Secretary and Treasurer; George McCall, Manager.

Richmond Standard Spike and Iron Company, Richmond. Two works: Manchester Rolling Mill, at Manchester, Chesterfield county, built in 1888–9 and put in operation April 15, 1889; one double gas heating furnace, 2 forge fires, 3 automatic spike machines, and one 9-

inch train of rolls; water-power; product, dock, ship, and railroad spikes; annual capacity, 7,200 gross tons. Iron Gate Rolling Mill, at Iron Gate, Alleghany county, built in 1890–1; 13 single and 4 double puddling furnaces, 4 forge fires, one double gas and two coal heating furnaces, 3 trains of rolls, (9, 18, and 19-inch,) and one hammer; product, muck bar, bar iron, car shapes, railroad, boat, and ship spikes, and links and pins; annual capacity, 22,500 gross tons. Byrd Warwick, President; Dudley McDonald, Secretary and Treasurer; R. W. Jeffery, Superintendent of Manchester works; J. C. Taliaferro, Superintendent of Iron Gate works.

Roanoke Iron Company, Roanoke, Roanoke county. Built in 1891–2 and first put in operation in February, 1892; 15 double puddling furnaces, one scrap furnace, one 3-high 22-inch train of muck rolls, and one 8,000-lb. hammer; product, muck and scrap bar; annual capacity, 21,500 gross tons. Brand, "Roanoke." Joseph H. Sands, President; James E. Porter, Secretary and Treasurer; D. H. Lentz, Manager. Selling agents, Crocker Brothers, New York. *See Roanoke Furnace.*

Roanoke Rolling Mill Company, Roanoke, Roanoke county. Built in 1888–9 and put in operation May 1, 1889; 11 double puddling furnaces, 4 heating furnaces, and 3 trains of rolls (one 10-inch guide, one 16-inch bar, and one 18-inch muck); product, muck bar and merchant iron; annual capacity, 11,000 gross tons. Idle.

Tredegar Iron Works, Tredegar Company, Richmond. Built in 1836; 4 coal and 7 gas heating furnaces, one scrap furnace, 7 trains of rolls, and 9 hammers; steam and water power; product, merchant bar iron, railroad axles, bridge iron, fish-plates, spikes, chairs, track bolts, links and pins, car iron, and horse shoes; annual capacity, 45,000 gross tons. Foundry and machine shops, run by water-power, contain 2 air furnaces, one brass furnace, and 4 cupolas; have melting capacity of 135 gross tons per day, and make car-wheels, pipes, and machinery. Car shops connected with the works, run by both water and steam power, can turn out 200 freight cars per month. Brands for horseshoes, "Piedmont," "Cranberry," and "Prairie." Archer Anderson, President; R. S. Archer, Superintendent of rolling mills; F. T. Glasgow, Superintendent of foundry and machine and car shops; John T. Anderson, General Sales Agent. Selling agents, Crerar, Adams & Co., Chicago.

Virginia Nail and Iron Works, Virginia Nail and Iron Works Company, N. B. Handy, Receiver, Lynchburg. Works at Reusens, Campbell county, 3½ miles above Lynchburg, on the Chesapeake and Ohio Railroad. Built in 1867 and refitted in 1880; nail factory added in 1884 and removed in 1890; 6 double puddling furnaces, one gas and 3 coal heating furnaces, and 3 trains of rolls (10, 18, and 20-inch); water-power; product, guide iron, round, square, and flat

bar iron, and light tee rails; annual capacity, 9,000 gross tons. Brand, "Virginia." Idle since 1891. *See Nannie B. Furnace.*

Vulcan Iron Works, Vulcan Iron Company, B. Rand Wellford, Receiver, Richmond, Henrico county. Bolt and nut works established in 1866; rolling mill added in 1887; one Smith gas heating furnace and one 10-inch train of rolls; product, bars, bolts, nuts, washers, and iron forgings and castings.

ROLLING MILLS AND STEEL WORKS COMMENCED BUT NOT COMPLETED.

Buena Vista Steel Company, Buena Vista, Rockbridge county. Philadelphia office, Bullitt Building. Part of foundations built in 1891 for a basic open-hearth steel plant of two 15-gross-ton furnaces and a 26-inch blooming mill; work suspended.

Glasgow Rolling Mill, R. R. Witt, Receiver, Lexington. The Glasgow Rolling Mill Company began in 1891 the erection of a rolling mill at Glasgow, Rockbridge county, with machinery from the Lawrence Iron Works, of Ironton, Ohio; equipment to consist of 18 puddling furnaces and 4 trains of rolls for the manufacture of bar and band iron and small T rails; work suspended. For sale.

Goshen Rolling Mill, George F. McCrea, Columbus, Ohio. Works at Goshen Bridge, Rockbridge county. Began in 1890 the erection of a rolling mill; nearly completed; work suspended in 1891; 6 double puddling furnaces and one 3-high 18-inch muck and one 10-inch train of finishing rolls erected; boilers built over the puddling furnaces. Address all inquiries to William J. Mahoney, Goshen Rolling Mill, Goshen Bridge.

Shenandoah Rolling Mill, Shenandoah Furnace Company, Shenandoah, Page county. Philadelphia office, Bullitt Building. Began building a rolling mill in 1891; work suspended in 1892; when completed will contain 12 double puddling furnaces, one heating furnace, and 3 trains of rolls (one 22-inch muck, one 18-inch bar, and one 10-inch guide); product, to be merchant bar iron; estimated annual capacity, 13,500 gross tons. David W. Flickwir, President, Roanoke; H. E. Gerhard, Secretary and Treasurer, Shenandoah. *See Gem Furnace.*

Number of rolling mills and steel works in Virginia: 10 completed and 4 partly built. Of these 1 has a Bessemer steel plant.

WEST VIRGINIA.

Crescent Iron Works, Whitaker Iron Company, Wheeling. Built in 1855 and partly destroyed by fire in 1893; rebuilding; will be completed May 15th or June 1st; new buildings to be entirely of iron and steel, and to be equipped with machinery for the production of sheet iron and black plates; annual capacity, 15,000 gross tons. Fuel

to be used, natural gas and bituminous coal. N. E. Whitaker, President; A. C. Whitaker, Secretary. *See Principio Furnaces, Maryland.*

La Belle Iron Works, Wheeling. Built in 1852 and enlarged since; incorporated December 3, 1875; 24 single puddling furnaces, 2 gas heating furnaces, 2 trains of rolls, (20-inch muck and 2-high 20-inch plate,) and 177 nail machines; product, steel nails, steel sheet bars, steel tack plate, steel skelp, and muck bar; annual capacity, 400,000 kegs of nails, 7,700 gross tons of steel sheet bars, and 12,000 gross tons of muck bar; make muck bar for market. Brand, "La Belle." Fuel used, bituminous coal. (One 3-high 24-inch mill not in use.) C. A. Robinson, President; J. E. Wright, Secretary; W. H. Travis, General Manager.

Riverside Iron Works, Wheeling. Works at Wheeling, Ohio county, and at Benwood, Marshall county. Built in 1859 and enlarged since; 14 regenerative gas heating furnaces, 224 nail machines, and 7 trains of rolls (one 9, one 12, four 21, and one 32-inch); product, bar steel, light T rails, skelp, steel strips and plates, and steel nails; annual capacity, 100,000 gross tons of finished bar steel, tack plate, and skelp and 550,000 kegs of nails. Bessemer steel works built in 1883–4; two 5-gross-ton converters; first blow made June 11, 1884; 6 soaking pits; product, steel, used for general purposes; annual capacity, 100,000 gross tons of ingots. Tube works built in 1887 for the manufacture of all kinds of wrought iron and steel tubes from ⅛ inch to 10 inches; first tube made August 11, 1887; annual capacity, 60,000 gross tons. Brand, "Riverside." Fuel used, manufactured gas and coal. J. N. Vance, President; John D. Culbertson, Secretary and Treasurer; Frank J. Hearne, General Manager. *See Riverside Furnace in West Virginia and Steubenville Furnace (Miscellaneous Bituminous District) in Ohio.*

Wheeling Steel and Iron Company, Wheeling, Ohio county. Four works, two in Ohio county and two in Marshall county. Belmont works, at Wheeling, Ohio county, formerly operated by the Belmont Nail Company, built in 1849; 25 single puddling furnaces, 3 regenerative gas heating furnaces, 4 forge fires, 2 trains of rolls, and 152 nail machines; product, nails, made from soft steel slabs; annual capacity, 350,000 kegs; brand, "Belmont;" fuel used, bituminous coal; N. Riester, Superintendent. Benwood Works, at Benwood, Marshall county, formerly called Benwood Iron Works, built in 1852, burned in 1876, and rebuilt in 1876–7; 30 single puddling furnaces, 3 gas heating furnaces, 2 trains of rolls, (one muck and one 3-high skelp,) and 173 nail machines; product, steel cut nails, muck bar, and skelp iron; annual nail-manufacturing capacity, 410,000 kegs; fuel used, bituminous coal. Top Mill, at Wheeling, Ohio county, formerly operated by the Wheeling Iron and Nail Company, built in 1867 and rebuilt in 1872; 8 single puddling furnaces,

6 gas heating furnaces, 2 softening furnaces, 2 annealing furnaces, 130 nail machines, and 3 trains of rolls (double muck and nail-plate and one 22-inch sheet train of 2 mills); product, iron and steel sheets and steel cut nails and spikes; annual capacity, 3,600 gross tons of sheets and 300,000 kegs of nails and spikes; brand, "Top Mill;" fuel used, bituminous coal; H. H. Hornbrook, Superintendent. Wheeling Steel Works, at Benwood, Marshall county; Bessemer plant built in 1885-6; first blow made August 12, 1886; two 5-gross-ton Bessemer converters, 2 soaking pits, and one 2-high 36-inch blooming mill; product, steel nail slabs, billets, and blooms; annual capacity, 100,000 gross tons of ingots or 90,000 gross tons of slabs, billets, and blooms; brand, "W. S. W.;" fuel used, coal; Charles T. Arnberg, Superintendent. C. R. Hubbard, President and General Manager; J. D. DuBois, Secretary; C. C. Woods, Treasurer. *See Furnaces in West Virginia and Martin's Ferry Furnace (Miscellaneous Bituminous District) in Ohio.*

Number of rolling mills and steel works in West Virginia: 6 completed and 1 rebuilding. Of these 2 make Bessemer steel.

KENTUCKY.

Anchor Iron and Steel Works, John Trapp, Newport, Campbell county. Rebuilt and fitted with new machinery in 1874; 5 single puddling furnaces, 5 heating furnaces, 2 scrap furnaces, and 4 trains of rolls (one 10, one 18, and two 20-inch); product, bar and sheet iron; annual capacity, 5,400 gross tons. These works are operated in connection with the American Bolt and Nut Works, also at Newport.

Ashland Steel Company, Ashland, Boyd county. Built in 1891; two 5-gross-ton Bessemer steel converters, two 4-hole gas-fired soaking pit furnaces, and one blooming mill; first blow made December 26, 1891; product, billets and slabs; daily ingot capacity, 450 gross tons. I. A. Kelly, President; John Russell, Vice-President; B. H. Burr, Secretary; L. R. Putnam, Treasurer.

Ewald Iron Company, 941 North Second st., St. Louis, Mo. Two mills: Tennessee Rolling Works, at Tennessee Rolling Works, Lyon county, built in 1846; 6 single puddling furnaces, 13 knobbling fires, 6 heating furnaces, 3 trains of rolls, and one hammer; annual capacity, 3,600 gross tons; not in operation. Tennessee Rolling Mills, at Louisville, formerly called Kentucky Rolling Mill, built in 1869; 14 single puddling furnaces, 6 heating furnaces, 12 knobbling fires and bloom forge, one annealing furnace, 2 steam shingling hammers, and 5 trains of rolls (8, 12, 18, 100-inch plate, and 72-inch plate and sheet with chill rolls); product, bar, guide, plate, and sheet iron, tank, shell, and flange steel plates; annual capacity, single turn, 9,000 gross tons. Brands of iron, "Tennessee Charcoal Bloom," "E. I. C. Charcoal," and "Laurel" staybolt iron. L. P.

Ewald, President; William Burg, Secretary; Thomas Shaver, Superintendent.

Licking Iron Works, Licking Rolling Mill Company, Covington. Built in 1845; 6 double puddling furnaces, 7 heating furnaces, 2 scrap furnaces, one steam hammer, and 6 trains of rolls (one 8, one 12, two 16, one 20, and one 22-inch); product, merchant bar, bridge, boiler, and sheet iron, rivets, angle, tee, jail, sash, and corrugated-roofing iron; special products, boiler plate, shafting, charcoal bar, angle, and tee iron; annual capacity, 8,100 gross tons. I. Droege, President; F. J. Droege, Vice-President; J. C. Droege, Treasurer; I. Droege, Jr., Secretary.

Mitchell, Tranter & Co., Second and Elm sts., Cincinnati. Works at Covington, Ky. Built in 1873; 4 knobbling, 11 puddling, 3 scrap, 2 slab, and 2 plate-mill furnaces, 2 annealing and 5 heating furnaces, 2 steam hammers, and 6 trains of rolls; one 7-gross-ton Siemens open-hearth steel furnace built in 1879; product, plate, sheet, channel, angle, and merchant iron, boiler plate, and plow steel; annual capacity, 13,500 gross tons. Brand, "Crown" horse-shoe bar and refined iron. Charles J. Tranter, President; James Tranter, Vice-President; George M. Clark, Treasurer; James A. Sebastiani, Secretary.

Newport Rolling Mill Company, Newport, Campbell county. Built in 1857; 8 single puddling and 10 heating furnaces, 4 box annealing furnaces, and 5 trains of rolls (1 forge and 4 sheet); product, iron and steel sheets for roofing and corrugating purposes and stove-pipe iron; annual capacity, 10,000 gross tons. (Formerly called Swift's Iron and Steel Works.) A. L. Andrews, President; W. F. Gaff, Secretary; L. T. Hubbard, Superintendent and General Manager; J. A. Andrews, Sales and Contracting Agent.

Norton Iron Works, Ashland, Boyd county. Put in operation in March, 1874; burned and rebuilt in 1883; 20 single puddling furnaces, 4 heating furnaces, 2 Smith gas furnaces, 126 nail machines, and 2 trains of rolls (one 20 and one 22-inch); product, steel nails; annual capacity, 350,000 kegs. Brand, "Norton." Charles H. Greene, President; M. H. Houston, Vice-President and Secretary; John Russell, Treasurer. Colburn & Lupton, general agents, No. 3 Johnston Building, Cincinnati. *See Furnaces.*

Watts (The) Steel and Iron Syndicate Limited, Middlesborough, Bell county. Built in 1890–3; seven 25-gross-ton basic open-hearth furnaces, (2 completed and 5 partially completed,) two 4-hole soaking pits, and one 32-inch blooming mill; not yet in operation; product, billets, blooms, and slabs; annual capacity, 75,000 gross tons. Brand, "Middlesborough." Fuel used, producer gas. Edmund Hannay Watts, Chairman, and R. A. Andrews, Secretary, London, England; Harry Paine, Cashier, Middlesborough, Ky.; Edgar Watts and Frank Watts, Managing Directors in America. *See Furnaces.*

Number of rolling mills and steel works in Kentucky: 9. Of these 1 makes Bessemer steel and 2 have open-hearth steel plants.

TENNESSEE.

Central (The) Iron Company, Nashville. Works (formerly operated by The Southern Iron Company) at Chattanooga, Hamilton county. Rolling mill built in 1864; 10 heating furnaces, one hammer, and 3 trains of rolls, (two 18 and one 20½-inch.) Open-hearth steel plant added in 1887–8; first cast made June 6, 1878; two 10-gross-ton Siemens furnaces, 12 gas producers, and one 36-inch Fritz blooming mill; remodeled by The Southern Iron Company in 1890 for producing basic open-hearth steel; first basic steel made September 15, 1890; idle. Puddle mill, built in 1869, removed and one 5-ton Bessemer converter built in 1886–7; first blow made May 7, 1887; utilized in 1891 for experiments in producing basic Bessemer steel; first basic Bessemer steel made August 24, 1891; idle. Robert Ewing, President; J. A. Cooper, Secretary and Treasurer. *See Charcoal Furnaces in Tennessee and Alabama, (The Southern Iron Company.)*

Harriman Rolling Mill, Duke & McCoy, Harriman, Roane county. Built in 1892 and first put in operation in March, 1893; one double puddling furnace, one heating furnace, and one 20-inch 3-high muck train of rolls; product, muck bar and arch iron for railroads; annual capacity, 5,500 gross tons.

Knoxville Iron Company, Knoxville, Knox county. Built in 1865; 10 single and 3 double puddling furnaces, 2 gas heating furnaces, 41 nail machines, and 4 trains of rolls (8, 15, 16, and 18-inch); product, merchant bars, iron and steel nails, railroad and boat spikes, fish-plates, bolts, and light T and street rails; annual capacity, 11,000 gross tons, including 75,000 kegs of nails. Brand, "K. I. Co." Otis A. Brown, President and Treasurer; E. J. Sanford, Vice-President; T. I. Stephenson, Secretary.

Lookout Iron Company, Harriman, Roane county. Works built at Chattanooga and first started in October, 1876; removed to Harriman in 1891 and put in operation in September, 1891; 20 single puddling furnaces, 3 heating furnaces, and 3 trains of rolls (18-inch muck and 8 and 16-inch bar); product, bar iron, 12 to 30-lb. T rails, fish-plates, and light sections of angle and channel iron; annual capacity, 16,500 gross tons. Sol. Simpson, President; W. H. Russell, Vice-President; J. D. Roberts, General Manager; W. B. Winslow, Assistant General Manager and Treasurer.

Southern (The) Steel Works, John Leighton & Sons, 610 Boyce st., Chattanooga, Hamilton county. Removed from Kingston in 1877; remodeled and enlarged in 1883; one single puddling furnace, one heating furnace, two 8-pot crucible steel-melting furnaces, and one

2,000-pound hammer; product crucible cast steel and forgings. Adding one 16-inch train of rolls.

Number of rolling mills and steel works in Tennessee: 5. Of these 1 has a Bessemer steel and an open-hearth steel plant and 1 makes crucible steel.

GEORGIA.

Atlanta Iron and Steel Castings Company, Atlanta, Fulton county. Built a furnace in 1891 for converting iron castings into steel by the Bates process; first steel made in the fall of 1892. Now owned by A. R. Bryan, Atlanta. Idle and for sale.

Georgia Cotton Tie Company, Rome, Floyd county. Built in 1889 and put in operation in July, 1889; 4 double puddling furnaces, 2 heating furnaces, 2 trains of rolls, (10 and 16-inch,) and one hammer; product, bar, band, and hoop iron, and cotton-ties; annual capacity, single turn, 2,700 gross tons. (Formerly operated by the Rome Cotton Tie Manufacturing Company.) Works owned by Harper Hamilton and others.

Number of rolling mills and steel works in Georgia: 2. Of these 1 has a plant for making special steel.

ALABAMA.

Alabama Iron and Steel Company, Brierfield, Bibb county. Built in 1863, rebuilt in 1882-3, and put in operation in August, 1883; 10 double and 4 single puddling furnaces, 5 heating furnaces, three 18-inch trains of rolls, and 72 nail machines; product, merchant bar iron and nails; annual capacity, 8,100 gross tons. (Formerly called Brierfield Rolling Mill.) T. J. Peter, President. *See Bibb Furnace.*

Alabama Rolling Mill Company, Birmingham, Jefferson county. Works at Gate City, Jefferson county. Built in 1887-8 and put in operation in February, 1888; 23 single puddling furnaces, 2 gas heating furnaces, and 3 trains of rolls (18-inch muck and 8 and 16-inch bar); product, bars, bands, hoops, light T rails, etc.; annual capacity, 24,000 gross tons. W. J. Behan, President; W. H. Hassinger, Vice-President and General Manager; D. M. Forker, Secretary and Treasurer.

Alabama Steel Works, (incorporated,) Fort Payne, DeKalb county. Built in 1889-90; two 15-gross-ton basic open-hearth furnaces; first steel made in July, 1893; 4 gas heating furnaces, 5 cut-nail machines, (idle,) and 2 trains of rolls (one 2-high 32-inch reversing and one 22-inch nail plate); product, ingots, blooms, billets, and slabs; annual capacity, 10,000 gross tons of ingots. Fuel used, producer gas. (Formerly called Fort Payne Rolling Mill.) J. A. Wilder, President; J. K. Lanning, Vice-President, Secretary, and Treasurer.

Anniston Rolling Mills, Anniston Rolling Mills Company, Anniston, Calhoun county. Built in 1890-1; not yet put in operation; 12 sin-

gle puddling furnaces, 2 large heating furnaces, and 2 trains of rolls (3-high 20-inch muck and 3-high 12-inch finishing); steam connections and shafting not finished. Robert Frazer, President, Columbus, Miss.; W. E. Robertson, Secretary and Treasurer, Anniston. For sale.

Bessemer (The) Rolling Mills, Bessemer, Jefferson county. Built in 1887–8 and put in operation in September, 1888; 24 single puddling furnaces, 6 heating furnaces, 5 trains of rolls, (20-inch muck, 8-inch guide, 16-inch bar, 22-inch sheet, and 26-inch plate,) and 3 Siemens producers; product, bar, guide, plate, and sheet iron; annual capacity, 27,000 gross tons. Owned by Morris Adler and others. Idle since the spring of 1891 and for sale.

Birmingham Rolling Mill Company, Birmingham, Jefferson county. Main office, Louisville, Ky. Completed in July, 1880; 10 double and 3 single puddling furnaces, 7 annealing furnaces, 2 pair furnaces, and 6 trains of rolls (two 8, one 16, one 18, and two 24-inch); new mill added in 1887 containing 22 single puddling furnaces, one heating furnace, one squeezer, and one 20-inch train of rolls; product, soft bar, plate, and sheet steel, and bar, angle, sheet, and plate iron, round-edge tire, small T rails, tram rails, and fish-plates; car iron a specialty; annual capacity, 60,000 gross tons. Uses producer gas in heating furnaces. James G. Caldwell, President; B. du Pont, Secretary; Thomas Ward, General Manager; J. D. Dwyer, Superintendent.

Jefferson Steel Company, Birmingham, Jefferson county. Built in 1889–90; one 15-gross-ton basic open-hearth steel furnace; first steel made April 24, 1890; product, ingots; annual capacity, 8,100 gross tons. (This furnace takes the place of one experimental Henderson open-hearth furnace built in 1887–8 and first steel made February 27, 1888. Formerly operated by the Henderson Steel and Manufacturing Company.) Eugene F. Enslen, President; P. A. Buyck, Vice-President; McK. Thomas, Secretary, Treasurer, and General Manager.

Shelby Rolling Mill Company, Helena, Shelby county. Works started in March, 1873; enlarged by present company in 1889; 10 single puddling furnaces, 3 heating furnaces, and 4 trains of rolls; product, merchant bar and band iron and light T rails; annual capacity, 7,200 gross tons. (Formerly called Central Iron Works.) Company failed; works idle. Address, G. W. Dudley, Florence.

Southern Rolling Mill, Birmingham Railway Supply Company, Birmingham. Built in 1888–9, using part of machinery from Nashville Iron Company's works, at Nashville, Tenn.; 25 single puddling and 3 heating furnaces and 3 trains of rolls (3-high 18-inch muck, 3-high 12-inch bar, and 3-high 12-inch guide); product, merchant bar iron; daily capacity, 54 gross tons. H. M. Caldwell, President; L. P. Worl, Secretary; John London, Treasurer.

United States (The) Car Company, Anniston, Calhoun county. Chicago

office, 520 Western Union Building; New York office, 45 Broadway. Built in 1884 and enlarged in 1888–9 and 1893; one single and 6 double puddling furnaces, 6 heating furnaces, one scrap furnace, 2 trains of rolls, (one 18-inch muck and bar train and one 10-inch merchant and guide,) and 5 hammers (one 6,000-lb., two 4,000-lb., and two helve); product, car axles and merchant bar iron; annual capacity, 15,000 gross tons. (Works formerly operated by the United States Rolling Stock Company.) David Cornfoot, President, London, England; T. F. B. Parker, Treasurer, New York; Geo. W. Ristine, General Manager, Chicago; B. F. Peacock, Superintendent of rolling mill and forge, Anniston.

Number of rolling mills and steel works in Alabama: 10. Of these 2 have basic open-hearth steel plants.

TEXAS.

Denison (The) Rolling Mill Company, Denison, Grayson county. Built in 1891 and put in operation in January, 1892; one Siemens heating furnace and 2 trains of 3-high rolls (9-inch and 16-inch); product, merchant iron and cotton-ties. J. T. Munson, President. For sale.

Texas Iron Rolling Mill, H. H. Roland, Tyler, Smith county. Built in 1891–2 and equipped with machinery from mill partly erected at Fort Worth in 1890; first put in operation in June, 1892; one heating furnace and 2 trains of rolls (one 9 and one 18-inch); product, merchant bars, cotton-ties, rail splices, and bolts and nuts; annual capacity, 4,500 gross tons.

ROLLING MILL COMMENCED BUT NOT COMPLETED.

Lone Star Iron Company, Jefferson, Marion county. Began building a rolling mill in 1891 to contain 15 single puddling furnaces, 3 heating furnaces, and 3 trains of rolls (one 18-inch muck and one 8 and one 12-inch bar); buildings partly erected and all the machinery on the ground; work suspended. Property to be sold on May 1st by order of court. *See Jefferson Furnace.*

Number of rolling mills in Texas: 2 completed and 1 partly erected.

OHIO.

LAKE COUNTIES.

American Wire Company, Cleveland, Cuyahoga county. Built in 1886 and first put in operation in November, 1886; new rod mill built in 1888 and first put in operation in January, 1889; one Belgian rod mill, with 6 gas producers, 4 heating furnaces, and 4 trains of rolls; one continuous rod mill, with 3 gas producers, 2 heating furnaces, and 3 trains of rolls; product, steel wire rods; annual capacity, 90,000 gross tons. Also operates a wire-drawing plant. R. F. Jopling, Vice-President and General Manager; A. B. Manship, Secretary.

Baackes (The) Wire Nail Company, Cleveland, Cuyahoga county. Wire-drawing plant and 118 nail machines built in 1890–1; rod mill added in 1892; product, wire rods, wire, and wire nails; annual capacity, 36,000 gross tons of rods, 36,000 gross tons of wire, and 600,000 kegs of nails. Brand for nails, purple-blue hoops. C. B. Lockwood, President; M. Baackes, Vice-President; O. G. Kent, Secretary and Treasurer.

Britton (The) Rolling Mill Company, 66 Hoyt ave., Cleveland, Cuyahoga county. Built in 1890–1 and started in May, 1891; 3 heating furnaces and 2 trains of rolls (one 24-inch by 72-inch train of universal rolls and one 24-inch tinplate train, with 2 hot mills and 3 stands of cold rolls); product, iron and steel plates and heavy sheets and black plates for tinning; annual capacity, 17,000 gross tons. Fuel used, coal. J. W. Britton, President; F. W. Britton, Vice-President and General Manager; C. R. Britton, Secretary; A. M. Britton, Treasurer. *See Tinplate Works, (Projected.)*

Cleveland (The) Hardware Company, Lake st., between Belden and Kirtland sts., Cleveland. Built in 1879; destroyed by fire in June, 1891, and entirely rebuilt; one heating furnace, with Smith & Laughlin gas producer, and one 10-inch train of rolls; product, shapes for wagon, carriage, and sleigh hardware, rolled from soft steel; annual capacity, 10,000 gross tons. Lee McBride, President; R. M. Parmelee, Vice-President; Charles E. Adams, Secretary and Treasurer.

Cleveland Rolling Mill Company, Cleveland. Works chiefly located at Newburgh, Cuyahoga county. Bessemer steel works built in 1867–8 and remodeled and fitted with modern appliances in 1893; first blow made October 15, 1868; two 10-gross-ton converters; annual capacity, 350,000 gross tons of ingots. Open-hearth steel works built in 1876–8; two 15-gross-ton open-hearth furnaces; annual capacity, 20,000 gross tons of ingots. Blooming mill built in 1881 and remodeled in 1891; 3 soaking pits and 2 trains of rolls (one 2-high 33-inch reversing and one 3-high 23-inch); annual capacity, 225,000 gross tons of blooms, billets, and slabs. Rail mills built in 1857; 5 heating furnaces and one train of rolls; annual capacity, 100,000 gross tons of rails. Two rod mills; annual capacity, 100,000 gross tons. Wire mills built in 1868 have an annual output of 70,000 gross tons of finished wire. Also a barb wire plant; annual capacity, 12,000 gross tons. Structural and bar mills contain one 22-inch structural train of rolls, one 18-inch and one 12-inch bar train, one 9-inch guide and merchant train, and one hoop mill; annual capacity, 55,000 gross tons of merchant bars and shapes. Plate mill consists of 5 single puddling furnaces, 9 heating furnaces, 2 busheling furnaces, 8 knobbling fires, and 4 trains of rolls (one 21-inch muck, two 21-inch sheet, and one 28-inch plate with 24-inch universal rolls); galvanizing works attached; annual capacity, 15,000 gross tons of plates and

4,000 gross tons of sheets. The company also has a foundry, a forge, machine shop, barb wire fence manufactory, and 3 blast furnaces. Product, Bessemer and open-hearth blooms, billets, and slabs, beams, channels, angles, and all other structural shapes, Bessemer steel rails, small T and tram rails, steel wire rods, merchant, spring, toe-calk, and sleigh-shoe steel, steel tires, hoops, and forgings, plain and barbed wire, steel boiler and tank plate, galvanized and black sheet iron, and corrugated roofing and siding. William Chisholm, President; W. B. Chisholm, Vice-President; Ed. S. Page, Secretary; Henry Grey, Superintendent. *See Furnaces in the Miscellaneous Bituminous District.*

Cleveland (The) Steel Casting Company, 14 Winter st., Cleveland, Cuyahoga county. Built in 1893; not yet in operation; one 10-gross-ton open-hearth steel furnace; product, steel castings; annual capacity, 6,000 gross tons. Fuel used, producer gas. W. W. Balkwill, President; N. P. Bowler, Vice-President and Treasurer; J. V. Kennedy, Secretary.

Cleveland (The) Steel Company, Cleveland, Cuyahoga county. Built in 1853 and rebuilt in 1873 and 1891; now being remodeled; to be equipped with 2 plate mills and 6 sheet mills; product, to be light steel plates and sheets. Contemplates erecting two open-hearth steel furnaces. (Formerly operated by the Britton Iron and Steel Company.) Frank Rockefeller, President; John A. Potter, Vice-President; L. H. Severance, Secretary; Samuel A. Sague, Treasurer.

H. P. Nail Company, Cleveland, Cuyahoga county. Built in 1880 and first put in operation in March, 1880; enlarged in 1891; 3 large gas heating furnaces, one 9-inch, one 12-inch, and one 16-inch train of rolls, and 319 wire-nail machines; product, steel wire nails, staples, steel wire rods, and steel wire; annual capacity, 1,000,000 kegs of wire nails and 50,000 gross tons of rods or wire. Galvanizing plant connected with the works has an annual capacity of 4,500 gross tons of wire. S. H. Chisholm, President; C. B. Beach, Vice-President; E. C. Beach, Secretary.

Lake Erie Iron Works, Lake Erie Iron Company, 155 St. Clair st., Cleveland, Cuyahoga county. Built in 1852; 16 single puddling and 19 heating furnaces, 4 trains of rolls, and 13 hammers; product, locomotive and car axles, iron and steel forgings of every description, iron shafting up to 20-inch round, and merchant bar iron; annual capacity, 30,000 gross tons. Nut and bolt works produce daily 45 gross tons of nuts and bolts of every description used by railroads, carbuilders, and for agricultural implements. W. C. Scofield, President; Edward Lewis, Vice-President; C. W. Scofield, Secretary and Treasurer; F. R. Scofield, Superintendent of nut and bolt works.

Maumee Rolling Mill, Maumee Rolling Mill Company, Toledo, Lucas county. Works at East Toledo. Built in 1883–4, burned April 10, 1887, and rebuilt in 1887–8; 5 single and 9 double puddling furnaces,

one scrap furnace, 10 heating furnaces, one squeezer, rail and mill shears, 7 trains of rolls, and one 5-ton hammer; product, extra quality assorted merchant bar, band, and shafting iron; also boiler plate, sheet, and tank iron and steel; special attention given to the manufacture of iron for bridge work and agricultural implements; annual capacity, 30,000 gross tons. Also operates a machine shop equipped with all modern appliances. Fuel used, petroleum.

Otis (The) Steel Company Limited, Cleveland, Cuyahoga county. New York office, Mills Building; Chicago office, Western Union Building. Built in 1873–4 and put in operation January 1, 1875; 14 Siemens heating furnaces, 9 hammers, seven 15-gross-ton open-hearth steel furnaces, and 3 trains of rolls (one 30 and two 34-inch); product, steel plate, bar steel, and forgings; annual capacity, 50,000 gross tons. Brand, "Otis Steel." Two 5-gross-ton converters for the production of Bessemer steel have since been added; first blow made August 5, 1884; product, steel for wire rods; annual capacity, 100,000 gross tons. C. A. Otis and F. L. Lehmann, Managing Directors; P. J. Benbow, General Manager; George Bartol, Superintendent.

Union Rolling Mill Company, Cleveland, Cuyahoga county. Works and office at Newburgh, in the city of Cleveland. Built in 1866–7; 15 single and 3 double puddling furnaces, 5 heating furnaces with Siemens gas producers, and 3 trains of rolls (8, 9, and 18-inch); product, nut, bolt, bridge, and rivet iron, soft steel bars, bar iron, shafting, and light T rails; specialties, "Union Refined" bar and cold-straightened shafting; daily capacity, 125 gross tons of finished iron. S. W. Sessions, President; A. S. Upson, Vice-President; H. A. Fuller, General Manager and Treasurer; H. H. Wyman, Secretary. Selling agents, The Condit-Fuller Company, Cleveland. *See Emma Furnace, Miscellaneous Bituminous District.*

Number of rolling mills and steel works in the Lake counties: 12. Of these 2 make Bessemer steel, 3 have open-hearth steel plants, and 1 open-hearth steel plant is projected.

MAHONING VALLEY DISTRICT.

Akron Iron Company, Akron, Summit county. Built in 1886; 19 single puddling furnaces, one scrap furnace, 5 heating furnaces, and 3 trains of rolls (8, 12, and 18-inch); product, best common, refined, and charcoal bar iron, shafting, and light T rails from 10 to 30 lbs. per yard; specialties, patent calendered iron and steel shafting and iron for agricultural implements; annual capacity, 18,000 gross tons. Fuel used, coal exclusively. Lewis Miller, President; J. A. Long, Secretary and Treasurer; A. P. Baldwin, General Superintendent; E. B. Miller, Assistant Superintendent.

Brown Bonnell (The) Iron Company, Youngstown, Mahoning county. Built in 1846; 48 double and 8 single puddling furnaces, 3 gas and

15 coal heating furnaces, 2 annealing furnaces, 4 spike and 2 washer machines, and 13 trains of rolls (three 20 and one 24-inch muck, and two 8, two 10, one 12, one 18, two 20, and one 24-inch finishing); product, bars, beams, channels, angles, universal-mill plates, angle splices, railroad and boat spikes, links and pins, washers, sheets, and plates; annual capacity, 90,000 gross tons. Brand, "Brown Bonnell." Fuel used, coal. Nail factory abandoned. (Formerly called Mahoning Iron Works.) Samuel Mather, President; Robert McCurdy, Vice-President; J. F. Taylor, Treasurer; E. P. Williams, Secretary; John I. Williams, General Manager. Selling agent, Charles H. Hawkins, Western Union Building, Chicago. *See Furnaces in the Mahoning Valley.*

Cherry Valley Iron Works, Leetonia, Columbiana county. Built in 1871; 2 double and 14 single puddling furnaces, one scrap furnace, 3 heating furnaces, and 3 trains of rolls (8, 16, and 18-inch); product, muck bar and merchant bars; annual capacity, 20,000 gross tons. Brand, "Cherry Valley." (Formerly called Leetonia Iron and Coal Company.) J. H. King, President; S. E. Welker, Secretary; C. N. Schmick, Treasurer. *See Cherry Valley Furnace, Mahoning Valley.*

Coleman (The) Shields Company, Niles, Trumbull county. Built in 1841; 22 single puddling furnaces, 3 heating furnaces, and 2 trains of rolls (20-inch muck and 24-inch plate); product, pipe casing and tube iron; annual capacity, 9,000 gross tons. Henry B. Shields, President; J. Morgan Coleman, Vice-President; James S. Shields, Secretary and Treasurer.

Falcon Iron and Nail Company, Niles, Trumbull county. Two mills: Falcon Iron and Nail Works built in 1867; 19 single puddling furnaces, 11 heating furnaces, 3 scrap furnaces, 4 box annealing furnaces, 44 nail machines, and 5 trains of rolls, (two 20 and three 22-inch); nail machines idle. Russia Sheet Iron Mills built in 1864; 23 single puddling furnaces, 5 heating furnaces, 3 box annealing furnaces, and 3 trains of rolls. Product, skelp iron, sheet iron, and sheet steel; annual capacity, 27,000 gross tons of skelp iron and 13,500 gross tons of sheet iron, sheet steel, and galvanized iron. Warner Arms, President; Tod Ford, Vice-President; Myron I. Arms, Secretary and Treasurer.

Falcon Tin Plate and Sheet Company, Niles, Trumbull county. Built in 1892-3 and first put in operation in April, 1893; 8 heating furnaces (4 pair and 4 sheet) and 12 trains of rolls (seven 2-high 24-inch hot and five 2-high 20-inch cold rolling); product, black sheet iron or steel, cold rolled and pickled, and cold rolled and black plates for tinning; annual capacity, 5,000 gross tons of sheets and 4,000 gross tons of black plates. Fuel used, bituminous coal and slack. Contemplates erecting a tinplate plant. Warner Arms, President; Tod Ford, Vice-President; W. DeP. Knowlton, Secretary; Myron I. Arms, Treasurer; William E. Harris, Manager. Selling agents, Ed-

ward C. Brainard, Chicago; George H. Ismon, New York. *See Tin-plate Works, (Projected.)*

Falls Hollow Staybolt Company, Cuyahoga Falls, Summit county. Built in 1865; rebuilt in 1884; 2 heating furnaces and one 8-inch and one 20-inch train of rolls; product, patent mandrel-rolled hollow staybolt iron; annual capacity, 1,800 gross tons. Brand, "Falls Hollow Staybolt Iron." Fuel used, crude oil. (Formerly called Stirling Works.) Selling agents, John W. Walsh and C. M. Walsh, Cuyahoga Falls; Wm. H. McElroy, 202 Walnut Place, Philadelphia; J. & H. Taylor, 751 Craig st., Montreal, Canada.

Haselton Iron Works, The Andrews Brothers Company, Youngstown, Mahoning county. Built at Niles, Trumbull county, in 1872, and removed to Haselton, a suburb of Youngstown, in 1880–1; 11 double and 22 single puddling furnaces, 8 heating furnaces, and 5 trains of rolls (one 8, one 10, one 16, and two 22-inch); product, bar, plate, sheet, rod, skelp, and band iron and steel; annual capacity, 36,000 gross tons. Brand, "Haselton." Fuel used, natural gas and coal. L. E. Cochran, President and General Manager; Mrs. C. H. Andrews, Vice-President; H. W. Heedy, Secretary and Treasurer. Western office, 59 Dearborn st., Chicago, John McLauchlin, Manager; Eastern office, 77 White Building, Buffalo, New York, W. S. Johnston, Manager. *See Furnaces in the Mahoning Valley.*

Hubbard Mill, The Hubbard Co-operative Iron Company, lessee, Hubbard, Trumbull county. Built in 1872 and first put in operation in 1873; 6 double and 10 single puddling furnaces, 3 heating furnaces, and 2 trains of rolls (one 8 and one 18-inch muck); product, muck bar; annual capacity, 15,000 gross tons. Fuel used, slack coal. Wm. F. Bonnell, President; James Simcox, Vice-President; George C. Wilson, Secretary and Manager; Isaac Green, Treasurer. Owned by The Mahoning Valley Iron Company.

Mahoning Valley Works, Mahoning Valley Iron Company, Youngstown, Mahoning county. Built in 1871; 3 single and 30 double puddling and 8 coal and 4 gas heating furnaces, 7 trains of finishing rolls, and 55 nail machines; product, merchant bar iron, angles, tank, plate, and sheet iron, boat spikes, bridge rivets, and steel nails; annual capacity, 45,000 gross tons; also make "Acme" polished shafting; daily capacity, 18 gross tons. Brands, "M. V. I." for shafting, "I. X. L." for horse shoe bars, "B. Q." for bridge iron, "M. S. B." for staybolt iron, and "MXX." Fuel used, bituminous coal. C. D. Arms, President; W. Scott Bonnell, Vice-President; James L. Botsford, Secretary and Treasurer. Also own the Hubbard Mill, at Hubbard, which is operated under lease by The Hubbard Co-operative Iron Company. *See Hannah Furnace, Mahoning Valley.*

Ohio (The) Steel Company, Youngstown, Mahoning county. Building works to contain two 10-gross-ton Bessemer converters, four 4-hole

soaking pits, 4 trains of rolls, (one 34-inch blooming and three 24-inch roughing and finishing,) and one 1,500-lb. hammer; product, to be rails, structural shapes, sheet and tinplate bars, slabs, and billets to 1½ inches square; estimated annual capacity, 300,000 gross tons. Fuel to be used, coal. Henry Wick, President; J. G. Butler, Jr., Vice-President; Myron C. Wick, Treasurer; Thomas McDonald, Superintendent.

Summers Iron Works, Summers Brothers & Co., Struthers, Mahoning county. Built in 1881–2; 2 single and 2 double puddling furnaces, one pair furnace, 2 heating furnaces, 3 patent box annealing furnaces, and 2 trains of hot rolls and one stand of cold rolls; product, light sheet iron; annual capacity, 2,100 gross tons. Brands, "S. B. & Co." and "Struthers." Fuel used, coal and slack. William Summers, President; S. Summers, Secretary and Treasurer.

