THE

IRON AND STEEL WORKS

OF

THE UNITED STATES,

ALSO OF CANADA AND MEXICO.

1896.

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 WIRE-ROD MILLS, WIRE MILLS, CUT-NAIL WORKS, WIRE-NAIL AND HORSE-NAIL WORKS, CAR-AXLE WORKS, CAR-WHEEL WORKS, CARBUILDING WORKS, LOCOMOTIVE WORKS, CAST AND WROUGHT-IRON PIPE WORKS, MALLEABLE IRON WORKS, SHIPBUILDING WORKS, 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.

THIRTEENTH EDITION. CORRECTED TO JANUARY 1, 1896.

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PREFACE TO THE THIRTEENTH EDITION.

We present herewith to the American Iron Trade the thirteenth edition of the Directory to the Iron and Steel Works of the United States, the first edition of which was published in 1873. For a number of years the Directory has appeared regularly every two years, the twelfth edition appearing early in 1894. Another edition need not be expected until 1898. In the present edition the descriptions of all the iron and steel works of the country which were mentioned in previous editions have been entirely rewritten, while all new iron and steel enterprises originating during the past two years have been fully described, the information given coming in all cases direct from the manufacturers. During these two years there has been an exceptionally large number of changes in the equipment of iron and steel works and in the officers intrusted with their management, while some old firms and companies have retired from business, in some instances being succeeded by new organizations and in others leaving no successors. In the same two years a very large number of entirely new iron and steel enterprises have been undertaken. In the new enterprises referred to sheet mills and tinplate works are most prominent, and of these a surprisingly large number have been built. Iron and steel works that have long been abandoned, and whose fate has been noted in previous editions, are generally omitted from the present edition, but all recently abandoned or likely to be long inactive works are retained and classified separately from other works.

This edition of the Directory embraces 334 printed pages, a larger number than any of its predecessors. In addition to all the old features an entirely new feature will be found in a complete list of the malleable iron works of the country, occupying several pages. The body of the volume brings down all changes and new enterprises to January 1, 1896, but later changes and newer enterprises will be found noted in a supplementary chapter immediately preceding the indexes. The latter, in connection with the table of contents, form a perfect guide to every paragraph of the Directory, which may be briefly summarized to include a complete list of all the blast furnaces, rolling mills, Bessemer steel works, open-hearth steel works, crucible steel works, plate and sheet mills, cut-nail works, tinplate works, stamping works, forges and bloomaries, wire-rod and wire mills, wire-nail works, iron and steel bridgebuilders, iron and steel shipbuilders, horse-nail works, locomotive works, malleable iron works, cast-iron pipe works, wrought-iron and wrought-steel pipe works, car-axle works, car-

wheel works, and carbuilders in the United States; also a list of the iron and steel works in Canada and Mexico. The present edition is the most comprehensive and the most complete of the whole series. Descriptions of plants are usually fuller than in any previous edition, and more attention than heretofore has also been given to the presentation of the names of selling agents.

Blast Furnaces.—In the Directory for 1876, twenty years ago, we enumerated and described 713 blast furnaces which were then active or which it was supposed would some day become active, their total annual capacity being 4,856,455 gross tons. In the edition for 1892 we enumerated 569 furnaces, with an annual capacity of 14,550,708 tons, and in the edition for 1894 we enumerated 519 furnaces, with an annual capacity of 16,271,027 tons. In the present edition we enumerate 469 furnaces, or just 100 less than in 1892 and just 50 less than in 1894. Yet with this great reduction in the number of active furnaces or of furnaces that may some day become active the annual capacity has increased to 17,373,637 tons in 1896, or 2,822,929 tons more than in 1892 and 1,102,610 tons more than in 1894.

In 1876 the average annual capacity of all the furnaces was 6,811 gross tons; in 1896 the average annual capacity is 37,044 tons. With 244 fewer furnaces than in 1876 we now have more than three and a half times the furnace capacity of that year.

These figures indicate a very great change in furnace construction and management in the last twenty years. Merciless competition, better methods of manufacture, better ores and better fuel, favored manufacturing localities, the constant tendency to lower prices, and the crushing effects of the panic of 1893 have combined to place the manufacture of pig iron in this country in 1896 in few and strong hands.

When the Directory for 1894 appeared not one new furnace in the United States was being built. In the present edition we enumerate 10 new furnaces in a more or less advanced stage of construction, and 14 other furnaces which have been projected and upon some of which work has been commenced but is now suspended. It is impossible to fix the exact status of these 24 furnaces, but it is probable that some will never be built, while several years may elapse before a number of the others will be completed. Of the furnaces that will surely be completed at an early day special mention may be made of the four new Duquesne furnaces of the Carnegie Steel Company, Limited. These four furnaces will each be 100 feet high by 22 feet in width at the boshes, and they will have an aggregate annual capacity of 700,000 gross tons. They will be the largest furnaces in the world.

In the present edition we have transferred to the abandoned list 54 furnaces which were classed in 1894 among the furnaces that were then active or likely to become active at some future time. Work has also been suspended upon 1 furnace which was being rebuilt two

years ago and was then counted as a completed furnace, and this furnace has therefore been placed among the partly erected furnaces, making a total of 55 furnaces which have been taken from the active list of 1894. Since the appearance of the Directory for that year there have been built and revived 5 furnaces, making the net reduction in the list of completed furnaces from 1894 to 1896 exactly 50, as already stated.

Of the 54 furnaces now transferred to the abandoned list 21 are in Pennsylvania, 5 in New York, 5 in Michigan, 4 in Virginia, 4 in Wisconsin, 3 in Ohio, 2 each in New Jersey, Maryland, Tennessee, and Illinois, and 1 each in Massachusetts, Connecticut, Alabama, and Missouri. Of the 5 furnaces which have been built or revived since the appearance of the last Directory 1 is in New York, 2 are in Pennsylvania, 1 is in Tennessee, and 1 is in Ohio. Of the 10 furnaces now in course of erection or upon which preliminary work has been done 4 are in Pennsylvania and 4 in Ohio, 1 is in Michigan, and 1 is in Utah. When completed 8 of these furnaces will use coke for fuel and 2 will use charcoal. Of the 14 partly erected and projected furnaces 1 is in New York, 3 are in Pennsylvania, 3 are in Virginia, 3 are in Tennessee, and 4 are in Alabama.

Of the 469 furnaces described in the present edition of the Directory 96 use charcoal as fuel, against 118 in the edition for 1894, and 373 use anthracite and bituminous coal and coke, against 401 in 1894. The total annual capacity of the 96 charcoal furnaces which are described in the present Directory is 1,098,550 gross tons, and the total annual capacity of the 118 charcoal furnaces which were described in 1894 was 1,285,440 tons. It will be noted that, while the aggregate furnace capacity of the country has increased 1,102,610 tons from 1894 to 1896, that of the charcoal furnaces alone actually decreased 186,890 tons.

The average annual capacity of the charcoal furnaces described in 1894 was 10,894 gross tons, and the average annual capacity of the charcoal furnaces described in 1896 is 11,443 tons. The average annual capacity of all the furnaces using mineral fuel in 1894 was 37,371 gross tons, and the average annual capacity of all the mineral fuel furnaces in 1896 is 43,633 tons.

Rolling Mills and Steel Works.—In the present edition of the Directory we enumerate and describe 505 completed rolling mills and steel works, of which 463 contain trains of rolls and 42 have no rolls. In the edition of 1894 we described 487 completed rolling mills and steel works. In the intervening time 41 new rolling mills and steel works have been built, 22 have been abandoned, and 1 which has heretofore been counted as a completed works has been placed in our list of mills commenced but not completed, as it has not been fully equipped with rolling mill machinery. The net increase in the period mentioned is, therefore, 18. In January, 1896, there were 5 rolling mills

and steel plants in course of erection, against 8 building and 1 rebuilding in the early part of 1894.

Puddling Furnaces.—The number of puddling furnaces connected with rolling mills in January, 1896, each double furnace being considered as the equivalent of two single furnaces, was 4,408, against 4,715 early in 1894, a decrease of 307 furnaces. The highest number of puddling furnaces reported in any edition of the Directory was in 1884, when 5,265 were mentioned. In 1892 there were still 5,120 in existence. Since that year the number has steadily declined, but not so rapidly as many have supposed. The most notable abandonment of puddling furnaces that has taken place in recent years has occurred at the American works of Jones & Laughlins Limited. In 1894 this firm reported 92 single puddling furnaces as still forming part of its plant; in the present edition only 15 single puddling furnaces are reported, and on February 8 the last of these 15 furnaces was dismantled. Hereafter this firm will manufacture only steel.

Bessemer Steel Works.—Since the appearance of the Directory for 1894 we have built 5 new standard Bessemer steel plants—one at Lorain, Ohio, by the Johnson Company, to make girder and T rails and street railroad specialties; one at Youngstown, Ohio, by the Ohio Steel Company, to make sheet and tinplate bars, slabs, and small billets; one at Columbus, Ohio, by the King, Gilbert, and Warner Company, to make steel slabs, billets, and sheet bars; one at Alexandria, Indiana, by the Union Steel Company, to make ingots, billets, bars, sheets, small rails, shapes, etc.; and one small converter at East Chicago, Indiana, by the Potter and Hollis Foundry Company, of Chicago, to make steel castings by the Walrand-Legenisel process, the capacity of the converter being only 1,000 pounds. After running this converter for a short time in 1895 at East Chicago the company has removed it in 1896 to Chicago, Illinois, where it is now in operation. A 2-gross-ton Robert-Bessemer converter was also built at East Chicago, Indiana, in 1894, by the Drexel Railway Supply Company, of Chicago, for the production of steel castings, but it was abandoned in 1895, after being operated for about one year. Since January, 1894, 4 standard Bessemer steel plants have been abandoned—1 in Pennsylvania, 2 in Ohio, and 1 in Illinois, and in the same period 1 Clapp-Griffiths and 2 Robert-Bessemer steel plants have been abandoned. In addition to the above the partly completed 4-gross-ton standard Bessemer converter at Sharon, Pa., work upon which was commenced in 1891 by the Sharon Steel Casting Company, has also been abandoned. Including the Walrand-Legenisel plant we now have 44 standard Bessemer steel works, with 99 converters, against 43 in 1894, with 95 converters. We also have 3 Clapp-Griffiths and 3 Robert-Bessemer steel plants, with 10 converters, but even these are not all in operation. The annual converting capacity of all the standard Bessemer steel plants in January,

1896, built and building, was 9,472,350 gross tons of ingots and direct castings, against 7,740,900 tons in January, 1894. This is a very great increase. But few direct castings are made at Bessemer steel works.

Open Hearth Steel.—We have built 11 new open-hearth steel plants since the appearance of the Directory for 1894, while 4 have been burned or abandoned, showing a net increase of 7 plants. We now have 88 completed open-hearth steel plants, and in addition 4 new plants are now in course of erection—1 in New York, 2 in Pennsylvania, and 1 in Indiana. The annual capacity in ingots and direct castings of the open-hearth steel plants in January, 1896, built and building, was 2,430,450 gross tons, against 1,740,000 tons in January, 1894, a surprisingly large increase. During the past two years rapid progress has been made in the manufacture of basic steel in open-hearth furnaces.

Open Hearth Steel Castings.—In 1894 there were 28 open-hearth plants which were prepared to make direct castings, and in 1896 there are 35 plants which are similarly equipped. In addition 1 plant for the manufacture of open-hearth steel castings is now being built. The manufacture of steel castings has grown so rapidly in late years that it has wrought a great change in our general foundry practice.

Basic Steel.—The manufacture of basic steel in this country is now wholly confined to works which have open-hearth steel plants. At a large number of these works basic steel is now regularly manufactured, and at some works it is almost if not altogether exclusively manufactured. All the manufacturers of open-hearth steel do not specify in the descriptions which they have sent to us for the Directory whether they make basic or acid steel, or both. In view of the rapid strides that have been made in the last few years in the manufacture of basic open-hearth steel the distinction is not necessary. We know definitely, however, that about one-half the open-hearth steel works of the country which produce ingots now make basic steel.

While the manufacture of basic Bessemer steel has no existence in this country to-day it is worthy of mention that the Troy Steel Company proposes to make basic Bessemer steel with three 15-gross-ton converters at its new works now being erected on Breaker Island.

Crucible Steel Works.—In the present edition of the Directory we enumerate 3 crucible steel plants less than in the edition of 1894, 8 plants having been abandoned in the meantime and 5 having been built. We now have 45 completed crucible steel plants, against 48 completed and 1 building in 1894. The aggregate annual capacity of the existing crucible steel works is 98,700 gross tons.

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, there were 55 mills and 5,094 nail machines. In January,

1896, there were 53 mills and 4,598 nail machines. These figures show a decrease of 948 nail machines in four years.

Wire Rods and Wire.—In the present Directory we enumerate 23 works which are equipped for rolling iron or steel wire rods, against the same number in 1894, and 73 completed iron or steel wire-drawing plants, and in addition 1 plant to be rebuilt, against 64 in 1894 and 1 in course of erection.

Wire Nail Works.—In the Directory for 1894 we enumerated 54 completed and 1 partly-erected wire-nail works. In the present edition we enumerate 53 completed wire-nail works and 1 works to be rebuilt. The capacity of the wire-nail works is now much greater than in 1894, the nominal decline in the whole number possessing no significance.

Structural Steel.—The works which make structural iron and steel will be found classified with the rolling mills and steel works. Of these there are about 40, but a few are now idle and others make only small sizes of structural material. Most of the large works make only steel shapes. During the past two years our capacity for the production of structural material has greatly increased.

Plate and Sheet Mills.—Included in the rolling mills and steel works already mentioned are the plate and sheet mills. Of these we now enumerate and describe 156 completed plants, 3 in course of erection, and 2 partly completed. In 1890, before our tinplate industry had obtained a foothold, there were 129 plate and sheet mills and 3 in course of erection. Most of the new mills that have since been built have been designed to meet the demand for black plates, or sheets, for tinning and terne plating, and many of the mills which were in existence in 1890 have been enlarged or changed to meet the same demand. In the present edition of the Directory 41 completed rolling mills are specifically named as making black plates for tinning, while 3 works of like character are in course of erection. Our armor-plate works are included with the plate works. For two years and more they have fully met the exacting requirements of the Government for the supply of armor plate in the construction of our new navy.

Tinplate Works.—In our Annual Report for 1890, printed in April, 1891, we announced that at 3 works in the country bright tinplates were then manufactured and that terne plates were manufactured at another works, while 2 additional tinplate plants were in course of erection. It was also stated that "other firms and companies are reported to be considering the advisability of engaging in the manufacture of tinplates and terne plates." 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 works were in course of erection. In the Directory for 1894 we described 56 completed works, 2 building, and 1 additional works which was partly erected. In the present edition we describe 69 completed works, 4 in

course of erection, and 1 works which are being rebuilt. Practically all the works now erected have been built since the passage of the tariff of 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 1894 we enumerated 25 forges and bloomaries, and we now enumerate 23, most of which are pig-and-scrap forges. In the whole South, where formerly there were literally hundreds of Catalan forges, making small quantities of wrought iron directly from the ore, there is now only one active forge of this character left—Helton Forge, at Crumpler, Ashe county, North Carolina. In 1876 there were 27 forges in New York which made iron directly from the ore; there are now only 7.

Miscellaneous Works.—In addition to the works which have already been mentioned we enumerate in the present edition 27 completed stamping works and 1 rebuilding; 74 iron and steel bridgebuilding works; 36 iron and steel shipbuilding yards; 13 horse-nail works; 22 locomotive works; 82 malleable iron works; 70 completed cast-iron and cast-steel pipe works and 1 partly erected; 38 completed wrought-iron and wrought-steel pipe, iron and steel riveted pipe, and seamless tube works, and 1 building; 64 completed car-axle works and 2 building; 112 completed car-wheel works and 1 partly erected; and 112 car-building works.

Natural Gas.—In the present Directory we enumerate 89 completed works which use natural gas in whole or in part, exactly 10 more than two years ago—45 in Allegheny county, Pa., 16 in other counties of Western Pennsylvania, 1 in West Virginia, 5 in Ohio, and 22 in Indiana. One works now being built in Indiana will also use natural gas. It is in Indiana chiefly that the use of natural gas in iron and steel works has been extended during the last few years. In January, 1892, only 6 works in that State used this fuel. It must be frankly added that the total consumption of natural gas in the iron and steel works of the country is growing less and less from year to year.

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 8 blast furnaces and 15 rolling mills and steel works, while Mexico is credited with 14 blast furnaces and 6 rolling mills and steel works. A new and large furnace has just been blown in at Hamilton, in Canada, and another rolling mill is being built in Canada. The iron and steel industry of the Dominion is making excellent progress.

No. 261 South Fourth Street, Philadelphia, March 1, 1896. J. M. S.

SUMMARY BY STATES.

Blast Furnaces.

States.	Furnaces Completed January 1, 1896.				Furnaces Building January 1, 1896.				Annual Capacity of Completed Furnaces January 1, 1896, in gross tons.			
	Anthracite.	Bituminous.	Charcoal.	Total.	Anthracite.	Bituminous.	Charcoal.	Total.	Anthracite.	Bituminous.	Charcoal.	Total. Gross tons.
Massachusetts,	. .	. .	3	3	. .	. .	. .	. .	. . .	. . . .	15,000	15,000
Connecticut, .	. .	. .	6	6	. .	. .	. .	. .	. . . .	. . . .	28,500	28,500
New York, . .	15	3	5	23	. .	. .	. .	. .	446,600	245,000	33,000	724,600
New Jersey, .	12	. .	. .	12	. .	. .	. .	. .	252,162	. . .	. . . .	252,162
Pennsylvania,	90	76	13	179	. .	4	. .	4	2,457,725	4,575,500	48,350	7,081,575
Maryland, . .	. .	5	4	9	. .	. .	. .	. .	. . . .	367,000	26,900	393,900
Virginia, . . .	. .	24	4	28	. .	. .	. .	. .	. . . .	808,500	22,750	831,250
West Virginia,	. .	4	. .	4	. .	. .	. .	. .	. .	231,000	. . . .	231,000
Kentucky, . .	. .	6	3	9	. .	. .	. .	. .	. . . .	207,000	49,500	256,500
Tennessee, .	. .	12	9	21	. .	. .	. .	. .	. . . .	507,000	146,000	653,000
North Carolina,	. .	2	. .	2	. .	. .	. .	. .	. . .	40,200	. . . .	40,200
Georgia, . .	. .	2	3	5	. .	. .	. .	. .	. . .	63,000	38,000	101,000
Alabama, . .	. .	39	12	51	. .	. .	. .	. .	. . .	1,804,000	168,500	1,972,500
Texas, . .	. .	. .	4	4	. .	. .	. .	. .	. .	. . .	52,000	52,000
Ohio, ...	. .	53	10	63	. .	4	. .	4	. . . .	2,377,200	40,050	2,417,250
Indiana, . .	. .	2	. .	2	. .	. .	. .	. .	. . .	27,000	. . . .	27,000
Illinois, . . .	. .	17	. .	17	. .	. .	. .	. .	. .	1,350,700	. . . .	1,350,700
Michigan, .	. .	. .	15	15	. .	. .	1	1	. . . .	. . . .	321,000	321,000
Wisconsin, . .	. .	4	2	6	. .	. .	. .	. .	. . . .	200,500	67,000	267,500
Minnesota, .	. .	1	. .	1	. .	. .	. .	. .	. .	50,000	. . . .	50,000
Missouri, .	. .	3	1	4	. .	. .	. .	. .	. . .	105,000	17,000	122,000
Colorado, . . .	. .	3	. .	3	. .	. .	. .	. .	. . .	160,000	. . . .	160,000
Utah, ...	. .	. .	. .	. .	. .	. .	1	1	. . . .	. . . .	. . . .	. . .
Oregon, ...	. .	. .	1	1	. .	. .	. .	. .	. . .	. . .	15,000	15,000
Washington, .	. .	. .	1	1	. .	. .	. .	. .	. . . .	. . . .	10,000	10,000
Total, . .	117	256	96	469	. .	8	2	10	3,156,487	13,118,600	1,098,550	17,373,637

From January, 1894, to January, 1896, we have transferred to the abandoned list 54 furnaces: 1 in Massachusetts, 1 in Connecticut, 5 in New York, 2 in New Jersey, 21 in Pennsylvania, 2 in Maryland, 4 in Virginia, 2 in Tennessee, 1 in Alabama, 3 in Ohio, 2 in Illinois, 5 in Michigan, 4 in Wisconsin, and 1 in Missouri. During the same period 5 furnaces have been built or revived: 1 in New York, 2 in Pennsylvania, 1 in Tennessee, and 1 in Ohio. On January 1, 1896, there were 14 furnaces which were projected, some of which were partly built and work on them temporarily suspended, located in the following States: New York, 1; Pennsylvania, 3; Virginia, 3; Tennessee, 3; and Alabama, 4.