Union (The) Iron and Steel Company, Youngstown, Mahoning county. (Successors to the Youngstown Iron and Steel Company and Cartwright, McCurdy & Co.) Four mills, two in Trumbull county and two in Mahoning county: Girard Mill, at Girard, Trumbull county, built in 1872 and put in operation September 1, 1873; 27 single puddling furnaces, 3 regenerative gas heating furnaces, and 4 trains of rolls (20-inch muck and 7, 8, and 10-inch finishing); product, all sizes of bar iron and small T rails; special attention given to the manufacture of iron for chains, bolts, nuts, and agricultural implements; annual capacity, 23,000 gross tons. Warren Mill, at Warren, Trumbull county, built in 1870, burned in 1878, and rebuilt in 1879; 20 single and 4 double puddling furnaces, 2 regenerative gas and 3 coal heating furnaces, and 3 trains of rolls (20-inch muck and 10 and 20-inch finishing); product, bar and skelp iron, shafting, etc.; annual capacity, 32,000 gross tons. Upper Mill, at Youngstown, Mahoning county, built in 1871 and burned and rebuilt in 1877; 27 single puddling furnaces, 2 gas heating and 4 coal heating furnaces, one tire-straightening machine, and 5 trains of rolls (20-inch muck and 7, 8, 10, and 12-inch finishing); product, bar, hoop, band, hame, box, tongue-cap, and tire iron and steel, angles, special shapes, and cotton-ties; annual capacity, 30,500 gross tons. Lower Mill, at Youngstown, Mahoning county, built in 1863, 1874, and 1890; 28 single and 18 double puddling furnaces, 10 heating furnaces, (3 using producer gas,) and 10 trains of rolls (3 muck trains, and one 6, one 7, three 8, one 10, and one 16-inch finishing train); product, hoops, bands, horse-shoe iron, bar iron, guide iron, shapes, and steel cotton-ties; annual capacity, 54,000 gross tons; brand, "Eagle." Fuel used, coal in all the works. Myron C. Wick, President; George D. Wick, 1st Vice-President; William E. Taylor, 2d Vice-President and Treasurer; William H. Baldwin, Secretary. *See Pomeroy Mill in the Ohio River District.*

Youngstown (The) Steel Company, Youngstown, Mahoning county. Built in 1882–3 and put in operation in March, 1883; one 20-gross-ton Siemens open-hearth steel furnace which is now idle; one 10-ton Pernot revolving furnace for dephosphorizing metal by the Krupp-Bell process; product, ingots, billets, and washed metal; annual capacity of washed metal, 40,500 gross tons. Fuel used, producer gas. Tod Ford, President and General Manager; Paul Jones, Vice-President; John Stambaugh, Jr., Secretary and Treasurer; E. L. Ford, Superintendent. *See Tod Furnace, Mahoning Valley.*

Number of rolling mills and steel works in the Mahoning Valley District: 17 completed and 1 building. Of these 1 has an open-hearth steel plant and 1 Bessemer steel plant is being built.

INTERIOR COUNTIES.

Cambridge (The) Iron and Steel Company, Cambridge, Guernsey county. Built in 1889–90 and put in operation in July, 1890; 8 single puddling furnaces, 2 scrap furnaces, 2 gas and 11 coal heating furnaces, and 6 trains of rolls (one 22-inch muck and three 22-inch and two 24-inch sheet); product, sheet iron and sheet steel; annual capacity, 9,000 gross tons. Brand, "Cambridge." Fuel used, coal. Also operates a galvanizing plant. A. Beyer, President; A. W. Brown, Vice-President, General Manager, Secretary, and Treasurer.

Canton Rolling Mill Company, Canton, Stark county. Building a rolling mill to contain 2 pair, 2 sheet, and 2 annealing furnaces and 3 trains of sheet rolls (two 24-inch for hot rolling and one 22-inch for cold rolling); product, to be iron and steel sheets; estimated annual capacity, 5,000 gross tons. Fuel to be used, petroleum and coal. E. E. Cline, President; E. K. Sober, Vice-President; E. L. Burchfield, Secretary; R. W. Jones, Treasurer; R. A. Wilson, Manager.

Canton Steel Works, Canton Steel Company, Canton, Stark county. General office, corner Twenty-first and Liberty sts., Pittsburgh, Pa. Built in 1872; 12 heating furnaces, 3 welding furnaces, 5 hammers, one 12-inch and one 20-inch train of rolls, and two 10-gross-ton open-hearth steel furnaces; first open-hearth steel made August 17, 1875; product, tool steel, cast steel, and spring steel; annual capacity 11,000 gross tons of ingots. Brand, "Canton." Fuel used, bituminous coal. John J. Young, President and General Manager; R. H. Bulley, Vice-President and Superintendent; D. C. Noble, Secretary and Treasurer.

Columbus Iron Works, The P. Hayden Saddlery Hardware Company, Columbus, Franklin county. Built in 1854; 2 single and 7 double puddling furnaces, 4 heating furnaces, and 4 trains of rolls; product, merchant bars, light T rails, and iron for harness and saddlery work and for all kinds of chains; annual capacity, single turn, 13,000 gross tons. Fuel used, coal, producer gas, and oil gas. W. B. Hayden,

President; C. H. Allen, Vice-President; A. Hayden, 2d Vice-President; C. H. Hayden, Secretary and Treasurer.

Findlay Rolling Mill Company, Findlay, Hancock county. Built in 1887 and first put in operation August 6, 1887; enlarged in 1890; 18 single puddling furnaces, one scrap furnace, 2 heating furnaces, and 2 trains of rolls (one 10-inch and one 20-inch); product, muck bar, bar iron, and tool and chain iron; annual capacity, 6,000 gross tons of muck bar and 10,000 gross tons of bar iron. Chain plant has a capacity of 1,800 gross tons of coil and cable chain per year. Fuel used, natural gas exclusively. Also operates Briggs Iron and Tool Company's shops; annual capacity, 20,000 dozen tools. J. D. Briggs, President; Samuel Sayward, Vice-President; H. W. Briggs, Secretary, Treasurer, and Manager.

Kellogg (The) Seamless Tube and Manufacturing Company, Findlay, Hancock county. Eastern office, 40 Water st., Boston. Built in 1888 and enlarged in 1891; one 10-gross-ton and one 25-gross-ton open-hearth steel furnace, with an annual capacity of 3,000 gross tons of ingots; 2 heating furnaces and 2 continuous trains of 16-inch rolls with 5 sets of rolls in each train; product, weldless steel tubes. Fuel used, natural gas. Howes Norris, President, and W. F. Almy, Treasurer, Boston; Benjamin Butterworth, Vice-President, Cincinnati; Charles H. Twist, Manager, Findlay.

Lima (The) Steel Casting Company, Lima, Allen county. Built in 1892 and first put in operation in October, 1892; one 10-gross-ton open-hearth steel furnace; product, steel castings; annual capacity, 1,000 gross tons. Fuel used, petroleum. W. T. Agerter, Receiver.

Massillon Rolling Mill, Joseph Corns & Son, Massillon, Stark county. Built in 1873 and put in operation January 4, 1875; 5 single puddling furnaces, 3 scrap furnaces, one regenerative gas heating furnace, and one 9-inch and one 18-inch train of rolls; product, best common and refined bar iron; specialties, shapes to pattern and iron for agricultural implements; annual capacity, 9,000 gross tons. Fuel used, bituminous coal.

New Philadelphia (The) Iron and Steel Company, New Philadelphia, Tuscarawas county. Built in 1883; 13 single puddling furnaces, one gas and 6 coal heating furnaces, and 11 trains of rolls; product, sheets and plates. Brand, "N. P. I. & S. Co." Fuel used, coal exclusively. A galvanizing plant is connected with the works. George Reeves, President; Albert Reeves, Secretary and Treasurer.

Piqua (The) Rolling Mill Company, Piqua, Miami county. Built in 1889; 6 single puddling furnaces, 2 heating furnaces, 3 pair furnaces, 3 softening furnaces, 4 annealing furnaces, and 4 trains of rolls (one 3-high 22-inch muck and three 22-inch sheet); product, iron and steel sheets; annual capacity, 6,100 gross tons. Brand, "Piqua." Fuel used, crude oil. J. G. Battelle, President and General Mana-

ger; W. P. Orr, Vice-President; James Hicks, Secretary and Treasurer; Frank Danks, Superintendent. Selling agents, The Cincinnati Corrugating Company, Piqua.

Reeves (The) Iron Company, Canal Dover, Tuscarawas county. Built in 1865–6; first iron rolled in February, 1866; 20 single puddling furnaces, 3 coal and 2 gas heating furnaces, one 3-high 20-inch muck, one 8, one 10, and one 20-inch finishing, 4 sheet, and one cold rolling mill; also a complete galvanizing and pickling plant; product, merchant bar iron and steel, light T rails, and black and galvanized and cold-rolled sheet iron and sheet steel; annual capacity, 36,000 gross tons. Fuel used, coal. (Formerly called the Dover Rolling Mill.) Jeremiah Reeves, President and General Manager; Jabez Reeves, Vice-President and Superintendent; P. S. Cooper, Secretary; S. J. Reeves, Treasurer.

Russia Mill, Joshua S. Ingalls & Co., Troy, Miami county. Experimental works started in 1886; present works began operations in 1889; 2 heating furnaces, one train of cold rolls, and 2 hammers (6,000-lb. and 8,000-lb.); product, "Craig" polished sheet steel, similar to Russia sheet iron, made from purchased sheets; annual capacity, 600 gross tons. Fuel used, natural gas under boilers and crude oil in heating furnaces. Intend enlarging works.

Solid (The) Steel Company, Alliance, Stark county. One 3-gross-ton and one 5-gross-ton open-hearth steel furnace built in 1883 and 1886 respectively; first steel made in August, 1883; product, steel castings; annual capacity, 5,500 gross tons. Works also contain a small experimental Bessemer converter. J. K. Bole, President; S. J. Williams, Treasurer; W. A. Blanchard, Secretary; C. W. Roepper, Superintendent.

Springfield Steel Casting Foundry, John W. Galvin & Co., lessees, Springfield, Clark county. Built in 1892–3 and first put in operation March 8, 1893; one 6-gross-ton Galvin open-hearth steel furnace; product, ingots and castings; annual capacity, 5,400 gross tons of ingots or 3,000 gross tons of castings. Fuel used, producer gas. Owned by The Lima Steel Casting Company.

Wellston Steel and Nail Mill, E. J. Bird, Jr., Ironton. Works at Wellston, Jackson county. Built in 1886; 2 heating furnaces, one 22-inch train of rolls, and 65 nail machines; product, steel nails; annual capacity, 160,000 kegs. Idle.

Zanesville Iron Works, Ohio Iron Company, Zanesville, Muskingum county. The first mill of these works was built in 1848; present company was organized in 1857 and has operated the works since then; now comprise one double and 19 single puddling furnaces, one scrap furnace, 3 coal and 3 gas heating furnaces, one re-heating furnace, one hammer, and 5 trains of rolls (two 8, one 10, one 16, and one 20-inch); one 10-gross-ton open-hearth steel furnace completed

in 1886; product, assorted iron and steel merchant bars and light iron and steel T rails; specialty, agricultural irons; annual capacity, 13,500 gross tons. Fuel used, coal. M. Churchill, President; E. B. Greene, Vice-President; John R. Cary, Secretary; C. D. Greene, Treasurer. *See Zanesville Furnace, Miscellaneous Bituminous District.*

Number of rolling mills and steel works in the interior counties: 14 completed and 1 building. Of these 6 make open-hearth steel and 1 has a small Bessemer steel plant.

OHIO RIVER COUNTIES.

Ætna-Standard Iron and Steel Company, Bridgeport, Belmont county. Two mills in Bridgeport: Ætna Works built in 1873 and put in operation January 1, 1874; enlarged in 1883 and 1891; 17 single puddling furnaces, 3 scrap furnaces, 6 regenerative gas and 1 reverberatory heating furnace, 3 sheet mill softening furnaces, 6 box annealing furnaces, 3 sheet mill pair furnaces, and 8 trains of rolls (one 20-inch muck, one 8 and one 9-inch guide, one 16 and one 24-inch bar, all 3-high, and one 21 and two 22-inch sheet); product, iron and steel bars, sheets, plates, bands, light T and street rails, angles, tees, channels, and miscellaneous shapes; annual capacity, 45,000 gross tons; brand, "Ætna;" adding two 24-inch black plate mills with necessary heating furnaces; (formerly operated by the Ætna Iron and Steel Company.) Standard Works built in 1882-3 and put in operation April 1, 1883; remodeled in 1888 and 1892; 8 pair heating furnaces, 9 softening furnaces, 5 double annealing furnaces, one plate-mill heating furnace, 9 trains of finishing rolls, (three 20-inch, five 22-inch sheet, and one 3-high 24-inch plate,) and 2 stands of cold rolls; product, plate and sheet iron and steel, galvanized iron, corrugated iron, and other forms of roofing iron; annual capacity, 25,000 gross tons; brand, "Standard;" (formerly operated by the Standard Iron Company.) Fuel used in both works, natural gas, producer gas, and coal. W. T. Graham, President; John A. Topping, Secretary; J. J. Holloway, Treasurer; B. M. Caldwell, General Manager. *See Tinplate Works.*

Belfont Iron Works, Belfont Iron Works Company, Ironton, Lawrence county. Built in 1852; 21 single puddling furnaces, 4 gas heating furnaces, 2 trains of rolls, and 126 nail machines; product, nails of iron and steel and of combined iron and steel; annual capacity, 300,000 kegs. Brand, "Belfont." Fuel used, bituminous coal. John G. Peebles, President; B. H. Burr, Vice-President and Superintendent; S. G. Gilfillan, Secretary and Treasurer. *See Belfont Furnace, Hanging Rock Bituminous District.*

Bellaire Nail Works, Bellaire, Belmont county. Built in 1867 and put in operation in February, 1868; rebuilt in 1893; 2 heating furnaces, 2 trains of rolls, and 125 nail machines; product, steel nails and

spikes, sheet bars, skelp, and nail and tack plate; annual capacity, 20,000 gross tons of rolled products or 300,000 kegs of nails. Bessemer steel works built in 1883–4; two 5-gross-ton converters, 2 heating furnaces, and a blooming mill; first blow made April 28, 1884; product, soft steel blooms, billets, and slabs; annual capacity, 100,000 gross tons. Fuel used, coal. J. R. McCortney, President; A. B. Carter, Secretary and Treasurer. *See Furnaces in the Miscellaneous Bituminous District.*

Brilliant Steel and Iron Company, Brilliant, Jefferson county. Main office, Wheeling, W. Va. Rolling mill started in September, 1883; 20 single puddling furnaces, 4 gas heating furnaces, 4 trains of rolls, (8, 12, 18, and 20-inch,) and one hammer; product, iron and soft steel bars, bands, and light T rails; annual capacity, 16,500 gross tons. Fuel used, coal. George K. Wheat, President; Alex. Updegraff, Secretary.

Burgess Steel and Iron Works, Portsmouth, Scioto county. Two works: Burgess Steel and Iron Works built in 1871; 3 single puddling furnaces, 13 heating furnaces, one 24-pot crucible steel-melting furnace, one 8 and one 10-gross-ton open-hearth steel furnace, 5 trains of rolls, and 5 steam hammers; product, plow steel, (open-hearth, puddled, German, and iron-centre crucible cast,) tool steel, steel and iron boiler plate, "U. S. Norway" refined iron, blooms, and five-ply safe steel; annual capacity, 22,500 gross tons. Portsmouth Iron and Steel Works built in 1832; 16 single puddling furnaces, 7 heating furnaces, 6 trains of rolls, and one hammer; iron products, plates, sheets, bars, hoops, railroad spikes, small T rails, splice bars, and bolts; annual capacity, 10,000 gross tons. One 10-gross-ton open-hearth steel furnace built in 1879; rebuilt to a 25-ton furnace in 1891; steel products, boiler plate, spring steel, etc.; annual capacity, 9,000 gross tons of ingots. George Davis, President; L. D. York, Vice-President and Superintendent; J. L. Watkins, Jr., Secretary and Treasurer.

Cincinnati Rolling Mill Company, 298 East Pearl street, Cincinnati. Works at Riverside, Hamilton county. Built in 1880 and enlarged in 1882; remodeled by present company; 9 single puddling furnaces, 6 heating furnaces, 5 box annealing furnaces, 3 pair furnaces, one 4-ton hammer, and 6 trains of rolls (one muck, one 3-high 70-inch plate, 3 sheet, and one cold-rolling train); product, muck bar, iron and steel sheets, and black plates for tinning; annual capacity, 7,500 gross tons. Fuel used, coal. W. T. Simpson, President; James N. Gamble, Vice-President; R. Simpson, Secretary; S. M. Goodman, Treasurer. Selling agents, W. T. Simpson & Co., Cincinnati.

Irondale Rolling Mills and Tin and Terne Plate Works, Wallace, Banfield & Co. Limited, Irondale, Jefferson county. Branch office, 106 Third ave., Pittsburgh, Pa. Built in 1875; bought and refitted by present owners, who erected two sheet mills in 1886; one puddling furnace, 2 heating furnaces, one scrap furnace, 8 sheet furnaces, 4

annealing furnaces, and 8 trains of rolls (one bar, four 24-inch sheet, and 3 trains of cold rolls); tinning plant, added in 1891-2, contains 6 tinning stacks with necessary fittings and 4 automatic tinning machines; product, black plates for tinning and tin and terne plates; annual capacity, 1,200 gross tons of black plates and 150,000 boxes of tin and terne plates. Fuel used, coal. John C. Wallace, Chairman; H. T. Duff, Secretary; William Banfield, Treasurer and Manager. *See Tinplate Works.*

Ironton Rolling Mill, The Eagle Iron and Steel Company, Ironton, Lawrence county. Built in 1852 and enlarged several times since; 15 single and 3 double puddling furnaces, 2 gas, 2 sheet bar, 2 sheet, one scrap, and one annealing furnace, and 5 trains of rolls (one 18-inch muck, one 3-high 16-inch bar, one 9-inch guide, and two 20 x 38-inch sheet); product, bar and sheet iron and steel; annual capacity, double turn, 13,000 gross tons. Fuel used, producer gas and bituminous coal. H. A. Marting, President and General Superintendent; S. B. Steece, Vice-President; H. H. Mittendorf, Secretary and Treasurer; George H. Fisher, Manager. Selling agents, George Kinsey & Co., Cincinnati; Wolfe & Good, St. Louis.

Jefferson Iron Works, Steubenville, Jefferson county. Built in 1855; 3 gas heating furnaces, one 21-inch train of plate rolls, and 160 nail machines; product, skelp iron and steel, sheet bars, and steel nails; annual capacity, 20,000 gross tons of rolled products or 400,000 kegs of nails. Brand, "Jefferson." Fuel used, coal. S. K. Wallace, President; Joseph Bell, Vice-President; G. P. Harden, Secretary; John Flannery, Manager. *See Furnaces in the Miscellaneous Bituminous District.*

Junction Iron Company, Mingo Junction, Jefferson county. Branch office, Wheeling, W. Va. Built in 1882 and put in operation November 1, 1882; 3 gas heating furnaces, one train of rolls, and 142 nail machines; product, steel cut nails and spikes and steel tack plate, made from steel supplied by the Laughlin and Junction Steel Company, of which this company is one-half owner; annual capacity, 350,000 kegs. Brand, "Junction Iron Co., Wheeling." Fuel used, producer gas and raw coal. H. M. Priest, President; George A. Dean, Superintendent. *See Mingo Furnaces, Miscellaneous Bituminous District.*

Kelly Nail Works, Kelly Nail and Iron Company, Ironton, Lawrence county. Built in 1883 and first put in operation November 1, 1883; 14 single puddling furnaces, 2 gas heating furnaces, 2 forge fires, 2 trains of rolls, (one 18-inch muck and one 2-high 22-inch plate,) and 120 nail machines; product, muck bar and iron and steel cut nails and spikes; annual capacity, double turn, 15,000 gross tons of muck bar and 250,000 kegs of nails. Brand, "The Ironton Nail." Fuel used, coal. Charles Parrott, President; Ironton A. Kelly, Vice-

President; Oscar Richey, Secretary and Treasurer. *See Sarah Furnace, Hanging Rock Bituminous District.*

Laughlin and Junction Steel Company, Mingo Junction, Jefferson county. Branch office, Wheeling, W. Va. Built in 1885–6; two 5-gross-ton Bessemer converters; first blow made February 8, 1886; one 5-hole soaking pit and one blooming mill; product, blooms, slabs, and billets for general purposes; annual capacity, 100,000 gross tons. Fuel used, coal and producer gas. (This company is operated by the Junction Iron Company and the Laughlin Nail Company.) W. L. Glessner and H. M. Priest, General Managers; M. J. Urquhart, Secretary and Business Manager; W. H. Bradley, Superintendent.

Laughlin Nail Company, Wheeling, W. Va. Works at Martin's Ferry, Belmont county, Ohio. Built in 1872–3; first keg of nails made March 4, 1873; works destroyed by fire August 8, 1881, but immediately rebuilt; 3 gas heating furnaces, one train of 20-inch rolls, 2 hammers, and 225 nail machines; product, cut nails and spikes, made from steel supplied by the Laughlin and Junction Steel Company, of which this company is one-half owner; annual capacity, 600,000 kegs. Brand, "Laughlin Nail Company, Wheeling." Fuel used, coal. W. L. Glessner, President.

Middleport (The) Steel and Nail Works, The King, Gilbert, and Warner Company, Columbus. Works at Middleport, Meigs county. Commenced to make nails February 22, 1886; 3 heating furnaces, 2 trains of rolls, (20 and 24-inch,) and 102 nail machines. Bessemer steel plant added in 1887; two 4-gross-ton converters and one 28-inch blooming train of rolls; first blow made in August, 1888. Product, steel slabs, billets, and nails; annual capacity, 100,000 gross tons of steel and 300,000 kegs of nails. Fuel used, coal. R. M. Gilbert, President; J. H. King, Vice-President; R. S. Warner, Secretary and Treasurer. *See Glasgow Furnace, Hocking Valley; see Franklin Furnace, Miscellaneous Bituminous District.*

Pomeroy Mill, Union Iron and Steel Company, Youngstown. Works at Pomeroy, Meigs county. Built in 1847; 13 single puddling furnaces, 4 heating furnaces, and 4 trains of rolls (one muck and one 7, one 8, and one 12-inch finishing); product, hoop, band, and refined iron, and steel cotton-ties; annual capacity, 20,000 gross tons. Fuel used, coal. (Formerly operated by Cartwright, McCurdy & Co.) *See The Union Iron and Steel Company, Mahoning Valley District.*

Wellsville Plate and Sheet Iron Company, Wellsville, Columbiana county. Mill built in 1873 to make tinplates; remodeled in 1880 by present owners; 8 single puddling furnaces, 2 heating furnaces, 5 pair and sheet furnaces, 5 annealing furnaces, one squeezer, one 20-inch bar train, two 24-inch trains, and 2 pairs of cold rolls; product, plate and sheet iron and steel; annual capacity, 4,500 gross tons. Fuel

used, coal. Persifor F. Smith, President and Manager; Richard G. Wood, Vice-President; Alan W. Wood, Secretary and Treasurer.

Number of rolling mills and steel works in the Ohio river counties: 18. Of these 3 make Bessemer steel, 2 make open-hearth steel, and 1 makes crucible steel.

Total number of rolling mills and steel works in Ohio: 61 completed and 2 building. Of these 6 make Bessemer steel and 1 Bessemer steel plant is being built, 12 make open-hearth steel and 1 open-hearth steel plant is projected, and 1 makes crucible steel.

INDIANA.

American (The) Tin Plate Company, Elwood, Madison county. Built in 1891–2 and first put in operation in June, 1892; 12 heating furnaces (10 sheet and 2 bar) and 3 trains of rolls (two 23-inch hot and one 18-inch cold); product, black plates for tin and terne plates, all consumed by the company in its tinplate works; annual capacity, 6,500 gross tons. Brand, "Elwood." Fuel used, natural gas exclusively. W. B. Leeds, President; John F. Hazen, Vice-President; L. H. Landon, Secretary; D. G. Reid, Treasurer. *See Tinplate Works.*

American (The) Wire Nail Company, Anderson, Madison county. Built in 1889; 3 heating furnaces, one rod mill, and 150 wire nail machines; product, wire rods, wire, and wire nails; annual capacity, 45,000 gross tons of rods and 600,000 kegs of nails. Fuel used, natural gas. (Wire nail plant brought from Covington, Ky., in 1891.) L. H. Gedge, President; C. P. Garvey, Secretary; E. J. Buffington, Treasurer.

Anderson Steel Casting Company, 143½ South Meridian st., Indianapolis. Works at Anderson, Madison county. Built in 1891–2 and first put in operation March 28, 1892; one 10-gross-ton open-hearth furnace; product, steel castings; annual capacity, 2,000 gross tons. Fuel used, natural gas. (Formerly operated by the Haugh-Kurtz Steel Company.) B. F. Haugh, President; J. A. Kurtz, Vice-President; B. O. Haugh, Secretary; W. E. Kurtz, Treasurer.

Central (The) Iron and Steel Company, Brazil, Clay county. Built in 1882–3 and first put in operation January 12, 1883; 9 double puddling furnaces, one gas and 8 coal heating furnaces, 5 trains of rolls, (two 10, one 16, and two 20-inch,) and one 1,500-lb. and two 4-ton hammers; product, bar iron, light T rails, car axles, forgings, Acheson's patent railroad spikes, and Williams's wrought-iron open hexagonal turn-buckles; special attention given to car and bridge specifications; annual capacity, 11,000 gross tons of rolled and forged iron and 7,000 gross tons of spikes. Brand, "Central." Fuel used, block coal. Adding one 8-inch train of rolls; also erecting a bolt and nut factory. Major Collins, President and Manager; J. H. Lewis, Treasurer; M. R. Collins, Secretary. *See Brazil Furnace.*

Chicago (The) Horse Shoe Company, East Chicago, Lake county. Office, 908 Ashland Block, Chicago. Built in 1888–9; one gas producer, (idle,) 2 large and 8 small heating furnaces, 7 bending machines, 7 planishing machines, 2 grubbing machines, 2 trains of rolls, (one 9-inch and one 12-inch,) and one 1¼-gross-ton Robert-Bessemer converter; steel works made first blow October 20, 1889; product, horseshoe bars and horse and mule shoes. Fuel used, petroleum. Gideon N. Caleb, President; William Poillon, Vice-President; Walter S. Caleb, Treasurer; E. A. Schwarzenberg, Secretary.

Corning Steel Company, Hammond, Lake county. Built in 1892 and first put in operation October 17, 1892; 2 billet heating furnaces and 8 trains of rolls (one 20-inch bar and seven 22-inch sheet); product, iron and steel sheets; annual capacity, 12,000 gross tons. Brand, "Corning." Fuel used, petroleum and coal. F. T. Corning, President; C. S. Corning, Secretary and Treasurer; Sidney McCloud, Manager.

East Chicago Iron and Steel Company, 828 Monadnock Building, Chicago. Works at East Chicago, Lake county. Built in 1889 and put in operation September 15, 1889; 13 double puddling furnaces, 9 heating furnaces, 10 forge fires, 3 hammers, (1,500-lb., 3-ton, and 5-ton,) and 5 trains of rolls (one 18-inch muck, one 18-inch scrap, and one 8-inch, one 10-inch, and one 18-inch finishing); product, muck bar, bar iron, car axles, shafting, and general forgings; annual capacity, 30,000 gross tons. Fuel used, natural gas. (Formerly called the National Forge and Iron Works.) Josiah J. Parkhurst, President; H. E. Weaver, Vice-President; Leonard S. Mulford, Secretary; William V. Baker, Treasurer; Frank B. Felt, Manager.

Emlyn (The) Steel and Tin Plate Company, Summitville, Madison county. Building a rolling mill to contain 16 heating furnaces, 2 annealing furnaces, 8 trains of hot and 4 trains of cold rolls, and 12 tinning machines; product, to be black plates for tin and terne plates; estimated annual capacity, 15,000 gross tons. Fuel to be used, natural gas. John Emlyn Jones, President; Theophilus Morgan, Vice-President and Manager; C. A. Rosecrans, Secretary; J. E. Jones, Treasurer. Selling agents, Allerton Clark Company, Chicago. *See Tinplate Works.*

Gas City Works, The Morewood Company, Gas City, Grant county. Built in 1893 and first put in operation in December, 1893; 8 heating furnaces and 16 trains of rolls (8 hot and 8 cold rolling); product, black plates for tin and terne plates; annual capacity, 6,200 gross tons. Fuel used, natural gas. Contemplate erecting an open-hearth steel plant in 1894. J. H. Rogers, President; H. C. Bond, Vice-President; C. M. Stuart, Secretary; L. Follet, Treasurer; C. Maliphant, Manager. Selling agents, Saunders, Fielding & Bond, Chicago. *See Tinplate Works.*

Greenfield Iron and Nail Company, Greenfield, Hancock county. Built in 1889 with machinery formerly in Cobb's Iron and Nail Works, at Aurora; one gas heating furnace, one 22-inch train of rolls, and 50 nail machines; product, iron and steel cut nails; annual capacity, 150,000 kegs. Fuel used, natural gas. Franklin Landers, President; W. C. Whitehead, Secretary and Treasurer. J. H. Moulden, Receiver. Selling agents, W. C. Brown, 45 LaSalle st., Chicago; John Cantwell, 2 North Second st., St. Louis.

Indiana Iron Company, Muncie, Delaware county. Built in 1892, utilizing machinery from the Lancaster Iron Company's rolling mill at Lancaster, Ohio; first put in operation in July, 1892; one double puddling furnace, 22 single puddling furnaces, 5 heating furnaces, and 4 trains of rolls (one 18-inch muck and one 8, one 10, and one 16-inch finishing); product, iron and steel bars, bolts, nuts, bridge rods, and gimlet-pointed coach screws; annual capacity, 30,000 gross tons of finished products. Fuel used, natural gas. L. A. Cobb, President; George O. Cromwell, Vice-President and Treasurer; George M. Bard, Secretary; D. H. Corbett, Superintendent of mill.

Indiana (The) Steel Company, Indianapolis, Marion county. Operates under lease one double and 2 single heating furnaces and the 26-inch mill in the works of the Premier Steel Company, producing beams from 6 to 20 inches; daily capacity, 100 gross tons. Fuel used, natural and producer gas. Jacob Christopher, President; J. E. McGettigan, Vice-President; W. R. Brown, Secretary; W. V. Martin, Treasurer.

Irondale (The) Steel and Iron Company, Middletown, Henry county. Building a rolling mill, utilizing machinery from the company's mill at Anderson, which was destroyed by fire on October 31, 1893; to contain 15 double and 2 single puddling furnaces, 8 heating furnaces, 5 trains of rolls, (one 18-inch muck, one 18-inch bar, and three 20-inch sheet,) and one 10-ton hammer; product, muck bar and plates and sheets; estimated annual capacity, 10,000 gross tons of muck bar and 5,000 gross tons of sheets. Fuel to be used, natural gas. George A. Laughlin, President; John F. Whitelaw, Vice-President; H. O. Crane, Treasurer and General Manager.

Lakeside Nail Company, 647 Rookery Building, Chicago. Works at Hammond, Lake county. Built in 1886–7; 4 gas heating furnaces, 2 trains of rolls, (22-inch slab and 22-inch nail plate,) and 202 nail machines; product, cut nails; annual capacity, 600,000 kegs. Brand, "Lakeside." Fuel used, coal. Works contain a Bessemer steel plant of two 3-gross-ton converters, which is idle; first blow made November 22, 1887. (Formerly called East Chicago Steel Works.) George S. Griscom, President; W. Scott Bonnell, Vice-President; T. F. Woodman, General Manager and Treasurer. Owned by the Chicago Steel Manufacturing Company.

Marion (The) Steel and Iron Company, (incorporated,) Marion, Grant

county. Built in 1893 and put in operation in September, 1893; 2 heating furnaces and one 10-inch train of rolls; product, rods, squares, flats, ovals, and hoop and band iron and steel; annual capacity, 13,500 gross tons. Fuel used, natural gas. Charles A. Borts, President; Thomas Reed, Vice-President; W. C. Ely, Secretary and Treasurer.

Midland Steel Company, Muncie, Delaware county. Built in 1892 and first put in operation October 10, 1892; one 20-gross-ton open-hearth steel furnace, 8 heating furnaces, 4 annealing furnaces, 5 soaking pits, and 3 trains of 24-inch rolls; product, billets, slabs, universal plates, tinplates, sheet bars, and stamping and tinning sheets; annual capacity, 10,000 gross tons. Fuel used, natural gas exclusively. R. J. Beatty, President; John A. McVoy, Vice-President; J. R. Wick, Secretary; J. G. Battelle, Treasurer; Robert M. Stevenson and William H. Bailey, Managers. Selling agents, John H. Heimbuecher and H. H. Coombs, St. Louis; James W. Ross, Chicago; Hubbert & Hubbert, Louisville; Houston & Co., Cincinnati.

Muncie Iron and Steel Company, Muncie, Delaware county. Built in 1893 and first put in operation in April, 1894; 2 heating furnaces and 2 trains of rolls (one 10-inch and one 12-inch); product, angles, tees, I beams, and channels up to 4 inches, rounds, flats, band iron, cotton-ties, etc.; annual capacity, 10,000 gross tons. Fuel used, natural gas exclusively. J. C. Gresheimer, President; Richard McGauley, Vice-President; Edward Tuhey, Secretary and Treasurer; W. J. Story, Manager.

Muncie Rolling Mill, Muncie Muck Bar Company, lessee, Muncie, Delaware county. Built in 1888–9 with part of machinery removed from Greencastle; put in operation in March, 1889; 18 double puddling furnaces, 2 scrap furnaces, and two 18-inch trains of rolls; product, muck bar; annual capacity, 25,000 gross tons. Fuel used, natural gas exclusively. (Nail factory, containing 50 nail machines, destroyed by fire on August 26, 1892.) T. F. Rose, President; Joseph Porter, Secretary and Treasurer; William J. Bowen, Superintendent. Owned by the Muncie Nail Company.

New Albany Forge and Rolling Mill, New Albany, Floyd county. Forge built in 1869; rolling mill added in October, 1887; one double puddling furnace, 7 coal and 2 gas heating furnaces, 3 forge fires, 3 trains of rolls, (10, 18, and 21-inch,) and 6 hammers; product, car axles, shafting, and bars; annual capacity, 4,500 gross tons of axles, 350 gross tons of shafting, and 9,000 gross tons of bars. Fuel used, coal. B. Whitney Herr, President. E. M. Hubbert, Receiver.

Ohio Falls Iron Works, New Albany, Floyd county. Built in 1866; 14 single puddling furnaces, one scrap furnace, 4 heating furnaces, and 3 trains of rolls (8-inch guide, 16-inch bar, and 18-inch muck); product, bridge, bar, plow, and staybolt iron; annual capacity, 13,500 gross tons. Fuel used, coal. Adding one 10-inch train of rolls. New-

land T. DePauw, President; Walter E. Stoy, Vice-President and Treasurer; Frank M. Stoy, Secretary.

Oliver Chilled Plow Works, South Bend Iron Works, proprietors, South Bend, St. Joseph county. Crucible steel plant built in 1891 for the production of steel solely for use in the works in the manufacture of plows; 96 pots can be used at each heat. Fuel used, coke.

Premier Steel Company, Indianapolis, Marion county. Built in 1857, 1881-2, 1886-7, and remodeled by present company in 1890-1; 7 single puddling furnaces, 2 heating furnaces, 8 soaking pits, one forge fire, and one 3-high 18-inch, one 3-high 26-inch, and one 3-high blooming train of rolls. Two 15-gross-ton open-hearth steel furnaces; first steel made in May, 1887; annual capacity, double turn, 18,000 gross tons of ingots. Two 4-gross ton basic-Bessemer converters erected in 1892-3; annual capacity, double turn, 100,000 gross tons of ingots. Product, billets, angles, channels, miscellaneous shapes, and merchant bar steel; annual capacity, single turn, 18,000 gross tons. Fuel used, producer and natural gas. (The 26-inch beam mill is leased by the Indiana Steel Company. One Adams direct process furnace abandoned.) C. W. DePauw, President; N. T. DePauw, Vice-President; Albert Trinler, Treasurer; W. H. Coen, Secretary. J. E. McGettigan, Receiver.

Terre Haute Iron and Steel Company, Terre Haute, Vigo county. Built in 1868; destroyed by fire September 19, 1873, and rebuilt in the winter of 1873-4; enlarged in 1883 and 1884; 5 double and 16 single puddling furnaces, 2 regenerative gas heating furnaces, and 3 trains of rolls (one 19-inch muck, one 18-inch bar, and one 10-inch guide); product, bar iron and light T rails; annual capacity, 18,000 gross tons. Fuel used, block coal. Works also contain 64 nail machines, which are idle. (Formerly owned by the Terre Haute Iron and Nail Works.) J. P. Crawford, President; A. J. Crawford, Vice-President and Treasurer; Samuel L. Bridwell, Secretary; M. H. Monkhouse, Superintendent.

Wabash Iron Company, Terre Haute, Vigo county. Completed in January, 1874; one double and 15 single puddling furnaces, one scrap and 3 heating furnaces, and 3 trains of rolls (8, 18, and 20-inch); product, bar and guide iron and light T rails; annual capacity, 12,000 gross tons. Brand, "Wabash." Fuel used, coal. A. J. Crawford, President; J. P. Crawford, Secretary, Treasurer, and Manager.

Westerman Natural Gas Iron Company, Marion, Grant county. Built in 1890-1 with machinery from the abandoned Prospect mill at Cleveland, Ohio; 4 heating furnaces and 2 trains of rolls; product, bar iron; annual capacity, 10,000 gross tons. Brand, "Westerman." Fuel used, natural gas. George Westerman, Jr., President; Daniel E. Brong, Vice-President; F. P. Luce, Secretary and Treasurer; George Westerman, Sr., General Manager.

Wetherald Rolling Mill, Wetherald Rolling Mill Company, Frankton, Madison county. Built in 1893, utilizing machinery from the abandoned Wetherald Rolling Mill at Findlay, Ohio; first put in operation in January, 1894; 5 scrap furnaces, 3 heating furnaces, and 3 trains of rolls (8, 10, and 18-inch); product, bar iron; annual capacity, 10,000 gross tons. Fuel used, natural gas.

White River (The) Iron and Steel Company, Muncie, Delaware county. Built in 1891-2, utilizing machinery formerly operated by the Anderson Rolling Mill Company, at Anderson; put in operation in June, 1892; 3 heating furnaces and 2 trains of rolls (one 8 and one 9-inch); product, merchant bar iron and steel; annual capacity, 15,000 gross tons. Fuel used, natural gas exclusively. W. J. Park, President; V. O. Foulk, Secretary, Treasurer, and Manager.

Wright Shovel Company, Anderson, Madison county. Built in 1891 and first put in operation January 1, 1892; 2 heating furnaces and two 16-inch trains of sheet rolls; product, sheets for shovels, spades, and scoops; annual capacity, 1,200 gross tons of sheets. Shovel works have 3 forge fires and 3 heating furnaces. Fuel used, natural gas. Thomas W. Wright, President; W. J. Alford, Secretary and Treasurer.

ROLLING MILL COMMENCED BUT NOT COMPLETED.

New Albany Rail Mill Company, The Union Trust Company, Assignee, Indianapolis. Commenced in 1893 the erection at Alexandria, Madison county, of a rolling mill, using machinery formerly in the company's works at New Albany and new and improved machinery recently purchased; made an assignment in July, 1893, and work suspended; part of machinery still at New Albany. For sale.

Number of rolling mills and steel works in Indiana: 26 completed, 2 building, and 1 partly built. Of these 1 makes Bessemer steel and 1 has a Bessemer steel plant, 1 makes Robert-Bessemer steel, 3 make open-hearth steel and 1 open-hearth steel plant is projected, and 1 makes crucible steel.

ILLINOIS.

Calumet Works, Calumet Iron and Steel Company, Rookery Building, Chicago. Works at Cummings, Cook county. Built in 1876 and first put in operation in August, 1876; 6 double and 10 single puddling furnaces, 7 Siemens heating furnaces, 4 trains of rolls, (one 9, one 14, and one 22-inch, and one 20-inch muck,) one 6-ton hammer, and 132 nail machines; product, merchant bar iron and steel, angle splices, and shafting; annual capacity, 45,000 gross tons. Fuel used, petroleum. (Nail mill not in operation; open-hearth steel plant erected in 1882 abandoned.) A. M. Wilcox, President and Treasurer; C. F. Stuart, Vice-President and Manager; F. S. Wheeler, Secretary; C. H. Wilcox, Assistant Treasurer. *See Calumet Furnace.*

Chicago Forge and Bolt Company's Rolling Mill, Chicago Rolling Mill Company, lessee, Chicago. Works and office, Fortieth st. and Stewart ave. Built in 1888 and burned in December, 1888; rebuilt in 1889; one heating furnace and one 10-inch and one 18-inch train of rolls; product, light steel angles, tees, channels, etc.; annual capacity, 22,500 gross tons. Fuel used, crude oil. Thomas S. Blair, Jr., General Manager; Hazen Brown, General Agent. Selling agents, Charles W. Goodrich & Co., Rookery Building, Chicago. Owned by the Chicago Forge and Bolt Company.

Chicago Splice Bar Mill, Morris Sellers & Co., Western Union Building, Chicago. Works, Chicago ave. and the Chicago river. Built in 1878; one forge fire, 3 heating furnaces, and 2 trains of rolls; product, "Samson" splice bars; annual capacity, 11,000 gross tons. Fuel used, block coal. Howard Greer, Superintendent.

Chicago Steel Casting Company, 4165 Lake st., Chicago. Works at Forty-eighth and Green streets. One 7-ton open-hearth steel furnace and one 8-pot crucible steel-melting furnace erected in 1892. W. K. Shelly, President; L. S. Shelly, Vice-President; S. P. Shelly, Treasurer. Idle and for sale or lease.

Chicago Tire and Spring Company, Western Union Building, Chicago. Works at Melrose, (Ovington P. O.,) Cook county. Tire mill built in 1881–2; new mill built in 1888; 2 heating furnaces and one universal tire mill. Steel department, added in 1884–5, contains one 8 and one 10-gross-ton open-hearth furnace; first steel made in February, 1885. Product, ingots, castings, locomotive and car-wheel tires, steel car couplers, circular forgings, and manganese steel castings; annual capacity, 13,000 gross tons. Spring works have furnaces, rolls, and machinery for making railroad car springs. Fuel used, coal and petroleum. C. H. Ferry, President and Treasurer.

Fowler Foundry Company, 1323 Monadnock Building, Chicago. Works at Stony Island ave. and Ninety-fifth st. Built in 1887; double gas heating furnace, with machinery for rolling solid steel car-wheel blanks into finished integral steel car wheels; annual capacity, 75,000 car wheels; fuel used, producer gas; idle. Robert-Bessemer plant added in 1889; one 2-gross-ton converter; first blow made September 5, 1889; product, steel castings of every description. (Formerly owned by the Fowler Steel Car Wheel Company; later by the Northern Steel Company.) H. W. Fowler, President and Treasurer; E. J. Fowler, Vice-President; Joseph Grove, Secretary.

Fowler Rolling Mill, Fowler Rolling Mill Company, 1323 Monadnock Building, Chicago. Works at Fifty-ninth st. and C. & W. I. R. R. Built in 1882; one forge fire, 2 heating furnaces, and one 9-inch train of rolls; product, "Fowler" railroad spikes; annual capacity, 80,000 kegs. Fuel used, crude petroleum exclusively. Sidney A. Kent,

President; William J. Watson, Vice-President; H. W. Fowler, Secretary, Treasurer, and General Manager.