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.	Walrand Legenisel.	Open-hearth.	Crucible.		
Maine,	1	1	. .	.	. .	.	. .		. .	. .	
New Hampshire,	1	1	. . .	.	. .	.	. .	1	.	.	. .
Massachusetts,	11	10	268	. .	1	. .	.	4	. .	1	.
Rhode Island,	1	1	. .	. .	.	. .	. .	.	. .	.	.
Connecticut,	7	7	. .	. .	.	. .	. .	.	3	. .	.
New York,	23	20	. . .	1	.	. .	. .	3	4	4	7
New Jersey,	20	18	193	. .	.	. .	. .	4	6	. .	1
Pennsylvania,	223	207	1,401	19	2	1	. .	46	21	32	11
Delaware,	9	8	. . .	. .	. .	. .	. .	1	.	. .	.
Maryland,	7	7	. . .	1	.	. .	. .	. .	1	4	1
Virginia,	9	9	137	1	. .	.	. .	. .	.	1	
West Virginia,	7	7	852	2	.	. .	. .	. .	. .	2	.
Kentucky,	9	9	126	1			. .	2	. .	1	. .
Tennessee,	5	4	41	1	.		.	1	1	. .	1
North Carolina,	. . .	. .	. .	. .	.		.		. .	. .	1
Georgia,	1	1	. .	.	.	.		.			.
Alabama,	9	8	77		.	. .	. .	2	. .	.	1
Texas,	2	2	. . .	. .	.	.	.	. .	. .	. .	.
Ohio,	67	62	795	7	. .			10	2	13	.
Indiana,	33	29	316	3		. .	1	3	1	6	.
Illinois,	27	25	279	5	.	1	.	7	1	3	. .
Michigan,	5	4	. . .	.	. .	1	. .	1	1	1	. .
Wisconsin,	5	3	. .	1	. .	.	. .	.	2	. .	. .
Minnesota,	3	3	. . .		.	.	. .	1	.	. .	. .
Missouri,	7	6	50		.	. .	. .	1	. .	1	. .
Iowa,	2	1	. . .	. .				.	1	. .	.
Kansas,	1	. . .	. .	.		.	.		1	.	. .
Colorado,	2	2	. . .	1		.	. .	.	. .	. .	. .
Wyoming,	1	1	. . .	. .	. .	.		.	.	.	. .
Washington,	1	1	. . .	.	. .	.	.	.	.		. .
Oregon,	1	1	. . .	. .	.	. .	. .	. .	.	. .	.
California,	5	5	63	. .	.	.	. .	1	. .	. .	.
Total,	505	463	4,598	43	3	3	1	88	45	69	23

Number of rolling mills building, 4. Number of steel plants building, 2, one of which is connected with a rolling mill. Number of tinplate works building, 4 and 1 rebuilding.

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

The number of wire-nail works in the United States is 53 completed and 1 to be rebuilt, located in 15 States, as follows: Massachusetts, 6; Rhode Island, 1; Connecticut, 1; New York, 6; New Jersey, 1; Pennsylvania, 8 completed and 1 to be rebuilt; West Virginia, 1; Ohio, 6; Indiana, 3; Illinois, 10; Wisconsin, 3; Missouri, 1; Kansas, 1; Washington, 2; and California, 3.

GRAND SUMMARY.

Iron and Steel Works.	January, 1896.	January, 1894.
Number of completed Blast Furnaces—256 Bituminous, 117 Anthracite and Coke, and 96 Charcoal: total,	469	519
Number of Blast Furnaces building,	10	.....
Annual capacity of completed Blast Furnaces, gross tons,	17,373,637	16,271,027
Annual capacity of the Bituminous Furnaces, gross tons,	13,118,600	11,679,700
Annual capacity of the Anthracite Furnaces, gross tons,	3,156,487	3,305,887
Annual capacity of the Charcoal Furnaces, gross tons,	1,098,550	1,285,440
Number of completed Rolling Mills and Steel Works,	505	487
Number of Rolling Mills and Steel Works building and rebuilding,	5	9
Number of Single Puddling Furnaces, (a double furnace counting as two single ones,)	4,408	4,715
Number of Heating Furnaces,	3,356	3,054
Annual capacity of completed Rolling Mills, double turn, gross tons,	14,763,920	12,477,890
Number of Rolling Mills having Cut-nail Factories,	53	55
Number of Cut-nail Machines,	4,598	5,094
Number of Wire-nail Works,	53	54
Number of completed standard Bessemer Steel Works,	43	43
Number of Bessemer Steel Works building,	.....	1
Number of standard Bessemer Converters,	99	95
Annual capacity (built and building) in ingots and direct castings, gross tons,	9,472,350	7,740,900
Number of completed Clapp-Griffiths Steel Works,	3	4
Number of Clapp-Griffiths Converters,	5	7
Number of completed Robert-Bessemer Steel Works, 3 completed and 1 partly built,	3	4
Number of Robert-Bessemer Converters—5 completed and 2 partly built,	5	6
Number of Walrand-Legenisel Steel Works,	1	.....
Number of completed Open-Hearth Steel Works,	88	81
Number of Open-Hearth Steel Works building,	4	1
Number of Open-Hearth Steel Furnaces—225 completed, 17 building, and 3 partly built,	225	189
Annual capacity (built and building) in ingots and direct castings, gross tons,	2,430,450	1,740,000
Number of completed Crucible Steel Works,	45	48
Number of Crucible Steel Works building,	.....	1
Number of Steel-melting Pots which can be used at each heat,	3,094	3,103
Annual capacity in ingots and direct castings, gross tons,	98,700	99,000
Number of completed Tinplate Works,	69	56
Number of Tinplate Works building—4 and 1 rebuilding,	4	2
Number of Forges making wrought iron from ore,	9	11
Annual capacity in blooms and billets, double turn, gross tons,	17,075	17,870
Number of pig and scrap iron Bloomaries,	14	14
Annual capacity in blooms, double turn, gross tons,	37,650	30,925

THE

IRON AND STEEL WORKS

OF

THE UNITED STATES.

BLAST FURNACES NOW ACTIVE OR WHICH HAVE RECENTLY BEEN ACTIVE.

Nearly all the furnaces in this list are now active or have recently been in blast. The telegraph address is given only when it is not the same as the post-office address. The dimensions 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 65.

MASSACHUSETTS.

CHARCOAL.

Richmond Iron Works, main office, Richmond Furnace P. O., Berkshire county. Three stacks, all in Berkshire county: Richmond Furnace, at Richmond, 32 x 9½, built in 1829, and rebuilt in 1863; steam-power. Van Deusenville Furnace, at Van Deusenville, 32 x 9½, built in 1834, and rebuilt in 1858; water-power. Cheshire Furnace, at Cheshire, 32 x 9½, 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, 15,000 gross tons of foundry pig iron for cannon, car-wheels, and machinery. Brand, "Richmond." 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 and General Manager, Richmond Furnace.

Number of furnaces in Massachusetts: 3 charcoal stacks.

CONNECTICUT.

CHARCOAL.

Canaan Furnaces, Barnum Richardson Company, Lime Rock, Litchfield county. 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. M. B. Richardson, President; C. W. Barnum, Vice-President; Sidney P. Ensign, Secretary; Porter S. Burrall, Treasurer. Selling agents, C. R. Ellicott & Co., Philadelphia.

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.

Landon Furnace, The Landon Iron Company, Chapinville P. O., Litchfield county. One stack, 32 x 9, built in 1825, burned in 1879, and rebuilt in 1881 and in 1890; steam and water power; one Gifford stove; 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; specialty, high-tensile strength iron; annual capacity, 4,000 gross tons. Brand, "Salisbury-Landon, 1825." F. Kingsbury Curtis, President, and F. J. Kingsbury, Vice-President, 58 William st., New York; A. M. Card, Secretary and Treasurer, 93 Nassau st., New York. General sales agents, C. R. Ellicott & Co., Philadelphia.

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, malleable castings, ordnance, and machinery; annual capacity, 5,000 gross tons. M. H. Robbins, President; Milo B. Richardson, Secretary and Treasurer. Selling agents, C. R. Ellicott & Co., Bullitt Building, Philadelphia.

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

Number of furnaces in Connecticut: 6 charcoal stacks.

NEW YORK.

ANTHRACITE AND MIXED ANTHRACITE AND COKE.

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; fuel, anthracite coal and coke; ores, magnetic from Northern New York, hematite and carbonate from Eastern New York, and Lake Superior; 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 16, 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, 36,000 gross tons. Brand, "Cedar Point."

Charlotte Furnace, Charlotte Iron Works, P. O. Box 218, Charlotte, Monroe county. 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 and Treasurer; H. P. Roberts, Secretary.

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." James P. Dickson, President, and Talbot Olyphant, Secretary and Treasurer, 21 Cortlandt st., New York. Sales made from the New York office of the company.

Franklin Iron Works, Franklin Iron Manufacturing Company, Franklin Iron Works P. O., Oneida county. One stack, 70 x 15, 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. Brand, "Franklin." A. E. Hedstrom, President, Buffalo, New York; W. A. Holden, Treasurer, Syracuse; C. H. Smyth, Secretary and Superintendent, at the works. Selling agents, Holden & Son, Syracuse.

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; fuel, anthracite coal; 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; 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." (Contemplate abandoning both stacks and erecting a new one, 75 x 16, in 1896.) 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; specialty, foundry pig iron; annual capacity, 18,000 gross tons. 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, and for sale.

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; fuel, anthracite coal and coke; ores, ⅓ Dutchess county brown hematite, ⅓ Port Henry magnetic, and ⅓ Forest of Dean, Orange county; 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 (The) Steel 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. (Formerly operated by the Troy Steel and Iron Company.) *See Rolling Mills and Steel Works.*

Number of anthracite and mixed anthracite and coke furnaces in New York: 15 completed stacks and 1 stack projected.

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; fuel, coke; ore, Lake Superior hematite; 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.

Niagara Furnaces, Tonawanda Iron and Steel Company, North Tonawanda, Niagara county. Two stacks: one, 76 x 17¾, built in 1873, and rebuilt in 1890–1; the other, 80 x 18, built in 1895; six Cowper-Kennedy stoves, three 70 x 18 and three 80 x 18; fuel, coke; ores, hematite and specular from Lake Superior; product, foundry and malleable pig iron; total annual capacity, 165,000 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., Cincinnati, Buffalo, and branch houses.

Number of coke furnaces in New York: 3 stacks.

CHARCOAL.

Chateaugay Ore and Iron Company, Plattsburgh, Clinton county. Two stacks in Clinton county: Plattsburgh Furnace, at Plattsburgh, 55 x 9½, 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, L. J. Wood, Cashier, and J. N. Stower, General Manager, Plattsburgh; Frank E. Smith, Vice-President, and Talbot Olyphant, Treasurer, 21 Cortlandt st., New York. *See Forges.*

Chatham Furnace, Kelley Mining Company, lessee, 93–95 Nassau st., New York City. Furnace at Chatham, Columbia county. One stack, 32 x 9, built in 1873; put in blast in July, 1873; warm blast; open top; ores, brown hematite from West Pittsfield, Mass., and "Harlem Valley" hematite from Columbia and Dutchess counties; product, pig iron for car-wheels, cannon, malleable castings, 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; William V. Reynolds, Secretary. Owned by the Chatham Furnace Company, Chatham, New York.

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, pig iron for car-wheels, chilled rolls, and gun-metal; annual capacity, 5,500 gross tons.

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

Number of charcoal furnaces in New York: 5 stacks. Total number of furnaces in New York: 23 completed stacks and 1 stack projected.

NEW JERSEY.

ANTHRACITE AND MIXED ANTHRACITE AND COKE.

Andover Iron Works, Andover Iron Company, Phillipsburg, Warren county. Two stacks: No. 1, 75 x 16, built in 1848, and rebuilt in 1886; and No. 3, 60 x 18, built in 1848; remodeled since that date; No. 1 furnace has three Siemens-Cowper-Cochrane stoves and No. 3 has three iron stoves; fuel, anthracite coal and coke; ores, magnetite from the company's mines and Lake Superior red hematite; product, foundry and forge pig iron; total annual capacity, 45,000 gross tons. Brand, "Andover." (No. 2 stack, 75 x 18, built in 1848, abandoned.) William A. Ingham, President, and Charles Gilpin, Jr., Secretary and Treasurer, 240 South Third st., Philadelphia; S. B. Patterson, 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; annual capacity, 26,000 gross tons. Walter Scranton, President, Moses Taylor Pyne, Vice-President, and James P. Higginson, 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 17 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; specialty, No. 2 foundry and gray forge pig iron; total annual capacity, 51,000 gross tons. Brand, "M. I. W." H. M. Howe, President, and John J. Kirk, Secretary and Treasurer, 229 Drexel Building, Philadelphia; Henry W. Lloyd, Agent, 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, Treasurer, 52 Wall st., New York; W. P. Hardenbergh, Manager, Newark.

Oxford Iron Works, Oxford Iron and Nail Company, Oxford, Warren

county. Main office, 26 Exchange Place, New York. One stack, 63 x 17½, 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 bar iron, nails, etc., by the company, only a small quantity of foundry pig iron being made and sold to other parties. *See Rolling Mills.*

Passaic Zinc Company, Jersey City. Furnace in Hudson county. One stack, 45 x 10, built in 1883, and first put in blast in February, 1884; rebuilt in 1894; four 21-pipe Cooper-Durham stoves; fuel, anthracite coal; product, spiegeleisen from zinc residuum; annual capacity, 7,-300 gross tons. Brand, "Passaic Zinc Co." 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; fuel, ⅞ anthracite coal and ⅛ Connellsville coke; ores, New Jersey magnetic and foreign; product, foundry, gray forge, and Bessemer pig iron; iron actually made in one year, 24,862 gross tons. Brand, "Pequest." B. F. Fackenthal, Jr., General Manager, Riegelsville, Pa. (Ringwood Furnace, at Hewitt, 48 x 13, altered from charcoal to anthracite in 1872, and idle for several years, abandoned in 1893.) *See Durham Iron Works, Lehigh Valley, Pennsylvania.*

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

Wharton Furnace, Edward Kelly, Manager, Port Oram, Morris county. One stack, 75 x 15, built in 1868, first blown in in 1869, remodeled in 1889, and old stack replaced by new steel shell stack in 1892; three regenerative hot-blast stoves; fuel, anthracite coal and coke; ores, North Jersey magnetic and Lake Superior hematite; product, neutral foundry, forge, and basic open hearth pig iron; annual capacity, 45,000 gross tons. Brand, "Wharton." (Formerly called Port Oram Furnace.) Joseph Wharton, proprietor, Philadelphia. Selling agents, Hugh W. Adams & Co., 15 Beekman street, New York City.

Number of furnaces in New Jersey: 12 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, abandoned.) C. Pardee, President, and C. F. Howell, Secretary and Treasurer, Philadelphia; Edward T. Clymer, Manager, Allentown.

Allentown (The) Rolling Mills, 229 Drexel Building, Philadelphia. Works at Allentown. Two stacks, each 65 x 16, built in 1864; open tops; two old style cast-iron stoves; 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. Six stacks, five at South Bethlehem and one at Bingen, all in Northampton county: No. 1, 61 x 15½, built and blown in in 1863; No. 2, 70 x 16, built and blown in in 1867, and rebuilt in 1877; No. 4, 70 x 15, built in 1874–5, and blown in in 1876; No. 5, 70 x 16, built in 1874–5, and blown in in 1877; No. 6, 70 x 16, built in 1881, and blown in in 1883; No. 7, (Bingen,) 65 x 16, situated at Bingen, built in 1870; Nos. 2, 4, 5, and 6 are equipped with twelve Siemens-Cowper-Cochrane stoves; the others have iron stoves. Fuel, anthracite coal and Connellsville coke; product, Bessemer pig iron, from local and foreign hematite and magnetic ores; total annual capacity, 225,000 gross tons. Foundations for Furnace No. 8 laid in 1892; work suspended. (No. 3 Furnace, built in 1868, has been dismantled.) *See Rolling Mills and Steel Works.*

Carbon Iron Works, Carbon Iron and Steel Company Limited, Mauch Chunk. Works at Parryville, Carbon county. One stack, 65 x 14, built in 1869, and blown in in 1870; rebuilt in 1894–5; 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 Lake Superior and foreign; annual capacity, 38,000 gross tons. Product, "Carbon" foundry iron, "Parry" Bessemer iron, and "Viking" low-phosphorus iron. (One stack, built in 1855, dismantled in 1893, and one stack, built in 1864, dismantled in 1894.) 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, $\frac{5}{8}$ hematite and $\frac{3}{8}$ magnetic, from Pennsylvania, New Jersey, and the Lake Superior region; product, foundry pig iron; total annual capacity, 40,500 gross tons. Brand, "Coleraine." For sale or lease. Address the Fidelity Insurance, Trust, and Safe Deposit Company, 327 Chestnut st., Philadelphia.

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.

Crane Iron Works, 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." R. E. Haistings, President; Leonard Peckitt, Vice-President and General Manager; J. M. Hodge, Secretary and Treasurer. Selling agents for New York and New England, J. W. Quincy & Co., 98 William st., New York.

Crumwold Furnace, Reading Iron Company, Reading. 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, Lake Superior and New York and New Jersey magnetics; product, foundry and forge pig iron; annual capacity, 29,000 gross tons. (Formerly called Emaus Furnace.) Albert Broden, Superintendent. Owned by the Philadelphia and Reading Coal and Iron Company and operated by the Reading Iron Company under a special agreement. *See Reading and Keystone Furnaces, Schuylkill Valley. See Reading Iron Company in Eastern Pennsylvania and Montour Rolling Mills in Central Pennsylvania.*

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 17; No. 3, 80 x 17; 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; fuel, anthracite coal and coke; ores, hematite from Northampton county, Pa., and the Lake Superior region, and magnetic from Morris county, N. J.; 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, 60-62 Devonshire st., 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." 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, 5,000 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.

Lucy Furnace, Lucy Furnace Company, South Bethlehem. Furnace at Glendon, Northampton county. One stack, 65 x 14½, built in 1873, and blown in in 1874; rebuilt in 1879; one Kent double brick oven; fuel, anthracite coal and coke; ores, Lake Superior and foreign; product, Bessemer pig iron; annual capacity, 25,000 gross tons. Brand, "Lucy." (Formerly leased by The Bethlehem Iron Company.) W. A. Wilbur, Manager. Owned by E. P. Wilbur and the Estate of G. B. Linderman.

Macungie Furnace, Macungie Iron Company, Harrison Building, south-

west corner Fifteenth and Market sts., 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 sale or lease.

Northampton Furnace, Northampton Iron Company, Freemansburg, Northampton county. One stack, 65 x 15, blown in July 17, 1873; product, Bessemer pig iron; annual capacity, 15,000 gross tons. W. A. Wilbur, President, and R. M. Gummere, Secretary and Treasurer, South Bethlehem. Furnace has been idle for several years, and is for lease.

Thomas Iron Works, The Thomas Iron Company, Hokendauqua, Lehigh county. Main office, Easton. Ten stacks, located as follows: five at Hokendauqua; two (Lock Ridge) at Alburtis, Lehigh county; one (Keystone) at Glendon, Northampton county; and two (Saucon) at Hellertown, Northampton county. Of the furnaces at Hokendauqua, one stack, No. 1, 80 x 17, was built in 1855 and rebuilt in 1894; two, Nos. 3 and 4, each 60 x 17, were built in 1863; and two, Nos. 5 and 6, each 65 x 17, were built in 1873. 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, 75 x 16, was first put in blast March 25, 1868, and was rebuilt in 1894; and No. 11, 60 x 16, was first put in blast May 25, 1870. 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; product, foundry and forge pig iron; total annual capacity, 240,000 gross tons. Brand, "Thomas." (No. 2 stack, at Hokendauqua, built in 1855, abandoned and dismantled in 1894.) B. F. Fackenthal, Jr., President, W. H. Hulick, Vice-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; Horace Boyd, 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, Easton.

Number of anthracite and mixed anthracite and coke furnaces in the Lehigh Valley: 41 completed stacks and 1 stack projected.

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

Anvil Furnace, Pottstown Iron Company, Pottstown, Montgomery county. 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." Selling agent, J. J. Mohr, Bullitt Building, Philadelphia.

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, "Brooke." 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.

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; partly rebuilt in 1893–4, and work suspended; 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, Estate of James Hooven, deceased, 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." For sale or lease. *See Rolling Mills.*

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. 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. Four stacks: Reading Furnaces, two stacks, each 55 x 14½, built in 1854 and 1873 respectively and 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 Crumwold Furnace, Lehigh Valley. See Reading Iron Company in Eastern Pennsylvania and Montour Rolling Mills in Central Pennsylvania.*

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, Grubb & Kaufman Limited, 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, and rebuilt in 1891; two Ford & Moncur brick stoves;

fuel, anthracite coal and coke; ores, Cornwall and local; product, principally Bessemer and foundry pig iron; total annual capacity, 56,000 gross tons. Brand, "Sheridan" for Bessemer and "Mill Creek" for foundry. Selling agent, J. J. Mohr, Bullitt Building, Philadelphia. Owned by the Sheridan Furnace Company.

Swede Furnaces, R. Heckscher & Sons, Swedeland, Montgomery county. Main office, Manhattan Building, 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" Bessemer 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; fuel, anthracite coal and coke; ores, Lake Superior and local hematite and New Jersey magnetic; 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, Isaac Eckert & Co., lessees, Topton, Berks county. Reading office, 24 North Sixth st. One stack, 70 x 16, built in 1873, remodeled in 1888, and rebuilt in 1892; three Gordon fire-brick stoves; fuel, anthracite coal and coke; ore, Cornwall; product, Bessemer pig iron; annual capacity, 30,000 gross tons. Isaac Eckert, Manager. Iron sold by the company and by J. J. Mohr, Bullitt Building, Philadelphia. Isaac Eckert and the Estate of Henry S. Eckert, owners.

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; fuel, ¾ anthracite coal and ¼ coke; ores, New Jersey and New York magnetites and Lake Superior and foreign; 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 Steel Company, Thurlow, Delaware county. 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: 26 completed stacks and 1 stack partly erected.

UPPER SUSQUEHANNA—MIXED ANTHRACITE AND COKE.