Illinois Steel Company, Rookery Building, Chicago. Milwaukee office, 151 New Insurance Building; New York office, 46 Wall st. Four plants in Illinois, styled the North Works, South Works, Joliet Works, and Union Works. North Works, located at Chicago, on the north branch of the Chicago river, at the foot of Wabansia ave., built in 1857; 8 heating furnaces and 2 trains of rolls; Bessemer steel works have two 6-gross-ton converters and all appliances for manufacturing rails; first blow made April 10, 1872; first steel rail rolled May 24, 1865, from steel made at Wyandotte, Michigan; product, Bessemer steel ingots, rails, and beams; annual capacity, 145,000 gross tons of ingots, 120,000 gross tons of rails, and 45,000 gross tons of beams, which last would come out of rail capacity. South Works, located at South Chicago; three 10-gross-ton Bessemer converters, 10 Siemens heating furnaces, one 3-high 40-inch blooming train, and two 3-high finishing trains of rolls; first blow made June 14, 1882; product, Bessemer steel ingots and rails; annual capacity, 432,000 gross tons of ingots and 360,000 gross tons of rails. These works are being extended by the addition of an open-hearth steel plant of four 15-gross-ton furnaces and a plate mill. Joliet Works, located at Joliet, Will county, built in 1870; two 9-gross-ton Bessemer converters; first blow made January 26, 1873, and first steel rail rolled March 15, 1873; annual capacity, 240,000 gross tons of Bessemer steel ingots. Steel rail mill has 5 heating furnaces, one 36-inch blooming train, one 23-inch rail train, and a Sellers 3-ton hammer; annual capacity, 200,000 gross tons of rails or billets. The wire-rod mill, built in 1888, contains one Garrett mill with three gas furnaces; annual capacity, 54,000 gross tons. Union Works, located at 3179 Ashland ave., Chicago; original mill built in 1863 and original Bessemer steel works made first blow July 26, 1871; Bessemer steel works and rail mill rebuilt in 1885–6; two 10-gross-ton converters, 5 cupolas, 4 spiegel cupolas, one 3-high 35-inch blooming mill, 4 gas ingot and one gas bloom heating furnace, and one 3-high 25-inch rail train; product, Bessemer steel rails; annual capacity, 325,000 gross tons of ingots and 270,000 gross tons of rails. Fuel used, coal and oil at the North, South, and Joliet Works; oil at the Union Works. Jay C. Morse, President; W. R. Stirling, 1st Vice-President; Robert Forsyth, 2d Vice-President; the above three officers, with Francis Hinton, of Milwaukee, and A. J. Forbes-Leith, of New York, constitute the Executive Committee; H. A. Gray, Secretary and Treasurer; W. A. Green, Assistant Secretary; J. L. Yale, General Sales Agent; A. M. Crane, Assistant General Sales Agent; L. D. Doty, Purchasing Agent. Officers at the various works in Illinois: North Works, F. H. Treat, Superintendent, and Charles F. Abbott, Auditor; South Works, W. R. Walker, Man-

ager, D. S. Mathias, Superintendent, E. A. S. Clarke, Assistant Superintendent, and R. H. Ismon, Auditor; Union Works, J. C. Walker, Superintendent, and A. D. Waterman, Auditor; Joliet Works, Charles Pettigrew, Manager, W. C. Catlin, Superintendent, and J. F. Wilson, Auditor. *See Furnaces in Illinois and Wisconsin. See Rolling Mills in Wisconsin.*

Inland Steel Company, (successor to Chicago Steel Works,) Chicago Heights, Cook county. Built at Chicago in 1873 and removed to Chicago Heights in 1893 by the Chicago Steel Works; first put in operation at Chicago Heights in January, 1894; 2 forge fires, 6 heating furnaces, (2 Lauth and 4 small,) one 14-inch train of rolls, and 2 hammers; product, flats, rounds, squares, diamonds, half ovals, tees, angles, channels, agricultural shapes, harrow teeth, plow beams, and cultivator attachments; annual capacity, 20,000 gross tons of bar steel, 100,000 steel plow beams, and 1,000 tons of harrow teeth. Brand, the word "Inland" in a diamond. Fuel used, petroleum and coke in heating furnaces and bituminous coal under boilers. J. E. Porter, President, Ottawa, Ill.; G. H. Jones, Vice-President, W. M. Adams, Secretary, and P. D. Block, Treasurer, Chicago Heights.

Joliet Sheet Rolling Mill Company, 215-17 Jefferson st., Joliet, Will county. Built in 1891-2 and first put in operation May 1, 1892; 3 heating furnaces, one annealing furnace, and 3 trains of rolls (two 22 x 32 and one 22 x 38 inches); product, sheet steel; annual capacity, 4,500 gross tons. Fuel used, coal and coke.

King (The) and Andrews Company, 218-22 North Union st., Chicago. Crucible steel plant added to an iron foundry in 1894; first steel castings made March 20th; four 4-pot steel melting holes; annual capacity, 700 gross tons. Rockwell King, President; Martin Andrews, Treasurer; William Francis, Jr., Secretary.

LeClaire Nail Works, LeClaire Steel Company, lessee, Belleville, St. Clair county. Built in 1885-6; 2 gas heating furnaces, one 22-inch train of rolls, and 60 nail machines; product, nails; annual capacity, 75,000 kegs. Fuel used, bituminous coal. (Formerly called Belleville Steel and Iron Nail Works.) James Waugh, President.

Norton Brothers, 813 Masonic Temple Building, Chicago. Works at Maywood, Cook county. One open-hearth steel furnace and buildings for a rolling mill erected in 1890-1; experimenting with fluid-metal rolling machinery for the production of steel sheets for tinning. *See Tinplate Works.*

Peoria Steel and Iron Company, Peoria. Works at Averyville, Peoria county. Built in 1890-1 and first put in operation in 1892; 2 forge fires, 7 heating furnaces, and 4 trains of rolls (two 8, one 10, and one 18-inch); product, bars, rounds, hoops, flats, special shapes, and agricultural implement material; annual capacity, 30,000 gross tons.

Fuel used, petroleum and coal. Also operates a bolt and nut plant. (Formerly called Peoria Rolling Mill.) George J. Gibson, President; J. B. Greenhut, Vice-President; B. J. Greenhut, Secretary and Treasurer.

Phœnix Horse Shoe Company, Joliet, Will county. Built in 1893 and put in operation in the same year; 3 double puddling furnaces, 18 heating furnaces, and 4 trains of rolls (three 9-inch and one 3-high 20-inch); specialty, horse and mule shoes; annual capacity, 10,000 gross tons. Brand, "Phœnix." Fuel used, petroleum. Charles Miller, President; E. H. Miller, Secretary; Charles H. Holton, Treasurer. *See Rolling Mills in New York.*

Plano Steel Works, Plano Steel Company, Plano, Kendall county. First put in operation January 1, 1885; 2 heating furnaces and one 12-inch train of rolls; product, steel shapes for agricultural implements; annual capacity, 5,400 gross tons. (Formerly called Plano Rolling Mill.) Albert H. Sears, President and Manager; Chris Dirks, Vice-President; E. L. Henning, Secretary; W. M. Foster, Treasurer. Idle and for sale or lease.

Pullman Iron and Steel Company, Pullman, Cook county. Built in 1883–4; 2 forge fires, 3 Swindell gas heating furnaces, 2 coal heating furnaces, and 3 trains of rolls (8, 10, and 18-inch); product, car and merchant iron and steel and special shapes of iron and steel; annual capacity, 27,000 gross tons of bar iron and 12,000 gross tons of muck bar. Fuel used, coal. Chicago office in Pullman Building. A. S. Weinsheimer, Treasurer; George H. Lowe, Superintendent; F. H. Taylor, General Agent.

Rock Island Arsenal, Rock Island, Rock Island county. One heating furnace, one 5,000-pound hammer, and one 14-inch train of rolls. Built to dispose of accumulated wrought scrap iron and to furnish material needed in the construction of the arsenal. Idle.

Sargent (The) Company, 701 Western Union Building, Chicago. Works at Fifty-ninth and Wallace sts. Iron foundry built in 1881; crucible steel plant added in 1890; one 24-pot Siemens steel-melting furnace; first steel made February 13, 1891; product, brake shoe inserts and general castings; annual capacity, 900 gross tons. Open-hearth steel plant, added in 1892, consists of one 12-gross ton Siemens furnace; first steel made September 17, 1892; product, general castings; annual capacity, 4,500 gross tons. Fuel used, producer gas. (Formerly called the Congdon Brake Shoe Company.) George M. Sargent, President; Geo. O. Manchester, Vice-President and Treasurer; William D. Sargent, General Manager; James C. Davis, Secretary.

Springfield Iron Company's Iron and Steel Works, The Springfield Iron Company, Springfield. Chicago office, 710 Western Union Building; St. Louis office, Laclede Building. Bessemer steel works built in 1886–7; two 5-gross-ton converters; first blow made September 8, 1887;

annual capacity, 135,000 gross tons of ingots. Open-hearth steel works contain two 20-gross-ton Siemens-Pernot furnaces and one Pernot furnace for dephosphorizing pig metal; first steel ingot made February 9, 1880; annual capacity, 18,000 gross tons. Puddle mill first put in operation in June, 1872; 8 double puddling furnaces and one 18-inch train of rolls. Blooming mill contains one 3-high 30-inch blooming train of rolls, with hydraulic tables, put in operation in 1879, and one 2-high 32-inch reversing train, put in operation in 1887, to work in direct connection with rail mill. Rail mill put in operation in 1872 and remodeled in 1887; one 23-inch train of finishing rail rolls, working in direct connection with the 32-inch blooming train; annual capacity, 135,000 gross tons of rails. Bar mills contain 13 Siemens heating furnaces and 6 trains of rolls (two 12, one 18, and one 23-inch adapted to work either iron or steel, and two 16-inch combination mills to roll steel exclusively); product, bars, fish-plates, light rails, and merchant shapes; annual capacity, 70,000 gross tons. Plate mills contain one 24-inch and one 31-inch train of rolls, the latter with rolls 112 inches in length; product, steel plates and sheets of all sizes; annual capacity, 18,000 gross tons. Fuel used, Siemens producer gas in all heating furnaces, except five furnaces in bar mill No. 1, which are supplied with gas made by the Hennin process from a plant of 5 Hennin gas producers built in 1891. The Hennin process for recovering tar and ammonia as by-products was discovered and developed at these works. Charles Ridgely, President; William Barret Ridgely, Vice-President; H. H. Cust, Secretary; John Griffiths, Superintendent.

Tudor Iron Works, 415 Locust st., St. Louis, Mo. Works at East St. Louis, St. Clair county, Ill. Put in operation in January, 1873; 2 single and one double puddling furnace, 4 scrap furnaces, 10 heating furnaces, Siemens gas producers, 6 trains of rolls, 10 automatic and 8 hand spike machines, 3 bolt headers, 5 bolt cutters, 3 nut tappers, and 6 nut machines; product, railroad splices, T rails, bar iron, bolts, and spikes; annual capacity, 55,000 gross tons. Brand for spikes, "Tudor." Fuel used, bituminous coal. T. A. Meysenburg, President; B. S. Adams, Secretary; F. W. Oliver, Treasurer.

Valley Steel Company, Belleville, St. Clair county. Office, American Central Building, St. Louis, Mo. Two works: One plant built in 1869–70 and remodeled in 1886–7; 8 heating furnaces, 4 trains of rolls, (22, 18, and 12-inch, and 32-inch blooming,) and two 4-gross-ton Bessemer steel converters; first blow made August 6, 1887; product, 12 to 40-lb. rails, billets, slabs, shafting, angles, channels, bars, flats, fish-plates, etc.; annual capacity, 55,000 gross tons. (Formerly operated by the Waugh Steel Works; later by the Belleville Steel Company.) The other plant built in 1882 and remodeled in 1885–6; two 3-gross-ton Clapp-Griffiths steel converters, one gas and 2 coal

heating furnaces, one 23½-inch slab train, one 3-high 21-inch nail-plate train, and 154 nail machines; steel works made first blow January 21, 1886; product, steel nails and large flats; annual capacity, 350,000 kegs of nails. Fuel used, bituminous coal. Clapp-Griffiths plant idle. (Formerly operated by the Western Nail Company; later by the Belleville Steel Company.) Charles A. McNair, President; T. A. Meysenburg, Vice-President; B. S. Adams, Secretary and Selling Agent; F. W. Oliver, Treasurer.

Waukegan Works, Washburn and Moen Manufacturing Company, Waukegan, Lake county. Main office, Worcester, Mass.; Chicago office, 107–109 Lake st. Built in 1891; 4 coal and 2 regenerative gas heating furnaces and 4 trains of rolls; product, wire rods and wire; annual capacity, 90,000 gross tons. *See Rolling Mills and Steel Works in Massachusetts.*

Western Tube Company, (formerly Haxtun Steam Heater Company,) Kewanee, Henry county. Built in 1883 and put in operation in November, 1883; 2 single and 4 double busheling furnaces, one squeezer, 4 heating furnaces, 3 trains of rolls, (one 16-inch muck, one 3-high 16-inch roughing, and one 2-high 16-inch finishing,) and one 5,000-pound hammer; product, skelp iron, used by the company in the manufacture of pipe; annual capacity, 35,000 gross tons. The company manufactures everything used in the construction of steam heating apparatus for all kinds of buildings. Fuel used, coal and oil. J. H. Pierce, President; J. C. Williams, Vice-President; A. M. Hewlett, Secretary and Treasurer; C. E. McCullough, Assistant Treasurer.

Number of rolling mills and steel works in Illinois: 28. Of these 6 make Bessemer steel, 1 has a Clapp-Griffiths steel plant, 1 makes Robert-Bessemer steel, 5 have open-hearth steel plants and 1 open-hearth steel plant is being built, and 3 have crucible steel plants.

MICHIGAN.

Detroit Steel and Spring Works, Detroit Steel and Spring Company, Michigan and Hubbard avenues, Detroit. First put in operation in May, 1882; 10 oil heating furnaces, 2 trains of rolls, (9 and 18-inch,) and 8 hammers. Crucible steel department first made steel in February, 1884; one 30-pot crucible steel-melting furnace. Robert-Bessemer department built in 1889 and put in operation in July, 1889; two 2-gross-ton converters; first blow made July 11, 1889. Product, merchant steel and elliptic and spiral springs of all kinds for railroad and other purposes and steel castings; total annual capacity, 20,000 gross tons. (Robert-Bessemer plant first operated under name of Michigan Steel Works.) Brand, the letter "D" in a triangle. Fuel used, producer gas and petroleum. T. H. Newberry, President and Treasurer; Charles P. Choate, Vice-President; Allen W. Atterbury,

Secretary; Dewitt Loomis, Manager; J. S. Newberry, Assistant Manager.

Eureka Iron and Steel Works, 2 Butler Building, Detroit. Works and general offices, Wyandotte, Wayne county. Built in 1855; 6 double and 2 single puddling furnaces, 6 forge fires, 8 heating furnaces, 6 trains of rolls, (8, 10, 18, 20, 24, and 30-inch,) and one 5-ton hammer; product, "Wyandotte" boiler plate and tank iron and bars; annual capacity, 8,100 gross tons of plates and 21,600 gross tons of bars. Fuel used, oil and producer gas. (Formerly called Wyandotte Rolling Mills.) George Hendrie, President, and Fred. B. Sibley, Secretary, Detroit; W. Van Miller, Treasurer, William Patterson, Superintendent, and J. S. Van Alstyne, Selling Agent, Wyandotte. *See Furnaces.*

Michigan-Peninsular Car Company, (successors to the Michigan Forge and Iron Company,) Detroit, Wayne county. Office, No. 1 Newberry Building. Forge originally built in 1870 and rolling mill in 1877; destroyed by fire in November, 1892, and immediately rebuilt; 13 heating furnaces, 6 hammers, and 3 trains of rolls (9, 16, and 20-inch); product, bar iron, car axles, links and pins, and miscellaneous forgings; annual capacity, 45,000 gross tons of bar iron, 45,000 car axles, and 5,000 gross tons of forgings. Fuel used, petroleum and coal. A car works operated by the company has a daily capacity of from 75 to 100 freight cars. James McMillan, Chairman of the Board; F. J. Hecker, President; Charles L. Freer and W. C. McMillan, Managing Directors; S. S. De Lano, Treasurer; Joseph Taylor, Secretary; Robert D. Field, Secretary forge department.

Muskegon Iron and Steel Company, Muskegon, Muskegon county. Rolling mill built and put in operation in 1890; 4 scrap furnaces and three 3-high trains of rolls (18-inch bar and billet, 12-inch, and 9-inch); open-hearth steel plant added in 1891; one 15-gross-ton furnace; first steel made in December, 1891; plant arranged for operation in connection with the Adams direct process; product, merchant bars and agricultural machinery steel; annual capacity, 16,000 gross tons. C. T. Hills, President; John J. Howden, Vice-President; C. H. Hills, Secretary and Treasurer.

Number of rolling mills and steel works in Michigan: 4. Of these 1 makes both Robert-Bessemer and crucible steel and 1 makes open-hearth steel.

WISCONSIN.

Eagle Horse Shoe Company, South Milwaukee, Milwaukee county. Built in 1892 and first put in operation July 1, 1892; 2 forge fires, 5 heating furnaces, and one 9-inch train of rolls; product, horse shoes, mule shoes, and toe calks; annual capacity, 60,000 kegs. Fuel used, coal and petroleum. George B. Van Norman, President;

Charles P. Button, Vice-President; Arthur C. Helms, Secretary; James McAlpine, Treasurer.

Illinois Steel Company, Rookery Building, Chicago, Illinois, and 151 New Insurance Building, Milwaukee, Wis. Milwaukee Works at Bay View, Milwaukee, built in 1868 and 1874; nail mill added in 1884; 7 quadruple puddling furnaces, 19 coal and 6 gas heating furnaces, 4 busheling furnaces, 8 trains of rolls, (one 8, two 9, one 12, two 18, one 21, and one 22-inch,) and one hammer; product, light rails, merchant bar iron and steel, and fish-plates; annual capacity, 72,000 gross tons of bar iron and steel and 36,000 gross tons of fish-plates, etc. Petroleum used for fuel under boilers. (Nail machines sold in 1891.) Officers at Milwaukee: Francis Hinton, Manager; O. W. Gay, Cashier; C. S. Otjen, Superintendent; J. H. Price, Auditor; S. J. Llewellyn, Sales Agent. *See Furnaces in Wisconsin and Illinois. See Rolling Mills and Steel Works in Illinois.*

West Superior Iron and Steel Company, West Superior, Douglas county. Built in 1890–1; two 4-gross-ton Bessemer steel converters, 5 heating furnaces, and 2 trains of rolls (one 30 x 90-inch train with 2 stands for plates and one 20-inch bar train); product, plates, structural shapes, and bars; annual capacity, 90,000 gross tons of ingots or 81,000 gross tons of rolled material. To be sold on April 26, 1894. *See Furnaces.*

Number of rolling mills and steel works in Wisconsin: 3. Of these 1 has a Bessemer steel plant.

MINNESOTA.

Duluth Manufacturing Company, Duluth, St. Louis county. Built in 1888–9 and put in operation in October, 1889; 4 heating furnaces, 5 gas producers, 2 trains of rolls, (10 and 18-inch,) and one 6,000-lb. and two 3,000-lb. hammers; product, bar iron, railroad fastenings, and axles and other forgings; annual capacity, 11,000 gross tons of rolled iron and 4,500 gross tons of forgings. Large car-building shops and foundry form part of the company's works. L. G. Matthews, President; W. J. Matthews, Assistant to President; H. H. Hanford, Vice-President; O. H. Simonds, Secretary; William Maccalliser, Treasurer; F. H. Duesler, Auditor; R. L. Ettenger, General Manager.

Ironton (The) Structural Steel Company, Lyceum Building, Duluth. Main office, 29 Broadway, New York. Works at Ironton, St. Louis county, Minnesota. Built in 1892–3 and first put in operation in December, 1893; 2 gas heating furnaces and two 30-inch trains of rolls; product, structural steel; annual capacity, 30,000 gross tons. Contemplates erecting three 25-gross-ton open-hearth steel furnaces. R. T. McCabe, President, and W. R. Heath, Secretary and Treasurer, New York; James E. York, Vice-President and General Manager, Duluth.

Minneapolis (The) Rolling Mill, Temple Court, Minneapolis. Building a rolling mill at Columbia Heights, Hennepin county, to contain 4 gas heating furnaces, 2 gas puddling furnaces, 2 gas busheling furnaces, one squeezer, and 4 trains of rolls (one 18-inch muck and one 9, one 12, and one 18-inch bar); also 4 forge fires in bolt works; product, to be bar iron, nuts and bolts, and general forgings; annual capacity, 30,000 gross tons of bar iron. J. F. Conklin, President; O. C. Merriman, Vice-President; F. G. James, Secretary; E. S. Baring-Gould, Treasurer; A. D. Arundel, Manager.

Number of rolling mills in Minnesota: 2 completed and 1 building. Of these 1 contemplates erecting an open-hearth steel plant.

MISSOURI.

Granite Iron Rolling Mills, St. Louis Stamping Company, Cass ave. and Second st., St. Louis. Works at Second and Destrehan sts. Built in 1879; one single puddling furnace, 2 gas heating furnaces, 8 charcoal knobbling fires, 3 trains of rolls, and 3 hammers; product, stamping sheet iron for "granite iron ware," galvanizing sheet, and black plates for tin and terne plates; annual capacity, 5,400 gross tons. F. G. Niedringhaus, President; William F. Niedringhaus, Vice-President and Manager. *See Tinplate Works.*

Helmbacher Forge and Rolling Mills Company, corner Barton and DeKalb sts., St. Louis. Works, South Second st., between Lami and Barton sts. Built in 1858; 7 single puddling furnaces, 10 heating furnaces, 2 trains of rolls, (one 10 and one 19-inch,) and 9 hammers; product, bar, rod, and band iron, coupling links and pins, car, tender, and locomotive axles, shafts, and all kinds of railroad, steamboat, and machinery forgings; annual capacity, 16,000 gross tons. James Green, President; Geo. A. Clark, Vice-President; G. L. Goetz, Secretary. Selling agents, John S. Brewer, 1029 Monadnock Building, Chicago; H. C. McNair, Endicott Building, St. Paul.

Kansas City (The) Bolt and Nut Company, Kansas City. Works at Sheffield, Jackson county. Built in 1887–8 and first put in operation in January, 1889; one heating furnace and one 10-inch train of rolls; product, bar and bolt iron; also bolts, nuts, spikes, etc.; annual capacity, 8,000 gross tons of bar iron and 2,700 gross tons of bolts, nuts, etc. Fuel used, producer gas in rolling mill and petroleum in bolt works. J. H. Sternbergh, President, Reading, Pa.; I. C. Howes, Vice-President and Treasurer, and R. C. Howes, Secretary, Kansas City. Selling agent, Francis T. West, Rookery Building, Chicago. *See Reading Bolt and Nut Works, Eastern Pennsylvania.*

St. Louis Steam Forge and Iron Works, corner Main and Miller sts., St. Louis. Built in 1862; one double puddling furnace, 4 forge fires, 10 heating furnaces, one train of 18-inch rolls, and 6 hammers; prod-

uct, bar iron, car axles, and railroad and steamboat forgings of iron or steel; annual capacity, 9,000 gross tons of axles and forgings and 2,250 gross tons of bar iron. G. C. McDonald, President; C. L. McDonald, Secretary and Treasurer.

Shickle, Harrison, and Howard Iron Company, (Steel Casting Department,) corner Twelfth and Papin sts., St. Louis. Built in 1892; one 6-gross-ton and one 8-ton basic open-hearth steel furnace; first steel made in September, 1892; product, car couplers and general machine castings; annual capacity, 9,000 gross tons. Thomas Howard, President; John W. Harrison, Vice-President and Treasurer; John M. Harrison, Secretary; Thomas M. Gallagher, General Superintendent; James Daniels, Selling Agent.

Union Steel and Iron Company, St. Joseph, Buchanan county. Built in 1889; one large gas heating furnace, 2 trains of rolls, (one 3-high 18 and one 3-high 20-inch,) and 50 nail machines; product, merchant iron and steel, sheet iron and steel, and steel nails; annual capacity, 200,000 kegs of nails and 9,000 gross tons of rolled iron and steel. Began in 1889 the erection of two 3-gross-ton Robert-Bessemer steel converters; not yet completed. Wm. Haven, President and Treasurer; George T. Walker, Vice-President, Secretary, and General Manager.

Weber Brothers, Clinton, Henry county. Built in 1892; 2 heating furnaces, one steam hammer, and 2 trains of rolls (one 9 and one 12-inch); product, merchant bar iron; annual capacity, 6,000 gross tons.

Number of rolling mills and steel works in Missouri: 7. Of these 1 makes open-hearth steel and 1 Robert-Bessemer steel plant is partly built. The works of the St. Louis Ore and Steel Company are referred to on page 185.

IOWA.

Damascus Steel Company, 118 Grand avenue, Des Moines, Polk county. Began in 1893 the manufacture experimentally by the "Dawson" process of soft crucible steel castings from refined wrought iron. Contemplates enlarging works and manufacturing "Damascus" steel in commercial quantities in 1894. S. R. Dawson, Superintendent.

Holcomb-Brown Iron Company, Burlington, Des Moines county. Put in operation in 1885; enlarged in 1887; 2 coal heating furnaces, 2 gas heating furnaces, 2 trains of 3-high rolls, (9 and 16-inch,) and one 5,000-lb. hammer; product, hammered merchant bar, heavy and light bands, car irons, horse-shoe bar, staybolt iron, steel buggy tire, steel for jail bars, and agricultural irons of all kinds; specialty, small shapes; annual capacity, double turn, 22,500 gross tons. (Formerly owned by the Iowa Rolling Mill Company.) Richard Brown, President; John G. Foote, Vice-President; John F. Holcomb, Sec-

retary and Treasurer. Works have been idle for some time; machinery may be removed to Tacoma, State of Washington.

Williams Rolling Mill Company, Muscatine, Muscatine county. Built in 1893 and first put in operation in October, 1893; 3 Siemens gas heating furnaces and 3 trains of rolls (two 9 and one 14-inch); product, bars, bands, and flats; annual capacity, 15,000 gross tons. S. T. Williams, President and General Manager; W. H. Thompson, Vice-President and Treasurer.

Number of rolling mills and steel works in Iowa: 3. Of these 1 makes crucible steel.

COLORADO.

Colorado Fuel and Iron Company, Pueblo, Pueblo county. Works at Bessemer, near Pueblo. Principal office, Boston Building, Denver; New York office, 18 Broadway; Chicago office, Rookery Building. Built in 1881-2 and extensive improvements made in 1889, 1891, and 1893; Bessemer converting department made its first blow April 11, 1882; two 5-gross-ton converters, three pig iron and two spiegel melting cupolas, two gas-fired soaking pits, two Siemens bloom-heating furnaces, one 3-high 23-inch rail and one 3-high 35-inch blooming train, one single and two double puddling furnaces, one 20-inch muck train, one 20-inch bar train, one 9-inch guide train, and railroad spike and bolt and nut machines; product, standard steel rails, bar iron and steel, mine rails, angle bars, railroad spikes, and nuts and bolts; annual capacity, 90,000 gross tons of steel rails, 20,000 gross tons of bar iron and steel, mine rails, and angle bars, and 30,000 kegs of railroad spikes, bolts, and nuts. Also operates a cast-iron pipe foundry with an annual capacity of 18,000 gross tons. (Formerly operated by the Colorado Coal and Iron Company. Rolling mill at Denver, built in 1888, has been abandoned.) Officers at New York: J. C. Osgood, President: C. H. Parmelee, Assistant Secretary and Assistant Treasurer. At Chicago: Paul Morton, 2d Vice-President. At Denver: Henry R. Wolcott, 1st Vice-President; J. A. Kebler, 3d Vice-President and General Manager; John L. Jerome, Secretary and Treasurer; A. C. Cass, Assistant Treasurer and General Sales Agent; J. A. Writer, Auditor; M. S. Donnelly, Purchasing Agent. At Bessemer: T. W. Robinson, General Superintendent. *See Furnaces.*

Trinidad Rolling Mill, The Trinidad Iron and Steel Company, Trinidad, Las Animas county. Built in 1888-9 and started in April, 1889; 3 scrap heating furnaces, 2 spike machines, and 3 trains of rolls (9, 12, and 18-inch); product, merchant bar iron and steel, mine T rails, and railroad spikes; annual capacity, 12,000 gross tons of bar iron and 15,000 kegs of spikes. W. D. Hofius, President and General Manager; William Pigott, Vice-President, Secretary, and Treasurer.

ROLLING MILL COMMENCED BUT NOT COMPLETED.

Denver Steel Rolling Mill Company, Denver, Arapahoe county. Began building a rolling mill in 1892, to be equipped with machinery for the manufacture of cotton-ties, barb wire, wire nails, etc.; buildings partly erected; work suspended in 1893. William N. Byers, President; E. H. Webb, Vice-President; C. D. Cobb, Secretary; R. W. Woodbury, Treasurer.

Number of rolling mills and steel works in Colorado: 2 completed and 1 partly built. Of these 1 makes Bessemer steel.

OREGON.

Ayer (N. E.) & Co., Portland, Multnomah county. Built in 1892 and first put in operation in September, 1892; 2 heating furnaces and 2 trains of rolls (one 10 and one 16-inch); product, bar, band, and hoop iron; annual capacity, 3,000 gross tons.

Number of rolling mills in Oregon: 1.

WYOMING.

Laramie Rolling Mills, Otto Gramm, lessee and manager, Laramie, Albany county. Built in 1874–5 and put in operation in April, 1875; 5 heating furnaces, one puddling furnace, one squeezer, 2 trains of rolls, (one 10 and one 19-inch,) and one 4,500-pound hammer; product, bar and rod iron, mine rails, nuts, car, bridge, and machine bolts, spikes, and track fastenings; annual capacity, 18,000 gross tons. Owned by the Union Pacific Railway Company.

Number of rolling mills in Wyoming: 1.

CALIFORNIA.

Central Pacific Railroad Rolling Mill, Southern Pacific Company, Sacramento, Sacramento county. Built in 1881; 9 heating furnaces, 3 trains of rolls, and 7 hammers; product, all kinds of bar and shaped iron; annual capacity, 11,000 gross tons. Brand, "C. P. R. R." H. J. Small, General Manager of mill.

Judson Manufacturing Company, Oakland, Alameda county. Office and salesroom, 14–16 Fremont st., San Francisco. Built in 1882; 4 coal heating furnaces, one 4-door 7 x 18 gas heating furnace, and 4 trains of rolls (one 8, one 10, and two 16-inch); product, bar iron, tack plate, tacks and fine lath nails, and structural and agricultural shapes; annual capacity, 11,000 gross tons of finished iron. Brand, "Judson." L. P. Drexler, President; H. E. Bothin, Vice-President; John Gillson, Secretary; P. A. Wagner, General Manager. Sales are made by the San Francisco office.

Los Angeles (The) Iron and Steel Company, Los Angeles, Los Angeles county. Main office, Denver, Colorado. Built in 1893–4 and to be

put in operation about May 1, 1894; 2 direct heating furnaces, (one pair and one sheet furnace,) and 3 trains of rolls (one 3-high 20 x 84-inch muck, one 3-high 22 x 60-inch plate, and one 3-stand sheet, with rolls 26 x 90, 42 x 22, and 36 x 20 inches); product, sheet and plate iron; annual capacity, 10,000 gross tons. Fuel used, petroleum. F. N. Myers, President and Treasurer, A. S. Robbins, Vice-President, J. G. Chamberlain, Manager, and F. R. Harris, Superintendent, Los Angeles; W. B. Smith, Secretary, Denver, Colorado.

Pacific Iron and Nail Company, 9 Beale st., San Francisco. Cable address, "Nails." Works at Oakland, Alameda county. Commenced operations May 1, 1883; 2 puddling furnaces, 4 heating furnaces, rotary squeezer, one 3-high 14-inch train of rolls, one muck-bar train, one nail-plate train, one hammer, 96 cut-nail machines, 22 wire-nail machines, and 20 barb-wire machines; product, wire nails, barb fence wire and market wire, iron nails, and steel nails from imported slabs; annual capacity, 340,000 kegs. Also makes nails of combined iron and steel. The company has a complete wire-drawing plant, with 32 blocks, and draws wire from imported rods. Herrmann J. Sadler, President and Treasurer; William Wright, Vice-President and General Manager; Wm. F. Mau, Secretary.

Pacific Rolling Mill and Forge, Pacific Rolling Mill Company, 202 Market st., P. O. Box, 2,032, San Francisco. Works at Potrero, San Francisco. Put in operation July 25, 1868; 4 single puddling and 17 heating furnaces, 8 trains of rolls, (one 8, one 10, one 12, three 18, one 28-inch blooming, and one 28-inch structural,) 4 spike and 2 rivet machines, 5 bolt headers, one pointer, 5 hot-press nut machines, 16 punching and straightening presses, 11 steam hammers, and 2 belt hammers; product, bar iron, angle iron, beams, channels, etc., shafting, 12 to 60-lb. iron and steel rails, railroad, ship, and boat spikes, bridge work, bolts, (all kinds except carriage,) nuts, washers, boiler rivets, horse-shoe shapes, car axles, and all kinds of railroad and ship forgings. Steel department added in 1884; one 5-ton and two 18-ton open-hearth steel furnaces; first steel made July 15, 1884; product, structural shapes, forgings, castings, etc. Total annual capacity, 40,000 gross tons. This company also controls a horse-shoe works, which is operated in connection with this plant. James G. Fair, President; W. P. Sullivan, Secretary; C. M. Keeney, General Manager; Patrick Noble, Superintendent.

Number of rolling mills and steel works in California: 4 completed and 1 nearly completed. Of these 1 makes open-hearth steel.

PROJECTED.

At or near San Diego, San Diego county, by the San Diego Iron and Steel Company, a plant for making wrought iron by the Eames direct process; also a steel plant and rolling mill. Dr. C. J. Eames, Manager.

UNITED STATES.

Total number of rolling mills and steel works in the United States in March, 1894: 487 completed, 1 rebuilding, 8 building, 9 partly completed but work suspended, and 2 projected. Of these 43 have completed Bessemer steel plants, 1 Bessemer plant is partly erected, and 1 Bessemer plant is being built; 4 have Clapp-Griffiths steel plants; 4 have Robert-Bessemer steel plants and 1 Robert-Bessemer steel plant is partly built; 81 have open-hearth steel plants, 1 open-hearth steel plant is being built, and 5 open-hearth steel plants are projected; 48 have crucible steel plants and 1 crucible steel plant is being built; 9 make blister steel; and 6 have plants for making special steel.

ROLLING MILLS RECENTLY ABANDONED OR LIKELY TO BE LONG IDLE.

NOTE.—A few of the rolling mills named in this list are supplied with good machinery, and circumstances may at some time favor their revival. Where the names of companies or firms are mentioned with the works they are usually the names of the owners or lessees of the works when first placed in this list. A list of rolling mills which have been long abandoned will be found in the Directory for 1892.

MASSACHUSETTS.

Bay State Iron Works, Bay State Iron Company, South Boston. Built in 1847 and enlarged in 1863 and 1873; product, steel plates, rolled from ingots furnished by other firms; dismantled.

Cambridge Rolling Mills, Gilmore & Eustis, Cambridgeport, Middlesex county. Built in 1868; burned and rebuilt in 1884; product, bars, shafting, rods, tires, and horse-shoe iron. (Formerly called Boston Rolling Mills.) Closed November 21, 1891, and not to be operated again as a rolling mill.

Tyler Steel Tube Company, 235 A st., South Boston. Works built in 1886 and rolling machinery added in 1889; removed to Washington, Pa., in 1889.

Wareham Nail Company, South Wareham, Plymouth county. Built in 1836; product, nails; abandoned.

CONNECTICUT.

Cold Spring Iron Works, Mitchell Brothers, Norwich, New London county. Built in 1845; product, ovals, half ovals, half rounds, rods, grooves, and scrolls; dismantled.

NEW YORK.

Ausable Horse Nail Works, Ausable Horse Nail Company, Keeseville, Essex county. Built in 1869; product, nail rods, all worked into horse nails by this company. Rolling mill idle for many years.

Sable Iron Works, J. and J. Rogers Company, Ausable Forks, Essex county. Built in 1834; product, bars for conversion into cast steel, Peru horse-shoe iron, and round and square iron; not likely to be operated again.

Spuyten Duyvil Rolling Mill, Spuyten Duyvil, New York City. Rail mill built in 1863 and bar mill added in 1872; product, rails, fish-plates, and bar iron; idle since 1883 and abandoned.

Syracuse Iron Works, Syracuse, Onondaga county. Built in 1861; product, bar, wire-rod, band, and hoop iron, railroad and boat spikes, fish bolts, horse-shoe and bridge iron, and cotton-ties; dismantled.

Wood, (William W.,) Wood's Falls, Clinton county. Rolling mill built in 1879-80 and operated in connection with a forge; product, car axles and bar iron; dismantled in 1890.

NEW JERSEY.

Columbia Rolling Mill Company, Fourteenth st. and Jersey ave., Jersey City. Built in 1888-9; product, taggers iron from tin scrap after the tin is removed; dismantled.

Jersey City Steel Works, Jersey City, Hudson county. Commenced operations August 1, 1862; abandoned.

Paterson Iron Company, Paterson, Passaic county. Works built in 1852; rolling mill added in 1883; burned and rebuilt in 1887; product, plates and heavy forgings. Machinery used in equipping the partly-completed plant of the South Baltimore Rolling Mill Company, at South Baltimore, Md.

Rockaway Rolling Mill, D. T. Warren, Rockaway, Morris county. First put in operation in May, 1886; product, blooms for steel purposes, from ore. Machinery removed in 1890 and works converted into an axe factory.

PENNSYLVANIA.

Bradford County Nail Works, W. H. Godcharles, Towanda, Bradford county. First started in November, 1872; product, iron and steel cut nails; destroyed by fire in July, 1893.

Brownsville Rolling Mill, Brownsville, Fayette county. Rolling mill completed December 1, 1873; remodeled in 1889; product, skelp iron, merchant bar iron, and muck bar; dismantled.

Chickies Rolling Mill, Chickies Rolling Mill Company, Chickies, Lancaster county. Built in 1865; product, muck bar; idle, and not likely to be operated again.

Dalmatia Nail and Iron Works, Dalmatia, Northumberland county. Nail works first put in operation in March, 1887; buildings erected for a rolling mill department but machinery never added.

Hamburg Rolling Mill, Philadelphia and Reading Coal and Iron Company, Twelfth and Market sts., Philadelphia. Works at Hamburg, Berks county. Built in 1865; product, muck bar; dismantled.

Kensington Iron and Steel Works, James Rowland & Co., 920 North Delaware ave., Philadelphia. Built in 1845; product, nails, merchant bar, band, hoop, skelp, and angle iron, and steel plow, cultivator, and shovel plate; dismantled in 1891.

Little Schuylkill Rolling Mill, Port Clinton, Schuylkill county. Built in 1868; product, merchant bar, guide, tee, channel, and angle iron; torn down in 1891.

Pennsylvania Iron and Steel Works, W. J. Hammond & Sons, Pittsburgh. Built in 1843; product, muck bar; dismantled.

Standard Iron Company Limited, Norristown, Montgomery county. Built in 1857; product, puddled bars; dismantled in 1890.

DELAWARE.

Delaware Iron Works, Wooddale, (near Wilmington,) New Castle county. Built in 1812; abandoned.

MARYLAND.

West Amwell Works, McCullough Iron Company, Elkton, Cecil county. Built in 1847; product, sheet iron; abandoned in 1890.

VIRGINIA.

Covington Iron Company, Covington, Alleghany county. Began in 1891 the erection of a rolling mill; not completed; abandoned.

Salem Rolling Mill Company, Salem, Roanoke county. Began in 1891 the erection of a rolling mill; buildings completed and part of machinery on the ground; abandoned.

TENNESSEE.

South Tredegar Iron Company, Chattanooga, Hamilton county. Built in 1866; product, bars, nails, railroad spikes, splice bars, and washers; also operated one 2-gross-ton Bessemer converter; dismantled.

TEXAS.

Texas Rolling Mills, Houston, Harris county. Built in 1884; product, light T rails, bars, spikes, and fish-plates; dismantled.

OHIO.

Columbus Steel Company, Columbus, Franklin county. Original works built in 1872 to roll rails; changed to steel works in 1886-7; two 15-gross-ton open-hearth steel furnaces; product, blooms, billets, and slabs; dismantled in 1890.

Globe Rolling Mill Company, 413 West Front st., Cincinnati. Built in 1845; product, bar, angle, sheet, and plate iron; dismantled in 1891.

Lancaster Iron Company, Lancaster, Fairfield county. Commenced in 1889 the erection of a rolling mill, part of the machinery being

taken from the Middlesex Rolling Mill in Pennsylvania; work suspended, and machinery utilized by the Indiana Iron Company in erecting a rolling mill at Muncie, Indiana.

Lawrence Iron Works, Lawrence Iron and Steel Company, Ironton. Built in 1853; product, bar, band, chain, and hoop iron, cotton-ties, and light T rails; dismantled in 1891 and part of machinery removed to Glasgow, Va.

Prospect Rolling Mill Company, Cleveland, Cuyahoga county. Built in 1888; product, merchant bar iron; dismantled in 1890 and machinery removed to Marion, Indiana.

Steubenville Iron and Steel Company, Steubenville, Jefferson county. Built in 1871-2; product, muck bar and pipe iron; dismantled in 1891. (Formerly known as the Alikanna Rolling Mill.)

Wetherald Rolling Mill Company, Findlay, Hancock county. Built in 1887; product, bar, band, and heavy hoop iron; machinery removed to Frankton, Indiana, in 1893.

Whitely Steel Works, Springfield, Clark county. Built in 1886; product, rods, flats, squares, shapes, cold-rolled iron and steel, steel nails, etc.; one 8-gross ton open-hearth steel furnace; abandoned.

INDIANA.

Anderson (The) Rolling Mill Company, Anderson, Madison county. Built and put in operation in 1891; dismantled and machinery removed to Muncie, where it is now being operated by the White River Iron and Steel Company.

Irondale (The) Steel and Iron Company, Anderson, Madison county. Built in 1889-90 with part of machinery removed from Aurora; product, sheet iron and muck bar; destroyed by fire October 31, 1893; rebuilding at Middletown, Indiana.

Ivanhoe Rolling Mill Company, Room 306, Stock Exchange Building, Chicago, Ill. Foundations built and frame work erected for a rolling mill at Ivanhoe, Lake county; work suspended; abandoned.

New Albany Rail Mill Company, The Union Trust Company, Assignee, Indianapolis. Built at New Albany, Floyd county, in 1864; part of machinery removed to Alexandria; company failed. Product, T rails, (8 to 25 lbs.,) tram rails, street rails, bars, angles, fishplates, spikes, washers, etc. For sale.

ILLINOIS.

Centralia Iron and Steel Works, Centralia, Marion county. Built in 1878; 2 heating furnaces, one annealing furnace, and 3 trains of rolls (one 8 and two 18-inch); product, bar iron; annual capacity, 18,000 gross tons. Bessemer plant built in 1887-8; first blow made March 29, 1888; one 2-gross-ton converter and 2 gas heating furnaces. Idle and for sale. (Formerly called the Centralia Iron and Nail Works.) Address G. C. McDonald, corner Main and Miller sts., St. Louis, Mo.

Chicago Steel Works, 806 Noble st., Chicago. Built in 1873; product, plow beams, harrow teeth, steel cultivator sleeves, shovel backs and squares, diamonds, rounds, tees, angles, and shapes for agricultural implements; machinery removed to Chicago Heights in 1893; now operated by the Inland Steel Company.

Lewistown Works, Pioneer Tinplate Company, Joliet, Will county. Began in 1891 the erection of a rolling mill for the manufacture of black plates for tinning; not completed; abandoned.

Western Steel and Spring Company, Harvey, Cook county. Built in 1891; product, open-hearth steel bars for springs; destroyed by fire in December, 1892. (Formerly called the Atkinson Steel and Spring Works.)

MINNESOTA.