Duncannon Furnace, The Duncannon Iron Company, Duncannon, Perry county. Office, 122 Race st., Philadelphia. One stack, 60 x 15, built in 1853, and rebuilt in 1880; iron stoves; fuel, anthracite coal and coke; 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.*

Lackawanna Furnaces, Lackawanna Iron and Steel Company, Scranton, Lackawanna county. New York office, 52 Wall st. Four stacks: two built in 1849, one in 1854, and one in 1872; sizes, 75 x 20, 75 x 17, 75 x 17, and 75 x 18; one fire-brick and three iron stoves; fuel, anthracite coal and coke; ores, chiefly magnetic from Lake Champlain and Putnam county, N. Y., with some Lake Superior and Cornwall; product, Bessemer pig iron; total annual capacity, 150,000 gross tons. Brand, "Lackawanna." (One stack, 75 x 18, built in 1852, abandoned in 1895.) A. H. Lee, Superintendent of Furnaces. *See Colebrook Furnaces, Lower Susquehanna Valley. See Rolling Mills and Steel Works.*

North Branch Furnaces, North Branch Steel Company, Danville, Montour county. Philadelphia office, Twenty-fifth st. and Washington ave. Two stacks: one, 48 x 16, built in 1867, and one, 60 x 17, 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 Lake Superior; 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: 7 stacks.

LOWER SUSQUEHANNA—COKE AND MIXED ANTHRACITE AND COKE.

Aurora Furnace, Steacy and Denney Company, 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 the 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, and rebuilt in 1885. North Cornwall Furnace, owned by the North Cornwall Furnace Company: one stack, 80 x 18, built in 1872, and rebuilt in 1890. Equipped with Whitwell stoves; fuel, coke; ore, Cornwall exclusively; 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.*

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; fuel, anthracite coal and coke; ores, magnetic from Cornwall, Lebanon county, and Chestnut Hill brown hematite from Silver Spring, Lancaster county; 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.

Colebrook Furnaces, Lackawanna Iron and Steel Company, Scranton. New York office, 52 Wall st. Furnaces at Lebanon, Lebanon county. Two stacks: No. 1, 85 x 19, built in 1881, remodeled in 1887, and rebuilt in 1895; No. 2, 80 x 14, completed in November, 1882; Whitwell stoves; fuel, coke; ore, Cornwall; product, principally Bessemer pig iron; total annual capacity, 100,000 gross tons. (Cornwall Anthracite Furnaces, at Cornwall, two stacks; No. 1, 38 x 12, built in 1854, and No. 2, 38 x 13, remodeled in 1885 and in 1889, abandoned; now used as roasters. Contemplates erecting a new stack at Colebrook, to be 85 x 19.) F. L. Grammar, Superintendent. *See Lackawanna Furnaces, Upper Susquehanna Valley. See Rolling Mills and Steel Works.*

Lebanon Furnaces, B. D. and E. R. Coleman, Managers, Lebanon, Lebanon county. Two stacks: No. 1, 80 x 17, built in 1845, rebuilt in 1868, and again in 1885; No. 3, 65 x 15, 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. Owned by the Estate of Mrs. Debbie B. Coleman, deceased.

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."

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 Paxton Iron and Steel Company. *See Harrisburg Nail Works and Paxton Rolling Mills in Central Pennsylvania.*

Pennsylvania (The) Steel Company, Steelton, Dauphin county. Office, Rooms 312–19 Girard Building, Broad and Chestnut sts., Philadelphia. Five stacks, four owned and one leased, four at Steelton and one at Harrisburg, all in Dauphin county: No. 1, 60 x 14, built in 1872–3, 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. Lochiel Furnace, 65 x 14, at Harrisburg, leased from the Lochiel Furnace Company; built in 1872, first put in blast in April, 1873, and remodeled in 1886; three Whitwell stoves. Fuel, anthracite coal and coke; ores, foreign and domestic hematite and magnetite; product, Bessemer pig iron and spiegeleisen; total annual capacity, 300,000 gross tons. *See Rolling Mills and Steel Works.*

St. Charles Furnace, Charles B. Grubb, Lancaster. Furnace at Columbia, 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.) For sale or lease.

Swatara Furnace, The McCormick Estate, 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, 18,000 gross tons. (Formerly called Union Deposit Furnace.) Idle since 1887, and for sale or lease.

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; product, neutral forge and foundry pig iron; annual capacity, 25,000 gross tons. Brand, "Vesta." *See Rolling Mills.*

Number of mineral fuel furnaces in the Lower Susquehanna Valley: 21 completed stacks and 1 stack projected.

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; F. B. Hawkins & Co., 35 Broadway, New York. Owned by the Bellefonte Furnace Company, Bullitt Building, Philadelphia.

Blair Furnace, Cambria Iron Company, Harrison Building, southwest corner Fifteenth and Market sts., Philadelphia. Furnace at Hollidaysburg, Blair county. One stack, 59 x 14, built in 1856, and rebuilt in 1883–4 and in 1892; fuel, Bennington coke; ores, local hem-

atite, Menominee hematite, and foreign; product, spiegeleisen and other pig iron; annual capacity, 20,000 gross tons. (One stack, built in 1856, dismantled in 1892. Formerly operated by the Blair Iron and Coal Company.) *See Furnaces in Western Pennsylvania. See Rolling Mills and Steel Works.*

Emma Furnace, Logan Iron and Steel Company, Lewistown, Mifflin county. Telegraph address, Burnham. Philadelphia office, Harrison Building, southwest corner Fifteenth and Market sts. One stack, 54 x 10½, 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, 12,000 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 17½, 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; fossil and hematite ore mines and limestone quarry are a part of the furnace property; product, soft and strong foundry pig iron; annual capacity, 62,000 gross tons. Brand, "Everett."

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 magnetic, fossil, hematite, and Lake Superior; 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; ore, Lake Superior hematite; product, principally a soft, strong, fluid foundry pig iron; total annual capacity, 30,000 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.

Rockhill Furnaces, Rockhill Iron and Coal Company, Rockhill Furnace, Huntingdon county. Telegraph address, Rockhill via Mount Union.

Office, 320 Walnut st., 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; H. N. Sims, Acting Manager.

Saxton Furnaces, Saxton Iron Company, Saxton, Bedford county. Main office, Bullitt Building, Philadelphia. Two stacks: No. 1, 70 x 18, built in 1880–1, and blown in October 16, 1882, three Whitwell stoves, each 70 x 18; No. 2, 71 x 17, built in 1886–7, and blown in November 30, 1889, three Whitwell stoves, each 60 x 18; fuel, Broad Top coke; ores, native, from mines on property, and 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 shrinkage of $\frac{13}{100}$ of an inch per foot. (Formerly called Powelton Furnaces.) William W. Kurtz, President; William B. Kurtz, Secretary and Treasurer.

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." *See Rolling Mills.*

Number of coke and mixed anthracite and coke furnaces in the Juniata Valley: 12 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; product, Bessemer and gray forge pig iron; total annual capacity, 72,000 gross tons. Brand, "Etna." (Formerly called Etna Furnaces.) *See Rolling Mills.*

Claire Furnace Company Limited, Sharpsville, Mercer county. Branch office with M. A. Hanna & Co., Cleveland, Ohio. One stack, 75 x 16, built in 1869, and rebuilt in 1886 and in 1893; four brick stoves; fuel, coke; ore, Lake Superior; product, Bessemer and foundry pig iron; annual capacity, 75,000 gross tons. M. A. Hanna, Chairman; A. C. Saunders, Treasurer; A. M. Robbins, Secretary and General Manager, all at Cleveland; J. W. Robbins, Superintendent, Sharpsville. Selling agents, M. A. Hanna & Co., Cleveland.

Douglas Furnaces, Corrigan, McKinney & Co., lessees, Sharpsville, Mercer county. General office, 716–19 Perry-Payne Building, Cleveland, Ohio. 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, Bessemer, neutral foundry, and forge pig iron; total annual capacity, 45,000 gross tons. Brand, "Douglas." Owned by The Carnegie Steel Company, Limited. *See Sharpsville Furnace, Shenango Valley, and Charlotte Furnace, Western Pennsylvania.*

Mabel Furnaces, Perkins & Co. Limited, Sharpsville, Mercer county. Two alternate stacks, each 65 x 15: 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.

Neshannock Furnace, Shenango Valley Steel Company, New Castle, Lawrence county. One stack, 78 x 18½, 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, consumed by the company in its steel works; annual capacity, 90,000 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 17½: 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 pig iron; annual capacity of each stack, 66,000 gross tons. Brand, "Norway." L. Raney, President; George B. Berger, Secretary and Treasurer.

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, W. C. Runyon, lessee, Cleveland, Ohio. Furnace at Sharon, Mercer county. One stack, 60 x 14, built in 1845, and rebuilt in 1882 and 1891; four iron pipe stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 45,000 gross tons. Brand, "Sharon." S. A. Richards, General

Manager. Owned by Boyce, Rawle & Co., Sharon. (To be operated by Runyon, Stubbs & Co. after May 1, 1896.)

Sharon Iron Company Limited, Sharon, Mercer county. Two stacks: one, 72 x 16, built in 1865, and rebuilt in 1887; and one, 72 x 16, built in 1866, and enlarged in 1883; Whitwell stoves; fuel, coke; ore, Lake Superior; specialty, No. 1 mill pig iron; total annual capacity, 73,000 gross tons. Brand, "Shenango." *See Rolling Mills.*

Sharpsville Furnace, Corrigan, McKinney & Co., lessees, Sharpsville, Mercer county. General office, 716–19 Perry-Payne Building, Cleveland, Ohio. 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." Owned by the Sharpsville Furnace Company. *See Douglas' Furnaces, Shenango Valley, and Charlotte Furnace, Western Pennsylvania.*

Spearman Furnace, The Spearman Iron Company, Sharpsville, Mercer county. One stack, 76 x 17, built in 1895, and blown in September 1, 1895; four Whitwell stoves, 60 x 18; fuel, Connellsville coke; ore, Lake Superior; product, foundry pig iron; annual capacity, 60,000 gross tons. Brand, "Spearman." (Two alternate stacks, built in 1872, abandoned and dismantled.) Joseph Forker, President; John Phillips, First Vice-President; Walter Pierce, Second Vice-President; J. J. Spearman, Treasurer and Manager; M. H. Henderson, Secretary.

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. Brand, "Stewart." Runs only one stack at a time. (Formerly called Valley Furnaces.) S. McClure, Agent. Selling agent, H. H. Brown, Treasurer, Cleveland, Ohio. *See Rolling Mills.*

Wheeler Furnace Company, West Middlesex, Mercer county. Three stacks in Mercer county: Ella Furnace, at West Middlesex, 70 x 14, 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, 70 x 14, built in 1868, put in operation in October, 1868, remodeled in 1882 and 1890, and rebuilt in 1894. Furnaces have 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, 45,000 tons. Brand, "Wheeler." Charles I. Rader, Manager. Proprietors and selling agents, Pickands, Mather & Co., Cleveland.

Number of coke furnaces in the Shenango Valley: 21 stacks.

ALLEGHENY COUNTY—COKE.