Harris Forge and Rolling Mills, Harris Forge and Rolling Mill Company, Irondale, Ramsey county. Built in 1890–1 and first put in operation in March, 1891; product, bar iron, forgings, car axles, bolts, nuts, washers, and builders' and contractors' supplies; destroyed by fire in 1893.

St. Paul Rolling Mill, St. Paul, Ramsey county. Built in 1885–6. Idle since 1886 and machinery removed to Fort Worth, Texas, in 1890. (Formerly known as the Capital Iron Works.)

MISSOURI.

Laclede Rolling Mills, Chouteau, Harrison, and Vallé Iron Company, 204 North Third street, St. Louis. Built in 1850 and rebuilt in 1879; product, bar, sheet, and plate iron and steel, blooms, angle and tee iron, small T rails, spikes, nuts, bolts, and washers; dismantled.

St. Louis Ore and Steel Company, Pierre Chouteau, James Taussig, and C. C. Maffitt, Purchasing Committee Chouteau Series of Bonds, 72 Gay Building, St. Louis. Works at South St. Louis. Built in 1872 as an iron-rail mill; Bessemer steel works erected in 1875–6; first blow made September 1, 1876; two 7-gross-ton converters, 4 pig-melting cupolas, 4 spiegel-melting cupolas, 40 gas producers, 10 Siemens heating furnaces, one 3-ton hammer, one 33-inch blooming train, one 24-inch billet train, and one 24-inch rail train; product, steel slabs, blooms, billets, and rails; annual capacity, 90,000 gross tons of ingots. (Formerly called the Vulcan Works.) Idle and for sale.

St. Louis Shovel Company, St. Louis. One train of rolls used for rolling bars into shovel blanks; abandoned.

KANSAS.

Western Iron Company, Rosedale, Wyandotte county. Built in 1875; product, mine and street rails, fish-plates, bolts, nuts, spikes, merchant bar iron, etc.; not likely to be again operated.

RECENTLY ABANDONED STEEL WORKS.

NOTE.—A list of steel works which have been long abandoned will be found in the edition of the Directory for 1892.

Ætna Iron and Steel Works, Crown Point, Lake county, Indiana. Built in 1886; product, steel castings.

American Steel Wheel Company, First and I sts., South Boston, Mass. One 3-gross-ton Bessemer steel converter built in 1888; product, solid steel car-wheels and steel castings; removed to Garwood, N. J.

American Steel Wheel Works, Garwood Land Improvement Company, Garwood, N. J. (P. O. address, Westfield.) One 3-gross-ton Bessemer steel converter removed from Boston, Mass.; product, solid steel car-wheels and steel castings; abandoned; machinery stored.

Bookwalter Casting Company, Springfield, Ohio. Built in 1888–9; two 1½-gross-ton Robert-Bessemer steel converters used for experimental purposes.

Calumet Iron and Steel Company, Rookery Building, Chicago. Works at Cummings, Cook county. Four 4-gross-ton open-hearth steel furnaces built in 1882; abandoned.

Centralia Iron and Steel Works, Centralia, Ill. One 2-gross-ton Bessemer steel converter built in 1887–8. Idle and for sale. Address G. C. McDonald, corner Main and Miller sts., St. Louis, Mo.

Chicago Crucible Steel Casting Company, Elston and Webster avenues, Chicago. Built in 1886 and removed to new works in 1888; product, open-hearth and crucible steel ingots and castings; burned in 1890 and abandoned as a steel plant.

Columbus Steel Company, Columbus, Ohio. Two 15-gross-ton open-hearth steel furnaces built in 1886–7; dismantled in 1890.

Crane Iron Company, Catasauqua, Pa. One 1½-ton experimental Robert-Bessemer steel converter built in 1889; abandoned.

Crescent Steel Company, Pittsburgh. Two 2-ton Bessemer converters built in 1889; removed in 1890.

Glasgow Iron and Steel Works, Glasgow Iron Company, Pottstown, Pa. Two 3-gross-ton Clapp-Griffiths steel converters built in 1885–6; first blow made May 11, 1886; abandoned.

Jefferson Iron Works, Steubenville, Ohio. Two 3-ton Bessemer steel converters built in 1886–7; dismantled in 1890.

Jersey City Steel Works, Jersey City, N. J. Crucible steel plant built in 1862; abandoned.

Johnson Company, Johnstown, Pa. Four 12-pot crucible steel-melting furnaces built in 1888.

McCormick & Co., Harrisburg, Pa. One 3-ton Clapp-Griffiths steel converter built in 1886.

Nellis's Agricultural Works, Pittsburgh. Built in 1870; product, crucible steel for springs; abandoned.

Neponset Steel Casting Company, Neponset, Boston, Mass. Product, open-hearth and crucible steel; abandoned.

New England Steel Works, Worcester, Mass. Two 4-gross-ton Bessemer steel converters built in 1884; sold to Premier Steel Company, Indianapolis, Ind. (Formerly called Worcester Steel Works.)

Pittsburgh Tool Steel Company, Ferguson Building, Pittsburgh. Works at Greensburg, Pa. Crucible steel plant built in 1889-90; abandoned. (Formerly operated by the Greensburg Rolling Mill Company.)

Pottsville Iron and Steel Company, Pottsville, Pa. Two 3-ton Clapp-Griffiths steel converters; first blow made February 2, 1886; abandoned.

Ramel-Conley Iron and Steel Company, Brewster, New York. Built in 1888-9; 12 retorts and one 10-gross-ton open-hearth steel furnace; retorts intended for reducing ore by the Conley direct process, producing a raw material for use in the open-hearth furnace. Idle.

St. Louis Ore and Steel Company, Pierre Chouteau, James Taussig, and C. C. Maffitt, Purchasing Committee Chouteau Series of Bonds, 72 Gay Building, St. Louis, Mo. Works at South St. Louis. Two 7-gross-ton Bessemer steel converters built in 1875-6. Idle and for sale.

St. Louis Steel Foundry Company, East St. Louis, Ill. Steel plant built in 1891; one 4-gross-ton basic Bessemer converter and one 6-ton basic open-hearth steel furnace; product, steel castings and ingots; destroyed by fire in May, 1892.

Schulte, Lohoff & Co., Evansville, Indiana. Built in 1887-8; three 10-pot steel-melting holes; abandoned.

South Tredegar Iron Company, Chattanooga, Tenn. One 2-gross-ton Bessemer steel converter; first blow made April 19, 1886; dismantled.

Springfield (The) Steel Casting Company, Springfield, Ohio. Crucible steel works built in 1890; product, steel castings; abandoned.

Syracuse Steel Foundry Company, 351 West Fayette st., Syracuse, New York. Works at Geddes. Crucible steel department abandoned.

Waukegan Iron and Steel Castings Company, Waukegan, Illinois. One furnace built in 1891 for converting iron castings into steel by the Bates process; abandoned.

Western Steel and Iron Casting Works, Centropolis, Jackson county, Mo. Built in 1892; six 4-pot crucible steel-melting holes; product, crucible steel castings; dismantled.

Western Steel and Spring Company, Harvey, Illinois. Two 15-gross-ton open-hearth steel furnaces built in 1891; burned in December, 1892. (Formerly called the Atkinson Steel and Spring Works.)

Whitely Steel Works, Springfield, Ohio. Built in 1886; one 8-gross-ton open-hearth steel furnace added in 1888; abandoned.

BESSEMER STEEL WORKS.

NOTE.—In this list are included all works which produce steel by the method of blowing air into or through molten iron, including the ordinary acid Bessemer process, the basic Bessemer process, the Clapp-Griffiths process, and the Robert-Bessemer process. The ton used in giving the capacity of the converters is the ton of 2,240 pounds. When not otherwise stated the converters are the ordinary tilting Bessemer converters. For a full description of these works see the list of rolling mills and steel works. The names of the mills which are equipped with machinery for making a specialty of rolling standard sections of steel rails are printed in SMALL CAPITALS.

MASSACHUSETTS—1.

Tremont Nail Company, West Wareham. One 3-ton Clapp-Griffiths converter.

NEW YORK—1.

TROY STEEL AND IRON COMPANY, Troy. New York office, 26 Broadway. Two 10-ton converters.

PENNSYLVANIA—23 COMPLETED AND 1 PARTLY BUILT.

American Iron and Steel Works, Jones & Laughlins Limited, Pittsburgh. Two 9-ton converters.

BETHLEHEM (THE) IRON COMPANY, South Bethlehem. Philadelphia office, 421 Chestnut st.; New York office, 80 Broadway. Four 7-ton converters.

CAMBRIA IRON AND STEEL WORKS, Cambria Iron Company, Johnstown. Office, 218 South Fourth st., Philadelphia. Four 11½-ton converters.

CARNEGIE (THE) STEEL COMPANY, LIMITED, 42–48 Fifth avenue, Pittsburgh. Three Bessemer steel works in Allegheny county: EDGAR THOMSON STEEL WORKS, at Bessemer, four 15-ton converters. DUQUESNE STEEL WORKS, at Cochran, two 10-ton converters. Homestead Steel Works, at Munhall, two 10-ton converters.

Chester Steel Castings Company, 407 Library st., Philadelphia. Works at Chester. Two 1-ton Robert-Bessemer converters.

Columbia Iron and Steel Works, Uniontown. Two 5-ton converters.

E. and G. Brooke Iron Company, Birdsboro. Two small converters; idle.

Hainsworth Steel Company, Pittsburgh. Two 6-ton converters.

Juniata Iron and Steel Works, Shoenberger & Co., Pittsburgh. Two 6-ton converters.

LACKAWANNA IRON AND STEEL COMPANY, Scranton. New York office, 52 Wall st. Two works: NORTH WORKS, three 7-ton converters. SOUTH WORKS, two 9-ton converters.

Lickdale Iron Company, Lebanon. Works at Lickdale, Lebanon county. Two 3-ton converters.

National Tube Works Company, McKeesport. Two 8-ton converters.

North Branch Steel Works, North Branch Steel Company, Danville. Philadelphia office, Twenty-fifth st. and Washington ave. Two 4-ton converters.

Oliver Iron and Steel Company, Pittsburgh. Two 2-ton Clapp-Griffiths converters.

Pennsylvania Steel Works, Pennsylvania Steel Company, Steelton. Office, 208 South Fourth st., Philadelphia; New York office, 2 Wall st.; Boston office, 70 Kilby st. Two 7-ton and three 8-ton converters.

Pittsburgh Steel Casting Company, Twenty-sixth and Railroad sts., Pittsburgh. One 10-ton converter.

Pottstown Iron Company, Pottstown. Philadelphia office, 400 Chestnut st. Three 10-ton converters.

Sharon Steel Casting Company, Sharon. One 4-ton converter partly erected; work suspended.

Shenango Valley Steel Company, New Castle. Two 8-ton converters.

Spang (The) Steel and Iron Company, Pittsburgh. Office, 66–70 Sandusky st., Allegheny. Works at Etna. Two 3-ton Clapp-Griffiths converters.

Wellman Iron and Steel Company, Thurlow, Delaware county. Philadelphia office, 220 South Fourth st. Two 3-ton converters.

MARYLAND—1.

Maryland Steel Company, 208 South Fourth st., Philadelphia. Works at Sparrow's Point, Baltimore county. Two 20-ton converters.

VIRGINIA—1.

Old Dominion Iron and Nail Works Company, Richmond. Works on Belle Isle. Two 3-ton converters. Idle since 1888.

WEST VIRGINIA—2.

Riverside Iron Works, Wheeling. Two 5-ton converters.

Wheeling Steel Works, Wheeling Steel and Iron Company, Wheeling. Works at Benwood. Two 5-ton converters.

KENTUCKY—1.

Ashland Steel Company, Ashland. Two 5-ton converters.

TENNESSEE—1.

Central (The) Iron Company, Nashville. Works at Chattanooga. One 5-ton converter. Experimented with basic process in 1891. Idle.

OHIO—6 COMPLETED AND 1 BUILDING.

Bellaire Nail Works, Bellaire. Two 5-ton converters.

Cleveland Rolling Mill Company, Cleveland. Two 10-ton converters.

Laughlin and Junction Steel Company, Mingo Junction. Branch office, Wheeling, W. Va. Two 5-ton converters.

Middleport (The) Steel and Nail Works, The King, Gilbert, and Warner Company, Columbus. Works at Middleport. Two 4-ton converters.

Ohio (The) Steel Company, Youngstown. Building two 10-ton converters.

Otis (The) Steel Company Limited, Cleveland. Two 5-ton converters.

Solid (The) Steel Company, Alliance. One small experimental converter.

INDIANA—3.

Chicago (The) Horse Shoe Company, 908 Ashland Block, Chicago, Ill. Works at East Chicago, Ind. One 1½-ton Robert-Bessemer converter.

East Chicago Steel Works, Chicago Steel Manufacturing Company, Hammond. Two 3-ton converters. Idle.

Premier Steel Company, Indianapolis. Two 4-ton basic converters.

ILLINOIS—8.

Fowler Foundry Company, 1323 Monadnock Building, Chicago. Works at Stony Island ave. and Ninety-fifth st. One 2-ton Robert-Bessemer converter.

ILLINOIS STEEL COMPANY, Rookery Building, Chicago. Four separate works in Illinois; NORTH WORKS, at Chicago, two 6-ton converters. SOUTH WORKS, at South Chicago, three 10-ton converters. JOLIET WORKS, at Joliet, two 9-ton converters. UNION WORKS, at 3179 Ashland ave., Chicago, two 10-ton converters.

SPRINGFIELD IRON COMPANY'S IRON AND STEEL WORKS, The Springfield Iron Company, Springfield. Two 5-ton converters.

Valley Steel Company, American Central Building, St. Louis. Two works at Belleville: One contains two 4-ton ordinary converters and the other two 3-ton Clapp-Griffiths converters. Clapp-Griffiths plant idle.

MICHIGAN—1.

Detroit Steel and Spring Works, Detroit Steel and Spring Company, Michigan and Hubbard aves., Detroit. Two 2-ton Robert-Bessemer converters.

WISCONSIN—1.

West Superior Iron and Steel Company, West Superior. Two 4-ton converters.

MISSOURI—1 PARTLY BUILT.

Union Steel and Iron Company, St. Joseph. Two 3-ton Robert-Bessemer converters partly built.

COLORADO—1.

COLORADO FUEL AND IRON COMPANY, Pueblo. Principal office, Boston Building, Denver; New York office, 18 Broadway; Chicago office, Rookery Building. Two 5-ton converters.

UNITED STATES.

Total number of Bessemer steel works: 51 completed, 2 partly built, and 1 building. Of these 4 are Clapp-Griffiths plants with 7 converters, 4 are Robert-Bessemer plants with 6 converters, and 1 Robert-Bessemer plant with 2 converters is partly built. Total number of converters: 108 completed, 3 partly built, and 2 building.

OPEN-HEARTH STEEL WORKS.

NOTE.—These works are fully described in the list of rolling mills and steel works. The ton here used is the ton of 2,240 pounds. The works which make steel castings exclusively are so described; the others make plates, sheets, structural shapes, bars, billets, forgings, etc.; a few works occasionally make a small quantity of rails.

NEW HAMPSHIRE—1.

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

MASSACHUSETTS—4.

General Electric Company, 42 Centre st., Lynn. General office, Schenectady, New York. Two 15-ton furnaces. Product, steel castings.

New England Steel Works, Worcester. One 4-ton and one 10-ton furnace. Product, steel castings.

Tremont Nail Company, West Wareham. One 20-ton furnace.

Washburn and Moen Manufacturing Company, Worcester. One 12-ton and one 20-ton furnace.

NEW YORK—3 COMPLETED AND 1 PROJECTED.

Buffalo Steel Foundry, Pratt & Letchworth, Buffalo. Two furnaces. Product, steel castings.

Gatling Ordnance Company, 14 White Building, Buffalo. Contemplates erecting an open-hearth steel plant at Gatling, Erie county.

Johnson (Isaac G.) & Co., Spuyten Duyvil, New York City. One 8-ton furnace. Product, steel castings.

Syracuse Steel Foundry Company, 351 West Fayette street, Syracuse. Works at Geddes. Two 10-ton furnaces. Product, steel castings.

NEW JERSEY—3.

Newark Steel Works, The Benjamin Atha and Illingworth Company, Newark. One 7-ton and one 15-ton furnace.

Passaic Rolling Mill Company, Paterson. Two 20-ton furnaces.

Trenton Steel Company, Trenton. One 7-ton furnace.

PENNSYLVANIA—EASTERN DISTRICT—13 COMPLETED AND 1 PROJECTED.

Bethlehem (The) Iron Company, South Bethlehem. Philadelphia office, 421 Chestnut st.; New York office, 80 Broadway. One 10-ton, one 20-ton, and two 40-ton furnaces.

Carpenter Steel Company, Reading. New York office, 1 Broadway. Contemplates erecting one 5-ton furnace in 1894.

Chester Steel Castings Company, 407 Library st., Philadelphia. Works at Chester. One 15-ton furnace. Product, steel castings.

Eureka Cast Steel Company, Chester. Works at Lamokin. One 20-ton furnace. Product, steel castings.

Lukens Iron and Steel Company, Coatesville. Philadelphia office, Bullitt Building. Two 20-ton furnaces.

Midvale (The) Steel Company, Nicetown, Philadelphia. Declines to give a description of its works for publication.

Norristown Steel Company, Norristown. Two 15-ton furnaces. Product, ingots and castings.

Pencoyd Iron Works, A. & P. Roberts & Co., 261 South Fourth st., Philadelphia. Works in Montgomery county, opposite Manayunk. Four 22-ton furnaces.

Penn Steel Castings and Machine Company, Chester. Two 20-ton furnaces. Product, steel castings.

Phœnix Iron Company, 410 Walnut st., Philadelphia. Works at Phœnixville. Four 15-ton furnaces.

Pottstown Iron Company, Pottstown, Montgomery county. Philadelphia office, 400 Chestnut st. One 12-ton furnace. Uses the basic process.

Pottsville Iron and Steel Company, Pottsville. Philadelphia office, 226 South Fourth st. Two 20-ton furnaces.

Standard Steel Casting Company, Thurlow, Delaware county. Two 8-ton and two 20-ton furnaces. Product, steel castings.

Wellman Iron and Steel Company, Thurlow, Delaware county. Philadelphia office, 220 South Fourth st. Two 15-ton and two 20-ton furnaces.

PENNSYLVANIA—CENTRAL DISTRICT—2.

North Branch Steel Company, Danville. Philadelphia office, Twenty-fifth st. and Washington ave. One 15-ton furnace.

Pennsylvania Steel Company, Steelton. Office, 208 South Fourth st., Philadelphia. One 5-ton, one 7-ton, two 15-ton, two 30-ton, and six 50-ton furnaces.

PENNSYLVANIA—WESTERN DISTRICT—27.

Aliquippa Steel Works, Aliquippa Steel Company, Room 39, Vandergrift Building, Pittsburgh. Works at Aliquippa, Beaver county. One 12-ton furnace.

Apollo Rolling Mills, Apollo Iron and Steel Company, Pittsburgh. Works at Apollo, Armstrong county. Two 20-ton furnaces.

Aschman (The) Steel Casting Company, Sharon. One 5-ton furnace. Product, steel castings.

Black Diamond Steel Works, Park, Brother & Co. Limited, Pittsburgh. Decline to give information concerning their works.

Cambria Iron and Steel Works, Cambria Iron Company, Johnstown. Office, 218 South Fourth st., Philadelphia. Three 20-ton furnaces, with the Pernot improvement, and one 15-ton Krupp washer.

Carbon Steel Company, Thirty-second st., Pittsburgh. New York office, Mills Building. Two 15-ton and six 30-ton furnaces.

Fort Pitt Foundry, Mackintosh, Hemphill & Co., Pittsburgh. Two 12-ton and two 20-ton furnaces. Product, steel castings.

Homestead Steel Works, The Carnegie Steel Company, Limited, 42–48 Fifth ave., Pittsburgh. Works at Munhall. One 12-ton, six 20-ton, eight 25-ton, and one 35-ton furnace.

Howe, Brown & Co. Limited, Penn ave. and Seventeenth st., Pittsburgh. One 20-ton and one 30-ton furnace.

Johnson (The) Company, Johnstown, Cambria county. One 2-ton and one 7-ton furnace. Product, ingots and heavy castings.

Juniata Iron and Steel Works, Shoenberger & Co., Pittsburgh. Two 12-ton furnaces.

La Belle Steel Works, La Belle Steel Company, Pittsburgh. Two 15-ton furnaces.

Latrobe Steel Works, Latrobe, Westmoreland county. Branch office, Bullitt Building, Philadelphia. Two 20-ton furnaces. Product used in making tires.

Leechburg Iron Works, Kirkpatrick & Co. Limited, Leechburg. Branch office, Iron Exchange Building, Wood and Water sts., Pittsburgh. One 15-ton furnace.

Linden (The) Steel Company, Pittsburgh. General office and works, Second ave. Two 15-ton and one 25-ton furnace.

McKeesport Iron Works, W. Dewees Wood Company, McKeesport. Two 20-ton furnaces.

Millvale Rolling Mill, Millvale Iron Company Limited, lessee, Bennett, Millvale borough, Allegheny county. Two 15-ton furnaces.

National Separating and Manufacturing Company, West Bridgewater. Office, 702 Duquesne Way, Pittsburgh. One small furnace. Product, steel castings.

National Tube Works Company, McKeesport, Allegheny county. One 18-ton furnace.

Pittsburgh Steel Works, Anderson, DuPuy & Co., 8 Wood st., Pittsburgh. Works at Chartiers. One 20-ton furnace.

Sharon Steel Casting Company, Sharon. One 5-ton and one 15-ton furnace. Product, steel castings.

Singer, Nimick & Co. Limited, 83 Water st., Pittsburgh. One 10-ton furnace.

Soho Iron and Steel Works, Moorhead-McCleane Company, Pittsburgh. Two 15-ton furnaces.

Solar Steel Works, William Clark's Son & Co., Pittsburgh. Two 12-ton furnaces.

Spang (The) Steel and Iron Company, Pittsburgh. Office, 66-70 Sandusky st., Allegheny. Works at Etna. Three 10-ton furnaces.

Totten and Hogg Iron and Steel Foundry Company, Twenty-fourth st. and A. V. R. R., Pittsburgh. One 15-ton furnace. Product, steel castings.

West Penn Steel Works, Jennings Brothers & Co. Limited, Pittsburgh. Office and steel plant on Preble ave., Allegheny. One 10-ton furnace.

KENTUCKY—2.

Mitchell, Tranter & Co., Second and Elm sts., Cincinnati. Works at Covington. One 7-ton furnace.

Watts (The) Steel and Iron Syndicate Limited, Middlesborough. Seven 25-ton furnaces, 2 completed and 5 partly built; designed to use the basic process.

TENNESSEE—1.

Central (The) Iron Company, Nashville. Works at Chattanooga. Two 10-ton furnaces designed to use the basic process. Idle.

ALABAMA—2.

Alabama Steel Works, (incorporated,) Fort Payne. Two 15-ton furnaces; built to use the basic process.

Jefferson Steel Company, Birmingham. One 15-ton furnace; built to use the basic process.

OHIO—12 COMPLETED AND 1 PROJECTED.

Burgess Steel and Iron Works, Portsmouth. Two works. One 8-ton, one 10-ton, and one 25-ton furnace.

Canton Steel Works, Canton Steel Company, Canton. General office, Twenty-first and Liberty sts., Pittsburgh, Pa. Two 10-ton furnaces.

Cleveland Rolling Mill Company, Cleveland. Two 15-ton furnaces.

Cleveland (The) Steel Casting Company, 14 Winter street, Cleveland. One 10-ton furnace. Product, to be steel castings. Not yet in operation.

Cleveland (The) Steel Company, Cleveland. Contemplates erecting two open-hearth steel furnaces.

Kellogg (The) Seamless Tube and Manufacturing Company, Findlay. Eastern office, 40 Water st., Boston. One 10-ton and one 25-ton furnace.

Lima (The) Steel Casting Company, Lima. One 10-ton furnace. Product, steel castings.

Otis (The) Steel Company Limited, Cleveland. Seven 15-ton furnaces.

Solid (The) Steel Company, Alliance. One 3-ton and one 5-ton furnace. Product, steel castings.

Springfield Steel Casting Foundry, John W. Galvin & Co., lessees, Springfield. One 6-ton furnace. Product, ingots and castings.

Youngstown (The) Steel Company, Youngstown. One 10-ton Pernot furnace for dephosphorizing metal by the Krupp-Bell process. Also one 20-ton Siemens furnace, now idle.

Zanesville Iron Works, Ohio Iron Company, Zanesville. One 10-ton furnace.

INDIANA—3 COMPLETED AND 1 PROJECTED.

Anderson Steel Casting Company, 143½ South Meridian st., Indianapolis. Works at Anderson, Madison county. One 10-ton furnace. Product, steel castings.

Gas City Works, The Morewood Company, Gas City. Contemplate erecting an open-hearth steel plant in 1894.

Midland Steel Company, Muncie. One 20-ton furnace.

Premier Steel Company, Indianapolis. Two 15-ton furnaces.

ILLINOIS—5 COMPLETED AND 1 BUILDING.

Chicago Steel Casting Company, 4165 Lake st., Chicago. Works, Forty-eighth and Green sts. One 7-ton furnace. Idle and for sale or lease.

Chicago Tire and Spring Company, Western Union Building, Chicago. Works at Melrose, (Ovington, P. O.,) Cook county. One 8-ton and one 10-ton furnace. Product, ingots and castings.

Illinois Steel Company, Rookery Building, Chicago. Building four 15-ton open-hearth steel furnaces at the South Works, South Chicago.

Norton Brothers, 813 Masonic Temple Building, Chicago. Works at Maywood, Cook county. One open-hearth furnace.

Sargent (The) Company, 701 Western Union Building, Chicago. Works at Fifty-ninth and Wallace sts. One 12-ton furnace. Product, steel castings.

Springfield Iron Company's Iron and Steel Works, The Springfield Iron Company, Springfield. Two 20-ton Siemens-Pernot furnaces and one Pernot furnace for dephosphorizing pig metal.

MICHIGAN—1.

Muskegon Iron and Steel Company, Muskegon. One 15-ton furnace.

MINNESOTA—1 PROJECTED.

Ironton (The) Structural Steel Company, Lyceum Building, Duluth. Main office, 29 Broadway, New York. Contemplates erecting three 25-ton open-hearth steel furnaces at Ironton, St. Louis county.

MISSOURI—1.

Shickle, Harrison, and Howard Iron Company, (Steel Casting Department,) cor. Twelfth and Papin streets, St. Louis. One 6-ton

and one 8-ton furnace. Uses the basic process. Product, machine castings.

CALIFORNIA—1.

Pacific Rolling Mill Company, 202 Market st., P. O. Box 2,032, San Francisco. Works at Potrero. One 5-ton and two 18-ton furnaces.

UNITED STATES.

Total number of open-hearth steel works in the United States: 81 completed, 1 building, and 5 projected. Number of furnaces: 189 completed, 4 building, and 5 partly built.

CRUCIBLE STEEL WORKS.

NOTE.—These steel works are fully described in the list of rolling mills and steel works. Their capacity is indicated by the number of pots which each works can use at one heat. Unless otherwise stated their product is merchant steel.

MASSACHUSETTS—1.

Washburn Car-Wheel Company, Hartford, Conn. Steel works at Worcester. 64 pots. Product used exclusively for car-wheel tires.

CONNECTICUT—3.

Collins Company, Collinsville, Hartford county. 60 pots. Product used by the company in its works in the manufacture of edge tools, steel plows, etc.

Farist (The) Steel Company, Bridgeport. 24 pots.

Windsor Locks (The) Steel Company, E. N. Sperry, Receiver, Bridgeport. Works at Windsor Locks. 40 pots. For sale.

NEW YORK—4.

Chrome Steel Works, Kent ave., Hooper and Keap sts., Brooklyn. 54 pots. Product, tool steel, castings, etc.

Johnson (Isaac G.) & Co., Spuyten Duyvil, New York City. 20 pots. Product, steel castings.

Monhagen Steel Works, Wheeler, Madden, and Clemson Manufacturing Company, Middletown, Orange county. Operated by The National Saw Company, Newark, N. J. 96 pots. Product used in making saws.

Sanderson Brothers Steel Company, Syracuse. Branch house, 11-13 South Jefferson st., Chicago. 78 pots.

NEW JERSEY—6.

Benjamin (The) Atha and Illingworth Company, Newark. Two works: Newark Steel Works, at Newark; 60 pots. New Jersey Steel Works, at Harrison, Hudson county; 30 pots.

Harvey Steel Company, Brills Station, Newark. New York office, 52 Wall st. 8 pots; for experimental purposes only.

Heller & Brothers, Newark. 36 pots. Product used by the firm in making tools.

Pompton Steel and Iron Company, Pompton, Passaic county. Designed for 160 pots; only 80 pots used at a heat.

West Bergen Steel Works, Spaulding, Jennings & Co., Jersey City, Hudson county. 96 pots.

PENNSYLVANIA—25 COMPLETED AND 1 BUILDING.

Aliquippa Steel Works, Aliquippa Steel Company, Vandergrift Building, Pittsburgh. Works at Aliquippa, Beaver county. 36 pots.

Beaver Falls Steel Works, Beaver Falls, Beaver county. 24 pots.

Black Diamond Steel Works, Park, Brother & Co. Limited, Pittsburgh.

Carpenter Steel Company, Reading, Berks county. New York office, 1 Broadway. 144 pots.

Crescent Steel Company, 136 First avenue, Pittsburgh. Works, Forty-ninth st. to Fifty-first st. 180 pots.

Cyclops Steel Works, Charles Burgess, Titusville. 36 pots.

Diamond Steel Company, Reading, Berks county. 48 pots.

Emmens Metal Company, Youngwood. 8 pots. Product, castings.

Eureka Cast Steel Company, Chester. Works at Lamokin. 12 pots. Product, steel castings.

Fairmount Steel Works, Alexander Foster & Co., 2325 Spring Garden st., Philadelphia. 24 pots.

Frankford Steel Company, Frankford, Philadelphia. 40 pots.

Howe, Brown & Co. Limited, Pittsburgh. 204 pots.

Hussey, Binns & Co. Limited, 64 Fourth ave., Pittsburgh. Works at Charleroi, Washington county. 24 pots. Product used in making shovels, spades, and scoops.

Keystone Saw, Tool, Steel, and File Works, Henry Disston & Sons, (incorporated,) Tacony, Philadelphia. 102 pots. Product used in making saws, files, etc.

La Belle Steel Works, La Belle Steel Company, Pittsburgh. 120 pots.

Midvale (The) Steel Company, Nicetown, Philadelphia.

New Castle Steel Casting Company, New Castle. 22 pots. Product, steel castings. Idle.

Oxford Iron and Steel Works, William & Harvey Rowland, Frankford, Philadelphia. 32 pots.

Philadelphia Steel Works, Hallahan, Gross & Frank, South Second st. and Stone House Lane, Philadelphia. 10 pots.

Pittsburgh Steel Casting Company, Twenty-sixth and Railroad sts., Pittsburgh. 66 pots. Product, steel castings.

Pittsburgh Steel Works, Anderson, DuPuy & Co., 8 Wood st., Pittsburgh. Works at Chartiers. 66 pots.

Reliance Steel Casting Company Limited, Pittsburgh. 24 pots. Product, steel castings.

Singer, Nimick & Co. Limited, 83 Water st., Pittsburgh.

Sterling Steel Company, Westinghouse Building, Pittsburgh. Works at Demmler. 48 pots.

Superior Steel Company, 500 Lewis Block, Pittsburgh. Works at Mansfield, (post-office address, Mansfield Valley,) Allegheny county. Building one 16-pot furnace.

Wayne Iron and Steel Works, Brown & Co., Incorporated, Pittsburgh. 162 pots.

MARYLAND—1.

Cumberland Steel and Tin Plate Company, Cumberland. 24 pots.

TENNESSEE—1.

Southern (The) Steel Works, John Leighton & Sons, 610 Boyce st., Chattanooga. 16 pots.

OHIO—1.

Burgess Steel and Iron Works, Portsmouth. 24 pots.

INDIANA—1.

Oliver Chilled Plow Works, South Bend Iron Works, proprietors, South Bend. 96 pots. Entire product used by the works in the manufacture of plows.

ILLINOIS—3.

Chicago Steel Casting Company, 4165 Lake st., Chicago. Works at Forty-eighth and Green sts. 8 pots. Idle and for sale or lease.

King (The) and Andrews Company, 218-22 North Union st., Chicago. 16 pots. Product, steel castings.

Sargent (The) Company, 701 Western Union Building, Chicago. Works at Fifty-ninth and Wallace sts. 24 pots. Product, brake shoe inserts and general castings.

MICHIGAN—1.

Detroit Steel and Spring Works, Detroit Steel and Spring Company, Michigan and Hubbard avenues, Detroit. 30 pots.

IOWA—1.

Damascus Steel Company, 118 Grand ave., Des Moines. One small experimental furnace.

UNITED STATES.

Total number of crucible steel works in the United States: 48 completed and 1 building. Number of pots which can be used at each heat in completed works, 3,103.

PLATE AND SHEET MILLS.

NOTE.—Mills making only nail plate, tack plate, skelp, or shovel plate are not included in this list. A number of the works named below make a specialty of rolling iron plates and sheets, although they occasionally roll steel plates and sheets from purchased billets. Works rolling black plates, or sheets, for tinning are also included in the list. For a complete description of all plants enumerated below see the list of rolling mills and steel works.

NEW HAMPSHIRE—1.

Nashua Iron and Steel Company, Nashua. Iron and steel plates.

CONNECTICUT—1.

Wilmot (The) and Hobbs Manufacturing Company, (Hot Rolling Mill Department,) Bridgeport. Steel plates and sheets.

NEW YORK—4.

Elmira Rolling Mills, N. D. Doxey & Co., lessees, Elmira. Iron plates.

Monhagèn Steel Works, Middletown. Operated by The National Saw Company, Newark, N. J. Steel saw plates.

Somerton Tin Plate Works, Somers Brothers, Third st. and Third ave., Brooklyn. Iron or steel black plates, or sheets, for tinning.

Troy Steel and Iron Company, Troy. Steel sheets.

NEW JERSEY—2.

American Sheet Iron Company, Phillipsburg. Iron and steel sheets.

Passaic Rolling Mill Company, Paterson. Iron and steel plates.

PENNSYLVANIA—EASTERN DISTRICT—25 COMPLETED AND 1 BUILDING.

Bethlehem (The) Iron Company, South Bethlehem. Heavy steel forged armor and other plates.

Brandywine Rolling Mills, Worth Brothers, Coatesville. Iron and steel plates.

Catasauqua Manufacturing Company, Catasauqua. Iron and steel plates.

Conshohocken, Pennsylvania, and Corliss Iron Works, J. Wood and Brothers Company, Conshohocken. General office, 223 North Second st., Philadelphia. Iron and steel plates and sheets.

Easton Sheet Iron Works, Theodore Oliver, Easton. Iron sheets.

Gibraltar Iron Works, Simon Seyfert, Reading. Iron plates.

Glasgow Iron Company, Pottstown. Iron and steel plates.

Keystone Iron Works Limited, Reading. Iron plates.

Keystone Saw, Tool, Steel, and File Works, Henry Disston & Sons, (incorporated,) Tacony, Philadelphia. Steel sheets and saw and engravers' plates.

Laurel Iron Works, Coatesville. Iron plates and sheets. Idle.

Lukens Iron and Steel Company, Coatesville. Philadelphia office, Bullitt Building. Iron and steel plates.

McIlvain (William) & Sons' Boiler Plate Mill, Wm. McIlvain & Sons, Reading. Iron and steel plates.

Oxford Iron and Steel Works, William & Harvey Rowland, Frankford, Philadelphia. Steel sheets.

Parkesburg (The) Iron Company, Parkesburg. Iron and steel plates.

Penn Treaty Iron Works, Marshall Brothers & Co., Beach and Marlborough sts., Philadelphia. Iron and steel plates and sheets and black plates for tinning.

Philadelphia Iron and Tinplate Works, Hughes & Patterson, Incorporated, Philadelphia. Works being remodeled and enlarged for the manufacture of black plates, or sheets, for tinning.

Pine Iron Works, Joseph L. Bailey & Son, lessees, Pine Iron Works P. O., Berks county. Iron and steel plates.

Plymouth Rolling Mill, J. Wood and Brothers Company, lessee, Conshohocken. Iron and steel plates and sheets.

Pottsgrove Iron Works, Potts Brothers Iron Company Limited, Pottstown. Iron plates.

Pottstown Iron Company, Pottstown. Iron and steel plates.

Reading Iron Company, Reading. Iron plates.

Schuylkill Iron Works, Alan Wood Company, 519 Arch st., Philadelphia. Works at Conshohocken. Iron and steel plates and sheets.

Seyfert Rolling Mills, Samuel R. Seyfert & Brother, Reading. Iron plates.

Valley Iron Works, W. W. Kurtz & Sons, Coatesville. Iron and steel plates.

Viaduct Iron Works, Coatesville Rolling Mill Company, Coatesville. Iron and steel plates and sheets.

Wellman Iron and Steel Company, Thurlow. Philadelphia office, 220 South Fourth st. Steel plates.

PENNSYLVANIA—CENTRAL DISTRICT—7.

Central Iron Works, Harrisburg. Iron and steel plates.

Lalance (The) and Grosjean Manufacturing Company, Harrisburg. Main office, 19 Cliff st., New York City. Iron and steel sheets.

Lebanon Rolling Mills, Lebanon. Iron plates and sheets.

North Branch Steel Company, Danville. Philadelphia office, Twenty-fifth st. and Washington ave. Steel plates.

Paxton Rolling Mills, Harrisburg. Iron and steel plates.

Pennsylvania Steel Company, Steelton. Office, 208 South Fourth st., Philadelphia. Steel plates.

York Rolling Mill, Steacy and Denney Company, (incorporated,) York. Iron plates.

PENNSYLVANIA—WESTERN DISTRICT—39 COMPLETED AND 1 BUILDING.

Aliquippa Steel Works, Aliquippa Steel Company, Room 39, Vandergrift Building, Pittsburgh. Works at Aliquippa, Beaver county. Steel plates and sheets.

Allegheny, Monongahela, and Birmingham Iron Works, Oliver Iron and Steel Company, Pittsburgh. Iron and steel plates.

American Iron and Steel Works, Jones & Laughlins Limited, Pittsburgh. Iron and steel plates and sheets.

Anchor Nail and Tack Works and Central Expanded Metal Company, Chess Brothers, Pittsburgh. Works at Rankin Station. Light steel plates for stamping.

Apollo Iron and Steel Company, Pittsburgh. Works at Apollo, Armstrong county. Iron and steel sheets and black plates for tinning.

Apollo Sheet Iron Works, P. H. Laufman & Co. Limited, Apollo, Armstrong county. Works in Westmoreland county. Pittsburgh office, Germania Bank Building. Iron and steel sheets and black plates for tinning.

Arethusa Iron Works, George W. Johnson, New Castle. Iron plates and sheets.

Atlantic Works, P. L. Kimberly & Co., Sharon, Mercer county. Iron plates.

Black Diamond Steel Works, Park, Brother & Co. Limited, Pittsburgh. Steel plates and sheets.

Blairsville Rolling Mill and Tin Plate Company, Blairsville. Black plates, or sheets, for tinning.

Canonsburg Iron and Steel Company, Canonsburg, Washington county. Branch office, Germania Bank Building, Pittsburgh. Iron and steel sheets for stamping and tinning.

Carbon Steel Company, Thirty-second st., Pittsburgh. New York office, Mills Building. Steel plates and sheets.

Carnegie (The) Steel Company, Limited, 42–48 Fifth avenue, Pittsburgh. Five works, three of which make steel armor and other plates.

Chartiers (The) Iron and Steel Company Limited, Iron Exchange Building, Wood and Water sts., Pittsburgh. Works at Carnegie. Iron and steel sheets.

Clinton Rolling Mill, Clinton Iron and Steel Company, 208 Wood st., Pittsburgh. Plates and sheets.

Ellwood Tin Plate Company, Ellwood City. Iron and steel black plates, or sheets, for tinning.

Gourley (S. A.) and others are building a sheet mill at Saltsburg, Indiana county. Will make black plates, or sheets, for tinning.

Howe, Brown & Co. Limited, Penn ave. and Seventeenth st., Pittsburgh. Steel plates and sheets.

Juniata Iron and Steel Works, Shoenberger & Co., Pittsburgh. Steel plates and sheets.

Kensington Iron Works, H. Lloyd's Sons Company, (incorporated,) Pittsburgh. Iron plates and sheets.

Leechburg Iron Works, Kirkpatrick & Co. Limited, Leechburg, Armstrong county. Branch office, Iron Exchange Building, Pittsburgh. Iron and steel sheets.

Linden (The) Steel Company, Pittsburgh. General office and works, Second ave. Steel armor and other plates and sheets.

McKeesport Iron Works, W. Dewees Wood Company, general offices and works, McKeesport. Branch office, 111 Water st., Pittsburgh. Iron and steel sheets.

Millvale Rolling Mill, Millvale Iron Company Limited, lessee, Bennett, Millvale borough, Allegheny county. Iron and steel plates.

New Castle Steel and Tin Plate Company, (incorporated,) New Castle. Black plates, or sheets, for tinning, consumed in the company's tinplate works.

Pittsburgh Steel Works, Anderson, DuPuy & Co., 8 Wood st., Pittsburgh. Works at Chartiers. Steel plates and sheets.

Republic Iron Works Department of National Tube Works Company, Twenty-fifth st., South Side, Pittsburgh. Plates and sheets.

Scottdale Iron and Steel Company Limited, Scottdale, Westmoreland county. Sheets.

Sharon Iron Company Limited, Sharon, Mercer county. Iron and steel plates and sheets.

Singer, Nimick & Co. Limited, 83 Water st., Pittsburgh. Steel sheets and plates.

Sligo Rolling Mills, Phillips, Nimick & Co., Pittsburgh. Iron plates and sheets.

Soho Iron and Steel Works, Moorhead-McCleane Company, Pittsburgh. Iron and steel plates and sheets.

Spang (The) Steel and Iron Company, Pittsburgh. Office, 66–70 Sandusky st., Allegheny. Works at Etna. Steel plates.

United States Iron and Tin Plate Manufacturing Company, Demmler P. O., Allegheny county. Iron and steel plates and sheets and black plates for tinning.

Vesuvius Iron and Nail Works, Moorhead, Brother & Co., (incorporated,) German National Bank Building, Pittsburgh. Works at Sharpsburg. Iron plates.

Wayne Iron and Steel Works, Brown & Co., Incorporated, Pittsburgh. Iron boiler plates.

West Penn Steel Works, Jennings Brothers & Co. Limited, Pittsburgh. Office, Preble ave., Allegheny. Rolling mill at Leechburg, Armstrong county. Steel sheets and light plates and pickled plates for tinning.

Wheatland Iron Company, Wheatland, Mercer county. Pittsburgh office, 208 Wood st. Iron plates.

DELAWARE—6.

Edge Moor Iron Company, Edge Moor, New Castle county. Plate mill not in operation.

Marshallton Iron Works, (incorporated,) Marshallton, New Castle county. Iron sheets.

Minquas Iron Works, McCullough Iron Company, Wilmington. Iron and steel sheets.

Newport Rolling Mills, Marshall Iron Company, Newport. Iron and steel sheets.