Carnegie (The) Steel Company, Limited, Carnegie Building, Pittsburgh. Eleven completed stacks and four stacks building, all in Allegheny county. Edgar Thomson Furnaces, at Bessemer, on the 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, 75 x 14½, built in 1879, has four fire-brick stoves, each 65 x 15; Furnaces B, 80 x 18, and C, 80 x 16, built in 1880, have eight fire-brick stoves, six 75 x 20 and two 75 x 21; Furnaces D and E, each 80 x 21, built in 1881, have seven fire-brick stoves, six 78 x 21 and one 78 x 20; Furnaces F and G, each 90 x 21, built in 1886–7, and enlarged in 1892, have seven fire-brick stoves, each 78 x 21; Furnaces H and I, each 90 x 21, built in 1889–90, have seven fire-brick stoves, each 79 x 21; fuel, Connellsville coke; ores, Pennsylvania, Lake Superior, and foreign; product, Bessemer pig iron, spiegeleisen, and ferromanganese. 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. Duquesne Furnaces, at Cochran, P., V., & C. Railway: four stacks building, each 100 x 22. Annual capacity of Edgar Thomson Furnaces, 1,000,000 gross tons; of Lucy Furnaces, 200,000 tons; of Duquesne Furnaces, 700,000 tons: total, 1,900,000 gross tons. *See Edgar Thomson, Duquesne, and Homestead Steel Works, and Upper and Lower Union Mills.*

Carrie Furnaces, Carrie Furnace Company, Rooms 603–6 German National Bank Building, Pittsburgh. Two stacks at Rankin Station, 90 x 18½; one, removed from Ohio in 1883, blown in February 29, 1884, and rebuilt in 1893; the other, built in 1888–9, blown in July 19, 1889, and rebuilt in 1895; seven Massicks & Crooke stoves, each 70 x 19½; fuel, coke; ore, Lake Superior; product, mill, foundry, and standard and low-phosphorus Bessemer pig iron; total annual capacity, 200,000 gross tons. Brands, "Carrie" and "Zenith." H. C. Fownes, President; E. S. Fownes, Secretary; W. C. Fownes, Treasurer.

Clinton Furnace, Clinton Iron and Steel Company, 208 Wood st., Pittsburgh. New York office, 15 Cortlandt st. One stack, 72½ x 16, built in 1859, and rebuilt in 1889–90 and in 1893; three C. H. Foote hot-blast stoves; fuel, coke; ore, Lake Superior; product, Bessemer, foundry, and mill pig iron; annual capacity, 63,500 gross tons. Brands, "Hector" and "Clinton." *See Rolling Mills.*

Edith Furnace, Hainsworth Steel Company, Pittsburgh. Telegraph address and location of furnace, Allegheny City. One stack, 75 x 16½,

built in 1882, and put in operation in November, 1882; rebuilt in 1891; four Cowper-Kennedy stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer and mill pig iron; annual capacity, 75,000 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, 90 x 21, built in 1888–9, and blown in in May, 1889; twelve Siemens-Cowper stoves; fuel, coke; ore, Lake Superior; product, Bessemer pig iron; total annual capacity, 300,000 gross tons. 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.

Little Giant Furnace, Neal Brothers, Germania Bank Building, Pittsburgh. Furnace at Allegheny City, Allegheny county. One stack, 40 x 6, built in 1889, and blown in in July, 1889; cold blast; fuel, Connellsville coke; product, white and mottled pig iron, made from salamander, buckshot, and Lake Superior hematite ore; annual capacity, 12,000 gross tons. Brand, "Little Giant." A. H. Neal, Superintendent.

Monongahela Furnaces, Department of National Tube Works Company, McKeesport. Two stacks, built in 1889–90: Furnace A, 80 x 20, blown in December 1, 1890; Furnace B, 80 x 19, blown in 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, 200,000 gross tons. Brand, "Monongahela." William B. Schiller, Manager; T. B. Walker, Superintendent of Blast Furnaces. *See Rolling Mills and Steel Works.*

Shoenberger Furnaces, Shoenberger Steel Company, Pittsburgh. Two stacks: one 75 x 14 and one 75 x 16, built in 1865, and rebuilt in 1890; seven Massicks & Crooke stoves; fuel, coke; ore, Lake Superior; product, Bessemer pig iron; total annual capacity, 120,000 gross tons. *See Rolling Mills and Steel Works.*

Soho Furnace, Pittsburgh Steel and Iron Manufacturing 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, 90,000 gross tons. Brand, "Soho." *See Rolling Mills and Steel Works.*

Number of coke furnaces in Allegheny county: 27 completed stacks and 4 stacks building.

WESTERN PENNSYLVANIA—COKE.

Cambria Iron Company, Harrison Building, southwest corner Fifteenth and Market sts., Philadelphia. Works at Johnstown, Cambria county. Six stacks: Nos. 1, 2, 3, and 4 were built in 1853 and 1854; No. 1, 76 x 20, was rebuilt in 1883 and 1895; No. 2, 76 x 18, was rebuilt in 1883 and 1891; No. 3, 76 x 20, was rebuilt in 1886 and 1894; No. 4, 76 x 18, was rebuilt in 1886 and 1892; No. 5, 76 x 19, called also Centennial Furnace, was built in 1873-6, blown in December 22, 1876, and rebuilt in 1890; No. 6, 76 x 19⅔, was first blown in July 20, 1879, and rebuilt in 1893. The furnaces are equipped with twenty Whitwell stoves. Fuel, Connellsville coke; ore, red hematite from the Menominee range, Michigan; specialty, Bessemer pig iron, spiegeleisen, and ferromanganese; total annual capacity, 400,000 gross tons. The Blair Furnace, at Hollidaysburg, adds 20,000 tons to this capacity, making the total 420,000 tons. *See Blair Furnace, Juniata Valley. See Rolling Mills and Steel Works.*

Charlotte Furnace, Corrigan, McKinney & Co., lessees, Scottdale, Westmoreland county. General office, 716-19 Perry-Payne Building, Cleveland, Ohio. One stack, 65 x 18, built in 1872-3, and put in blast October 14, 1873; iron stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer and foundry pig iron; annual capacity, 70,000 gross tons. Brand, "Charlotte." Owned by the National Foundry and Pipe Works Limited. *See Douglas and Sharpsville Furnaces, Shenango Valley.*

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, 120,000 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, Assistant General Manager. 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, and for sale or lease.

Rebecca Furnace, Kittanning Iron and Steel Manufacturing Company, 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, Gleniron, 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 and for sale.

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, "Boiling Springs." (Company formerly called South Side Iron Company Limited. Furnace formerly known as Carlisle Iron Works.) Owned and operated by J. C. Bucher.

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.*

Falling Spring Furnace, Bonebrake & Burkhart, 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, Harrison Building, southwest corner Fifteenth and Market sts. 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. Brand, "Greenwood." *See Emma 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. Furnace 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; annual capacity, 2,300 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." Selling agent, J. J. Mohr, Bullitt Building, Philadelphia.

Maiden Creek Furnace, Jacob K. Spang, Lenhartsville, Berks county. One stack, 33 x 9, built in 1854; equipped for hot blast in 1890; closed 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, fire-box, and car-wheel iron; annual capacity, 6,000 gross tons. Brand, "Pine Grove." J. C. Fuller, President; S. R. Still, Superintendent. *See Bloomaries.*

Number of charcoal furnaces in Pennsylvania: 13 stacks. Total number of furnaces in Pennsylvania: 179 completed stacks, 4 stacks building, 1 stack partly erected, and 2 stacks 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, Girard Building, Broad and Chestnut sts. 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; cold blast; steam and water power; open top; 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 county. One stack, 36 x 8⅓, built in 1847; burned and rebuilt in 1888; warm blast; open top; 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 Furnace, Whitaker Iron Company, Wheeling, West Va. Furnace at Principio Furnace P. O., Cecil county; telegraph address, Perryville. One stack, 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, 12,600 gross tons. Brand, "Principio." (No. 1 stack, 35 x 9, built in 1723 and rebuilt in 1836, abandoned in 1894.) *See Rolling Mills in West Virginia.*

Stickney (The) Iron Company, 11 South Gay st., Baltimore. Furnace at Canton, Baltimore county. One stack, Furnace B, 48 x 11, completed and put in blast May 15, 1882; hot blast; ore, Baltimore carbonate; product, pig iron used in the manufacture of malleable iron castings and car-wheels and known as "Stickney" iron; annual capacity, 6,000 gross tons. (One stack, Furnace A, 50 x 9½, built in 1854 and rebuilt in 1871, dismantled in 1894.) Selling agents, Reed, Stickney & Co., Baltimore. *See Rolling Mills. See Tinplate Works.*

Number of charcoal furnaces in Maryland: 4 stacks. Total number of furnaces in Maryland: 9 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; three Taws & Hartman improved Whitwell stoves; fuel, New River coke; ore, brown, from Craig creek; product, foundry pig iron; annual capacity, 25,000 gross tons. Brand, "Alleghany." F. C. Dininny, Jr., President, New York; T. C. Jones, Superintendent, Iron Gate; Meriwether Jones, General Manager, Richmond. Selling agents, C. R. Baird & Co., Bullitt Building, Philadelphia; N. S. Bartlett & Co., Boston.

Bristol Furnace, Bristol Iron and Steel Company, Bristol, Tenn. Philadelphia office, Bullitt Building. Furnace built on the Virginia side of the 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; ore, Cranberry, from North Carolina; product, high-grade Bessemer pig iron; annual capacity, 45,000 gross tons. Brand, "Bristol." Comly B. Shoemaker, President, Room 408, 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 Furnace, The Rich Patch Iron Company, lessee, Buena Vista, Rockbridge county. General office, Low Moor. One stack, 70 x 16, built in 1889–90, and blown in December 12, 1890; three Whit-

well stoves; fuel, New River coke; ore, brown hematite, from the company's mines in Alleghany county; product, high-grade foundry pig iron; annual capacity, 36,000 gross tons. Brand, "Rich Patch." Contemplates erecting a new stack on its iron-ore property in Alleghany county. D. Shanahan, President; C. M. Shanahan, Vice-President and General Manager; Charles J. Doherty, Treasurer; J. G. O'Callaghan, Secretary. Selling agents, Frank Samuel, Manhattan Building, Philadelphia; M. A. Hanna & Co., Cleveland; Hickman, Williams & Co., Louisville. Owned by the Virginia Development Company.

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 15, built in 1882–3, and first put in operation May 29, 1883; Furnace B, 70 x 14½, 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, 84,000 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. *See Rolling Mills.*

Dora Furnace, Dora Furnace Company, Pulaski City, Pulaski county. One stack, 75 x 17, built in 1891–2, 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 General 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 forge pig iron; annual capacity, 36,000 gross tons. Brand, "Gem." Selling agents, Rogers, Brown & Co., Cincinnati. *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; fuel, Pocahontas coke; ores, local brown hematite and limonite; product, foundry and forge pig iron; annual capacity, 25,000 gross tons. Brand, "Ivanhoe." George H. Seeley, President; Jordan L. Mott, Vice-President; J. T. Pearson, Secretary and Treasurer; George M. Seeley, General Manager, at the works. Selling agents, C. R. Baird & Co., Bullitt Building, Philadelphia; N. S. Bartlett & Co., Boston.