Riverside Iron Works, Delaware Iron Company, New Castle. Philadelphia office, 222-24 South Third st. Iron plates.

Wilmington Rolling Mills, The Seidel and Hastings Company, Wilmington. Iron boiler and other plates.

MARYLAND—4 AND 1 PARTLY ERECTED.

Baltimore (The) Iron, Steel, and Tinplate Company, Locust Point, Baltimore. Black plates, or sheets, for tinning.

Cumberland Steel and Tin Plate Company, Cumberland, Allegany county. Black plates, or sheets, for tinning.

McCullough Iron Company, Northeast and Rowlandville, Cecil county. Two works in Cecil county. Iron sheets. Represented in Philadelphia by The McDaniel and Harvey Company, 1600 Washington ave.

South Baltimore Rolling Mill Company, 44 South st., Baltimore. Works at South Baltimore. Partly erected. Plates.

WEST VIRGINIA—2 AND 1 REBUILDING.

Crescent Iron Works, Whitaker Iron Company, Wheeling. Iron plates and sheets. Rebuilding.

Riverside Iron Works, Wheeling. Steel plates.

Top Mill, Wheeling Steel and Iron Company, Wheeling. Iron and steel sheets.

KENTUCKY—5.

Anchor Iron and Steel Works, John Trapp, Newport, Campbell county. Iron sheets.

Ewald Iron Company, 941 North Second st., St. Louis, Mo. Works at Louisville. Iron and steel plates and sheets.

Licking Iron Works, Licking Rolling Mill Company, Covington. Iron plates and sheets.

Mitchell, Tranter & Co., Second and Elm sts., Cincinnati, Ohio. Works at Covington. Iron and steel plates and sheets.

Newport Rolling Mill Company, Newport. Iron and steel sheets.

ALABAMA—2.

Bessemer (The) Rolling Mills, Bessemer, Jefferson county. Iron plates and sheets. Idle and for sale.

Birmingham Rolling Mill Company, Louisville, Ky. Works at Birmingham. Iron and steel plates and sheets.

OHIO—24 AND 1 BUILDING.

Ætna-Standard Iron and Steel Company, Bridgeport. Two works. Iron and steel plates and sheets. Preparing to make black sheets.

Britton (The) Rolling Mill Company, 66 Hoyt ave., Cleveland. Iron and steel plates and sheets and black plates for tinning.

Brown Bonnell (The) Iron Company, Youngstown. Iron plates and sheets.

Burgess Steel and Iron Works, Portsmouth. Two works. Iron and steel plates and sheets.

Cambridge (The) Iron and Steel Company, Cambridge. Iron and steel sheets.

Canton Rolling Mill Company, Canton. Building; iron and steel sheets.

Cincinnati Rolling Mill Company, 298 E. Pearl st., Cincinnati. Works at Riverside. Iron and steel sheets and black plates for tinning.

Cleveland Rolling Mill Company, Cleveland. Iron and steel plates and sheets.

Cleveland (The) Steel Company, Cleveland. Light steel plates and sheets.

Falcon Iron and Nail Company, Niles. Two works. Iron and steel sheets.

Falcon Tin Plate and Sheet Company, Niles. Iron and steel plates and sheets and black plates for tinning.

Haselton Iron Works, The Andrews Brothers Company, Youngstown. Iron and steel plates and sheets.

Irondale Rolling Mills and Tin and Terne Plate Works, Wallace, Banfield & Co. Limited, Irondale. Black plates, or sheets, for tinning.

Ironton Rolling Mill, The Eagle Iron and Steel Company, Ironton. Iron and steel sheets.

Mahoning Valley Works, Mahoning Valley Iron Company, Youngstown. Iron plates and sheets.

Maumee Rolling Mill Company, Toledo. Iron and steel plates and sheets.

New Philadelphia (The) Iron and Steel Company, New Philadelphia. Iron plates and sheets.

Otis (The) Steel Company Limited, Cleveland. Steel plates.

Piqua (The) Rolling Mill Company, Piqua. Iron and steel sheets.

Reeves Iron Company, Canal Dover. Iron and steel sheets.

Russia Mill, Joshua S. Ingalls & Co., Troy. "Craig" polished sheet steel, made from purchased sheets.

Summers Iron Works, Summers Brothers & Co., Struthers. Light iron sheets.

Wellsville Plate and Sheet Iron Company, Wellsville. Iron and steel plates and sheets.

INDIANA—4 COMPLETED AND 2 BUILDING.

American (The) Tin Plate Company, Elwood. Black plates, or sheets, for tinning, all consumed by the company in its tinplate works.

Corning Steel Company, Hammond. Iron and steel sheets.

Emlyn (The) Steel and Tin Plate Company, Summitville. Building; black plates, or sheets, for tinning.

Gas City Works, The Morewood Company, Gas City. Black plates, or sheets, for tinning.

Irondale (The) Steel and Iron Company, Middletown. Building; iron plates and sheets.

Midland Steel Company, Muncie. Steel plates and sheets for stamping and tinning.

ILLINOIS—3 COMPLETED AND 1 BUILDING.

Illinois Steel Company, Rookery Building, Chicago. Plate mill being added to the South Works, at South Chicago.

Joliet Sheet Rolling Mill Company, Joliet. Steel sheets.

Norton Brothers, 813 Masonic Temple Building, Chicago. Works at Maywood. Experimenting with fluid metal rolling machinery for the manufacture of steel sheets for tinning.

Springfield (The) Iron Company, Springfield. Steel plates and sheets.

MICHIGAN—1.

Eureka Iron and Steel Works, 2 Butler Building, Detroit. Iron plates.

WISCONSIN—1.

West Superior Iron and Steel Company, West Superior. Steel plates.

MISSOURI—2.

St. Louis Stamping Company, St. Louis. Iron and steel sheets and plates for stamping and black plates for tinning.

Union Steel and Iron Company, St. Joseph. Iron and steel sheets.

CALIFORNIA—1 BUILDING.

Los Angeles (The) Iron and Steel Company, Los Angeles. Main office, Denver, Colorado. Iron plates and sheets. Mill nearly completed.

UNITED STATES.

Total number of iron and steel plate and sheet mills in the United States: 133 completed, 1 rebuilding, 7 building, and 1 partly erected.

CUT-NAIL WORKS.

NOTE.—This list embraces all rolling mills in the United States which have cut-nail machines. For a complete description of the works enumerated below see the list of rolling mills and steel works.

MASSACHUSETTS—3.

Mount Hope Iron Company, Somerset. 100 nail machines.
Robinson Iron Company, Plymouth. 18 nail machines.
Tremont Nail Company, West Wareham. 173 nail machines.

NEW JERSEY—2.

Cumberland Nail and Iron Company, Bridgeton. Branch office, 43 North Water st., Philadelphia. 90 nail machines.
Oxford Iron and Nail Company, Oxford. New York office, 52 Wall st. 103 nail machines.

PENNSYLVANIA—EASTERN DISTRICT—4.

Birdsboro Nail Works, E. and G. Brooke Iron Company, Birdsboro. 118 nail machines.
Keystone Nail Works, The Ellis and Lessig Steel and Iron Company Limited, Pottstown. 105 nail machines.
Plymouth Rolling Mill, J. Wood and Brothers Company, lessee, Conshohocken. 12 nail machines. Nail department idle.
Pottstown Iron Company, Pottstown. 95 nail machines.

PENNSYLVANIA—CENTRAL DISTRICT—15.

Bellefonte Iron and Nail Company, Bellefonte. 53 nail machines.
Chesapeake Nail Works, Charles L. Bailey & Co., (incorporated,) Harrisburg. 103 nail machines.
Danville Nail Works, Danville. 92 nail machines. Idle and for sale.
Duncannon Iron Company, Duncannon. Office, 122 Race st., Philadelphia. 50 nail machines.
Harrisburg Nail Works, Harrisburg. Works at Fairview, Cumberland county. 83 nail machines.
Hollidaysburg Iron and Nail Company, Hollidaysburg. 23 nail machines.
Juniata Rolling Mill, Hollidaysburg and Gap Iron Works, Hollidaysburg. 30 nail machines. Idle and for sale or lease.
Lewisburg Rolling Mill, The Lewisburg Iron and Steel Company, Lewisburg. 41 nail machines.

Lock Haven Nail Works, Charles M. O'Connor, Lock Haven. 20 nail machines. Idle and for sale.

Milton Nail Works, The C. A. Godcharles Company, Milton. 88 nail machines.

Northumberland Iron and Nail Works, Van Alen & Co., Northumberland. 53 nail machines.

Sunbury Iron Works, Sunbury. 41 nail machines.

Taggarts & Howell, Northumberland. 95 nail machines.

Watsontown Nail Works, D. Frank Wagner, Watsontown. 25 nail machines.

Williamsport Iron and Nail Works, Williamsport Iron and Nail Company, Williamsport. 80 nail machines.

PENNSYLVANIA—WESTERN DISTRICT—3.

Anchor Nail and Tack Works and Central Expanded Metal Company, Chess Brothers, Pittsburgh. 90 nail machines. Idle.

Atlantic Iron and Steel Company, New Castle. 55 nail machines. Nail department idle, and not likely to be operated again.

Atlantic Works, P. L. Kimberly & Co., Sharon. 40 nail machines.

VIRGINIA—1.

Old Dominion Iron and Nail Works Company, Richmond. Works on Belle Isle. 146 nail machines.

WEST VIRGINIA—5.

La Belle Iron Works, Wheeling. 177 nail machines.

Riverside Iron Works, Wheeling. 224 nail machines. Nail factory idle.

Wheeling Steel and Iron Company, Wheeling. Three nail factories: Belmont Works, 152 nail machines; Benwood Works, 173 nail machines; Top Mill, 130 nail machines.

KENTUCKY—1.

Norton Iron Works, Ashland. 126 nail machines.

TENNESSEE—1.

Knoxville Iron Company, Knoxville. 41 nail machines.

ALABAMA—2.

Alabama Iron and Steel Company, Brierfield. 72 nail machines.

Alabama Steel Works, (incorporated,) Fort Payne. 5 nail machines. Idle.

OHIO—10.

Belfont Iron Works Company, Ironton. 126 nail machines.

Bellaire Nail Works, Bellaire. 125 nail machines.

Falcon Iron and Nail Company, Niles. 44 nail machines. Idle.

Jefferson Iron Works, Steubenville. 160 nail machines.

Junction Iron Company, Mingo Junction. Branch office, Wheeling, W. Va. 142 nail machines.

Kelly Nail and Iron Company, Ironton. 120 nail machines.

Laughlin Nail Company, Wheeling, W. Va. Works at Martin's Ferry. 225 nail machines.

Mahoning Valley Works, Mahoning Valley Iron Company, Youngstown. 55 nail machines.

Middleport (The) Steel and Nail Works, The King, Gilbert, and Warner Company, Columbus. Works at Middleport. 102 nail machines.

Wellston Steel and Nail Mill, E. J. Bird, Jr., Ironton. Works at Wellston. 65 nail machines. Idle.

INDIANA—3.

Greenfield Iron and Nail Company, Greenfield. 50 nail machines.

Lakeside Nail Company, 647 Rookery Building, Chicago. Works at Hammond. 202 nail machines.

Terre Haute Iron and Steel Company, Terre Haute. 64 nail machines. Idle.

ILLINOIS—3.

Calumet Iron and Steel Company, Rookery Building, Chicago. Works at Cummings. 132 nail machines. Idle.

LeClaire Nail Works, LeClaire Steel Company, lessee, Belleville. 60 nail machines.

Valley Steel Company, Belleville. Office, American Central Building, St. Louis, Mo. 154 nail machines.

MISSOURI—1.

Union Steel and Iron Company, St. Joseph. 50 nail machines.

CALIFORNIA—1.

Pacific Iron and Nail Company, 9 Beale st., San Francisco. Works at Oakland. 96 nail machines.

UNITED STATES.

Total number of rolling mills containing cut-nail machines: 55. Number of nail machines: 5,094.

TINPLATE WORKS.

NOTE.—In this list the word "tinplates" is limited to pure tin-coated sheets. Sheets coated with a mixture of tin and lead are referred to as "terne" plates. The capacity of the works is given in boxes, the box, unless otherwise stated, being understood to be the equivalent of a box of 112 plates 14 inches by 20 inches and weighing from 108 to 112 pounds. The word "set" refers to the set of tinning pots or the "machine" necessary for tinning or coating the black plates. "Black plates" are the iron or steel sheets before they are coated. Various kinds of tinning sets are employed. The weekly producing capacity of the works is given as reported by the manufacturers. Unless otherwise stated coal is used for fuel. The rolling mill or black plate department of the tinplate works which make their own black plates will be found described in the list of rolling mills.

MASSACHUSETTS—1.

Steel Edge Stamping and Retinning Company, 89 State st., Boston. Works at Millis, Norfolk county. Tinning plant erected in 1889; 4 tinning pots; product used in its own works in the manufacture of stamped hollow ware. Buys black plates. F. H. Williams, A. L. Hollander, and C. C. Converse, Assignees. *See Stamping Works.*

NEW YORK—8.

American Stamping Company, 103-19 North Third st., Brooklyn, Kings county. New York office, 104-106 John st. Tinning plant erected in 1892; product used in its own works in the manufacture of stamped ware. Buys black plates. *See Stamping Works.*

Central (The) Stamping Company, 25 Cliff street, New York City. Works at Brooklyn, Kings county. Ten tinning pots built about 1890; product chiefly used in its own works in the manufacture of stamped ware. Buys black plates. Rebuilding tinning plant. David H. James, President; W. M. Aikman, Vice-President; Geo. W. Ketcham, Secretary and Treasurer. *See New Jersey. See Stamping Works.*

East River Lead Company, Kahn Brothers, 523-27 East Nineteenth st., New York City. Built in 1891 and first terne plates made in May, 1891; one set; product, terne plates; weekly capacity, 120 boxes, 20 x 28, 205 pounds per box. Brands, "Mohawk," "First New York," and "Juanita." Buys black plates. Jacob Kahn, President; German Kahn, Vice-President; Eml. S. Kahn, Secretary; E. Hochheim-

er, Treasurer; Rudolph Sichel, Manager; Solomon Kahn, Selling Agent.

Iron Clad Manufacturing Company, 22-24 Cliff st., New York City. Works at Brooklyn, Kings county. Tinning plant erected about 1876 and greatly enlarged since; product chiefly used in its own works for stamped ware. Buys black plates. Robert Seaman, President and Treasurer; H. B. Haigh, Vice-President; David D. Otis, Secretary; F. E. Young, General Superintendent. *See Stamping Works.*

Jaques, (George W.,) Thirteenth ave., near Twentieth and Twenty-first sts., New York City. Built in 1894; first tinplates made March 19th and first terne plates March 26th; 2 sets; product, terne plates; weekly capacity, 250 boxes, 20 x 28. Brands, "Juno," "Petrel," and "N. P. R." Buys black plates. Contemplates adding 2 sets.

Meurer Brothers Company, 571-77 Flushing ave., Brooklyn, Kings county. Built in 1894 and first tin and terne plates made in March, 1894; 6 sets, 2 for tinplates and 4 for terne plates; weekly capacity, 600 boxes of tin plates and 1,200 boxes of terne plates. Brands, "Meurer Roofing IC.," "Flushing IC.," and "Pullman IC." Buys black plates. Expects to add 4 sets.

Somerton Tin Plate Works, Somers Brothers, Third st. and Third ave., Brooklyn, Kings county. Built in 1891 and first tinplates made in October, 1892; 4 sets; product, tinplates; weekly capacity, 1,800 boxes. Brands, "Somerton" for best stamping and "Somerbrook" for bright charcoal. Fuel used, petroleum. Make black plates. *See Rolling Mills.*

Thomson (A. A.) & Co., 213-15 Water st., New York City. Built in 1892 and first terne plates made May 2, 1892; 3 sets; product, terne plates; weekly capacity, 450 boxes. Brands, "Old Colony," "Thomson's Puritan," and "Central." Buy black plates.

NEW JERSEY—3.

Central (The) Stamping Company, 25 Cliff st., New York City. Works at Newark, Essex county. Six tinning pots; product chiefly used in its own works in the manufacture of stamped ware. Buys black plates. *See New York. See Stamping Works.*

Elizabethport Works, The Morewood Tin Plate Manufacturing Company, Elizabeth. Works at Elizabethport, Union county. Built in 1892; first terne plates made in October and first tinplates in December, 1892; 8 sets, 6 for tinplates and 2 for terne plates; weekly capacity, 2,400 boxes of tinplates and 2,000 boxes of terne plates. Fuel used, petroleum. Buy black plates. J. H. Rogers, President; C. M. Stuart, Secretary and Treasurer; E. Stevenson, Superintendent. Idle.

Saunders, Fielding & Bond, 284 Pearl st., New York City. Works at Jersey City. One set; product, terne plates. Buy black plates.

PENNSYLVANIA—25.

Aliquippa Tin Plate Company, 25 Sixth ave., Pittsburgh. Works at Aliquippa, Beaver county. Built in 1892; first tin and terne plates made in August, 1892; 3 sets, one for tinplates and 2 for terne plates; weekly capacity, double turn, 172 boxes of tinplates and 344 boxes of terne plates. Brands, "Beaver" and "Aliquippa." Buys black plates. B. Donovan, President; W. J. Shaw, Secretary; J. P. Bailey, Treasurer.

American (The) Tin Plate Machine and Manufacturing Company, 328 Chestnut st., Philadelphia. Works at Linfield, Montgomery county. Built in 1892; first terne plates made in May, 1892, and first tinplates in November, 1893; one Buckman's automatic continuous seaming and tinning machine; weekly capacity, 2,000 rolls of 100 square feet of terne plates, equal to 450 boxes, 20 x 28. Buys black plates. Propose erecting additional machines. P. B. Calvert, President; E. B. Smith, Secretary and Treasurer; S. Y. Buckman, Vice-President and Manager.

American Tin and Terne Plate Company, 45–47 Richmond st., Philadelphia. Works at 55–57 Laurel st. Built in 1891–2 and first terne plates made January 17, 1892; 3 sets; weekly capacity, 300 boxes of terne plates, 20 x 28. Brands, "Keystone," "Puritan," and "Hancock." Buys black plates.

Apollo Rolling Mills, Apollo Iron and Steel Company, Pittsburgh. Works at Apollo, Armstrong county. Tinning plant added to rolling mill and steel plant in 1891 and first terne plates made December 15, 1891; 3 sets; product, terne plates; weekly capacity, 1,020 boxes. Brand, "Apollo Best Roofing." Fuel used, natural gas. Make black plates. *See Rolling Mills.*

Apollo Sheet Iron Works, P. H. Laufman & Co. Limited, Apollo, Armstrong county. Works in Westmoreland county. Pittsburgh office, Germania Bank Building. Tinning plant added to rolling mill in 1891; first terne plates made in May, 1891; one set; product, terne plates; weekly capacity, 30 tons of 30 x 96-inch plates. Brand, "Apollo." Fuel used, natural gas. Make black plates. *See Rolling Mills.*

Black Diamond Tinplate Works, Henry W. Scattergood, 51–53 Laurel st., Philadelphia. Built in 1893; first terne plates made June 1 and first tinplates September 12, 1893; 3 sets; 2 for tinplates and one for terne plates; weekly capacity, 420 boxes of tinplates and 250 boxes of terne plates. Brand, "Black Diamond." Buy black plates.

Blairsville Rolling Mill and Tin Plate Company, Blairsville, Indiana county. Built in 1892 and first tin and terne plates made in November, 1892; 5 sets, 3 for tinplates and 2 for terne plates; weekly capacity, 750 boxes of 20 x 28 tinplates and 900 boxes of 20 x 28 terne plates. Brands, for tinplates, "Blairsville Best Bright," "Clifton," and "Conemaugh;" for terne plates, "Neville" and "Duquesne." Makes black plates. *See Rolling Mills.*

Canonsburg Iron and Steel Company, Canonsburg, Washington county. Branch office, Germania Bank Building, Pittsburgh. Tinning plant added to rolling mill in 1894; first tin and terne plates made April 1st; 2 sets, one for tinplates and one for terne plates; weekly capacity, 120 boxes of tinplates and 120 boxes of terne plates, 20 x 28. Fuel used, natural gas. Makes black plates. *See Rolling Mills.*

Continental (The) Tin Plate Works, Gummey, Spering & Co., Twenty-sixth st. and Washington ave., Philadelphia. Built in 1892; first terne plates made in June and first tinplates in November, 1892; 4 sets, 3 for terne plates and one for tinplates; weekly capacity, double turn, 350 boxes of tinplates and 1,000 boxes of terne plates. Brands, for tinplates, "Phœnix Bright," (Melyn grade,) "Climax Bright," (Lisvane grade,) and "Mars" (full J. B. grade); for terne plates, "Pennsyl" old method, "Leominster," "Alderly," "Phœnix," "Climax," "Venus," "Flag," "Eagle," "Liberty," "Anchor," "Pioneer," "Hercules," "Stag," "Victor," "Sun," "Colonial," "Neptune," and "Continental." Buy black plates, but may erect a black plate rolling mill.

Duquesne Tin Plate Works, 715-17 Lewis Block, Pittsburgh. Works on Second ave., Soho. Built in 1893; first terne plates made June 1 and first tinplates November 15, 1893; 2 sets; now producing terne plates only; weekly capacity, 1,200 boxes of 14 x 20 plates, either 135 lbs., 108 lbs., or 100 lbs. to the box. Brands, "Iron City" and "Soho." Fuel used, natural gas. Buy black plates. Contemplate adding 4 sets, when tinplates will again be produced. C. Dreifus, President; J. Wildberg, Vice-President and Manager; E. Dreifus, Secretary; L. E. Block, Treasurer.

Griffiths & Cadwallader, Pittsburgh. Works in the Twenty-third Ward. Built in 1891 and first terne plates made December 27, 1891; 3 sets, one for tinplates and 2 for terne plates; weekly capacity, 200 boxes of tinplates and 500 boxes of terne plates. Brands, for terne plates, "Bonus," "Lulu," "Glenwood," "Optimus," and "NF.;" for tinplates, "Primrose" and "Petunia." Fuel used, natural gas. Buy black plates.

Hamilton, (John,) 61-63 Third ave., Pittsburgh. Built in 1890 and first terne plates made in April, 1890; 3 sets; product, terne plates; weekly capacity, 450 boxes, 20 x 28. Brands, "Hamilton's Best Redipped," "Osceola" old style, and "Mingo" old process. Fuel used, natural gas. Buys black plates.

Laufman (The) Tin Plate Company, 421 Wood st., Pittsburgh. Works at Butler Junction, W. P. R. R., Armstrong county. Tinning plant built in 1890 and first terne plates made in June; 4 sets; product, terne plates; weekly capacity, 500 boxes of 240 lbs. each, 20 x 28 plates, "old process." Brands, Laufman's "Apollo," "Freeport," "Tip Top," and "Allegheny." Fuel used, natural gas. Black plates ob-

tained from the Apollo Sheet Iron Works. (Formerly operated by the Pittsburgh Electro-Plating Company Limited.) P. H. Laufman, Proprietor; P. H. Laufman, Jr., Manager.

McKinley Tin Plate Works, McKinley Tin Plate Company, Wilkinsburg, Allegheny county. Built at Pittsburgh in 1891 and removed to Wilkinsburg in 1892; first terne plates made January 7, 1892; 3 sets; product, terne plates; weekly capacity, 350 boxes, 20 x 28. Brands, "McKinley," "Wilkinsburg," and "Fort Pitt." Fuel used, natural gas. Buy black plates. L. H. Smith, President; H. Y. Haws, Vice-President; E. S. Wangenheim, Secretary and Treasurer.

Merchant & Co., (incorporated,) 517 Arch st., Philadelphia. Works, 2025 Washington ave. Eight sets; product, tin and terne plates. Buy black plates.

New Castle Steel and Tin Plate Company, (incorporated,) New Castle, Lawrence county. Built in 1892-3; first tin and terne plates made in November, 1893; 12 sets, 9 for tinplates and 3 for terne plates. Brands, "New Castle Best Charcoal," "New Castle 'A' Charcoal," "New Castle 'B' Charcoal," "New Castle Coke," "New Castle Old Method Ternes," and "New Castle Palm Ternes." Makes black plates. *See Rolling Mills.*

Norristown Tin Plate Works, Norristown, Montgomery county. Built in 1892 and first tin and terne plates made in June, 1892; 7 sets, 2 for tinplates and 5 for terne plates; weekly capacity, 500 boxes of tin plates and 2,000 boxes of terne plates. Brands, for tinplates, "Earnest;" for terne plates, "Norristown," (dull,) "Earnest," (bright,) "Norristown Extra," (extra coated,) and "Norristown Redipped," (old style.) Buy black plates. Richard Lewis, General Manager. Selling agents, C. S. Trench & Co., 20 Cliff st., New York.

Penn Treaty Iron Works, Marshall Brothers & Co., Beach and Marlborough sts., Philadelphia. Tinning plant added to rolling mill in 1891; first terne plates made in January and first tinplates in April, 1891; 6 sets, 3 for tinplates and 3 for terne plates; weekly capacity, 1,000 boxes of tinplates and 1,000 boxes of terne plates. Brand, "Penn Treaty." Makes black plates. *See Rolling Mills.*

Philadelphia Iron and Tin Plate Works, Hughes & Patterson, Incorporated, Philadelphia. Works, Beach and Vienna sts. Tinning plant added to rolling mill in 1893; first tinplates made in September and first terne plates in December; 6 sets, 3 for tinplates and 3 for terne plates; weekly capacity, 1,650 boxes of tinplates and 650 boxes of terne plates. Brands, for tinplates, "H. & P. Best Bright," "Seminole Bright," "Mohawk Bright," and "Cherokee Bright;" for terne plates, "H. & P. Redipped Roofing," "H. & P. Best Roofing," "Delaware Roofing," "Huron Roofing," and "Oneida Roofing." Buy black plates, but preparing to make them. *See Rolling Mills.*

Philadelphia (The) Tin Plate Company, Nathan Trotter & Co., pro-

prietors, 36 North Front st., Philadelphia. Works at Eighteenth st. and Washington ave. Built in 1893 and first tin and terne plates made January 1, 1894; 3 sets; weekly capacity, 750 boxes of either tin or terne plates. Brands, for tinplates, "Paoli" and "Chelten;" for terne plates, "Madison" and "Penllyn." Buys black plates.

Phillips Tin Plate Works, Phillips Tin Plate Company, 200 Walnut Place, Philadelphia. Works at Tenth st. and Susquehanna ave. Built in 1892; first terne plates made in October and first tinplates in November, 1892; 5 sets, 2 for tinplates and 3 for terne plates; weekly capacity, single turn, 500 boxes of tinplates and 750 boxes of terne plates. Brands, for tinplates, "Century," "Oak," "Walnut," and "Gladys;" for terne plates, "Waldo," "Phillips' Roofing," "Boston," "National," "Columbus," "Republic," and "Zero." Buy black plates. Intend enlarging works. F. R. Phillips, Managing Partner.

Pittsburgh Tin Plate Works, New Kensington, Westmoreland county. Built in 1891-2; first terne plates made in February and first tinplates in October, 1892; 5 sets, one for tinplates and 4 for terne plates; weekly capacity, 200 boxes of tinplates and 600 boxes of terne plates. Buy black plates, but are preparing to erect a four mill plant for making black plates. W. P. Beaver, President; J. B. Strawbridge, Vice-President and General Manager; W. N. Voegtly, Secretary and Treasurer.

Scott (J. B.) & Co., 122-24 Second ave., Pittsburgh. Built in 1891-2 and first terne plates made in January, 1892; one set; product, terne plates; weekly capacity, 600 boxes. Brand, "Scott's Extra Coated." Contemplate adding new sets. Buy black plates.

Taylor (N. and G.) Company's Tinplate Works, N. and G. Taylor Company, 301-305 Branch st., Philadelphia. Works on Tasker st., from Meadow st. to Swanson st. Built in 1891; first terne plates made in April and first tinplates in November, 1891; 20 sets; weekly capacity, double turn, 20,000 boxes of either tin or terne plates. Brands, for tinplates, "Hand-Dipped," "Brilliant," "Royal," "Merion," "Linden," "Almond," "Locust," and "Mint;" for terne plates, "The Genuine Taylor 'Old Style,'" "The Taylor Roofing Tin," "Old Method," "Columbia," "Branch," "Maple," "Willow," "Knoxall," and "Globe." Buy black plates.

United States Iron and Tin Plate Works, United States Iron and Tin Plate Manufacturing Company, Demmler, Allegheny county. Original works erected in 1874; first terne plates made in 1874 and first tinplates in 1876; manufacture stopped in 1878 and resumed in 1890; 11 sets, 8 for tinplates and 3 for terne plates; weekly capacity, double turn, 3,250 boxes of tinplates and 1,250 boxes of terne plates. Brands, for tinplates, "U. S. bright," "Youghiogheny bright," and "Versailles bright;" for terne plates, "U. S. Monongahela," "U. S. Eagle," "U. S. Redipped," and "U. S. Grant." Fuel used, natural

gas. Make black plates. May enlarge works. Selling agents, Ely & Williams, Philadelphia, New York, and Boston. *See Rolling Mills.*

MARYLAND—3.

Baltimore (The) Iron, Steel, and Tinplate Company, Locust Point, Baltimore. Two works: Canton Works built in 1892; first tinplates made in January, 1893; 8 sets, 7 for tinplates and one for terne plates; weekly capacity, 3,000 boxes of tin plates and 450 boxes of terne plates. Locust Point Works built in 1891-2; first tinplates made May 11, 1892; 7 sets; product, tinplates. Makes black plates. *See Rolling Mills.*

Matthai, Ingram & Co., Baltimore. Works, Ohio avenue and Light, Winder, and Byrd sts. New York office, 64 Reade st. Built in 1892 and first tinplates made in April, 1892; 2 sets; weekly capacity, 372 boxes of tinplates, all consumed in the works. Buy black plates.

OHIO—6 COMPLETED, 1 BUILDING, AND 1 PARTLY BUILT.

Ætna-Standard Iron and Steel Company, Bridgeport, Belmont county. Adding a tinplate plant to rolling mill to contain 3 sets, 2 for tinplates and one for terne plates; estimated weekly capacity, 600 boxes of tinplates and 300 boxes of terne plates. Fuel used, gas and coal. Preparing to make black plates. *See Rolling Mills.*

Cincinnati (The) Corrugating Company, Piqua, Miami county. Built in 1891 and first terne plates made August 16, 1891; one set; product, terne plates; weekly capacity, 250 boxes. Brand, "Piqua." Black plates obtained from the Piqua Rolling Mill Company. James Hicks, President; Edward A. Hart, Treasurer; J. G. Battelle, Secretary and General Manager.

Cleveland (The) Tin Plate Company, Cleveland, Cuyahoga county. Office and works, Hoyt ave. and L. S. & M. S. Ry. Built in 1891; first tinplates made October 31, 1891, and first terne plates December 14, 1891; 2 sets, one for tinplates and one for terne plates; weekly capacity, 500 boxes. Brands, "Buckeye" and "C. T. P." Fuel used, petroleum. Buys black plates. D. R. Hanna, President; N. P. Bishop, Vice-President; C. R. Britton, Secretary; E. H. Williams, Treasurer and Manager.

Columbia Tin Plate Company, Piqua, Miami county. Built in 1891-2; first tinplates made in March and first terne plates in June, 1892; 2 sets, one for tinplates and one for terne plates; weekly capacity, 350 boxes of tinplates and 350 boxes of terne plates. Brands, "Miami," "L. & S.," and "Chicago." Buys black plates. Owned by F. R. Slauson and W. K. Leonard.

Irondale Rolling Mills and Tin and Terne Plate Works, Wallace, Banfield & Co. Limited, Irondale, Jefferson county. Branch office, 106 Third ave., Pittsburgh. Tinning plant added to rolling mill in 1891; enlarged in 1892; 6 sets and 4 automatic tinning machines; prod-

uct, tin and terne plates; weekly capacity, 2,800 boxes of tinplates and 200 boxes of terne plates. Make black plates. *See Rolling Mills.*

Record Manufacturing Company, Conneaut, Ashtabula county. Built in 1891; first tinplates made March 1, 1892; 2 sets; product, tinplates; weekly capacity, single turn, 480 boxes. Brands, "Record Charcoal A." and "Record Charcoal A 1." Buys black plates. George J. Record, proprietor.

Simpson (W. T.) & Co., 298 East Pearl st., Cincinnati. Works at Riverside, Hamilton county. Built in 1891 and first terne plates made in November, 1891; one set; product, terne plates; weekly capacity, 300 boxes of 280 lbs. each. Black plates supplied by the Cincinnati Rolling Mill Company.

Youngstown (The) Tin Plate Company, Youngstown, Mahoning county. Began the erection of a tinplate plant at Youngstown in 1893; one set of Morewood pots and an engine partly erected; work suspended. Plant purchased by the Opperman Electric Supply Company.

INDIANA—3 COMPLETED AND 1 BUILDING.

American (The) Tin Plate Company, Elwood, Madison county. Built in 1891-2 and first tin and terne plates made in July, 1892; 10 sets; weekly capacity, 3,500 boxes of tin and terne plates, 14 x 20; also various weights of tinplates, from 135 lbs. to 270 lbs. per box. Brands, for tinplates, "Leeds" and "Elwood" for charcoal and "Elwood" for coke; for terne plates, "Elwood" and "Indiana." Fuel used, natural gas exclusively. Makes black plates, all consumed by the company. Adding 4 sets, to be ready for operation about July 1st, when weekly capacity will be 6,000 boxes. *See Rolling Mills.*

Emlyn (The) Steel and Tin Plate Company, Summitville, Madison county. Building; to contain 16 sets, 12 for tinplates and 4 for terne plates; estimated weekly capacity, 4,000 boxes of 14 x 20 tinplates and 1,000 boxes of 20 x 28 terne plates. Will make black plates. Selling agents, Allerton Clark Company, Chicago. *See Rolling Mills.*

Gas City Works, The Morewood Company, Gas City, Grant county. Built in 1893; first terne plates made in June and first tinplates in December, 1893; 10 sets, 8 for tinplates and 2 large ones for terne plates; weekly capacity, 3,000 boxes of tinplates and 2,000 boxes of terne plates. Fuel used, natural gas. Make black plates. Selling agents, Saunders, Fielding & Bond, Chicago. *See Rolling Mills.*

Indiana (The) Tinplate Manufacturing Company, Daniel G. Koontz, Receiver, Atlanta, Hamilton county. Built in 1892-3; first tinplates made in May and first terne plates in June, 1893; 3 sets, 2 for tinplates and one for terne plates; weekly capacity, 300 boxes of tinplates and 100 boxes of terne plates. Fuel used, natural gas. Buys black plates. E. Stanford, President; Warren G. Koontz, Secretary; M. P. Elliott, Treasurer. Idle.

ILLINOIS—5.

Burn Manufacturing Company, Chicago. Works at Chicago Ridge, Cook county. Built in 1893; first tinplates made in 1893; one set; product, tinplates; weekly capacity, 200 boxes. Fuel used, coal or petroleum. Buys black plates. Walter S. Burn, Manager. *See Stamping Works.*

Chicago (The) Stamping Company, Congress and Green sts., Chicago. Original plant erected in 1865; first tinplates made in January, 1894; 3 sets; product, tinplates; weekly capacity, 600 boxes. Buys black plates, but may erect a black plate mill. Contemplates putting in additional tinning sets. Lee Sturges, President and Treasurer; W. M. Conger, Vice-President and Secretary. *See Stamping Works.*

Chicago (The) Tin Plate Manufacturing Company, 533 Rookery Building, Chicago. Works at Wentworth ave. and Fortieth st. Built in 1893; first tinplates made September 18 and first terne plates September 28, 1893; 3 sets, 2 for tinplates and one for terne plates; weekly capacity, double turn, 700 boxes of 14 x 20 tinplates and 400 boxes of 20 x 28 terne plates. Buys black plates, but may manufacture them. Contemplates putting in additional tinning sets. N. D. Lewis, President; H. C. Myles, Vice-President; J. D. Lewis, Secretary and Treasurer.

Norton Brothers, 813 Masonic Temple Building, Chicago. Works at Maywood, Cook county. Built in 1891; 16 Norton automatic sets. Buy black plates, but intend making them. *See Rolling Mills.*

Western Tin Plate Works, G. W. Shipman, Sr., Belleville, St. Clair county. Built in 1893 and first terne plates made in October, 1893; one set; product, terne plates; weekly capacity, 240 boxes, 20 x 28. Buy black plates.

MICHIGAN—1.

Buhl Stamping Company, Detroit, Wayne county. Tinning plant erected in 1888; product chiefly used by the company in the manufacture of milk can stock, tubular lanterns, etc. Buys black plates. Theo. D. Buhl, President; Charles H. Jacobs, Vice-President and Manager; D. C. Delamater, Secretary; J. M. Thurber, Treasurer; Thomas W. Forster, Superintendent. *See Stamping Works.*

MISSOURI—1.

Granite Iron Rolling Mills, St. Louis Stamping Company, Cass ave. and Second st., St. Louis. Works at Second and Destrehan sts. Tinning plant added to rolling mill in 1890; first tinplates made in November, 1890, and first terne plates in March, 1891; 12 sets, 8 for tinplates and 4 for terne plates; weekly capacity, 3,600 boxes of tinplates and 2,000 boxes of terne plates. Brands, for tinplates, "Granite" and "St. Louis;" for terne plates, "Ex. Fine." Make black plates. *See Rolling Mills. See Stamping Works.*

UNITED STATES.

Number of tinplate works in the United States in April, 1894: 56 completed, 2 building, and 1 partly built.

PROJECTED.

Britton (The) Rolling Mill Company, Hoyt ave. and L. S. & M. S. Ry., Cleveland, Cuyahoga county, Ohio. Contemplates adding a tinplate plant to rolling mill. Makes black plates. *See Rolling Mills in Ohio, (Lake Counties.)*

Elwood Tin Plate Company, Elwood, Madison county, Indiana. Contemplates erecting a plant at Elwood for the manufacture of black plates and of tin and terne plates; to be equipped with 10 tinning sets.

Falcon Tin Plate and Sheet Company, Niles, Trumbull county, Ohio. May erect a tinplate plant; now manufacturing black plates. *See Rolling Mills in Ohio, (Mahoning Valley District.)*

Montpelier Sheet and Tin Plate Company, Montpelier, Blackford county, Indiana. Contemplates erecting a tinplate plant and a black sheet mill at Montpelier. M. Seiberling, President; C. A. Ford, Vice-President and Secretary; J. H. Shoemaker, Treasurer; C. W. Kolbe, General Manager.

Pennsylvania Rolling Mill and Tin Plate Company, Blairsville, Indiana county, Pa. Contemplates erecting a tinplate plant at Blairsville. J. H. Devers, President; M. J. Lewis, Vice-President; R. M. Wilson, Treasurer; Dr. Howell, Secretary.

PURE LEAD-COATED SHEETS.

Ajax (The) Lead Coating Company, 46-52 Richmond st., Philadelphia, Pa. Plant erected in 1889 for coating iron or steel sheets with pure lead; product, flat or corrugated lead-coated sheets up to 30 inches by 12 feet in size; weekly capacity, 20 to 25 tons. Buys iron or steel sheets. J. G. Hendrickson, President; F. J. Clamer, Vice-President; J. R. Neison, Secretary and Treasurer.

STAMPING WORKS.

NOTE.—A number of companies engaged in the manufacture of stamped ware operate tinning pots in connection with their works. When not otherwise stated the works purchase the black plates consumed. A nearly complete list of these companies is given below.

MASSACHUSETTS—2.

Dover Stamping Company, 88-90 North st., Boston. Works at Cambridgeport. Product, tinned stamped ware, etc.

Steel Edge Stamping and Retinning Company, 89 State st., Boston. Works at Millis. Product, stamped hollow ware, retinned ware, etc. *See Tinplate Works.*

CONNECTICUT—6.

Acme (The) Shear Company, Bridgeport. Product, tinned spoons and forks.

Eastern (The) Tinware Company, 103-19 North Third st., Brooklyn, New York. Works at Portland, Conn. Product, retinned stamped ware, etc.

Mix (G. I.) & Co., Yalesville. Product, tinned spoons and forks.

North (The) Haven Manufacturing Company, North Haven. Product, tinned spoons.

Parker (The Charles) Company, Meriden. Product, tinned spoons.

Wallace (R.) & Sons Manufacturing Company, Wallingford. Product, tinned spoons and forks.

NEW YORK—6.

American Stamping Company, 103-19 North Third st., Brooklyn. Product, tinned stamped ware. *See Tinplate Works.*

Central (The) Stamping Company, 25 Cliff st., New York City. Works at Brooklyn. Product, tinned stamped ware. *See New Jersey. See Tinplate Works.*

Iron Clad Manufacturing Company, 22-24 Cliff st., New York City. Works at Brooklyn. Product, tinned stamped ware and sheets and plates. *See Tinplate Works.*

Lalance (The) and Grosjean Manufacturing Company, 19 Cliff st., New York. Works at Woodhaven, Long Island. Product, tinned stamped ware. Makes black plates. *See Rolling Mills in Central Pennsylvania.*

Shepard (Sidney) & Co., Buffalo. Product, tinned stamped ware and milk-can bodies.

Troy (The) Stamping Works, J. M. Warren & Co., Troy. Product, retinned ware, etc.

NEW JERSEY—1.

Central (The) Stamping Company, 25 Cliff st., New York City. Works at Newark, N. J. Product, tinned stamped ware. *See New York. See Tinplate Works.*

PENNSYLVANIA—1.

Dunlap (John) Company, Second and Market sts., Pittsburgh. Product, tinned stamped ware, etc.

MARYLAND—1.

Evans, Jr., (Henry,) Baltimore. Product, tinned stamped ware.

OHIO—4.

Avery (The) Stamping Company, Cleveland. Product, tinned stamped ware, etc.

Cincinnati (The) Tin Plating Company, 219-21 Carr st., Cincinnati. Product, tinned spoons, forks, cast iron, etc.

Eberhard (The) Manufacturing Company, Cleveland. Product, tinned shapes, etc.

Knapp and Pratt Manufacturing Company, Geneva. Product, tinned spoons, etc.

ILLINOIS—3.

Bellaire (The) Stamping Company, Harvey. Product, tinned stamped ware.

Burn Manufacturing Company, Chicago. Works at Chicago Ridge. Product, tinned milk-can stock, tinplates, etc. *See Tinplate Works.*

Chicago (The) Stamping Company, Congress and Green sts., Chicago. Product, tinned stamped ware, tinplates, etc. *See Tinplate Works.*

MICHIGAN—1.

Buhl Stamping Company, Detroit. Product, tinned stamped ware, milk cans, etc. *See Tinplate Works.*

MISSOURI—2.

St. Louis Stamping Company, Cass ave. and Second st., St. Louis. Product, tinned stamped ware, tinplates, etc. Makes black plates. *See Tinplate Works. See Rolling Mills.*

Standard Stamping Company, 918-22 North Second st., St. Louis. Product, tinned stamped ware.

WISCONSIN—2.

Geuder and Paeschke Manufacturing Company, Milwaukee. Product, retinned stamped ware.

Kieckhefer Brothers Company, Milwaukee. Product, tinned stamped ware.

UNITED STATES.

Number of stamping companies in the United States which are described in the foregoing list: 29.

FORGES AND BLOOMARIES.

NOTE.—Under the title of forges are embraced all works which make wrought iron direct from ore. Under the title of bloomaries are embraced all works which hammer blooms from pig or scrap iron for sale. Many plate, sheet, and rod makers have charcoal forge fires in their mills making blooms exclusively for their own use, but such establishments are not included in this list.

FORGES.

NEW YORK—8, ALL LOCATED IN THE LAKE CHAMPLAIN DISTRICT.

Chateaugay Ore and Iron Company, Plattsburgh, Clinton county. Four works: Plattsburgh Iron Works, built at Plattsburgh in 1879 as a rolling mill; converted into a forge in 1883; 4 fires and one hammer. Chateaugay Lake Iron Works, built at Chateaugay Lake, Franklin county, in 1875; 16 fires and 3 hammers. Clayburgh Iron Works, built at Clayburgh, Clinton county, in 1844; rebuilt and enlarged in 1883; 7 fires and one hammer. Russia Iron Works, built at Moffittsville, Clinton county, in 1844; enlarged in 1883; 7 fires and one hammer. All run by water-power; product, charcoal blooms for general purposes, made from Chateaugay ore; total annual capacity, 10,800 gross tons. *See Charcoal Furnaces.*

Sable Iron Works, J. and J. Rogers 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; water-power; product, charcoal blooms for best tool steel; total annual capacity, 7,000 gross tons.

NEW JERSEY—1.

Steam Forge, P. W. Levering, lessee, Jersey City. Forge at Rockaway, Morris county. Built in 1878; 2 forge fires, one hammer, and one direct process furnace for making wrought iron direct from the ore; experiments commenced in 1891. Owned by B. B. Oram.

NORTH CAROLINA—1.

Helton Forge, W. J. Pasley, Crumpler, Ashe county. Built in 1859; 2 fires and one hammer; product, bar iron; annual capacity, 70 gross tons.

TENNESSEE—1.

Harriman (The) Wrought Iron Company, 76 Montgomery st., Jersey City, N. J. Experimental plant built at Harriman, Roane county, Tenn., in 1891 for the production of wrought iron direct from the

ore by the Neville process; not now in operation. E. K. Seguine, President; A. A. Hopkins, Vice-President; P. W. Levering, Secretary and Treasurer.

BLOOMARIES.

NEW JERSEY—2.

Paterson Bloomary, Isaac P. Oberg, Paterson, Passaic county. Built in 1878; 4 fires and one hammer; product, cold blast charcoal blooms and charcoal iron for boiler plate and wire, made from scrap iron; annual capacity, double turn, 2,250 gross tons. Idle.

Port Oram Forge, Port Oram Manufacturing Company, Port Oram, Morris county. Built in 1878; started in August, 1878; 8 forge fires, one run-out fire, and 2 hammers; product, charcoal blooms for all purposes, made from scrap and pig iron; annual capacity, double turn, 4,000 gross tons. Robert F. Oram, President; T. W. Oram, Secretary; Edward S. Hance, Treasurer and Superintendent.

PENNSYLVANIA—10.

Cove Forge, Wm. McIlvain & Sons, Reading. Works at Duncannon, Perry county. First put in operation in 1864; 5 fires, one refinery, and one hammer; blast operated by water-power and hammer by steam-power; product, charcoal blooms for general purposes, made from pig iron; annual capacity, 1,000 gross tons. Idle and for sale. *See Rolling Mills in Eastern Pennsylvania.*

Eagle Forge, Curtins & Co., Roland, Centre county. Telegraph address, Bellefonte. Built in 1809; 8 fires and one hammer; water-power; product, blooms for general purposes, made from charcoal pig iron; specialties, blooms for boiler plate and rivet and screw rods; annual capacity, 1,800 gross tons. *See Eagle (charcoal) Furnace. See Eagle Iron Works, Central Pennsylvania Rolling Mills.*

French Creek Forge, Esther Kaufman, St. Peter's P. O., Chester county. Built in 1872; 4 fires and one hammer; water and steam power; product, charcoal blooms, made from scrap iron; annual capacity, 800 gross tons. Thomas Wanner, Attorney.

Howard Iron Works, Jenkins Brothers & Lingle, Bellefonte. Works at Howard, Centre county. Built in 1879; 10 fires, one 6-tuyere run-out, and one steam hammer; steam and water power; product, charcoal blooms; annual capacity, 2,700 gross tons. *See Howard Rolling Mills, Central Pennsylvania.*

Laurel Forge, South Mountain Mining and Iron Company, Pine Grove Furnace, Cumberland county. Built in 1830; 6 fires, one double run-out, and one hammer; water-power; product, charcoal blooms, made from Pine Grove pig iron; annual capacity, 1,800 gross tons. Joseph Fuller, Superintendent. *See Pine Grove (charcoal) Furnace.*

Lucknow Forge, John W. Reily, Fort Hunter P. O., Dauphin county.

Forge at Lucknow Station, P. R. R., 4 miles west of Harrisburg; 9 forge fires, one run-out, and one steam hammer; product, blooms for boiler plate, sheet iron, wire, tube, skelp, tinplates, etc., made from pig and scrap iron; annual capacity, 5,400 gross tons.

Milesburg Iron Works, McCoy & Linn, Milesburg, Centre county. Built in 1830; 7 fires and one hammer; water-power; product, charcoal blooms for boiler plate and best wire, made from pig iron; annual capacity, 2,000 gross tons. Wire used for flat and round head wood-screws and for best grade of carriage bolts. *See Hecla (charcoal) Furnace. See Milesburg Iron Works, Central Pennsylvania Rolling Mills.*

Mont Alto Iron Works, Mont Alto Iron Company, David Knepper, Receiver, Mont Alto, Franklin county. Telegraph in office at Mont Alto connecting with Western Union office at Chambersburg. Built in 1866: 8 Wiestling's patent improved Lancashire hearths and a double run-out fire; one Nasmyth steam hammer and one self-acting steam helve hammer; product, charcoal blooms for all purposes requiring best quality; annual capacity, 3,600 gross tons. Brand, "Mont Alto." General office at the works; all sales made by David Knepper, Receiver. *See Mont Alto (charcoal) Furnace.*

Spring City Bloom Works, Spring City, Chester county. Built in 1884; 6 forge fires and one hammer; product, blooms for plate and sheet iron, made from scrap iron; daily capacity, double turn, 12 gross tons. S. H. Egolf, President; W. W. Emery, Secretary; Henry Francis, Treasurer; H. S. Hallman, Manager.

Springton Forge, Wallace, Chester county. Built in 1790 and rebuilt in 1881; 4 forge fires, one run-out, and one steam hammer; water-power blast; product, charcoal blooms; annual capacity, 2,000 gross tons. Owned by Jerome Keeley, 421 Chestnut st., Philadelphia. Idle and for sale or rent.

MARYLAND—1.

Principio Forge, Principio Forge Company, lessee, Principio Furnace P. O., Cecil county. Telegraph address, Perryville. Built in 1883–4; 12 fires, one heating furnace, and one hammer; coke run-out attached; steam-power used throughout; product, charcoal blooms for boiler tubes, used by the Tyler Tube and Pipe Company, of Washington, Pa.; annual capacity, double turn, 8,000 gross tons. N. E. Whitaker, President. Owned by the Whitaker Iron Company, Wheeling, W. Va.

ALABAMA—1.

Anniston Bloomary, Cherokee Iron Company, Cedartown, Georgia. Works at Anniston, Calhoun county. Built in 1887; 5 forge fires and one hammer; steam-power; product, blooms, made from pig iron. Idle. *See Furnaces in Georgia, (Cherokee Iron Works.)*

Number of iron-ore forges in the United States, 11; number of pig and scrap iron bloomaries, 14: total, 25.

RECENTLY ABANDONED FORGES AND BLOOMARIES.

NOTE.—A list of forges and bloomaries which have been long abandoned will be found in the edition of the Directory for 1892.

VERMONT.

East Middlebury Iron Works, East Middlebury, Addison county. Rebuilt in 1880. Idle since 1885.

NEW YORK.

Horicon Iron Company's Forge, Ticonderoga, Essex county. Built in 1865; product, charcoal blooms for steel purposes. Idle since 1883. Owned by H. G. Burleigh & Brother.

Keene Forge, W. F. & S. H. Weston, Keene, Essex county. Built in 1880; abandoned.

Payne's Forge, D. F. Payne, Wadham's Mills, Essex county. Built in 1873; abandoned.

Peru Steel Ore Company Limited, Clintonville, Clinton county. Built in 1837; abandoned.

Peterburgh Iron Works, Peter Tremblay, Clayburgh, Clinton county. Forge at Peterburgh. Product, charcoal blooms for steel purposes.

Wilmington Forge, W. F. & S. H. Weston, Wilmington, Essex county. Rebuilt in 1874; abandoned.

Wood, (William W.,) Wood's Falls, Clinton county. Built in 1863 and rebuilt in 1872.

NEW JERSEY.

Bloomingdale Forge, Ryerson Estate, Bloomingdale, Passaic county. Built in 1800 and rebuilt in 1841; product, scrap blooms.

King Brothers, Drakesville, Morris county. Forge at Shippingsport. Built about 1865; product, scrap blooms.

Rockaway Forge, Rockaway, Morris county. Used direct process.

Rockaway Forge, T. H. Hoagland, Rockaway, Morris county. Built about 1800; product, blooms from scrap iron; abandoned.

Warren Forge, American Sheet Iron Company, Phillipsburg, Warren county. Built in 1875; partly dismantled.

PENNSYLVANIA.

Boiling Springs Iron Company, Boiling Springs, Cumberland county. Built in 1760 and rebuilt in 1860; product, charcoal blooms made from pig iron; dismantled.

Perry Forge, Seidel Brothers, Marysville, Perry county. Built in 1862; partly destroyed by a flood in 1889 and abandoned.

VIRGINIA.

Eagle Forge, Crockett Depot, Wythe county. Built in 1882; product, bar iron from pig iron; abandoned.

Pine Forge, Mount Jackson, Shenandoah county. Rebuilt in 1874; abandoned.

TENNESSEE.

Little Doe Forge, on Little Doe creek, 13 miles west of Mountain City, Johnson county.

Morrison's Forge, on Laurel creek, 7 miles from Mountain City, Johnson county. Built in 1879.

Mud Splatter Forge, Johnson county. Built in 1867.

NORTH CAROLINA.

Roan Mountain Steel and Iron Company, Magnetic City, Mitchell county. Forge built in 1875; dismantled.

Tom's Creek Forge, on Tom's creek, Surry county. Built in 1862.

WIRE-ROD AND WIRE MILLS.

NOTE.—The works which do not draw wire but which roll rods are indicated by the word "rods" placed after their names; all others draw wire. For a more complete description of the rod mills see the list of rolling mills. Some of the wire works in this list make copper and brass wire as well as iron and steel wire. The ton used in giving capacities is the gross ton of 2,240 pounds.

NEW HAMPSHIRE—1.

Haley Manufacturing Company, Concord. Annual capacity, 550 tons of wire.

MASSACHUSETTS—12.

Gurney, (D. B.,) Whitman. Annual capacity, 700 tons of wire.

Lamb (Horace) & Co., Northampton. Annual capacity, from 275 to 300 tons of wire.

Perkins, (Henry,) Bridgewater. Annual capacity, 1,350 tons of wire.

Plymouth (The) Mills, Plymouth.

Prentiss (G. W.) & Co., Holyoke.

Prouty Wire Company, Charlton City.

Spencer Wire Company, Spencer. Annual capacity, 1,500 tons of wire.

Taunton Tack Company, Atlas Tack Corporation, 508 Sears Building, Boston. Works at Taunton. Annual capacity, 1,000 tons of wire.

Washburn and Moen Manufacturing Company, Worcester. Two works. Rods and wire; annual capacity, 90,000 tons. *See Illinois.*

Worcester Wire Company, Worcester. Annual capacity, 20,000 tons of wire.

Wright and Colton Wire Cloth Company, Worcester. Annual capacity, 2,000 tons of wire.

RHODE ISLAND—1.

American Screw Company, Providence.

CONNECTICUT—5.

Ansonia (The) Brass and Copper Company, Ansonia. Draws iron and steel wire but principally brass and copper wire.

Gilbert and Bennett Manufacturing Company, Georgetown. Annual capacity, 1,800 tons of wire.

New Haven Rolling Mill Company, New Haven. Rods. Annual capacity, 4,500 tons.

New Haven Wire Manufacturing Company, New Haven. Annual capacity, 11,000 tons of wire.

Yale Steel Company, New Haven. Works at Westville.

NEW YORK—6.

Brooklyn Wire Nail Company, 29 Broadway, New York City. Works at Brooklyn. Annual capacity, 7,000 tons of wire.

Griswold, (J. Wool,) Troy. Annual capacity, 3,000 tons of wire.

Kilmer Manufacturing Company, Newburgh. Rods and wire, all consumed by the company in the manufacture of barb wire, fence wire, and bale ties.

Syracuse Steel Wire Company, Syracuse.

Wickwire Brothers, Cortland. Annual capacity, 1,000 tons of wire.

Wolff (R. H.) & Co. Limited, One-hundred-and-seventeenth and One-hundred-and-eighteenth sts. and Harlem river, New York City.

NEW JERSEY—5.

Benjamin (The) Atha and Illingworth Company, Newark. Works at Harrison. Rods. Annual capacity, 3,000 tons.

Roebling's (John A.) Sons Company, Trenton. Rods and wire. Annual capacity, 18,000 tons of rods and 32,000 tons of wire.

Stewart Hartshorn Company, East Newark. Draws wire for its own consumption in the manufacture of shade rollers. Annual capacity, 500 tons.

Trenton (The) Iron Company, Trenton. Rods and wire. Annual capacity, 16,000 tons of rods and 20,000 tons of wire.

West Bergen Steel Works, Spaulding, Jennings & Co., Jersey City. Rods and wire. Annual capacity, 2,000 tons of wire. Rods all consumed by the firm in their own works.

PENNSYLVANIA—13.

Beaver Fall Mills, The Carnegie Steel Company, Limited, Beaver Falls. General office and post-office address, 42–48 Fifth ave., Pittsburgh. Rods and wire. Annual capacity, 65,000 tons of rods.

Cambria Iron Company, Johnstown. Philadelphia office, 218 South Fourth st. Rods. Annual capacity, 27,000 tons. Building a wire drawing plant.

Consolidated Steel and Wire Company, Rookery Building, Chicago. Two works: Allentown Works, at Allentown, Pa.; rods and wire; annual capacity, 65,000 tons of wire. Pittsburgh Works, at Rankin Station, Allegheny county; rods and wire; annual capacity, 70,000 tons of wire. *See Illinois and Missouri.*

Hazard (The) Manufacturing Company, Wilkesbarre. Draws wire for its own use in the manufacture of wire rope.

Kidd Steel Wire Company Limited, Sharpsburg. Polished drill rods and needle wire. Annual capacity, 300 tons.

Milesburg Iron Works, McCoy & Linn, Milesburg. Rods and wire. Annual capacity, 1,350 tons of rods.

New Castle Wire Nail Company, New Castle. Rods and wire. Annual capacity, 45,000 tons of rods and 45,000 tons of wire.

Oliver and Roberts Wire Company, Pittsburgh. Rods and wire. Annual capacity, 70,000 tons of rods and 75,000 tons of wire.

Philadelphia Wire Works, Thomas Hamilton's Sons, 1340-52 Vienna st., Philadelphia. Annual capacity, 1,400 tons of wire.

Philips, Townsend & Co., North Penn Junction, Philadelphia. Annual capacity, 9,000 tons of wire, all consumed in nail works.

Pittsburgh Wire Company, 33-43 Seventh ave., Pittsburgh. Works at Braddock. Rods and wire. Annual capacity, 40,000 tons of wire.

Stewart (The) Wire Company, Easton. Works at South Easton. Annual capacity, 20,000 tons of wire.

WEST VIRGINIA—1.

Columbia Barb Wire and Nail Works, Kanawha City. Not yet in operation.

OHIO—6.

American Wire Company, Cleveland. Rods and wire. Annual capacity, 90,000 tons of rods and 45,000 tons of wire.

Baackes Wire Nail Company, Cleveland. Rods and wire. Annual capacity, 36,000 tons of rods and 36,000 tons of wire.

Cincinnati Barbed Wire Fence Company, Cincinnati. Draws wire.

Cleveland Rolling Mill Company, Cleveland. Rods and wire. Annual capacity, 100,000 tons of rods and 70,000 tons of wire.

H. P. Nail Company, Cleveland. Rods and wire. Annual capacity, 50,000 tons of rods or wire, used by the company in making nails.

New (The) Philadelphia Wire and Nail Company, New Philadelphia. Annual capacity, 16,000 tons of wire.

INDIANA—1.

American (The) Wire Nail Company, Anderson. Rods and wire. Annual capacity, 40,000 tons of wire.

ILLINOIS—10.

Ashley Wire Company, George W. Bush, Receiver, Joliet. Annual capacity, 15,000 tons of wire.

Chicago Wire and Spring Company, corner Lake and LaSalle sts., Chicago.

Clark and Windsor Wire and Spring Company, Joliet. Annual capacity, 7,500 tons of wire.

Consolidated Steel and Wire Company, Rookery Building, Chicago. Two works: Joliet Works, at Joliet; annual capacity, 75,000 tons of wire. Lockport Works, at Lockport; annual capacity, 30,000 tons of wire. *See Pennsylvania and Missouri.*

Garden City Wire and Spring Company, 28 Chester st., Chicago. Annual capacity, 30,000 tons of wire.

Illinois Steel Company, Rookery Building, Chicago. Works at Joliet. Rods. Annual capacity, 54,000 tons.

Rockdale Works, Joliet Enterprise Company, George H. Munroe, Receiver, Joliet. Works at Rockdale, near Joliet. Annual capacity, 45,000 tons of wire.

Superior Barbed Wire Company, De Kalb. Annual capacity, 25,000 tons of wire.

Waukegan Works, Washburn and Moen Manufacturing Company, Waukegan. Main office, Worcester, Mass.; Chicago office, 107-109 Lake st. Wire rods and wire. Annual capacity, 90,000 tons. *See Massachusetts.*

MISSOURI—1.

St. Louis Wire Mill, Consolidated Steel and Wire Company, Rookery Building, Chicago. Works at St. Louis. Annual capacity, 30,000 tons of wire. *See Pennsylvania and Illinois.*

KANSAS—1.

Consolidated Barb Wire Company, Lawrence. Annual capacity, 17,000 tons of wire.

IOWA—1.

McCosh Iron and Steel Company, C. W. Rand, Receiver, Burlington.

WASHINGTON—2.

Puget Sound Wire Nail and Steel Company, Everett. Annual capacity, 12,500 tons of wire.

Townsend Nail Works, The Port Townsend Steel Wire and Nail Company, Port Townsend. Annual capacity, 10,000 tons of wire.

CALIFORNIA—2.

California Wire Works, 509-11 Market st., San Francisco. Annual capacity, 9,000 tons of wire.

Pacific Iron and Nail Company, 9 Beale st., San Francisco.

UNITED STATES.

Number of works in the United States having wire-rod rolling machinery: 23.

Number of works having wire-drawing plants: 64 completed and 1 building.

WIRE-NAIL WORKS.

NOTE.—Some of the wire-nail works purchase the wire which they use, but a number of establishments have rod mills and roll rods and draw wire for their own use and for sale. The works which roll rods are fully described in the list of rolling mills. The capacity when given has been furnished to us by the respective manufacturers.

MASSACHUSETTS—8.

Baker (Charles F.) & Co., 50 Lincoln st., Boston. Sizes, 15, 16, and 17 gauges. Number of nail machines, 54.

Bond (The) Nail Company, Raynham. Double-pointed wire nails. Sizes, from ½ x ½ inch to 1½ x 1½ inches.

Gurney, (D. B.,) Whitman. Draws wire and makes wire nails. Sizes, up to 20-penny. Number of nail machines, 17. Annual capacity, 15,000 kegs.

Perkins, (Henry,) Bridgewater. Draws wire and makes wire nails. Sizes, from ⅛ to 9 inches. Number of nail machines, 18. Annual capacity, 5,000 kegs.

Plymouth (The) Mills, Plymouth. Draw wire and make wire nails.

Taunton Tack Company, Atlas Tack Corporation, 508 Sears Building, Boston. Works at Taunton. Draws wire and makes wire nails. Sizes from ¼ inch to 4 inches. Number of nail machines, 90. Annual capacity, 8,000 kegs.

Taunton Wire Nail Company, Taunton. Special nails. Number of nail machines, 13. Annual capacity, 10,000 kegs.

Wire (The) Goods Company, Worcester. Makes all sizes of iron, brass, and copper nails. Number of nail machines, 100. Annual capacity, 60,000 kegs.

RHODE ISLAND—1.

American Screw Company, Providence. Draws wire and makes all sizes of wire nails. Number of nail machines, 51.

CONNECTICUT—3.

Birmingham Wire Nail Company, Birmingham. R. S. Gardner, Receiver. Idle.

Excelsior (The) Nail Company, Seymour. Number of nail machines, 25. Idle.

Russell and Erwin Manufacturing Company, New Britain. Office, 45 Chambers st., New York City.

NEW YORK—5.

Brooklyn Wire Nail Company, 29 Broadway, New York City. Works at Brooklyn. Draws wire and makes wire nails up to 60-penny, (6 inches.) Number of nail machines, 70. Annual capacity, 130,000 kegs.

Griswold, (J. Wool,) Troy. Draws wire and can make all sizes of wire nails up to 8-inch spikes. Number of nail machines, 19. Annual capacity, 20,000 kegs. Wire-nail machines idle.

Hassall, (John,) 63 Elizabeth st., New York City. Works at Clay and Oakland sts., Brooklyn. Sizes, from the smallest up to 4 inches. Specialty, escutcheon pins, made of brass, copper, and steel. Number of nail machines, 50. Annual capacity, 5,000 kegs.

Kilmer Manufacturing Company, Newburgh. Rolls rods, draws wire, and makes wire nails of all sizes up to 40-penny. Number of nail machines, 25. Daily capacity, 100 kegs.

Titchener (E. H.) & Co., Binghamton. Number of nail machines, 7.

NEW JERSEY—1.

Roebling's (John A.) Sons Company, Trenton. Rolls rods, draws wire, and makes all sizes of wire nails. Number of nail machines, 22. Annual capacity, 12,000 kegs.

PENNSYLVANIA—9 COMPLETED AND 1 PARTLY BUILT.

Beaver Falls Mills, The Carnegie Steel Company, Limited, Beaver Falls. General office and post-office address, 42–48 Fifth ave., Pittsburgh. Roll rods, draw wire, and make wire nails. Number of nail machines, 142. Annual capacity, 850,000 kegs.

Consolidated Steel and Wire Company, Rookery Building, Chicago. Two works: Allentown Works, at Allentown, Pa; roll rods, draw wire, and make wire nails; annual capacity, 400,000 kegs. Pittsburgh Works, at Rankin Station, Allegheny county; roll rods, draw wire, and make wire nails; annual capacity, 600,000 kegs. *See Illinois and Missouri.*

New Castle Wire Nail Company, New Castle. Rolls rods, draws wire, and makes wire nails. Number of nail machines, 222. Annual capacity, 1,000,000 kegs.

Oliver and Roberts Wire Company, Pittsburgh. Rolls rods, draws wire, and makes all sizes of wire nails. Number of nail machines, 140. Annual capacity, 700,000 kegs.

Philips, Townsend & Co., North Penn Junction, Philadelphia. Draw wire and make all kinds of wire nails. Sizes, from 60-penny down to the smallest. Number of nail machines, 96. Annual capacity, 200,000 kegs.

Pittsburgh Wire Company, 33–43 Seventh ave., Pittsburgh. Works at Braddock. Rolls rods, draws wire, and makes wire nails. Annual capacity, 15,000 kegs.

South Easton Wire Nail Company, Easton. Office, 105 Chambers st., New York City. Number of nail machines, 7. Idle.

Stewart (The) Wire Company, Easton. Draws wire. Number of nail machines, 7. Nail machines idle.

Taylor (The) Wire Nail Company, New Stanton. Wire-nail plant partly built.

VIRGINIA—1.

Maryland Tack Company, Front Royal. Number of nail machines, 6. Not now operating nail machines.

WEST VIRGINIA—1.

Columbia Barb Wire and Nail Works, Kanawha City. Not yet in operation. Will draw wire and make all sizes of wire nails.

OHIO—7.

Baackes Wire Nail Company, Cleveland. Rolls rods, draws wire, and makes wire nails. Number of nail machines, 118. Annual capacity, 600,000 kegs.

Cincinnati Barbed Wire Fence Company, Fairmount Station, Cincinnati. Draws wire and makes all sizes of wire nails. Number of nail machines, 50.

Frank's Wire Nail Company, 35 West Mound st., Columbus. Idle, and machinery for sale.

H. P. Nail Company, Cleveland. Rolls rods, draws wire, and makes wire nails. Number of nail machines, 319. Annual capacity, 1,000,000 kegs.

New (The) Philadelphia Wire and Nail Company, New Philadelphia. Draws wire and makes all sizes of wire nails. Number of nail machines, 60. Annual capacity, 300,000 kegs.

Salem (The) Wire Nail Company, Salem. Two works, one at Salem and one at Findlay. Salem Works, 106 nail machines; annual capacity, 500,000 kegs. Findlay Works, 100 nail machines; annual capacity, 500,000 kegs.

INDIANA—3.

American (The) Wire Nail Company, Anderson. Rolls rods, draws wire, and makes all sizes of wire nails. Number of nail machines, 150. Annual capacity, 600,000 kegs.

Arrow (The) Company, Cincinnati, Ohio. Works at Anderson. All sizes of standard and list nails. Number of nail machines, 75. Annual capacity, 200,000 kegs.

Indiana (The) Wire Fence Company, Crawfordsville. Standard sizes. Number of nail machines, 8. Annual capacity, 10,000 kegs.

ILLINOIS—6.

Ashley Wire Company, George W. Bush, Receiver, Joliet. Draws wire

and makes wire nails. Sizes, from 3-penny to 10-penny. Number of nail machines, 5.

Illinois (The) Nail Company, No. 3 Dix st., Chicago.

Joliet Works, Consolidated Steel and Wire Company, Rookery Building, Chicago. Works at Joliet. Draw wire and make standard sizes of wire nails only. Annual capacity, 600,000 kegs. *See Pennsylvania and Missouri.*

Rockdale Works, Joliet Enterprise Company, George H. Munroe, Receiver, Joliet. Works at Rockdale, near Joliet. Draw wire and make all sizes of wire nails. Number of nail machines, 35. Annual capacity, 70,000 kegs. Idle.

Superior Barbed Wire Company, De Kalb. Draws wire and makes all sizes of wire nails. Number of nail machines, 100. Annual capacity, 200,000 kegs.

Western Nail Company Limited, 180 Lake st., Chicago. Sizes, from smallest up to 60-penny. Number of nail machines, 14. Daily capacity, single turn, 200 kegs. Idle.

WISCONSIN—2.

Janesville Barb Wire Company, Janesville. Sizes, from smallest to 60-penny. Number of nail machines, 8. Annual capacity, 25,000 kegs.

Milwaukee Tack and Nail Company, Milwaukee. Manufactures small steel wire nails and tacks.

MISSOURI—1.

St. Louis Wire Mill, Consolidated Steel and Wire Company, Rookery Building, Chicago. Works at St. Louis. Draws wire and makes all sizes of wire nails. Annual capacity, 400,000 kegs. *See Pennsylvania and Illinois.*

IOWA—1.

McCosh Iron and Steel Company, C. W. Rand, Receiver, Burlington. Draws wire and makes all sizes of wire nails. Number of nail machines, 46.

KANSAS—1.

Consolidated Barb Wire Company, Lawrence. Draws wire and makes wire nails. Number of nail machines, 20. Annual capacity, 100,000 kegs.

WASHINGTON—2.

Puget Sound Wire Nail and Steel Company, Everett. Draws wire and makes all sizes of wire nails up to spikes 12 inches long. Number of nail machines, 56. Annual capacity, 250,000 kegs.

Townsend Nail Works, The Port Townsend Steel Wire and Nail Company, Port Townsend. Draw wire and make wire nails. Sizes, from $\frac{3}{16}$ to 13 inches. Number of nail machines, 40. Annual capacity, 200,000 kegs.

CALIFORNIA—2.

California Wire Works, 509-11 Market st., San Francisco. Draw wire and make wire nails from 2-penny to 12-inch spikes. Number of nail machines, 32. Annual capacity, 120,000 kegs.

Pacific Iron and Nail Company, 9 Beale st., San Francisco. Works at Oakland. Draws wire and makes wire nails. Number of nail machines, 22.

UNITED STATES.

Total number of wire-nail works in the United States: 54 completed and 1 partly built.

BRIDGEBUILDING WORKS.

NOTE.—This list does not include contractors or railroad companies which build iron and steel bridges, but only works operating iron and steel bridgebuilding plants. Unless otherwise stated all the companies named build highway and railroad bridges. Many of them also construct all kinds of iron and steel buildings. The capacity when given has been furnished by the respective manufacturers and is in gross tons of 2,240 pounds.

VERMONT—1.

Vermont (The) Construction Company, St. Albans. Annual capacity, 2,000 tons.

MASSACHUSETTS—2.

Boston Bridge Works, D. H. Andrews, proprietor, 70 Kilby st., Boston. Works at Cambridge. Annual capacity, 10,000 tons.

Hawkins' (R. F.) Iron Works, Springfield. Annual capacity, 4,000 tons.

CONNECTICUT—1.

Berlin (The) Iron Bridge Company, East Berlin. Annual capacity, 10,000 tons.

NEW YORK—10.

Buffalo Bridge and Iron Works, Buffalo. Annual capacity, 6,000 tons.

Elmira Bridge Company Limited, Elmira. Annual capacity, 15,000 tons.

Groton Bridge and Manufacturing Company, Groton. Annual capacity, 10,000 tons.

Hilton Bridge Construction Company, Commercial Bank Building, Albany. Annual capacity, 5,000 tons.

Horseheads Bridge Company, Horseheads. Highway bridges only. Annual capacity, 1,500 tons.

Kellogg Iron Bridge Works, Builders Exchange, Buffalo. Weekly capacity, 500 tons.

Owego Bridge Company, Owego. Highway bridges only.

Post & McCord, 289 Fourth ave., New York. Works at Greenpoint, Brooklyn. Annual capacity, 9,000 tons.

Rochester Bridge and Iron Works, John F. Alden, proprietor, Rochester. Annual capacity, 12,000 tons.

Shepard Bridge Works, Havana. Highway bridges only.

NEW JERSEY—3.

Passaic Rolling Mills, Passaic Rolling Mill Company, Paterson. Annual capacity, 15,000 tons.

Roebling's (John A.) Sons Company, Trenton. Suspension bridges only.

Trenton Iron Works, New Jersey Steel and Iron Company, Trenton. Annual capacity, 24,000 tons.

PENNSYLVANIA—11.

Keystone Bridge Works, The Carnegie Steel Company, Limited, 42–48 Fifth ave., Pittsburgh. Works on Fifty-first st. Annual capacity, 17,000 to 20,000 tons. (Formerly owned by the Keystone Bridge Company.)

Pencoyd Bridge and Construction Company, A. & P. Roberts & Co., 261 South Fourth st., Philadelphia. Works in Montgomery county, opposite Manayunk. Annual capacity, 40,000 tons.

Penn Bridge Works, Penn Bridge Company, Beaver Falls. Annual capacity, 5,000 tons.

Pennsylvania Steel Company, 208 South Fourth st., Philadelphia. Works at Steelton. Annual capacity, 12,000 tons.

Philadelphia (The) Bridge Works, Cofrode & Saylor, (incorporated,) 257 South Fourth st., Philadelphia. Works at Pottstown. Annual capacity, 18,000 to 20,000 tons.

Phœnix (The) Bridge Works, The Phœnix Bridge Company, 410 Walnut st., Philadelphia. Works at Phœnixville. Annual capacity, 50,000 tons.

Pittsburgh Bridge Company, Pittsburgh. Annual capacity, 10,000 tons.

Pottsville Bridge Works, Pottsville Iron and Steel Company, Pottsville. Philadelphia office, 226 South Fourth st. Annual capacity, 7,500 tons.

Schultz Bridge and Iron Company, McKee's Rocks. Annual capacity, 10,000 tons.

Shiffler Bridge Company, Forty-eighth st. and A. V. Ry., Pittsburgh. Annual capacity, 10,000 tons.

Union Bridge Company, Athens. New York office, 1 Broadway; Buffalo office, 24 Hayen Building. Annual capacity, 15,000 to 18,000 tons.

DELAWARE—1.

Edge Moor Bridge Works, Edge Moor, (P. O. address, Wilmington.) Annual capacity, 30,000 tons.

VIRGINIA—1.

American Bridge and Iron Company, Roanoke. Annual capacity, 3,000 tons.

WEST VIRGINIA—1.

Vulcan Road Machine Company, Charles Town. Specialty, "Lane" highway bridges.

KENTUCKY—1.

Louisville Bridge and Iron Company, cor. Oldham and Eleventh sts., Louisville. Annual capacity, 7,500 tons.

TEXAS—1 BUILDING.

Southwestern Bridge and Iron Company, Fort Worth. Plant almost completed. Will erect railroad and highway bridges.

OHIO—14.

Brackett (The) Bridge Company, 84-85 Smith Building, Cincinnati. Works at Glendale. Annual capacity, 10,000 tons.

Buchanan (The) Bridge Company, Bellefontaine. Works at South Bellefontaine. Highway bridges.

Canton (The) Bridge Company, Canton. Annual capacity, 3,500 tons.

Champion Bridge Company, Wilmington. Highway bridges only.

King Bridge Company, Cleveland. Annual capacity, 18,000 tons.

Massillon (The) Bridge Company, Massillon. Annual capacity, 6,000 tons.

Mount Vernon (The) Bridge Company, Moun Vernon. W. H. Pratt, Receiver. Annual capacity, 9,000 tons.

New (The) Columbus Bridge Company, Columbus. Annual capacity, 3,600 tons.

Stacey Manufacturing Company, Cincinnati.

Standard Boiler and Bridge Company, Bellaire. Light bridges.

Toledo (The) Bridge Company, Toledo. Annual capacity, 6,000 tons.

Variety (The) Iron Works Company, Cleveland. Annual capacity, 3,000 to 4,000 tons.

Wrought Iron Bridge Company, Canton. Works at South Canton, on line of C., C., and S. R. R. Annual capacity, 10,000 tons.

Youngstown (The) Bridge Company, Youngstown. Annual capacity, 6,000 tons.

INDIANA—2.

Indiana Bridge Company, Muncie. Annual capacity, 3,000 tons.

La Fayette (The) Bridge Company, La Fayette.

ILLINOIS—5.

American Bridge Works, Fortieth st. and Stewart ave., Chicago. Annual capacity, 30,000 tons.

Chicago Bridge and Iron Company, Washington Heights, Chicago. Annual capacity, 15,000 tons.

Kenwood Bridge Company, 617 First National Bank Building, Chicago. Works at Grand Crossing. Annual capacity, 2,400 tons.

Lane Bridge and Iron Works, P. E. Lane, proprietor, Chicago. Highway bridges. Annual capacity, 6,000 tons.

Lassig Bridge and Iron Works, 97 Dearborn st., Chicago. Works, cor. Clybourn and Wrightwood avenues. Railroad bridges only. Annual capacity, 15,000 tons.

MICHIGAN—2.

Detroit Bridge and Iron Works, Detroit. Annual capacity, 12,000 tons.

Jackson Bridge and Iron Company, 9 Allen Bennett Block, Jackson. Works at Sabin and Sheldon sts. Annual capacity, 2,000 tons.

WISCONSIN—2.

Milwaukee Bridge and Iron Works, Milwaukee. Annual capacity, 4,000 tons.

Wisconsin Bridge and Iron Company, North Milwaukee. Annual capacity, 3,000 tons.

MINNESOTA—1.

Gillette-Herzog (The) Manufacturing Company, Second st. and Seventh ave., S. E., Minneapolis. Annual capacity, 6,000 to 7,000 tons.

IOWA—2.

Clinton Bridge and Iron Works, Clinton. Highway bridges. Annual capacity, 5,000 to 6,000 tons.

Fair, Williams & Co., Ottumwa. Highway bridges. Annual capacity, 1,000 tons.

MISSOURI—2.

St. Joseph Bridge and Iron Company, St. Joseph. Annual capacity, 1,800 tons.

Stupp Brothers Bridge and Iron Company, Seventh and Shenandoah sts., St. Louis. Highway bridges a specialty. Annual capacity, 10,000 tons.

KANSAS—1.

Missouri Valley Bridge and Iron Works, Leavenworth. Annual capacity, 20,000 tons.

CALIFORNIA—3.

Judson Manufacturing Company, 14-16 Fremont st., San Francisco. Works at Oakland.

Pacific Rolling Mill Company, 202 Market st., San Francisco. Works at Potrero. Annual capacity, 2,000 tons.

Phelps (The) Manufacturing Company, 15 Drumm st., San Francisco.

UNITED STATES.

Total number of bridgebuilding works in the United States: 66 completed and 1 building.

IRON AND STEEL SHIPBUILDERS.

MAINE—2.

Bath Iron Works Limited, Bath. Yards on Water st. Gunboats, rams, passenger steamers, yachts, etc.

Sewall (Arthur) & Co., Bath. Sailing vessels.

MASSACHUSETTS—3.

Atlantic (The) Works, East Boston. All kinds of vessels.

City Point Works, Harrison Loring, P. O. Box 2,244, Boston. Yards at City Point, South Boston. Ocean going and inland vessels.

George Lawley & Son Corporation, South Boston. Steam and sailing yachts; also composite yachts.

RHODE ISLAND—1.

Herreshoff Manufacturing Company, Bristol. Torpedo boats and steam and sailing yachts.

NEW YORK—2.

Continental (The) Iron Works, Brooklyn. Ferry-boats, steam vessels, etc.

Union (The) Dry Dock Company, Buffalo. Vessels for river, lake, and ocean service.

NEW JERSEY—2.

Crescent Ship Yard and Iron Works, The Samuel L. Moore and Sons Company, Elizabeth. Cruisers, ferry-boats, tug-boats, yachts, and barges.

Dialogue (J. H.) & Son, Camden. All kinds of vessels.

PENNSYLVANIA—4.

Cramps' Ship Yard, The William Cramp and Sons Ship and Engine Building Company, Beach and Ball sts., Philadelphia. Steel steamships, men-of-war, yachts, etc.

Delaware River Iron Ship Building and Engine Works, Chester. Steam and sailing vessels of all kinds.

Hillman (The) Charles Ship and Engine Building Company, Beach st. above Palmer st., Philadelphia. All kinds of vessels.

Penn Works, The Neafie and Levy Ship and Engine Building Company, Philadelphia. All kinds of vessels.

DELAWARE—2.

Harlan (The) and Hollingsworth Company, Wilmington. Yards on the Christiana river. Steam vessels of all descriptions.

Pusey (The) and Jones Company, Wilmington. All kinds of vessels.

MARYLAND—2.

Columbian (The) Iron Works and Dry Dock Company, Baltimore. Yards at Locust Point. All kinds of vessels.

Maryland Steel Company, Sparrow's Point. Steam and sailing vessels.

VIRGINIA—1.

Newport News (The) Shipbuilding and Dry Dock Company, Newport News. New York office, 1 Broadway. All kinds of vessels.

OHIO—3.

Cleveland (The) Ship Building Company, 120 Viaduct, Cleveland. Yards on the Cuyahoga river. All kinds of lake vessels and steamers.

Craig Ship Building Company, Toledo. Yards at East Toledo. Passenger, car-ferry, and freight steamers; also composite vessels.

Globe Iron Works, The Globe Iron Works Company, West Centre and Spruce sts., Cleveland. Passenger and freight steamships, barges, yachts, tugs, light-house tenders, etc.

ILLINOIS—1.

Chicago Ship Building Company, 1013 Rookery Building, Chicago. Yards at South Chicago. All kinds of vessels.

MICHIGAN—3.

Detroit Dry Dock Company, Detroit. Yards at Detroit and Wyandotte. All kinds of lake vessels.

Wheeler (F. W.) & Co., West Bay City. All kinds of vessels.

WISCONSIN—1.

American (The) Steel Barge Company, West Superior. New York office, 36 Wall st. Whalebacks principally.

IOWA—1.

Iowa Iron Works, Dubuque. Torpedo boats, revenue cutters, river steamboats, etc., not exceeding 8 feet draft.

WASHINGTON—1.

Pacific Steel Barge Works, Pacific Steel Barge Company, 36 Wall st., New York. Yards at Everett. Whalebacks principally, but are equipped for building all kinds of vessels.

CALIFORNIA—1.

Union Iron Works, First and Mission streets, San Francisco. Yards at Potrero. Battle-ships, cruisers, ocean steamships, yachts, tugs, sailing vessels, etc.

UNITED STATES.

Total number of iron and steel ship yards in the United States: 30.

HORSE-NAIL WORKS.

NOTE.—The capacity when given is in net tons of 2,000 pounds and has been furnished to us by the respective manufacturers.

MASSACHUSETTS—1.

Putnam (The) Nail Company, Neponset, Boston. Sizes, from No. 1 to No. 14. Number of machines, 100 forging and 120 hammer pointing. Annual capacity, 3,000 net tons.

VERMONT—1.

National Horse Nail Company, Vergennes. Sizes, from No. 2 to No. 12. Brand, "Champlain."

CONNECTICUT—3.

Capewell (The) Horse Nail Company, 40 Governor st., Hartford.

Fowler (The) Nail Company, Seymour. Brand, "Vulcan."

New Process (The) Nail Company, Torrington.

NEW YORK—4.

Albany Horse Nail Company, Henry L. Smith, Receiver, Albany. Works on Van Rensselaer Island. Number of machines, 16 forging and 3 pointing. For sale.

Ausable (The) Horse Nail Company, 10 Murray st., New York City. Works at Keeseville.

Essex Horse Nail Company Limited, Essex. Sizes, from No. 1 to No. 13. Number of machines, 20 forging and 12 hammer pointing. Annual capacity, 500 net tons.

Mooney (W. M.) & Co., Ausable Chasm.

PENNSYLVANIA—1.

Standard Horse Nail Company, New Brighton. Sizes, from No. 3 to No. 12.

ILLINOIS—3.

North-Western (The) Horse Nail Manufacturing Company, 51-53 Franklin st. Chicago. Works at Brighton Park, Chicago. Sizes, from No. 2 to No. 11, in both large and small heads. Number of machines, 75 forging and 27 pointing. Annual capacity, 2,200 net tons.

Superior Horse Nail Works, First National Bank, owner, Kankakee. Sizes, from No. 4 to No. 11. Number of machines, 12 forging and 7 hammer pointing. Annual capacity, 300 net tons.

Union Horse Nail Company, 603 West Twenty-second st., Chicago. Sizes, No. 3 to No. 10.

UNITED STATES.

Number of horse-nail works in the United States: 13.

LOCOMOTIVE WORKS.

NOTE.—The following list does not include railroad companies which build locomotives. Unless otherwise stated these works build freight and passenger locomotives.

MAINE—1.

Portland Locomotive Works, Portland. Annual capacity, 72.

NEW HAMPSHIRE—1.

Manchester Locomotive Works, Manchester. Boston office, 40 Water st. All kinds. Annual capacity, 125.