Jennie and Polly Furnaces, The Big Stone Gap 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 and Wise county, Virginia, coke; ore, local fossil; product, foundry pig iron; annual capacity, 26,000 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. (Formerly operated by the Appalachian Steel and Iron Company.) S. Zorn, President; C. T. Ballard, Vice-President; Oscar Fenley, Secretary and Treasurer; R. C. Ballard Thruston, Manager.

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; six iron pipe stoves; fuel, West Va. coke; ore, brown hematite, mined near the furnace; product, chiefly basic pig iron, cast in chills; total annual capacity, 40,000 gross tons. Brand, "Longdale." H. Firmstone, President, and J. E. Johnson, Manager; John L. Wilson, Treasurer, 608 Chestnut 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 blown in April 20, 1895; three Gordon-Whitwell-Cowper stoves; fuel, New River coke; ore, native hematite; product, foundry pig iron; brand, "Covington." 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. For lease.

Nannie B. Furnace, 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." Owned by C. H. Harmon & Co., Charlotteville. *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. Two stacks: Pulaski Furnace, at Pulaski City, owned by the company, 75 x 17, built in 1887, and blown in in February, 1888; three Whitwell stoves. Max Meadows Furnace, at Max Meadows, Wythe county, leased from the Max Meadows Iron Company, 75 x 17, built in 1890–1, and blown in November 19, 1895; 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; total annual capacity, 90,000 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.

Radford-Crane Furnace, Radford-Crane Iron Company, Radford, Montgomery county. Main office, Girard 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, West Roanoke Iron Company, Roanoke, Roanoke county. One stack, 82 x 17, built in 1890, and blown in December 1, 1890; four Massicks & Crooke stoves; fuel, Pocahontas coke; ore,

brown hematite from Southwest Virginia; product, foundry and forge pig iron; annual capacity, 48,000 gross tons. Brand, "Roanoke." William Beury, President and Treasurer; John Cooper, Vice-President; J. L. Beury, Secretary; R. P. Patterson, Superintendent. Selling agents, C. R. Baird & Co., Bullitt Building, Philadelphia. Owned by the Roanoke Iron Company.

Rockbridge Furnace, Virginia Iron and Railway Company, Goshen Bridge, Rockbridge county. One stack, 78 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; Thomas D. Ranson, Vice-President; C. J. Johnston, Secretary and Treasurer; W. J. Mahoney, Superintendent. Selling agents, Matthew Addy & Co., Cincinnati.

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, Salem; Logan M. Bullitt, Vice-President, and Charles S. Thorne, Secretary and Treasurer, Philadelphia. Selling agent, Frank Samuel, Manhattan Building, Philadelphia.

PROJECTED.

Basic City Furnace, Basic City, Augusta county. Foundations laid in 1890 for one coke stack; work suspended. D. K. Joslin, 421 Chestnut st., Philadelphia.

Number of coke furnaces in Virginia: 24 completed stacks, 1 stack partly erected, and 2 stacks projected.

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.

Liberty Furnace, Liberty Furnace P. O., Shenandoah county. Telegraph address, Edinburg. 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; warm blast; Durham stove; ore, local limonite; product, car-wheel pig iron; annual capacity, 15,500 gross tons. Brand, "Liberty." A new railroad, 3-foot gauge, connects Liberty Furnace with Edinburg, 12 miles distant. (Columbia Furnace, built in 1809, torn down in 1890.) Owned by the Quaker City National Bank, Phila-

delphia. For sale or lease. Address H. H. Yard, 415 Drexel Building, Philadelphia.

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. May be started up with coke as fuel when a projected railroad reaches the furnace.

Reed Island Furnace, Reed Island Iron Company, Reed Island, Pulaski 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; water-power; open top; 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.

Number of charcoal furnaces in Virginia: 4 stacks. Total number of furnaces in Virginia: 28 completed stacks, 1 stack partly erected, and 2 stacks projected.

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 ⅔ limonite and ⅓ 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; four Massicks & Crooke stoves; fuel, Connellsville coke; ores, Missouri, Lake Superior, and foreign; product, Bessemer pig iron; annual capacity, 75,000 gross tons. Brand, "Riverside." *See Steubenville Furnace in Ohio, Miscellaneous Bituminous list. 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 rebuilt in 1894; three Massicks & Crooke stoves; brand, "Top Mill;" James McCahan, Furnace Manager. Fuel, Connellsville coke; ore, Lake

Superior; product, Bessemer pig iron; total annual capacity, 140,000 gross tons. *See Martin's Ferry Furnace in Ohio, Miscellaneous Bituminous list. 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. Three stacks: one, 62 x 16, first blown in August 31, 1869, one, 64 x 16, built in 1887, and one, 66 x 16, (leased from the Norton Iron Works,) built in 1873, blown in February 16, 1874, and remodeled in 1877; eleven 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, 50,000 gross tons. Brand, "Ashland." Douglas Putnam, President and General Manager; John G. Peebles, Vice-President; Robert Peebles, Secretary and Treasurer; E. C. Means, Superintendent.

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.

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, 130,000 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 Rivers Furnaces, The Columbian Land and Mining Company, Grand Rivers, Livingston county. Boston office, 53 State st. Two stacks: 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." (Formerly operated by The Grand Rivers Company.) Aretas Blood, President, Manchester, N. H.; Henry L. Lawrence, Vice-President, Boston, Mass.; George Wallace, Treasurer, 53 State st., Boston, Mass.

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. For sale.

Chattanooga Furnace, The Chattanooga Iron Company, Atlanta, Ga. Furnace at Chattanooga, Hamilton county. One stack, 60 x 12, 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, 24,000 gross tons. Brand, "Chattanooga." Julius L. Brown, President, and Elijah A. Brown, Secretary and Treasurer, Atlanta, Ga.; F. H. Connor, General Manager, Chattanooga. Selling agents, Adolph Pluemer, Cincinnati; DeCamp & Yule, St. Louis.

Citico Furnace, Citico Furnace Company, Chattanooga, Hamilton county. One stack, 69 x 17, built in 1883, and first put in blast in April, 1884; rebuilt in 1895; 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, 40,000 gross tons. Brand, "Citico." H. S. Chamberlain, President; F. Nieland, Secretary and Treasurer.

Dayton (The) Coal and Iron Company Limited, Dayton, Rhea county. Sales office, 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." W. J. Isaacson, Managing Director, Cincinnati; Vincent Ferguson, General Superintendent, Dayton, Tenn.

Embreeville Furnace, George B. Parker, London, England. Furnace at Embreeville, Washington county. Telegraph address of furnace, "Nolachucky," Embreeville. Main office, 37 Lombard st., London, E. C., England. One stack, 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, 45,000 gross tons. Brand, "Embre." Guy R. Johnson, Manager, Embreeville. Sole sales agents, Matthew Addy & 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. Julien F. Gracey, President; T. D. Luckett, Secretary and Treasurer.

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 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, Ohio; 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 Furnace, Roane Iron Company, Rockwood, Roane county. Main office, Chattanooga. One stack, 70 x 16½, built in 1893, and blown in January 6, 1894; three Hugh Kennedy hot-blast stoves; fuel, coke; ore, red fossiliferous; product, foundry pig iron; annual capacity, 45,000 gross tons. Brand, "Rockwood." One stack, to be 70 x 16½, partly erected in 1893; work suspended. (One stack, 65 x 15, built in 1872, abandoned and dismantled in 1893.) H. S. Chamberlain, President, Orion L. Hurlbut, Secretary, and F. Nieland, Treasurer, Chattanooga; Willard Warner, Jr., Superintendent of Furnace, Rockwood.

Tennessee Coal, Iron, and Railroad Company, Nashville. Four stacks: 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." 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, mill, and basic open-hearth pig iron; annual capacity, of Sewanee Furnace, 54,000 gross tons; of South Pittsburg Furnaces, 175,000 tons. N. Baxter, Jr., President, Nashville,

Tenn.; David Roberts, 1st Vice-President, Birmingham, Ala.; A. M. Shook, 2d Vice-President, Nashville; G. B. McCormack, General Manager, Birmingham, Ala.; Jas. L. Gaines, Assistant General Manager, Nashville, Tenn.; James Bowron, Treasurer, Andrew M. Adger, Secretary and Assistant Treasurer, H. D. Cooper, Auditor, and Erskine Ramsay, Chief Engineer, Birmingham, Ala.; S. Kirkpatrick, Purchasing Agent for Tennessee, Nashville. A. P. Gaines, Superintendent of Furnaces in Tennessee. Selling agents, Rogers, Brown & Co., Cincinnati, and branch houses; Matthew Addy & Co., Cincinnati and St. Louis. *See Coke Furnaces in Alabama.*

PROJECTED.

The La Follette Coal and Iron Company, 66 Broadway, New York City, contemplates erecting a coke stack, with a daily capacity of 200 gross tons, at La Follette, Campbell county, in 1896.

Number of coke furnaces in Tennessee: 12 completed stacks, 1 stack nearly completed, 1 stack partly erected, and 1 stack projected.

CHARCOAL.

Bear Spring Furnace, White, Dixon & Co., lessees, Bear Spring, Stewart county. Telegraph address, Erin. One stack, 47 x 9½, built in 1832, abandoned in 1854, rebuilt in 1873, and again abandoned; repaired in 1893–4, and blown in in February, 1894; cold blast; ore, local brown hematite; specialty, pig iron for chilled rolls; annual capacity, 5,000 gross tons. Brand, "Dover." George W. Dixon, Superintendent. Selling agent, J. H. Hillman, Pittsburgh. Owned by the Cumberland Lands Limited.

Buffalo Iron Company, Nashville, Davidson county. Main office, Mannie, Wayne county, but business transacted from Nashville. Six 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." 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." Allen's Creek Furnaces, (formerly called Mannie Furnaces,) at Mannie, Wayne 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 22, 1893, 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 six stacks, 105,000 gross tons. (Formerly operated by The Central Iron Company.) Selling agents, Rogers, Brown & Co., Cincinnati, and branch houses; Hickman, Williams & Co., Louisville. *See Attalla (charcoal) Furnace in Alabama, and Rolling Mills and Steel Works in Tennessee.*

La Grange Furnace, Herman Justi, Nashville.. Furnace at Stribling, Stewart county, seven miles from Danville, on Memphis branch of the Louisville and Nashville Railroad. One stack, 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." (Formerly operated by The Central Iron Company.) For sale.

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." J. H. Fall, President; W. R. Cole, General Manager. Selling agents, Matthew Addy & Co., Cincinnati and St. Louis; J. H. Hillman, Pittsburgh; C. R. Baird & Co., Philadelphia.

Number of charcoal furnaces in Tennessee: 9 stacks. Total number of furnaces in Tennessee: 21 completed stacks, 1 stack nearly completed, 1 stack partly erected, and 1 stack projected.

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; 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 blown in 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, The Georgia Mining, Manufacturing, and Investment Company, lessee, Rising Fawn, Dade county. 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, Receiver, and C. T. Watson, Treasurer for Receiver, Atlanta; F. H. Connor, General Manager for Receiver, Chattanooga, Tennessee. Selling agents, DeCamp & Yule, St. Louis. Owned by the Walker Coal and Iron Company.

Number of coke furnaces in Georgia: 2 stacks.