RHODE ISLAND—1.

Rhode Island Locomotive Works, Providence. Standard and narrow gauge. Annual capacity, 200.

NEW YORK—4.

Brooks Locomotive Works, Dunkirk. All kinds. Annual capacity, 325.

Dunkirk Engineering Company, Dunkirk. Geared locomotives from 7 to 50 tons' weight. Annual capacity, 25.

Hunt (C. W.) Company, 45 Broadway, New York City. Works at West New Brighton. Locomotives for industrial railways and mines.

Schenectady Locomotive Works, Schenectady. Annual capacity, 425.

NEW JERSEY—2.

Cooke Locomotive and Machine Company, Paterson. All kinds. Annual capacity, 180.

Rogers Locomotive Company, Paterson. All kinds. Annual capacity, 300.

PENNSYLVANIA—6.

Baldwin Locomotive Works, Burnham, Williams & Co., Philadelphia. All kinds. Annual capacity, 1,000.

Climax Works, Climax Manufacturing Company, Corry. Patent geared locomotives for steep grades and sharp curves. Annual capacity, 50.

Dickson Manufacturing Company, Scranton. Standard and special locomotives. Annual capacity, 100.

Pittsburgh Locomotive and Car Works, Pittsburgh. All kinds. Annual capacity, 250.

Porter (H. K.) & Co., Pittsburgh. Light locomotives, street motors, and compressed air locomotives. Annual capacity, 200.

Vulcan Iron Works, Wilkesbarre. Light and mine locomotives. Annual capacity, 50.

MARYLAND—1.

Ryan-McDonald Manufacturing Company, 44 South street, Baltimore. Works at Curtis Bay. Light locomotives. Annual capacity, 30.

VIRGINIA—3.

Richmond Locomotive and Machine Works, Richmond. Annual capacity, 200.

Roanoke Machine Works, Roanoke. Freight locomotives. Annual capacity, 50.

Virginia Iron Works, T. W. Godwin & Co., Norfolk. Narrow-gauge locomotives. Annual capacity, 50.

OHIO—1.

Lima (The) Locomotive and Machine Company, Lima. Shay patent and ordinary direct locomotives. Annual capacity, 100.

ILLINOIS—1.

Grant (The) Locomotive Works, Chicago. All kinds. Annual capacity, 200.

UNITED STATES.

Total number of locomotive works in the United States: 21.

CAST-IRON PIPE WORKS.

NOTE.—This list includes manufacturers of cast-iron gas and water pipe and of soil and plumbers' pipe. The ton used in giving the daily melting capacity of the works is the gross ton of 2,240 pounds.

GAS AND WATER PIPE.

MASSACHUSETTS—1.

Davis and Farnum Manufacturing Company, Waltham. Sizes, from 2 to 36 inches.

NEW YORK—2.

Buffalo Cast Iron Pipe Company, Buffalo. Sizes, from 3 to 36 inches. Daily melting capacity, 60 tons.

Utica (The) Pipe Foundry Company, Utica. Sizes, from 3 to 30 inches. Daily melting capacity, 60 tons.

NEW JERSEY—5.

McNeal (The) Pipe and Foundry Company, Burlington. New York office, 52 Wall st. Sizes, from 1½ to 48 inches. Daily melting capacity, 200 tons.

Warren Foundry and Machine Company, Phillipsburg. Office, 106

Broadway, New York City. Sizes, from 3 to 48 inches. Daily melting capacity, 250 tons.

Wood (R. D.) & Co., 400 Chestnut st., Philadelphia. Three works, one at Millville, one at Camden, and one at Florence.

PENNSYLVANIA—4.

Emaus Pipe Foundry, Donaldson Iron Company, Emaus. Philadelphia office, Betz Building. Sizes, from 1½ to 20 inches. Daily melting capacity, 80 tons.

Jackson (The) and Woodin Manufacturing Company, Berwick. Sizes, from 3 to 12 inches. Daily melting capacity, 45 tons.

National Foundry and Pipe Works Limited, Scottdale. Sizes, from 3 to 30 inches. Daily melting capacity, 75 tons.

Reading Foundry Company Limited, Reading. Sizes, from 3 to 48 inches. Daily melting capacity, 140 tons.

VIRGINIA—2.

Hill City Pipe Works, The Glamorgan Pipe and Foundry Company, Lynchburg. Sizes, from 3 to 20 inches. Daily melting capacity, 75 tons.

Radford Pipe Works, The Radford Pipe and Foundry Company, Cincinnati, Ohio. Works at Radford. Sizes, from 2 to 36 inches. Daily melting capacity, 125 tons.

KENTUCKY—2.

Addyston (The) Pipe and Steel Company, Cincinnati, Ohio. Works at Newport, Ky. Sizes, 3 to 60 inches. Daily melting capacity, 250 tons. *See Ohio.*

Dennis Long & Company, Louisville. All sizes. Daily melting capacity, 250 tons.

TENNESSEE—2.

Chattanooga Foundry and Pipe Works, Chattanooga. Sizes, from 3 to 24 inches. Daily melting capacity, 80 tons. *See Alabama.*

South Pittsburg Pipe Works, South Pittsburg. Sizes, from 3 to 16 inches. Daily melting capacity, 75 tons.

ALABAMA—3.

Anniston Pipe Works, Anniston Pipe and Foundry Company, Anniston. Sizes, from 3 to 36 inches. Daily melting capacity, 200 tons.

Chattanooga Foundry and Pipe Works, Chattanooga, Tenn. Works at Bridgeport. Sizes, from 24 to 48 inches. Daily melting capacity, 150 tons. *See Tennessee.*

Howard-Harrison Iron Company, Bessemer. Sizes, from 3 to 60 inches. Daily melting capacity, 300 tons.

TEXAS—1 COMPLETED AND 1 BUILDING.

Jim Hogg Pipe Foundry, State of Texas, R. W. Finley, Financial Agent, Rusk. Sizes, from 3 to 36 inches. Daily melting capacity, 75 tons.

New Birmingham Pipe Works, New Birmingham. Building. Sizes to be from 4 to 16 inches. Daily melting capacity, 40 tons.

OHIO—4.

Addyston (The) Pipe and Steel Company, Cincinnati. Works at Addyston. Sizes, from 3 to 60 inches. Daily melting capacity, 350 tons. *See Kentucky.*

Clow (James B.) & Son, New Philadelphia. Office, Chicago, Ill. Sizes, from 3 to 16 inches. Daily melting capacity, 75 tons.

Lake Shore Foundry, Cleveland. Sizes, from 3 to 48 inches. Daily melting capacity, 300 tons.

Ohio (The) Pipe Company, Columbus. Sizes, from 3 to 30 inches. Daily melting capacity, 100 tons.

ILLINOIS—1.

Massac (The) Iron Company, Metropolis. Sizes, from 4 to 8 inches. Daily melting capacity, 75 tons.

MICHIGAN—1.

Michigan-Peninsular Car Company, No. 1 Newberry Building, Detroit. Works at West Detroit. Sizes, from 3 to 30 inches. Daily melting capacity, 80 tons.

WISCONSIN—1.

West Superior Iron and Steel Company, West Superior. Sizes, from 4 to 24 inches. Daily melting capacity, 60 tons.

MISSOURI—1.

Shickle, Harrison, and Howard Iron Company, St. Louis. Sizes, from 3 to 60 inches. Daily melting capacity, 200 tons.

COLORADO—1.

Colorado (The) Fuel and Iron Company, Pueblo. Principal office, Boston Building, Denver; New York office, 18 Broadway; Chicago office, Rookery Building. Sizes, from 4 to 24 inches. Daily melting capacity, 60 tons.

OREGON—1.

Oregon (The) Iron and Steel Company, Oswego. Main office, Portland. Sizes, from 3 to 32 inches. Daily melting capacity, 35 tons.

SOIL AND PLUMBERS' PIPE.

NEW YORK—7.

Abendroth Brothers, 109-11 Beekman st., New York City. Works at Port Chester. Sizes, from 2 to 8 inches. Daily melting capacity, 60 tons.

Bignall (The) Manufacturing Company, Medina. Sizes, from 2 to 6 inches. Daily melting capacity, 20 tons.

Bowen & Beach, Medina. Sizes, from 2 to 8 inches. Daily melting capacity, 15 to 18 tons.

Cassidy & Adler, 533 West Fifty-fifth st., New York City. Sizes, from 2 to 15 inches. Daily melting capacity, 27 tons.

Monitor Iron Works, 76-80 Centre st., New York City. Works at Sing Sing. Sizes, from 2 to 15 inches. Daily melting capacity, 60 tons. *See New Jersey.*

Mott (The J. L.) Iron Works, 88-90 Beekman st., New York City. Works at Mott Haven. Sizes, from 2 to 15 inches.

Swett (A. L.) Iron Works, Albert L. Swett, proprietor, Medina. Sizes, from 2 to 6 inches. Daily melting capacity, 20 to 25 tons.

NEW JERSEY—4.

Columbian Iron Works, The J. D. Johnson Company, 139-43 North Seventh st., Philadelphia. Works at Hainesport, N. J. Sizes, from 2 to 15 inches. Daily melting capacity, 25 to 30 tons.

Flemington Iron Works, John Foran, proprietor, Flemington. Sizes, from 2 to 6 inches. Daily melting capacity, 20 tons.

Monitor Iron Works, 76-80 Centre st., New York City. Works at Newark, N. J. Sizes, from 2 to 15 inches. Daily melting capacity, 50 tons. *See New York.*

Salem Iron Works, C. A. Blessing, 516 Montgomery ave., Philadelphia. Works at Salem, N. J. Sizes, up to 12 inches. Daily melting capacity, 25 tons.

PENNSYLVANIA—2.

Berlin Iron and Lead Works, The Wm. G. Price Company, Pittsburgh. Works at Penn Station, Westmoreland county. Sizes, from 2 to 14 inches. Daily melting capacity, 50 tons.

Lansdale Iron Works, Charles R. Schmidt, Lansdale.

DELAWARE—1.

Wilmington Pipe and Foundry Company, Thirteenth and Heald sts., Wilmington. Sizes, from 2 to 6 inches. Daily melting capacity, 5 tons.

MARYLAND—3.

Bartlett, Hayward & Co., Baltimore. New York office, 15 Wall st. Sizes, plumbers' pipe, 2 to 12 inches; cast iron flange pipe, 4 to 30 inches.

McShane (Henry) Manufacturing Company, 441 North st., Baltimore. Sizes, from 2 to 15 inches. Daily melting capacity, 70 tons.

Regester (J.) & Sons, Holliday and Saratoga sts., Baltimore. Works at Bay View, Baltimore county. Sizes, from 2 to 15 inches. Daily melting capacity, 60 tons.

KENTUCKY—1.

Ahrens (The) and Ott Manufacturing Company, Louisville. Sizes, from 2 to 12 inches. Daily melting capacity, 40 tons.

TENNESSEE—1.

Shuster Foundry, Shuster & Lodge, South Pittsburgh. Sizes, from 2 to 8 inches. Daily melting capacity, 10 tons.

ALABAMA—3.

Alabama Pipe Company, Bessemer. Sizes, from 2 to 6 inches. Daily melting capacity, 30 tons.

Gadsden Foundry and Machine Works, Gadsden. Sizes, from 2 to 6 inches. Daily melting capacity, 10 tons.

Hercules Foundry Company, Anniston. Office, 234 Congress st., Boston, Mass. Sizes, from 2 to 12 inches. Daily melting capacity, 50 tons.

OHIO—2.

Humphryes (The) Manufacturing Company, Mansfield. Sizes, from 2 to 6 inches. Daily melting capacity, 40 tons.

Lorain Manufacturing Company, Cleveland.

INDIANA—2.

Bell-Armistead (The) Manufacturing Company, Vincennes. Sizes, from 2 to 15 inches. Daily melting capacity, 35 tons.

Kingsley Foundry Company, Hammond. Sizes, from 2 to 6 inches. Daily melting capacity, 10 tons.

ILLINOIS—4.

Aurora Iron Works, 36 LaSalle st., Chicago. Works at Aurora. Sizes, from 2 to 6 inches. Daily melting capacity, 5 tons.

Bignall (S. L.) Hardware Company, 226 Lake st., Chicago. Works at St. Charles. Sizes, from 2 to 6 inches. Daily melting capacity, 10 tons.

Russell Brothers & Young, 84-86 LaSalle st., Chicago. Works at Cragin. Sizes, from 2 to 6 inches. Daily melting capacity, 10 tons.

Wolff (L.) Manufacturing Company, 93 West Lake st., Chicago. Sizes, from 2 to 12 inches. Daily melting capacity, 20 tons.

WISCONSIN—2.

Hoffmann and Billings Manufacturing Company, 141-47 West Water st., Milwaukee. Sizes, from 2 to 12 inches. Daily melting capacity, 15 to 25 tons.

Rundle-Spence Manufacturing Company, 63-67 Second st., Milwaukee. Sizes, from 2 to 12 inches. Daily melting capacity, 20 tons.

UNITED STATES.

Number of cast-iron gas and water pipe works in the United States, 32 completed and 1 building; number of soil and plumbers' pipe works, 32: total, 64 completed and 1 building.

WROUGHT-IRON AND STEEL PIPE WORKS.

NOTE.—This list also includes works manufacturing cold-drawn seamless tubes and steel-riveted pipe. The ton used is the gross ton of 2,240 pounds.

NEW YORK—2.

Cohoes Tube Works, Aird, Don & Curtis, Cohoes. Sizes, from ⅛ to 2 inches. Annual capacity, 11,000 tons.

Syracuse Tube Company, Syracuse. Sizes, from 1¼ to 8 inches. Annual capacity, 22,500 tons.

NEW JERSEY—2.

Cumberland Nail and Iron Company, Bridgeton. Branch office, 43 North Water st., Philadelphia. Sizes, from ⅛ to 1½ inches. Annual capacity, 3,200 tons.

East Jersey Pipe Works, McKee & Milson, Paterson. Product, steel-riveted pipe. Sizes, 24 inches and upward.

PENNSYLVANIA—19.

Allison (The) Manufacturing Company, Thirty-second and Walnut sts., Philadelphia.

American Tube and Iron Company, Middletown. Sizes, from ⅛ to 16 inches. Annual capacity, 110,000 tons. *See Ohio.*

Byers (A. M.) & Co., Pittsburgh. All sizes.

Chester (The) Pipe and Tube Company, 267 South Fourth st., Philadelphia. Works at South Chester. Sizes, from 1½ to 12 inches. Annual capacity, 40,000 tons.

Conshohocken Tube Company, Conshohocken. Sizes, from ⅛ to 4 inches. Annual capacity, 9,000 tons.

Duquesne Tube Works Company, Ferguson Building, Pittsburgh. Works at Duquesne. Sizes, from ⅛ to 10 inches. Annual capacity, 27,000 tons.

Ellwood Ivins' Tube Company, Oak Lane Station, Philadelphia. Offices: 906 Filbert st., Philadelphia, and 32 Howard st., New York. Cold-drawn steel and other seamless tubes, from $\frac{1}{64}$ of an inch in diameter to 5 inches.

Ellwood Shafting and Tube Company, Ellwood City. Seamless steel tubes. Annual capacity, 1,500,000 feet.

Etna Iron and Tube Works, Spang, Chalfant & Co., Pittsburgh. Works at Etna. Sizes, from ⅛ to 10 inches. Annual capacity, 30,000 tons.

Lehigh Tube and Coil Works, Albright's Son & Co., Allentown. Sizes,

from $\frac{1}{8}$ to 2 inches. Specialty, $\frac{3}{4}$-inch, 1-inch, and $1\frac{1}{4}$-inch pipe up to 42 feet in length.

National Tube Works Company, McKeesport. Offices, Boston, New York, Pittsburgh, Chicago, and St. Louis. Sizes, from $\frac{1}{8}$ to 24 inches. Annual capacity, 225,000 tons.

Norristown Iron Works, James Hooven, Norristown. Sizes, from $\frac{1}{4}$ to $2\frac{1}{2}$ inches, butt welded. Annual capacity, double turn, 5,000 tons.

Oil City Tube Company, Oil City. Sizes, from $\frac{1}{8}$ to 12 inches. Annual capacity, 36,000 tons.

Oil Well Supply Company, (Continental Tube Works,) Pittsburgh. Sizes, from $\frac{1}{8}$ to 16 inches. Daily capacity, 200 tons.

Pascal Iron Works, Morris, Tasker & Co., (incorporated,) 222-24 South Third st., Philadelphia. Works at Fifth and Tasker sts. Sizes, from $\frac{1}{8}$ to $1\frac{1}{2}$ inches. *See Delaware.*

Pennsylvania Tube Works, Pittsburgh. Works at Soho. Sizes, from $\frac{1}{8}$ to 24 inches. Annual capacity, 150,000 tons.

Pittsburgh (The) Tube Company, Pittsburgh. Sizes, from $\frac{1}{8}$ to 12 inches. Annual capacity, 36,000 tons.

Reading Iron Company, Reading. Sizes, from $\frac{3}{8}$ to 12 inches. Annual capacity, 67,000 tons.

Tyler (The) Tube and Pipe Company, Washington. Charcoal iron boiler tubes exclusively. Sizes, from 1 to 10 inches. Annual capacity, 15,000 tons.

DELAWARE—1.

Delaware Iron Company, Morris, Tasker & Co., (incorporated,) New Castle. Office, 222-24 South Third st., Philadelphia. Sizes, from $\frac{3}{8}$ to 16 inches. Annual capacity, 75,000 tons. *See Pennsylvania.*

WEST VIRGINIA—1.

Riverside Iron Works, Wheeling. Works at Benwood. Sizes, from $\frac{1}{8}$ to 8 inches. Annual capacity, 60,000 tons.

OHIO—4.

American Tube and Iron Company, Youngstown. Main office, Middletown, Pa. Sizes, from $1\frac{1}{2}$ to 20 inches. Annual capacity, 27,000 tons. *See Pennsylvania.*

Kellogg (The) Seamless Tube and Manufacturing Company, Findlay. Eastern office, 40 Water st., Boston, Mass. Sizes, from 2 to $7\frac{1}{2}$ inches. Annual capacity, 3,000 tons.

Paige (The) Tube Company, Warren. Sizes, from $\frac{3}{8}$ to 8 inches. Annual capacity, 40,000 tons.

Shelby (The) Steel Tube Company, Shelby. Sizes, from $\frac{1}{16}$ to $2\frac{1}{4}$ inches. Annual capacity, 360 tons.

ILLINOIS—2.

Crane Company, 10 North Jefferson st., Chicago.

Western Tube Company, (successors to Haxtun Steam Heater Com-

pany,) Kewanee. Sizes, 3 inches and smaller. Annual capacity, 35,000 tons.

CALIFORNIA—1.

Risdon (The) Iron and Locomotive Works, Beale and Howard sts., San Francisco. Product, wrought iron and steel riveted pipe. Sizes, from 4 inches up. Annual capacity, 9,000 tons.

UNITED STATES.

Total number of wrought-iron and steel pipe, steel riveted pipe, and seamless tube works in the United States: 32.

CAR-AXLE WORKS.

NOTE.—The following list does not include railroad companies which make car axles. The annual capacity in axles is given in number of axles in all cases where manufacturers have furnished this information.

MAINE—1.

Eastern Forge Company, Room 78, Mason Building, Boston, Mass. Works at Portland. Annual capacity, 15,000.

NEW HAMPSHIRE—2.

Cole Manufacturing Company, Lakeport. Works at Laconia. Passenger, locomotive, and street car axles. Annual capacity, 5,000.

Nashua Iron and Steel Company, Nashua. Tender, truck, and driving axles. Annual capacity, 12,000.

MASSACHUSETTS—3.

Boston Forge Company, East Boston. All kinds of axles. Annual capacity, 12,000.

Cape Ann Anchor Works, Gloucester. All kinds of axles. Annual capacity, 12,000.

Talcott (N. W.) Axle Works, S. & W. C. Lawton, Brightwood. Iron and steel axles. Annual capacity, 10,000.

CONNECTICUT—1.

Bridgeport Forge Company, Bridgeport.

NEW YORK—6.

DeLaney Forge and Iron Company, Buffalo. Locomotive axles only.

Globe Iron Works, The White Manufacturing Company, 556 West Thirty-fourth st., New York City. Horse, cable, and electric street car axles.

Gould Steam Forge, Gould Coupler Company, 120 Broadway, New York City. Works at Buffalo. Annual capacity, 7,200 locomotive or 60,000 car axles.

Peckham Motor Truck and Wheel Company, Kingston.

Sizer, (W. S.,) Buffalo. Car, tender, truck, and locomotive axles. Annual capacity, 18,000.

Troy Steel and Iron Company, Troy. New York office, 26 Broadway. Railroad and street car axles. Annual capacity, 15,000.

NEW JERSEY—2.

Taylor Iron and Steel Company, High Bridge. Annual capacity, 36,000.

Union Steam Forge, MacPherson, Willard & Co., Bordentown. Works at White Hill Station.

PENNSYLVANIA—20.

Allentown (The) Rolling Mills, Drexel Building, Philadelphia. Works at Allentown. Rolled iron axles. Annual capacity, 12,000.

Cambria Iron and Steel Works, Cambria Iron Company, Johnstown. Office, 218 South Fourth st., Philadelphia. Open-hearth steel axles, annealed and tempered by the Coffin process. Annual capacity, 50,000.

Carnegie (The) Steel Company, Limited, Pittsburgh. Annual capacity, 70,000.

Catasauqua Manufacturing Company, Catasauqua. Iron and fibrous steel axles. Annual capacity, 30,000.

Cayuta Wheel and Foundry Company, Sayre. All kinds of hammered axles. Annual capacity, 5,000.

Dickson Manufacturing Company, Scranton. Manufactures axles for its own use only.

Erie Forge Company Limited, Erie. Not making car axles at present.

Frankford Steel Company, Adam Tindel, proprietor, Frankford, Philadelphia. Annual capacity, 2,000 locomotive and 8,000 passenger axles.

Green Ridge Iron Works, A. L. Spencer, Scranton. Mine car axles only.

Jackson (The) and Woodin Manufacturing Company, Berwick. New York office, 26 Cortlandt st. Straight rolled iron and steel axles.

Lackawanna (The) Iron and Steel Company, Scranton. Mine car axles only.

Lehigh Car, Wheel, and Axle Works, McKee, Fuller & Co., Catasauqua. Works at Fullerton. Daily capacity, 80.

Lewisburg Steam Forge Company, Lewisburg. Idle.

Lockhart Iron and Steel Company, Pittsburgh. Not making car axles at present.

Midvale Steel Company, Nicetown, Philadelphia.

Milton (The) Iron Company, Milton. Annual capacity, 10,000.

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

Open-hearth steel locomotive driving axles and all kinds of car axles. Annual capacity, 70,000.

Penn Iron Company Limited, Lancaster. Hammered and rolled axles.

Pittsburgh Forge and Iron Company, Pittsburgh. Works at Allegheny. Car and locomotive axles. Annual capacity, 76,000.

Sheldon Axle Company, Wilkesbarre. Mine car axles and wagon and carriage axles only. Annual capacity, 6,000 to 8,000.

DELAWARE—1.

Johnson Forge Company, Wilmington. Annual capacity, 35,000.

VIRGINIA—2.

Johnson (J. R.) & Co., Richmond. Works at Maury Station. Hammered car, truck, and locomotive axles. Annual capacity, 90,000.

Tredegar Iron Works, Tredegar Company, Richmond. Annual capacity, 20,000.

WEST VIRGINIA—1.

Ensign (The) Manufacturing Company, Huntington. Hammered axles from wrought scrap iron. Annual capacity, 15,000.

KENTUCKY—1.

Louisville Steam Forge Company, Louisville. Annual capacity, 30,000.

ALABAMA—2.

Peacock's Iron Works, George Peacock, Selma. Iron and steel mine car axles. Annual capacity, 15,000.

United States (The) Car Company, Anniston. Office, 520 Western Union Building, Chicago, Ill. Car and locomotive axles. Daily capacity, 120.

OHIO—8.

Akron Steam Forge Company, Akron. All kinds of iron and steel car axles. Annual capacity, 30,000.

Cincinnati (The) Forge and Iron Company, Cincinnati. Iron and steel locomotive, truck, and car axles. Annual capacity, 50,000.

Cleveland City Forge and Iron Company, Cleveland. Annual capacity, 110,000.

Dorner (The) and Dutton Manufacturing Company, Cleveland. Hammered steel street car axles. Annual capacity, 7,500.

Fulton (The) Tool and Manufacturing Company, Canal Fulton. Mine and pit car axles, round and square; also self-oiling. Annual capacity, 10,000.

Lake Erie Iron Company, 155 St. Clair st., Cleveland. Iron and steel axles. Annual capacity, 48,000.

Otis Steel Works, The Otis Steel Company Limited, Cleveland. Passenger, freight, and driving axles. Annual capacity, 75,000 to 100,000.

Toledo Car Wheel and Foundry Company, Toledo. Street car axles only.

INDIANA—3.

Bass Foundry and Machine Works, Fort Wayne.

Central (The) Iron and Steel Company, Brazil. Passenger, freight, locomotive, truck, and driving axles. Annual capacity, 24,000.

East Chicago Iron and Steel Company, 828 Monadnock Building, Chicago, Ill. Works at East Chicago, Ind. Car and locomotive axles. Annual capacity, 25,000.

ILLINOIS—3.

Chicago Forge and Bolt Company, Fortieth st. and Stewart ave., Chicago. All kinds of car axles. Annual capacity, 50,000.

Pullman's Palace Car Company, Pullman. Iron axles.

Willard (The) Sons & Bell Company, 708 Western Union Building, Chicago. Works at South Chicago. Annual capacity, 40,000.

MICHIGAN—2.

Michigan-Peninsular Car Company, No. 1 Newberry Building, Detroit. Iron car axles. Annual capacity, 45,000.

Sheffield Car Company, Three Rivers. All kinds of iron and steel turned axles.

MINNESOTA—1.

Duluth Manufacturing Company, Duluth. Works at West Duluth. Freight and passenger axles. Annual capacity, 6,000.

MISSOURI—2.

Helmbacher Forge and Rolling Mills Company, corner Barton and DeKalb sts., St. Louis. Car, tender, truck, and driving axles. Annual capacity, 30,000.

St. Louis Steam Forge and Iron Works, Main and Miller sts., St. Louis. The nine-bar fagot iron axle for railway cars. Annual capacity, single turn, 24,000.

COLORADO—1.

Denver (The) Boiler and Sheet Iron Works, The Denver Boiler and Sheet Iron Works Company, Denver. Mine car axles.

UTAH TERRITORY—1.

Silver Iron Works, Silver Iron Company, P. O. Box L., Provo. Mine and ore car axles. Annual capacity, 1,000.

CALIFORNIA—3.

Pacific Rolling Mill Company, San Francisco. Annual capacity, 4,000.

Phelps (The) Manufacturing Company, 15 Drumm st., San Francisco. Works at North Point and Buchanan sts. Car and locomotive axles. Annual capacity, 2,000.

Risdon (The) Iron and Locomotive Works, Beale and Howard sts., San Francisco. Mine and freight car axles. Annual capacity, 4,000.

UNITED STATES.

Total number of car-axle works in the United States: 66.

CAR-WHEEL WORKS.

NOTE.—The following list does not include railroad companies which make car wheels. The figures of capacity in the works named below relate to the number of wheels and not to tonnage.

MAINE—1.

Portland Company, Portland. Product, cast iron wheels. Annual capacity, 7,500.

NEW HAMPSHIRE—2.

Ford & Kimball, Concord. Product, cast iron wheels. Annual capacity, 6,000.

Laconia (The) Car Company, Laconia. Product, cast iron wheels. Annual capacity, 19,000.

VERMONT—2.

Miltimore Elastic Steel Car Wheel Company, Arlington. Product, steel wheels. Daily capacity, 25.

St. Albans Foundry Company, St. Albans. Product, cast iron wheels. Annual capacity, 10,000.

MASSACHUSETTS—2.

Swett Car Wheel and Foundry Company, Chelsea. Product, cast iron wheels. Daily capacity, 200.

Wason Manufacturing Company, Brightwood. Works at Springfield. Product, cast iron chilled tread wheels, for railroad, street cars, etc. Annual capacity, 60,000.

CONNECTICUT—2.

Barnum Richardson Company, Lime Rock. Product, cast iron wheels. Annual capacity, 25,000.

Washburn Car-Wheel Company, Hartford. Product, crucible-steel-tired wheels. Annual capacity, 5,000.

NEW YORK—12.

Allen Paper Car Wheel Company, Chicago, Ill., and 39 Cortlandt st., New York City. Works at Hudson, N. Y., and Pullman, Ill. Product, steel-tired wheels, paper and metal centres. Annual capacity, 12,000 to 18,000. *See Illinois.*

Brooks Locomotive Works, Dunkirk. Product, Thurber steel-tired wheels.

Buffalo Car Wheel Works, Buffalo. Product, cast iron wheels. Annual capacity, 50,000.

Globe Iron Works, The White Manufacturing Company, 556 West Thirty-fourth st., New York City. Product, chilled cast iron car wheels. Annual capacity, 30,000.

National Car Wheel Company, Box 63, Buffalo. Works at Depew. Product, steel-tired wheels, with cast iron or wrought iron centres. Annual capacity, 7,500.

New York Car Wheel Works, Buffalo. Product, "machined" chilled cast iron wheels. Annual capacity, 180,000.

Niagara Car Wheel Company, 30 Coal and Iron Exchange, Buffalo. Product, chilled cast iron railroad car wheels. Annual capacity, 140,000.

Ramapo Wheel and Foundry Company, Ramapo. Product, chilled cast iron wheels and steel-tired wheels. Annual capacity, 60,000 cast iron and 12,000 steel-tired.

Rochester Car Wheel Works, P. O. Box 65, Rochester. Works at East Rochester. Product, cast iron railroad and street car wheels. Annual capacity, 60,000 railroad and 40,000 street car wheels.

Rood & Brown, Buffalo. Product, chilled cast iron wheels. Annual capacity, 50,000.

Thacher (Geo. H.) & Co., Albany. Product, cast iron wheels. Annual capacity, 70,000.

Union (The) Car Company, Buffalo. Works at Depew. Product, chilled cast iron wheels. Annual capacity, 150,000.

NEW JERSEY—3.

Canda Manufacturing Company, 11 Pine st., New York City. Works at Carteret, N. J. Product, Canda contracted chilled wheels. Daily capacity, 350.

Jersey City (The) Wheel Foundry and Machine Works, 151 Greene street, Jersey City. Product, cast iron wheels and Thomas steel-tired wheels. Annual capacity, 30,000 cast chilled and 3,000 steel-tired.

Taylor Iron and Steel Company, High Bridge. Product, chilled iron and steel-tired wheels. Annual capacity, 40,000 cast iron and 5,000 steel-tired.

PENNSYLVANIA—19.

Boies Steel Car Wheel Works, The Boies Steel Wheel Company, Scranton. Product, steel-tired wheels. Annual capacity, 10,000.

Cayuta (The) Wheel and Foundry Company, Sayre. Product, all kinds of cast iron wheels. Annual capacity, 70,000.

Chester Steel Castings Company, 407 Library st., Philadelphia. Works at Chester. Steel wheels.

Connellsville Machine and Car Company, Connellsville. Product, chilled mine car wheels. Annual capacity, 20,000.

Davenport & Fairbairn, Erie. Product, all kinds of cast iron wheels. Annual capacity, 110,000. Idle.

Harman & Hassert, Bloomsburg. Product, cast iron mine car wheels. Annual capacity, 20,000.

Harrisburg Car Manufacturing Company, Harrisburg. Product, cast iron wheels. Annual capacity, 36,000. Idle.

Hazleton Iron Works, Hazleton. Product, mine car wheels.

Hodge (The) Manufacturing Company, Greenville. Product, chilled or plain mine car wheels. Annual capacity, 15,000.

Huntingdon Car and Car Wheel Works, The Huntingdon Manufacturing Company, 45 Broadway, New York City. Works at Huntingdon. Product, chilled cast iron wheels. Annual capacity, 20,000.

Irwin Foundry, Hockensmith & Wagoner, Irwin. Product, mine and other car wheels. Annual capacity, 52,000.

Jackson (The) and Woodin Manufacturing Company, Berwick. New York office, 26 Cortlandt st. Annual capacity, 100,000 chilled freight and 55,000 mine car wheels.

Lehigh Car, Wheel, and Axle Works, McKee, Fuller & Co., Catasauqua. Works at Fullerton. Product, cast iron and steel-tired wheels. Daily capacity, 300.

Marshall (John) & Co., Kittanning. Product, coal car wheels. Annual capacity, from 8,000 to 10,000.

Philadelphia Car Wheel Company, 807 Girard Building, Philadelphia. Works at Snyder ave. and Swanson st. Product, "machined" wheels for steam, street railway, and miscellaneous service. Annual capacity, 35,000.

Pittsburgh Car Wheel Company, 505 Times Building, Pittsburgh. Works at Home and Hatfield sts. Product, car wheels for steam, street railway, and mine car service. Annual capacity, 45,000.

Redstone Foundry, J. V. Graft & Co., Uniontown. Product, pit car wheels. Annual capacity, 13,000.

Standard (The) Steel Works, 220 South Fourth st., Philadelphia. Works at Burnham. Product, steel-tired wheels, with forged wrought-iron centres. Annual capacity, 10,000.

Whitney (A.) & Sons, Callowhill and Sixteenth sts., Philadelphia. Product, steel-tired and chilled cast iron wheels. Daily capacity, 80 tons of wheels.

DELAWARE—1.

Lobdell Car Wheel Company, Wilmington. Product, chilled and unchilled wheels. Annual capacity, 150,000.

MARYLAND—1.

Baltimore (The) Car Wheel Company, Baltimore. Product, electric motor trucks and all kinds of wheels. Annual capacity, 120,000.

VIRGINIA—4.

Old Atlantic Iron Works, W. A. Anderson, 206 Water st., Norfolk. Product, cast iron tram wheels. Annual capacity, from 1,500 to 2,000.

Portsmouth Iron Works, John F. Clarke, Jr., Portsmouth. Product, chilled and bogie wheels. Annual capacity, 2,400.

Roanoke Machine Works, Roanoke. Product, cast iron chilled wheels. Annual capacity, 30,000.

Tredegar Iron Works, Tredegar Company, Richmond. Product, all kinds of cast iron railroad car wheels. Annual capacity, 30,000.

WEST VIRGINIA—1.

Ensign (The) Manufacturing Company, Huntington. Product, patent contracting cast iron chilled wheels. Annual capacity, 90,000.

NORTH CAROLINA—1.

North Carolina Car Company, Raleigh. Product, cast iron chilled wheels. Annual capacity, 12,000. Enlarging plant.

KENTUCKY—2.

Howell Wheel Company, 68-72 West Ninth st., Covington. Product, hand-car and railroad velocipede wheels.

Louisville Car Wheel and Railway Supply Company, 1023 East Jefferson st., Louisville. Product, chilled cast iron wheels. Annual capacity, 50,000.

TENNESSEE—2 COMPLETED AND 2 BUILDING.

Chattanooga Car and Foundry Company, Chattanooga. Product, chilled cast iron and double and single plate and spoke wheels. Annual capacity, 20,000.

Knoxville Car Wheel Company, Knoxville. Product, chilled cast iron wheels. Annual capacity, 50,000.

Lenoir Car Wheel Works, Bass Foundry and Machine Works, Fort Wayne, Indiana. Building works at Lenoir, Tenn., to have a daily capacity of from 200 to 300 wheels.

Memphis Car and Foundry Company, Memphis. Building. Product to be chilled cast iron car, locomotive, and street car wheels. Annual capacity, 90,000. Expects to commence operations June 1, 1894.

ALABAMA—3.

Bluffton Car Wheel Works, The Elliott Car Company, Gadsden. Works at Bluffton. Product, freight car wheels. Annual capacity, 6,000. Works may be removed to Gadsden.

Decatur Car Wheel and Manufacturing Company, New Decatur. Product, chilled cast iron wheels. Annual capacity, 75,000.

Peacock's Iron Works, George Peacock, Selma. Product, all kinds of small car wheels. Annual capacity, 35,000 self-oiling and 15,000 plate wheels.

TEXAS—3.

Dickson Car Wheel Company, Houston. Product, cast iron wheels. Annual capacity, 50,000.

Lone Star (The) Iron Company, Jefferson.

Marshall Car Wheel and Foundry Company, Marshall. Product, cast iron car and engine truck wheels. Annual capacity, 50,000.

OHIO—14.

Ball Bearing (The) Car Wheel and Manufacturing Company, Cleveland. Mine and light car wheels. Expects to manufacture railroad wheels in 1895.

Barney (The) and Smith Car Company, Dayton. Product, cast iron wheels. Annual capacity, 50,000.

Cleveland Foundry, Bowler & Co., 14 Winter st., Cleveland. Product, chilled passenger, locomotive, freight, mine, and street car wheels. Annual capacity, 75,000.

Cleveland Wheel and Foundry Works, Maher & Brayton, Cleveland. Product, cast iron wheels.

Dorner (The) and Dutton Manufacturing Company, Cleveland. Product, electric motor and street car wheels. Annual capacity, 12,000.

Fulton (The) Tool and Manufacturing Company, Canal Fulton. Product, plain and self-oiling chilled and unchilled wheels. Annual capacity, 12,000.

Fulton (The) Truck and Foundry Company, Cleveland. Two works, one at Cleveland and one at Mansfield. Product, steam, street, and steel-tired wheels. Annual capacity, 15,000 steam, 50,000 street, and 1,200 steel-tired.

Lima (The) Locomotive and Machine Company, Lima. Product, chilled cast iron and steel-tired wheels. Annual capacity, 6,000 chilled and 1,000 steel-tired.

Mowry Car Wheel Works, Cincinnati. Product, cast iron wheels.

Nelsonville (The) Foundry and Machine Company, Nelsonville. Product, self-oiling chilled mine car wheels. Annual capacity, 20,000.

Paige Car Wheel Company, 185 Euclid ave., Cleveland. Product, steel-tired wheels. Annual capacity, 14,000.

Toledo Car Wheel and Foundry Company, Toledo. Product, street car wheels.

Watt (The) Mining Car Wheel Company, Barnesville. Product, chilled self-oiling mine car wheels. Annual capacity, 60,000.

INDIANA—8.

Bass Foundry and Machine Works, Fort Wayne. Product, cast iron wheels.

Haskell and Barker Car Company, Michigan City. Product, chilled cast iron wheels. Annual capacity, 50,000.

Indiana Car and Foundry Company, Indianapolis. Works at West Indianapolis. Product, all kinds of railroad car wheels. Annual capacity, 60,000.

Ohio Falls (The) Car Manufacturing Company, Jeffersonville. Two

works, one at Jeffersonville and one at Clarksville. Product, all kinds of cast iron wheels. Annual capacity, 75,000.

Stedman's Foundry and Machine Works, Aurora. Product, cast iron wheels.

Terre Haute Car and Manufacturing Company, Terre Haute. Product, Barr contracting chilled railroad and street car wheels. Annual capacity, 100,000.

Treat (C. A.) Manufacturing Company, East Chicago. Office, Hannibal, Missouri. Product, cast iron wheels. Annual capacity, 40,000. *See Missouri.*

ILLINOIS—12 COMPLETED AND 1 BEING REMOVED.

Allen Paper Car Wheel Company, Chicago, and 39 Cortlandt st., New York City. Works at Pullman, Ill., and Hudson, N. Y. Product, paper and metal centre steel-tired wheels. Annual capacity, from 12,000 to 18,000. *See New York.*

Barker Mine Car and Foundry Company, Springfield. Product, mine car wheels, self-oiling and plain. Annual capacity, 12,000 to 15,000.

Barnum and Richardson Manufacturing Company, 64 South Jefferson st., Chicago. Product, chilled cast iron wheels.

Bass, (J. H.,) 97 Dearborn st., Chicago. Works at Clark and Forty-seventh sts. Product, cast iron wheels. Annual capacity, 45,000.

Fowler Foundry Company, 1323 Monadnock Building, Chicago. Works, Stony Island ave. and Ninety-fifth st. Product, rolled steel wheels. Annual capacity, 75,000. Idle.

Griffin Wheel Company, 508 Western Union Building, Chicago. Works at Sacramento ave. and C. & N. W. Ry. Product, chilled cast iron wheels for cars, locomotives, electric motor, horse, and cable cars. Annual capacity, 200,000.

Litchfield Car and Machine Company, Litchfield. Product, cast iron wheels. Equipment being removed to Memphis, Tennessee.

Madison Car Company, Madison. Product, chilled cast iron wheels. Daily capacity, 400.

Mt. Vernon Car Manufacturing Company, Mt. Vernon. Product, chilled cast iron car and locomotive wheels. Annual capacity, 80,000.

Steel Truss Car Wheel Company, St. Louis, Mo. Works at Edwardsville. Steel-tired and steel centre wheels.

Union Foundry and Pullman Car Wheel Works, Pullman. Product, chilled cast iron freight and passenger wheels. Annual capacity, 100,000.

Wells (The) and French Company, Western Union Building, Chicago. Works at Paulina and Blue Island avenues. Product, chilled wheels. Annual capacity, 95,000.

Whiting Car Wheel Company, 225 Dearborn st., Chicago. Works at Harvey. Product, chilled cast iron wheels. Annual capacity, 84,000 to 90,000.

MICHIGAN—8.

Grand Rapids Iron Works, Butterworth & Lowe, Grand Rapids. Product, logging car wheels. Annual capacity, 9,000.

Griffin Car Wheel Company, Detroit. Product, all kinds of car wheels. Annual capacity, 75,000.

Kalamazoo Railroad Velocipede and Car Company, Kalamazoo. Product, velocipede, hand, and mine car wheels. Annual capacity, 20,000.

Lake Shore Iron Works, 151 East Washington st., Marquette. Product, mine car wheels. Annual capacity, from 1,000 to 1,200.

Michigan-Peninsular Car Company, No. 1 Newberry Building, Detroit. Product, chilled cast iron wheels. Daily capacity, 700.

Roberts, Throp & Co., (incorporated,) Three Rivers. Product, light steel wheels for hand and push cars.

Russel Wheel and Foundry Company, Detroit. Product, chilled cast iron plate and spoke wheels. Annual capacity, 35,000.

Sheffield Car Company, Three Rivers. Product, chilled plate and spoke wheels for flat cars, logging cars, etc., pressed and rolled wrought steel plate wheels for hand and push cars, and wood-centre steel-tired wheels. Annual capacity, 25,000.

MINNESOTA—2.

Duluth Manufacturing Company, Duluth. Works at West Duluth. Annual capacity, 40,000.

Northwestern Wheel and Foundry Company, St. Paul. Product, Barr contracting chilled wheels. Annual capacity, 65,000.

MISSOURI—5.

Kansas City Car and Wheel Company, Houser Building, St. Louis. Works at Birmingham. Product, locomotive, passenger, freight, motor, mining, street, and other car wheels. Annual capacity, 36,000.

Missouri Car and Foundry Company, Houser Building, St. Louis. Product, locomotive, passenger, freight, motor, mining, ore, logging, and street car wheels. Annual capacity, 180,000.

St. Charles Car Company, St. Charles. Product, chilled cast iron wheels. Annual capacity, 86,000.

St. Louis Car Wheel Company, St. Louis. Product, cast iron wheels. Daily capacity, 200.

Treat (C. A.) Manufacturing Company, Hannibal. Product, cast iron wheels. Annual capacity, 25,000. *See Indiana.*

UTAH TERRITORY—1.

Silver Iron Works, Silver Iron Company, P. O. Box L., Provo. Product, mine car wheels, chilled and unchilled. Annual capacity, 2,000.

CALIFORNIA—2.

Occidental Foundry, Steiger & Kerr, San Francisco. Product, locomotive and street car wheels. Annual capacity, 10,000.

Risdon (The) Iron and Locomotive Works, Beale and Howard sts., San Francisco. Product, mine and railway car wheels.

UNITED STATES.

Total number of car-wheel works in the United States: 113 completed, 2 building, and 1 being removed.

CARBUILDERS.

NOTE.—This list does not include railroad companies which build cars.

MAINE—1.

Portland Company, Portland. Annual capacity, 350 flat and box cars.

NEW HAMPSHIRE—1.

Laconia (The) Car Company, Laconia. Annual capacity, 1,500 freight, 150 passenger, and 1,000 street cars.

MASSACHUSETTS—7.

Bradley Car Works, Osgood Bradley & Sons, Worcester. Annual capacity, 100 passenger and 700 freight cars.

Briggs Carriage Company, Amesbury. Street cars only. Annual capacity, 300.

Ellis Car Company, Amesbury. Street cars and electric snow plows. Annual capacity, 400 cars and 100 plows.

Keith Manufacturing Company, Isaac N. Keith & Son, Sagamore. Freight cars only. Annual capacity, 800.

Newburyport Car Manufacturing Company, Newburyport. Street cars only.

Randall Street and Electric Manufacturing Company, 1131 Tremont st., Roxbury, Boston. Street and electric cars of all kinds. Annual capacity, from 100 to 300.

Wason Manufacturing Company, Brightwood. Works at Springfield. Daily capacity, 1 passenger, 2 street, and 6 freight cars.

NEW YORK—12.

Buffalo Car Manufacturing Company, Buffalo. Freight cars of every description.

Gilbert Car Manufacturing Company, William Shaw, Receiver, Troy. All kinds of cars, for both steam and street railways.

Hunt (C. W.) Company, 45 Broadway, New York City. Works at West New Brighton. Iron or wooden flat, tip, and charging narrow-gauge cars. Annual capacity, 500.

Jones' Car Works, J. M. Jones' Sons, West Troy. Electric, cable, and horse cars only. Annual capacity, 500.

Lewis (The) and Fowler Manufacturing Company, 28 Sandford street, Brooklyn. Open and closed street cars only. Annual capacity, 1,600.

Ramapo Iron Works, Hillburn. Plantation, mine, and logging cars.

Rogers (A. L.) & Co., 108 Wall st., New York City. Works at Van Pelt Manor. Street cars only. Annual capacity, 250.

Stephenson (John) Company Limited, 47 East Twenty-seventh st., New York City. Street cars of all kinds. Annual capacity, 700.

Stuebner (G. L.) & Co., Long Island City. Narrow-gauge coal and ore cars.

Turl's Iron Works, John Turl's Sons, 534 West Twenty-eighth street, New York City. Plantation and mine cars. Annual capacity, 15,000.

Union (The) Car Company, Buffalo. Works at Depew. Freight cars of all kinds. Annual capacity, 6,000.

Wagner Car Works, Wagner Palace Car Company, Buffalo. Sleeping, passenger, parlor, dining, buffet, and other cars. Annual capacity, 250.

NEW JERSEY—3.

Birnie, (William,) 125 Bay st., Jersey City. Contractors' cars.

Canda Manufacturing Company, 11 Pine st., New York City. Works at Carteret, N. J. Freight and passenger cars. Annual capacity, 6,000.

Fowler (J. W.) Car Company, 309 Pine st., Elizabethport. Tramway, electric, cable, and horse cars; also electric snow sweepers, snow plows, etc. Annual capacity, 1,200.

PENNSYLVANIA—22.

Allison (The) Manufacturing Company, Thirty-second and Walnut sts., Philadelphia. Freight cars of every description.

Billmeyer and Small Company, York. Annual capacity, 200 passenger and 1,500 freight cars.

Bloomsburg Car Company, Bloomsburg. Annual capacity, 1,200 freight, 1,000 dump, and 2,000 mine cars.

Carlisle Manufacturing Company, Carlisle. Freight and mine cars. Annual capacity, 3,000.

Connellsville Machine and Car Company, Connellsville. Annual capacity, 150 coke and 2,500 mine cars.

Dauphin Car Works, Dauphin. Idle.

Erie Car Works, Erie. Annual capacity, 5,000 freight cars.

Harman & Hassert, Bloomsburg. Annual capacity, 2,000 mine and construction cars.

Harrisburg Car Manufacturing Company, Harrisburg. Annual capacity, 4,000 freight cars. Idle.

Hazleton Iron Works, Hazleton. Mine cars only.

Huntingdon Car and Car Wheel Works, The Huntingdon Manufactur-

ing Company, 45 Broadway, New York City. Works at Huntingdon. Annual capacity, 3,000 steel freight cars.

Irwin Foundry, Hockensmith & Wagoner, Irwin. Mine cars only. Annual capacity, 2,500.

Jackson (The) and Woodin Manufacturing Company, Berwick. New York office, 26 Cortlandt st. Annual capacity, 4,000 freight cars.

Lamokin Car Works, E. H. Wilson & Co., Chester. Philadelphia office, 222 South Third st. Works at Lamokin Station, near Chester. Annual capacity, 360 street cars.

Lebanon Manufacturing Company, 167 North Tenth st., Lebanon. Annual capacity, 3,500 freight, 150 street, 50 passenger, 200 refrigerator, and 200 mine cars, and 75 tenders.

Lehigh Car, Wheel, and Axle Works, McKee, Fuller & Co., Catasauqua. Daily capacity, 20 freight cars.

Lehigh Valley Car Company, Northampton. New York office, Central Building. Annual capacity, 2,000 freight, coal, and mine cars.

Middletown Car Works, Arthur King, Middletown. Annual capacity, 2,500 freight cars.

Milton Car Works, Murray, Dougal & Co. Limited, Milton. Annual capacity, 3,500 freight cars.

New Castle Car Works, The New Castle Car Manufacturing Company, New Castle. Street cars only. Annual capacity, 150.

Pardee Car and Machine Works, Watsontown. Annual capacity, 2,100 freight cars. Idle and for sale.

Philadelphia Car Works, J. G. Brill Company, Sixty-second st. and Woodland ave., Philadelphia. Annual capacity, 100 passenger, 500 freight, and 1,200 street cars, and 2,500 electric motor trucks.

DELAWARE—2.

Delaware Car Works, Jackson and Sharp Company, Wilmington. Sleeping, parlor, and other passenger, and electric, street, and cable cars. Special attention giving to export work.

Harlan (The) and Hollingsworth Company, Wilmington. New York office, 86 Boreel Building; Chicago office, 925 Monadnock Building; London office, Dashwood House, 9 New Broad st., E. C. All kinds of parlor, boudoir, sleeping, passenger, and baggage cars. Annual capacity, 400.

MARYLAND—2.

Ryan-McDonald Manufacturing Company, 44 South st., Baltimore. Narrow-gauge and contractors' cars of all kinds. Annual capacity, 1,500.

South Baltimore Car Works, 44 South st., Baltimore. Annual capacity, 4,000 freight cars.

VIRGINIA—3.

American (The) Car Works, The American Car Company, Basic City. Annual capacity, 1,000 freight and express cars.

Roanoke Machine Works, Roanoke. Annual capacity, 3,500 freight and 50 passenger cars.

Tredegar Iron Works, Tredegar Company, Richmond. Annual capacity, 2,400 freight cars.

WEST VIRGINIA—1.

Ensign (The) Manufacturing Company, Huntington. Annual capacity, 4,500 freight cars.

TENNESSEE—1 AND 2 BUILDING.

Chattanooga Car and Foundry Company, Chattanooga. Annual capacity, 1,000 freight, 1,000 mine, and 2,000 cane cars.

Lenoir (The) Car Company, Lenoir City. Building works to manufacture all kinds of freight and mine cars. Daily capacity to be about 15.

Memphis Car and Foundry Company, Memphis. Building works to manufacture all kinds of freight, refrigerator, and logging cars. Annual capacity to be 7,000.

NORTH CAROLINA—1.

North Carolina (The) Car Company, Raleigh. Annual capacity, 600 freight cars.

ALABAMA—5.

Elliott (The) Car Company, Gadsden. Annual capacity, 1,800 box and 1,000 flat cars.

Peacock's Iron Works, George Peacock, Selma. Mine, logging, and other small cars. Annual capacity, 5,000.

Union Iron Works, Selma. Logging, push, cane, and other small cars. Annual capacity, 1,200.

United States (The) Car Company, Anniston. Office, 520 Western Union Building, Chicago, Ill. Works at Anniston and New Decatur. Annual capacity, 4,500 freight cars at each place. *See Illinois.*

TEXAS—2.

Beaumont Iron Works, O. B. Greeves, proprietor, Beaumont. Logging and freight cars. Annual capacity, 600.

Marshall Car and Foundry Company, Marshall, Texas. Mine and log cars.

OHIO—10.

Ball Bearing (The) Car Wheel and Manufacturing Company, Cleveland. Brick, lumber, mine, pit, push, and other cars.

Barney (The) and Smith Car Company, Dayton. Annual capacity, 350 sleeping and other passenger and baggage cars, 6,000 freight cars, and 1,000 street and electric cars.

Brewer and Krehbiel Manufacturing Company, 236 Superior st., Cleveland. Street cars.

Fulton (The) Tool and Manufacturing Company, Canal Fulton. Mine, clay, stone, and pit cars. Annual capacity, 1,500.

Jewett Car Works, The Jewett Car Company Limited, Jewett. Annual capacity, 300 steam and 300 electric cars.

Kuhlmann Car Company, Cleveland. Street cars only.

Lima Locomotive and Machine Company, Lima. Freight, caboose, mine, and other cars. Annual capacity, 3,000 freight and 300 caboose cars.

Minerva Car Works, Pennock Brothers, Minerva. Annual capacity, 2,000 freight cars.

Watt (The) Mining Car Wheel Company, Barnesville. Annual capacity, 5,000 mine cars.

Youngstown (The) Car Manufacturing Company, Youngstown. Works at Haselton Station. Annual capacity, 3,000 freight cars.

INDIANA—5.

Haskell and Barker Car Company, Michigan City. Annual capacity, 6,000 freight cars of all kinds.

Indiana Car and Foundry Company, Indianapolis. Works at West Indianapolis. All kinds of freight cars. Daily capacity, 15.

Ohio Falls (The) Car Manufacturing Company, Jeffersonville. Two works, one at Jeffersonville and one at Clarksville. Freight, passenger, parlor, sleeping, and other cars. Annual capacity, 6,000 freight and 300 passenger cars.

Terre Haute Car and Manufacturing Company, Terre Haute. All kinds of freight cars. Annual capacity, 6,000.

ILLINOIS—8 COMPLETED AND 1 BEING REMOVED.

Barker Mine Car and Foundry Company, Springfield. Mine, ore, stone, and other cars. Annual capacity, 3,000.

Corey (The) Car and Manufacturing Company, corner of Ashland and Carroll avenues, Chicago. Wood or steel dump and mine cars.

Harvey Steel Car and Repairing Works, 825 Rookery Building, Chicago. Works at Harvey. Steel and wooden freight cars.

Litchfield Car and Machine Company, Litchfield. Equipment being removed to Memphis, Tennessee.

Madison Car Company, Madison. Annual capacity, 12,000 freight cars.

Mt. Vernon Car Manufacturing Company, Mt. Vernon. Annual capacity, 5,000 freight, refrigerator, caboose, and tank cars.

Pullman's Palace Car Company, Pullman. Passenger, street, and freight cars. *See Michigan.*

United States (The) Car Company, 520 Western Union Building, Chicago. Annual capacity, 6,000 freight cars. *See Alabama.*

Wells (The) and French Company, Chicago. Annual capacity, 7,000 freight, refrigerator, and caboose cars.

MICHIGAN—5.

Kalamazoo Railroad Velocipede and Car Company, Kalamazoo. Velocipede, hand, push, mine, and sugar-cane cars. Annual capacity, from 4,000 to 5,000.

McCracken and Hovey Car Company, Muskegon. All kinds of freight cars. Annual capacity, 3,000.

Michigan-Peninsular Car Company, No. 1 Newberry Building, Detroit. All kinds of freight and refrigerator cars. Annual capacity, 30,000.

Pullman's Palace Car Company, Detroit. Passenger and street cars. *See Illinois.*

Sheffield Car Company, Three Rivers. Flat, logging, mine, hand, velocipede, and other cars. Annual capacity, 10,000.

MINNESOTA—1.

Duluth Manufacturing Company, Duluth. Annual capacity, 4,500 freight and 3,500 ore, lumber, and mine cars.

MISSOURI—8.

American Refrigerator Transit Company, Commercial Building, St. Louis. Works at Main and Barton sts. Refrigerator cars.

Brownell Car Company, 2300 North Broadway, St. Louis. Street cars only. Annual capacity, 600.

Kansas City Car and Wheel Company, Houser Building, St. Louis. Works at Birmingham. Daily capacity, 10 freight cars.

Laclede (The) Car Company, 4500 North Second st., St. Louis. Street cars only. Daily capacity, 10.

Missouri Car and Foundry Company, Houser Building, St. Louis. Freight, coal, caboose, stock, refrigerator, mine, and other cars. Annual capacity, 12,000.

St. Charles Car Company, St. Charles. Annual capacity, 6,000 freight and 300 passenger cars.

St. Louis Car Company, St. Louis. Street, cable, and electric cars. Annual capacity, 2,000.

Whitman Agricultural Company, Eighth st. and Clark ave., St. Louis. Construction, dump, and clay cars. Annual capacity, 600.

ARKANSAS—1.

Brinkley Car Works and Manufacturing Company, Brinkley. Box and flat cars.

KANSAS—1.

Burton Stock Car Company, Wichita. Office, Chicago, Ill. All kinds of steam railway cars. Daily capacity, 16.

COLORADO—2.

Denver (The) Boiler and Sheet Iron Works, The Denver Boiler and Sheet Iron Works Company, Denver. Mine cars. Annual capacity, 1,000.

Woeber Brothers Carriage Company, Denver. Works at South Denver. Cable, electric, and street cars. Annual capacity, 300.

CALIFORNIA—4.

California Car Works, John Hammond & Co., 334 Beale st., San Francisco. Annual capacity, 600 freight; 300 passenger, and 500 street cars. Specialty, double-ender cable and electric cars.

Carter Brothers, 42 Market st., San Francisco. Works at Newark. Annual capacity, 500 freight, 50 passenger, and 100 street cars.

Holt (The) Manufacturing Company, Stockton. All kinds of street cars. Annual capacity, 150.

Risdon (The) Iron and Locomotive Works, Beale and Howard sts., San Francisco. Annual capacity, 1,000 flat, 1,000 mine, and 1,000 sugar-cane cars.

OREGON—1.

Columbia (The) Car and Tool Works, 329 Second st., Portland. All kinds of cars, but chiefly a patent combination car. Annual capacity, combination, 25; other kinds, 35; freight, 50.

UNITED STATES.

Total number of car building works in the United States: 109 completed, 2 building, and 1 being removed.

CANADA.

BLAST FURNACES.

NOVA SCOTIA.

Londonderry (The) Iron Company Limited, Londonderry. Main office, Montreal. Works at Acadia Iron Mines, (near Londonderry,) Colchester county. Two stacks: Furnace A, 75 x 18, and Furnace B, 62 x 18, built in 1875–6 and blown in in 1877; Furnace A rebuilt in 1883 and again in 1891; three Siemens-Cowper fire-brick and one Ford iron-pipe stove; fuel, coke, made from coal mined in Pictou and Cumberland counties; ores, limonite, carbonate, and red hematite from Colchester and Annapolis counties; product, foundry pig iron; annual capacity, 40,000 gross tons. Brand, "Siemens." A cast-iron pipe foundry is operated in connection with the works. *See Rolling Mills.*

New Glasgow Iron, Coal, and Railway Company Limited, Ferrona, Pictou county. One stack, 65 x 15, built in 1892; first blown in in August, 1892; three Massicks & Crooke stoves; fuel, coke, made from coal mined near the furnace; ores, local brown and red hematite; product, foundry pig iron; annual capacity, 25,000 gross tons. Brand, "Ferrona." J. F. Stairs, President; Graham Fraser, Vice-President; Harvey Graham, Secretary; David Aitken, Superintendent. Selling agents, Drummond, McCall & Co., Montreal.

Pictou Charcoal Iron Company Limited, Bridgeville, Pictou county. One stack, 55 x 11, built in 1892 and first blown in in December, 1892; two Cooper-Durham stoves; fuel, charcoal; ore, local brown hematite; product, car-wheel and malleable pig iron; annual capacity, 6,000 gross tons. Brand, "Bridgeville." J. D. McGregor, President; A. C. McDonald, Secretary-Treasurer; Ernst A. Sjöstedt, General Manager.

QUEBEC.

Canada Iron Furnace Company Limited, Montreal. Furnace at Radnor Forges, Champlain county. One stack, 40 x 9, built and blown in in 1891; one Drummond pipe stove; steam and water power; fuel, charcoal; ores, lake and bog from the Three Rivers district and Lac-a-la-Tortue; product, pig iron for car wheels and malleable purposes; annual capacity, 10,000 gross tons. Brand, "C. I. F." P. H. Griffin, President, and T. Guilford Smith, Vice-President, Buffalo, N. Y.; George E. Drummond, Managing Director and Treasurer, and Thomas J. Drummond, Secretary, Montreal; John J.

Drummond, Superintendent, at the furnace. Selling agents, Drummond, McCall & Co., Montreal. (The present stack takes the place of the old Radnor Furnace.)

McDougall (John) & Co., 574 William st., Montreal. Furnaces at Drummondville, Drummond county. Two stacks: Grantham Furnace, 35 x 10, built and blown in in 1880, and St. Francis Furnace, 32 x 9, built and blown in in 1881; water-power; warm blast; fuel, charcoal; ore, local limonite; product, car-wheel pig iron; annual capacity, 4,000 gross tons. George McDougall, Manager.

ONTARIO.

Hamilton Furnace, The Hamilton Iron and Steel Company Limited, Hamilton, Wentworth county. Main office, 93-95 Nassau st., New York City, U. S. A. Building one stack, 75 x 16; three Gordon-Whitwell stoves; will use Connellsville coke and local hematite and magnetic ores; product, to be foundry pig iron; estimated annual capacity, 60,000 gross tons. Brand, "Hamilton." William Foster, Jr., President, H. N. Curtis, Secretary, and J. J. Morehouse, Treasurer and General Manager, New York; John H. Tilden, Vice-President, Hamilton, Ontario.

ROLLING MILLS AND STEEL WORKS.

NOVA SCOTIA.

Halifax Rolling Mills Company, Halifax, Halifax county. Works on the harbor, three miles from the city. Built in 1878; 2 heating furnaces, 2 trains of rolls, and 20 cut-nail machines. Idle for some time. For sale. E. D. Adams, agent, Halifax.

Londonderry (The) Iron Company Limited, Londonderry. Main office, Montreal. Works at Acadia Iron Mines, (near Londonderry,) Colchester county. Built in 1875-6 and put in operation in 1876; one single and 8 double puddling furnaces, one scrap and 4 heating furnaces, 3 trains of rolls, (9, 16, and 18-inch,) and 3 steam hammers; product, bar iron and nail plate; annual capacity, 9,000 gross tons. Brand, "Siemens." Fuel used, bituminous coal. A. T. Paterson, President; Hon. D. MacInnes, Vice-President; James Phymister, Secretary; F. C. Budden, Treasurer; R. G. Leckie, General Manager. *See Furnaces.*

Nova Scotia Steel and Forge Company Limited, New Glasgow, Pictou county. Forge built in 1872 and steel plant in 1882; one 20-gross-ton and one 25-gross-ton acid open-hearth steel furnace; first steel made in 1883; annual capacity, 30,000 gross tons of ingots; 12 forge fires, 10 coal and 5 gas heating furnaces, 7 trains of rolls, (three 9, one 12, one 16, one 20, and one 26-inch,) and 5 hammers (3 upright,

from 10 cwt. to 5 tons, and 2 helve); product, railway, marine, and engine forgings, car axles, mine rails, machinery, spring, and agricultural-implement steel, steel plates, and iron and steel merchant bars; annual capacity, 28,000 gross tons of finished iron and steel products; has also made basic steel. Fuel used, bituminous coal and producer gas. Graham Fraser, President and Manager; H. Ritchie, Treasurer; Thomas Cantley, Secretary.

NEW BRUNSWICK.

Cold Brook Rolling Mills, I. & E. R. Burpee, 11 Dock st., St. John. Works at Cold Brook, St. John county. Built in 1864 and remodeled and enlarged in 1874; one forge fire, 7 scrap furnaces, 3 trains of rolls, (one 10 and two 18-inch,) and 2 spike machines; product, bar iron, iron and steel nail plate, ship and railway spikes, mine rails, and bridge bolts; annual capacity of rolled iron and steel, 5,500 gross tons. Fuel used, bituminous and anthracite coal.

Portland Rolling Mills, J. Harris & Co., St. John, St. John county. Works built in 1856 and rolling mill added in 1860; burned and rebuilt in 1889; one single puddling furnace, 5 heating furnaces, 3 trains of rolls, (12 and 18-inch bar and 18-inch nail-plate,) 2 spike machines, and one 5-ton helve hammer; product, bar iron, car axles, nail plate, street and mine rails, fish-plates, ship and railway spikes, knees for ships, shafting, etc.; annual capacity, 6,000 gross tons. Fuel used, bituminous coal.

QUEBEC.

Metropolitan Rolling Mills, Abbott & Co., 55 St. Sulpice st., Montreal. Works on Delorimier ave. Built in 1883; equipped with heating furnaces, trains of rolls, and machinery for producing bar iron, cut nails, railroad spikes, and horse shoes.

Montreal Rolling Mills Company, Montreal. Works at Ste. Cunegonde, Hochelaga county. Built about 1857; 4 coal and 3 gas heating furnaces, 3 trains of rolls, (9-inch, 12-inch, and 18-inch,) 75 cut-nail machines, and 28 wire-nail machines; product, bar and horse-shoe iron, nail plate, skelp, horse shoes, horse-shoe nails, cut nails, and iron and steel wire nails; annual capacity, 9,000 gross tons of bar and horse-shoe iron, 3,500 gross tons of skelp, 9,000 gross tons of nail plate, 25,000 kegs of horse shoes, 25,000 boxes of horse-shoe nails, 125,000 kegs of cut nails, and 30,000 kegs of wire nails. Brand, "M. R. M. Co.," inclosed in a semi-circle. Andrew Allan, President; Hugh McLennan, Vice-President; Wm. McMaster, Managing Director; A. F. Macpherson, Secretary and Treasurer.

Peck, Benny & Co., 391 St. Paul street, Montreal. Works on Mill street. Built about 1856; water-power; 5 heating furnaces and 3

trains of rolls; product, horse nails, cut nails, and ship and railroad spikes.

Pillow and Hersey Manufacturing Company Limited, 105 Mill st., Montreal. Built in 1859; 8 heating furnaces, 4 trains of rolls, (9-inch guide, 12 and 18-inch bar, and 18-inch plate,) 91 cut-nail machines, and 18 wire-nail machines; product, cut nails, wire nails, bar iron, railway and pressed spikes, horse shoes, tacks, bolts, and nuts; annual capacity, for cut nails, 100,000 kegs; for wire nails, 18,000 kegs. Fuel used, bituminous and anthracite coal. Randolph Hersey, President and Managing Director; John A. Pillow, Vice-President; George A. Mac Agy, Secretary; George Luckhurst, Assistant Secretary.

ONTARIO.

McDonell (The) Rolling Mill Company Limited, Sunnyside, Toronto. Built in 1893 and put in operation in the same year; 3 coal heating furnaces and 2 trains of rolls (9 and 20-inch); product, merchant bar iron, agricultural implement and carriage iron, channels, angles, beveled-edge flats, etc.; annual capacity, 5,000 gross tons. Owned by Mary McDonell.

Ontario Rolling Mill Company, Hamilton. Three mills, two at Hamilton, Wentworth county, and one at Swansea, York county. The Hamilton mills were built in 1861 and contain one single and 3 double busheling furnaces, 9 coal heating furnaces, 5 trains of rolls, (14-inch muck, 9 and 10-inch guide, 20-inch bar, and 20-inch plate,) 3 hammers, (5-ton and 2-ton upright and one helve,) and 45 cut-nail machines; product, bar and band iron and steel, fish-plates, nail plate, forgings, cut nails, rivets, and washers; annual capacity, 100,000 kegs of cut nails and 27,000 gross tons of other finished products. The Swansea mill was built in 1888 and contains one coal and 3 Smith gas heating furnaces, one 10-inch train of rolls, and one 5,000-lb. upright hammer; product, bar iron; annual capacity, 10,800 gross tons. C. E. Doolittle, President; C. S. Wilcox, Vice-President and Treasurer; W. A. Child, Secretary.

Number of blast furnaces in Canada: 7 completed and 1 building. Of these 3 use coke and 4 use charcoal as fuel, and 1 will use coke.

Number of rolling mills in Canada: 13. Of these 1 has an open-hearth steel plant.

MEXICO.

BLAST FURNACES.

DURANGO.

Helfenistein Furnace, Mexican National Iron and Steel Company, City of Durango. Main office, No. 12 San Juan de Letran, City of Mexico. One stack, 54 x 10, built and blown in in 1887; rebuilt in 1894; two iron-pipe stoves; steam-power; fuel, coke and charcoal, the coke being made from coal mined near Sabinas; ore, low in phosphorus, averaging 60 per cent. of metallic iron, mined near the furnace; product, foundry and mill pig iron; annual capacity, 15,000 gross tons. (Formerly operated by the Durango Steel and Iron Company.) *See Furnaces in Jalisco and Hidalgo. See Rolling Mills in Durango and Hidalgo.*

Rosa Flores Furnace, Rosa Flores Blast Furnace Company, City of Durango. Furnace 6 miles from Durango. One small charcoal stack built about 1850; water-power; product, mill and foundry pig iron; daily capacity, 5 gross tons. A foundry is connected with the works. *See Rolling Mills.*

JALISCO.

Manuel L. Corcuera, Guadalajara. Furnace at Sierra de Tapalpa, district of Sayula. One stack, 40 x 9, built and blown in in 1869; cold blast; steam-power; fuel, charcoal; ore, local hematite; product, mill pig iron; annual capacity, 3,600 gross tons. T. Rubalcaba, Manager. *See Rolling Mills.*

Mexican National Iron and Steel Company, City of Mexico. Comanja Furnaces, at Comanja, district of Lagos; two stacks, each 37 x 9; time of building uncertain; cold-blast; steam-power; fuel, charcoal; ore, local brown hematite; product, gray forge pig iron; total annual capacity, 3,200 gross tons. Brand, "Comanja." (Formerly operated by Richard Honey.) *See Furnaces in Durango and Hidalgo. See Rolling Mills in Durango and Hidalgo.*

HIDALGO.

Mexican National Iron and Steel Company, City of Mexico. Seven cold-blast charcoal furnaces, all in Hidalgo: Apulco Furnace, at Apulco, one stack, 34½ x 9, built about 1835; water and steam power; ore, local brown hematite; product, gray forge pig iron; brand, "Apulco;" John Walker, Manager. Encarnacion and Guadalupe Furnaces, at Encarnacion and Guadalupe, three stacks, two 35 x 9 and one 35 x 9½; Encarnacion No. 1 built about 1850, Encarnacion No. 2 built in 1892 and not yet blown in, and Guada-

lupe built in 1845; steam-power used at Encarnacion and water-power at Guadalupe; ore, local magnetic; product, mottled and white pig iron; brand, "Encarnacion;" Thomas Ivey, Manager. La Trinidad Furnace, at La Trinidad; post-office and telegraph address, Tulancingo; one stack, 34¾ x 9, built in 1850; water and steam power; ore, local brown hematite; product, gray forge pig iron; brand, "Trinidad;" John Mayne, Manager. Los Reyes Furnace, at Los Reyes; post-office and telegraph address, Tulancingo; one stack, 32 x 10 5/12, built about 1845; water-power; ore, local brown hematite; product, gray forge pig iron; brand, "Reyes." San Miguel Furnace, at Zacualtipan, one stack, 32 x 8¾, built about 1859; water and steam power; ore, local brown hematite; product, gray forge pig iron; brand, "Zacualtipan;" John Skinfill, Manager. The annual capacity of these furnaces is about 4,000 gross tons for the two Encarnacion stacks, 1,800 gross tons each for Guadalupe and San Miguel, and 1,600 gross tons for each of the others. Selling agents, the proprietor, Valentin, Elcoro & Co., and others. (Formerly operated by Richard Honey.) *See Furnaces in Durango and Jalisco. See Rolling Mills in Durango and Hidalgo.*

OAXACA.

La Reforma Furnace, Francisco Quijano, City of Oaxaca. Furnace at San Pedro, district of Villa Alvarez. One stack, 30 x 8, built in 1882 and blown in in 1883; cold blast; water-power; fuel, charcoal; ore, hematite; product, foundry pig iron; annual capacity, 1,800 gross tons. Brand, "Q." Selling agents, Quijano & Co., Oaxaca. A foundry is connected with the furnace.

ROLLING MILLS AND STEEL WORKS.

DURANGO.

Durango Rolling Mills, Mexican National Iron and Steel Company, City of Durango. Main office, City of Mexico. Built in 1886 and put in operation in 1887; 5 double puddling furnaces, 2 forge fires, one Siemens gas heating furnace, and 2 trains of rolls (18-inch puddle with squeezers and 10-inch guide); steam-power; product, bar iron; daily capacity, double turn, 25 gross tons. Brand, "Durango." Fuel used, bituminous coal. (Formerly operated by the Durango Steel and Iron Company. The Clapp-Griffiths steel plant removed from Pittsburgh, U. S. A., to Durango in 1888–9 has been dismantled.) Richard Honey, President; J. R. Barcroft, Vice-President; Thomas Phillips, Secretary and Treasurer; J. S. McCaughan, Manager. *See Furnaces in Durango, Jalisco, and Hidalgo. See Rolling Mills in Hidalgo.*

Rosa Flores Rolling Mill, Rosa Flores Blast Furnace Company, City of Durango. Works 6 miles from Durango. Two puddling furnaces,

one heating furnace, and one train of rolls; water-power; product, merchant bars; annual capacity, 2,000 gross tons. *See Furnaces.*

CHIHUAHUA.

Compañia Industrial Mexicana, City of Chihuahua. Built in 1891 and put in operation in 1892; one Siemens gas heating furnace, 3 trains of rolls, (8, 12, and 20-inch,) one 1,500-lb. hammer, and 7 cut-nail machines; steam-power; product, merchant bar iron, bolts, nuts, and washers, and horse shoes; annual capacity, 10,000 gross tons of rolled products and 12,000 kegs of nails. Brand, "C. I. M." Fuel used, bituminous coal. Also operates a machine shop and foundry. Enrique C. Creel, President; Juan A. Creel, Manager; Francisco Fletcher, Superintendent.

HIDALGO.

Mexican National Iron and Steel Company, City of Mexico. Two completed rolling mills and an open-hearth steel plant in course of erection in Hidalgo; San Miguel Works, at Zacualtipan, built about 1859; 2 single puddling furnaces, one heating furnace, 2 trains of rolls, and one 1-ton hammer; product, rounds and squares up to 4 inches and flats up to 6 inches in width; annual capacity, 1,600 gross tons; brand, "Zacualtipan;" building one 5-ton Siemens open-hearth steel furnace; John Skinfill, Manager. Encarnacion Works, at Encarnacion, built about 1854; 3 puddling furnaces, one heating furnace, 2 trains of rolls, and one 22-cwt. hammer; product, same as San Miguel Works; annual capacity, 1,800 gross tons; brand, "Encarnacion;" Thomas Ivey, Manager. Water and steam power are employed at the San Miguel Works and steam-power at the Encarnacion Works; wood is used for fuel at both works. (Formerly operated by Richard Honey.) *See Furnaces in Durango, Jalisco, and Hidalgo. See Rolling Mills in Durango.*

JALISCO.

Manuel L. Corcuera, Guadalajara. Works (Ferreria de Tula) at Sierra de Tapalpa, district of Sayula. Rolling mill built and put in operation in 1873; 2 single puddling furnaces, 4 forge fires, one heating furnace, one 9-inch and one 12-inch train of rolls, and one 1-ton upright and 2 trip hammers; product, all sizes of merchant iron; annual capacity, 1,800 gross tons. Fuel used, wood. A foundry is connected with the works. *See Furnaces.*

Number of furnaces in Mexico: 13. Of these 12 use charcoal for fuel and 1 uses both coke and charcoal.

Number of rolling mills in Mexico: 6. Of these one is erecting an open-hearth steel plant.

LATEST INFORMATION.

NOTE.—The information given below comprises changes in existing works which were made while the Directory was going through the press, information which was not received in time to appear in its proper place, and descriptions of new enterprises which have since been decided upon. It makes the book complete to the middle of April.

BLAST FURNACES.

The Kelley Mining Company has changed its address from 1440 Broadway to 93–95 Nassau st., New York City. This company operates under lease the Chatham Furnace, at Chatham, New York. (Page 5.)

The Passaic Zinc Company, of Jersey City, N. J., has completed the rebuilding of its furnace in Hudson county, N. J. The furnace was blown in on April 3d. (Page 7.)

The Sheridan Furnaces, at Sheridan, Lebanon county, Pa., formerly operated by William M. Kaufman & Co., have been purchased by The Sheridan Iron Company. The office of the company is at 416 Walnut st., Philadelphia. C. Ross Grubb, President; Louis S. Kite, Secretary and Treasurer. (Page 14.)

Henry S. Eckert, part owner of the Topton Furnace, at Topton, Pa., and owner of the Rohrerstown Rolling Mill, at Rohrerstown, Pa., died on January 10, 1894. (Pages 15 and 111.)

Ruby Furnace, at Colebrook, Pa., formerly operated by Albert Ferguson & Co., has been dismantled. (Page 18.)

The Wheeler Furnace Company is rebuilding its Alice Furnace, at Sharpsville, Pa. (Page 23.)

Little Giant Furnace, Neal Brothers, Germania Bank Building, Pittsburgh. Furnace at Allegheny, Allegheny county, Pa. One stack, 40 x 6, built in 1889 and blown in in July of the same year; cold blast; fuel used, Connellsville coke; product, white and mottled pig iron, made from salamander, buckshot, and Lake Superior hematite; annual capacity, 12,000 gross tons. Brand "Little Giant." A. H. Neal, Superintendent.

Bristol Furnace, of the Bristol Iron and Steel Company, of Bristol, Tenn., (furnace on Virginia side of State line, in Washington county,) is to be sold by order of court on June 28, 1894. (Page 30.)

The new Rockwood Furnace of the Roane Iron Company, at Rockwood, Tenn., was blown in on January 6, 1894. (Page 38.)

The Southern Iron Company, of Nashville, Tennessee, has been reorganized and its name changed to "The Central Iron Company." The

officers of the new company are Robert Ewing, President, and J. A. Cooper, Secretary and Treasurer. (Pages 40, 46, and 145.)

Bear Spring Furnace, (charcoal,) in Stewart county, Tennessee, which has been idle for a number of years, has been revived. The furnace is owned by the Cumberland Lands Limited, and is operated by White, Dixon & Co., of Bear Spring, under lease. The telegraph address of the furnace is Erin. One stack, 47 x 9½, built in 1832, abandoned in 1854, rebuilt in 1873, and repaired in 1893–4; last blown in in February, 1894; cold blast; fuel used, charcoal; ore, local brown hematite; annual capacity, 5,000 gross tons. Brand, "Dover." George W. Dixon, Superintendent. Selling agent, J. H. Hillman, Pittsburgh.

E. A. Uehling has resigned as Furnace Manager of the Sloss Furnaces, at Birmingham, Alabama. J. H. McCune, assistant to the President, has assumed the duties of the position. (Page 44.)

The pig-iron commission firm of Warren, Wood & Co., of New York City, has been dissolved. The business will be continued by Henry M. Warren & Co., with offices at 115 Broadway, New York City, and 70 Kilby st., Boston. (Page 46.)

The Round Mountain Furnace Company, with headquarters at Chattanooga, Tenn., is now operating the Round Mountain Furnace, at Round Mountain, Alabama. L. S. Colyar, President; Jo. C. Guild, Vice-President; E. Shackleford, Secretary; E. B. Pennington, Superintendent. (Page 48.)

The property of the Lone Star Iron Company, at Jefferson, Marion county, Texas, was ordered by the court to be sold on May 1st, but the sale did not take place. The plant consists of the Jefferson charcoal blast furnace and a partly-erected rolling mill. (Pages 48 and 148.)

Star and Crescent Furnace, of The Cherokee Iron Manufacturing Company, at Rusk, Texas, has been sold to Frank A. Daniels, of New Orleans, La., acting as trustee for the bondholders. It has not yet been decided whether the plant will be operated by the trustee or offered for sale. (Page 49.)

Vesuvius Furnace, of the Ironton Coal and Iron Company, at Pedro, Lawrence county, Ohio, has been leased by The Vesuvius Iron Company, of Pedro. W. C. Amos, President, Treasurer, and Selling Agent; A. J. Duteil, Secretary and Manager. (Page 51.)

Lee Burt has been elected President of the Union Iron Company, of Detroit, Michigan, in place of Austin Burt, deceased. (Page 61.)

Robert Kelly has been appointed Receiver of the West Superior Iron and Steel Company, of West Superior, Wis. (Pages 63 and 175.)

Eagle Furnace, of the Eagle Iron Company, at Spring Valley, Pierce county, Wisconsin, was blown in on February 20, 1894. (Page 63.)

The Midland Blast Furnace Company, of 411 Olive st., St. Louis, Mo., has abandoned its charcoal furnace at Midland, Crawford county, Mo. (Page 65.)

ROLLING MILLS AND STEEL WORKS.

The American Steel Casting Company, main office, Thurlow, Pa., has purchased the plants of the Syracuse Steel Foundry Company, of Syracuse, N. Y.; the Norristown Steel Company, of Norristown, Pa.; the Standard Steel Casting Company, of Thurlow, Pa.; the Sharon Steel Casting Company, of Sharon, Pa.; and the Solid Steel Company, of Alliance, Ohio. J. K. Bole is President of the new company; Daniel Eagan, Vice-President; Augustus Trump, Secretary; and S. J. Williams, Treasurer. The Executive Committee consists of J. K. Bole, of Alliance, Ohio; Daniel Eagan, of Sharon, Pa.; and Fred. Frazer, of Syracuse, N. Y. (Pages 84, 98, 102, 133, and 157.)

Messrs. A. & P. Roberts & Co., of the Pencoyd Iron Works, 261 South Fourth st., Philadelphia, Pa., have established an office in Room 905, Havemeyer Building, New York City. (Page 91.)

The Thorndale Iron Works, at Thorndale, Chester county, Pa., are for sale. (Page 102.)

The officers of the Wellman Iron and Steel Company, of Thurlow, Pa., are now as follows: S. T. Wellman, President, and Richard Peters, Jr., Secretary. The company has discontinued its Philadelphia office. (Page 103.)

The rolling mill of the Logan Iron and Steel Works, at Burnham, Mifflin county, Pa., was partly destroyed by fire on April 17th. The works will be rebuilt at once, and will be equipped with the latest improved machinery. (Page 108.)

The Ellwood Tin Plate Company, of Ellwood City, Lawrence county, Pa., has elected the following officers: H. A. Bishop, President; A. W. Brown, Vice-President and General Manager; Charles Babcock, Treasurer; J. R. Phillips, Secretary. (Page 130.)

The Saltsburg Rolling Mill Company is the name adopted by the organization which is erecting a rolling mill at Saltsburg, Pa. S. A. Gourley, President; W. F. Stitt, Treasurer; Gill Stitt, Secretary. (Page 135.)

The officers of the Norton Iron Works, of Ashland, Boyd county, Kentucky, are now as follows: M. H. Houston, President; T. M. Adams, Vice-President; John Russell, Treasurer; J. Russell Houston, Secretary. (Page 144.)

The Springfield Iron Company, of Springfield, Illinois, has removed its St. Louis office from the Laclede Building to the Union Trust Building. (Page 171.)

The American Steel Foundry Company, of Granite City, Madison county, Illinois, proposes to erect at Granite City three 15-gross-ton open-hearth steel furnaces for the manufacture of both acid and basic steel castings. The main office of the company is in the Wells Building, St. Louis, Mo. Rolla Wells, President; Edward F. Goltra, Vice-President and Manager; L. J. Hayward, Secretary and Treasurer.

The Kansas City Steel and Iron Works have been organized for the purpose of manufacturing cast steel at Topeka, Kansas. F. Burleigh Johnson, President, 820 Kansas ave., Topeka.

Continental (The) Tin Plate Works, Gummey, Spering & Co., Twenty-sixth st. and Washington ave., Philadelphia, Pa., which now operate a tinplate plant, contemplate erecting a rolling mill for the manufacture of black plates. (Page 212.)

Pittsburgh Tin Plate Works, New Kensington, Westmoreland county, Pa., which now operate a tinplate plant, are preparing to erect a four-mill plant for rolling black plates. (Page 214.)

Chicago (The) Stamping Company, Congress and Green sts., Chicago, Ill., which now operates a tinplate plant, contemplates erecting a rolling mill for the manufacture of black plates. (Page 217.)

Chicago (The) Tin Plate Manufacturing Company, 533 Rookery Building, Chicago, Ill., with tinplate works at Wentworth ave. and Fortieth st., contemplates erecting or leasing a rolling mill for the manufacture of black plates. (Page 217.)

Elwood Tin Plate Company, Elwood, Madison county, Indiana, contemplates erecting a rolling mill for the manufacture of black plates; also a tinplate plant with 10 tinning sets. (Page 218.)

Montpelier Sheet and Tin Plate Company, Montpelier, Blackford county, Indiana, contemplates erecting a rolling mill for the manufacture of black plates and a tinplate plant at Montpelier. (Page 218.)

TINPLATE WORKS.

The Phillips Tin Plate Company, of Philadelphia, has removed its office from 200 Walnut Place to 918 Filbert st. (Page 214.)

The Granite Iron Rolling Mills of the St. Louis Stamping Company, at St. Louis, Mo., now have 14 tinning sets, 8 for tinplates and 6 for terne plates. (Page 217.)

STAMPING WORKS.

Adams (The) and Westlake Company, 110 Ontario st., Chicago, Ill. Product, tinned stamped ware, lanterns, etc.

MISCELLANEOUS.

The cast-iron pipe works of The Glamorgan Pipe and Foundry Company, at Lynchburg, Va., were destroyed by fire on April 10th. They will be rebuilt at once. (Page 243.)

The name of the Phœnix Building, in Chicago, has been changed to the Western Union Building.

MEXICO.

Ferreria del Salto, LaGlise & Sons, Toluca, State of Mexico. One small charcoal blast furnace, located 32 miles west of Toluca; water-power; ore, local hematite.

INDEX TO NAMES OF WORKS.

NOTE.—This index includes all the blast furnaces, rolling mills, steel works, tinplate works, and forges and bloomaries which are named in this Directory.

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