CHARCOAL.

Etna Furnace, Etna Furnace Company, Etna P. O., Polk county. One stack, 43 x 9⅔, 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, Rome, and Joseph J. Hamilton, Secretary and Treasurer, Etna. Selling agents, Hall Brothers & Co., Louisville; Ryan & Co., Cincinnati.

Rome Furnace, The Rome Iron Company, Rome, Floyd county. General office, Chattanooga, Tenn. 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. Selling agents, J. E. Cartwright, St. Louis; Rogers, Brown & Co., Cincinnati, and branch houses.

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; closed top; cold and warm blast; one Player iron stove; ore, local brown hematite; product, car-wheel and foundry pig iron; annual capacity, 13,500 gross tons.

Brand, "Tallapoosa." W. H. Kimball, President; C. W. Fox, Secretary and Treasurer.

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

ALABAMA.

COKE.

Bessemer Land and Improvement Company, Bessemer, Jefferson county. One completed stack, one partly erected, and two projected. Fort Payne Furnace, 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; ores, red and brown hematite; product, forge and foundry pig iron; annual capacity, 27,000 gross tons; (formerly operated by the Fort Payne Furnace Company.) Bay State Furnace, Fort Payne, DeKalb county, one stack, 65 x 14, partly erected in 1890-1 by the Bay State Furnace Company; work suspended in 1891; three fire-brick stoves; furnace may be completed at Fort Payne by the present owner or it may be torn down and removed to Bessemer. Company also contemplates erecting immediately, at Bessemer, two stacks, each 75 x 17, and several hundred coke ovens. (Edwards Furnace, at Woodstock, Bibb county, one stack, 70 x 15, first blown in June 10, 1880; remodeled in 1887 and 1890; three hot blast stoves; stack to be torn down and removed to Bessemer; formerly operated by the Edwards Iron Company.) H. F. DeBardeleben, President; Walker Percy, Vice-President; H. M. McNutt, Secretary and Treasurer. *See Rolling Mills and Steel Works, (projected.)*

Clara Furnace, F. W. Roebling, Trustee for Bondholders, Trenton, N. J. Furnace at Birmingham, Jefferson county. One stack, 65 x 15½; 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. For sale.

Clifton Furnaces, Clifton Iron Company, Ironaton, Talladega county. Two stacks: No. 1, 55 x 13, built in 1884, and blown in April 16, 1885; No. 2, 60 x 14, built in 1889-90, and blown in in 1891; built to use charcoal for fuel, but changed to coke in 1895; Cowper stoves; fuel, Alabama coke; ore, local brown hematite; product, foundry pig iron; total annual capacity, 72,000 gross tons. Brand, "Clifton." T. G. Bush, President, Anniston; Augustus Lowell, Vice-President, Boston, Mass.; Paul Roberts, Secretary and Assistant Treasurer, Ironaton. Selling agents, Matthew Addy & Co., Cincinnati; C. L. Peirson & Co., Boston and New York.

Gadsden-Alabama Furnace, Gadsden, Etowah county. One stack, 75 x 16, built in 1887–8, and first blown in October 14, 1888; three Whitwell stoves; fuel, coke; ores, local red and brown hematite; product, foundry and basic pig iron; annual capacity, 35,000 gross tons. Brand, "Etowah." Owned by Thomas T. Hillman, George L. Morris, and Mrs. Aileen Ligon, of Birmingham. Idle, and for sale or lease.

Hattie Ensley Furnace, Colbert Iron Company, lessee, Sheffield, Colbert county. One stack, 75 x 17, built in 1887, and blown in December 31, 1887; three Whitwell stoves; fuel, coke; ore, local brown hematite; product, foundry pig iron; annual capacity, 48,000 gross tons. Brand, "Lady Ensley." A. A. Berger, President; Wade Allen, Vice-President; J. V. Allen, Secretary and Treasurer; A. J. McGarry, Manager. Selling agents, Lee Chamberlain & Co., Columbus, Ohio. Owned by the James P. Witherow Company, Pittsburgh.

Lady Ensley Furnace, Lady Ensley Furnace Company, Sheffield, Colbert county. One stack, 75 x 17, built in 1887–9, and first blown in April 25, 1889; three Whitwell stoves; annual capacity, 45,000 gross tons. R. W. Cobb, Receiver. Idle since June, 1892.

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, 30,000 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; 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. For sale.

Pioneer Furnaces, Pioneer Mining and Manufacturing Company, Thomas, Jefferson county. Two stacks, each 75 x 16½: 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, 95,000 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, 50 Wall st., New York; Dallett & Co., 201 Walnut Place, Philadelphia.

Sheffield Furnaces, Sheffield Coal, Iron, and Steel Company, Sheffield, Colbert county. Three stacks, each 75 x 18, built in 1887–8; No.

1 blown in in September, 1888, and No. 2 blown in in October, 1889; No. 3 not yet blown in; Nos. 1 and 2 rebuilt in 1891; nine Whitwell-Cowper stoves; fuel, Alabama and Virginia coke; ores, Alabama and Tennessee brown hematite; product, foundry pig iron; total annual capacity, 150,000 gross tons. Brand, "Sheffield." E. W. Cole, President, Nashville, Tenn.; Jerome Keeley, Vice-President, Philadelphia; George H. Berlin, Secretary, Sheffield; J. A. McKee, Treasurer, Philadelphia; Samuel Adams, Superintendent, Sheffield. Selling agents, Rogers, Brown & Co., Cincinnati.

Sloss Furnaces, Sloss Iron and Steel Company, Birmingham, Jefferson county. Four stacks: No. 1, 82¼ x 18, built in 1881–2, put in blast April 12, 1882, and rebuilt in 1895; No. 2, 68 x 18, built in 1882; No. 3, 73 x 16½, built in 1887–8, and blown in in October, 1888; No. 4, 73 x 16½, built in 1887–9, and blown in in February, 1889; five Whitwell, eight Gordon-Whitwell-Cowper, and three two-pass 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, 200,000 gross tons. Brand, "Sloss." Thomas Seddon, President; E. W. Rucker, Vice-President; W. L. Sims, Secretary and Treasurer; J. H. McCune, Furnace Manager. Selling agents, D. L. Cobb, Louisville and Chicago; J. E. Cartwright, St. Louis; Rogers, Brown & Warner, Philadelphia; Hugh W. Adams & Co., 15 Beekman st., New York.

Spathite Furnace, The Spathite Iron Company, Florence, Lauderdale county. One stack, 75 x 14, completed in December, 1888, and blown in in October, 1889; rebuilt in 1893; three improved Pollock stoves; fuel, coke; ores, spathite and brown hematite from Iron City, Tenn.; product, spathite pig iron; annual capacity, 30,000 gross tons. Brand, "Spathite." (Formerly called North Alabama Furnace.) J. Overton Ewin, Receiver; J. H. Short, Superintendent. Selling agents, Rogers, Brown & Co., Cincinnati.

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. Negotiations now pending for the sale of the furnace.

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; eight Whitwell stoves;

No. 5, or Little Belle, 60 x 12, built in 1889-90; three Whitwell stoves. Oxmoor Furnaces, at Oxmoor, (formerly called Eureka Furnaces,) 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, made in the company's ovens; ores, local brown hematite and red fossiliferous from the company's mines; product, foundry, mill, and basic open-hearth pig iron; total annual capacity, 361,500 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, mill, and basic open-hearth pig iron; annual capacity of Alice Furnaces, 113,000 gross tons; of Ensley Furnaces, 270,000 tons. Total annual capacity of the thirteen stacks, 744,500 tons. John Dowling, Superintendent Bessemer and Oxmoor Furnaces; A. E. Barton, Superintendent Alice and Ensley Furnaces. *See Coke Furnaces in Tennessee for a full list of officers and selling agents.*

Trussville Furnace, Trussville, Jefferson county. One stack, 65 x 17, built in 1887-9, and blown in in April, 1889; three Whitwell stoves; fuel, Alabama coke; ore, local red hematite; product, foundry pig iron; annual capacity, 30,000 gross tons. Brand, "Trussville." Owned by Messrs. Hogsett, Ewing & Thompson. Negotiations pending for the sale of the furnace; if sold, stack will be enlarged to 75 x 18, and capacity increased to 60,000 gross tons.

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, The Woodstock Iron Works, Anniston, Calhoun county. Two stacks, each 75 x 16, built in 1887-9, and one blown in October 10, 1889; six Whitwell stoves; fuel, Alabama coke; ore, local brown hematite; product, foundry pig iron; total annual capacity, 72,000 gross tons. Brand, "Woodstock." John D. Probst,

President, and George Glover, Secretary, New York; H. Atkinson, Vice-President, J. W. McCulloh, General Manager, and W. L. Doane, Treasurer and Assistant Secretary, Anniston. *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 fossiliferous, mined within 3 miles of the furnace; specialty, foundry pig iron; total annual capacity, 100,000 gross tons. Brand, "Woodward." J. H. Woodward, President; Frank M. Eaton, Secretary; Silas Hine, Treasurer.

Number of coke furnaces in Alabama: 39 completed stacks, 1 stack partly erected, and 2 stacks projected.

CHARCOAL.

Attalla Furnace, Buffalo 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, C. R. Baird & Co., Philadelphia; DeCamp & Yule, St. Louis; Forster, Hawes & Co., Chicago. *See Rolling Mills.*

Coosa 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 Gadsden Furnace.) A. J. Crawford, President, Terre Haute, Ind.; T. W. Stewart, Secretary, Treasurer, and General Manager.

Decatur Charcoal Iron Furnace, The 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. J. D. Probst, President, and C. Y. Kent, Assistant Secretary, New York; C. C. Harris, Vice-President, W. T. Mulligan, Secretary, W. A. Bibb, Treasurer, and John C. Eyster, General Counsel, New Decatur. For sale or lease.

Jenifer Furnace, Jenifer Furnace Company, Jenifer, Talladega county. Central office, Anniston. 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 H. Noble, President, and John E. Ware, Secretary and Treasurer, Anniston. Selling agents, Rogers, Brown & Co., Cincinnati and St. Louis; C. R. Baird & Co., Philadelphia.

Langdon Furnace, The National Bank of Augusta, Augusta, Ga. Furnace at Langdon, (P. O. address, Rock Run Station,) Cherokee county. One stack, 42 x 11, 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.) For sale.

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; expects to complete stack in 1896. W. F. Smalley, President; J. H. Ledbetter, Vice-President; R. L. Hurt, Secretary and Treasurer.

Rock Run Furnace, Rock Run Iron and Mining Company, Rock Run, Cherokee county. One stack, 54½ x 11½, built in 1873–4, enlarged in 1881 and in 1892, and rebuilt in 1894; warm blast; ore, local brown hematite; product, car-wheel pig iron; annual capacity, 15,000 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 Furnace, The Round Mountain Furnace Company, lessee, Chattanooga, Tenn. 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." (Formerly called Round Mountain Iron Works.) L. S. Colyar, President; Jo. C. Guild, Vice-President; E. Shackleford, Secretary; E. B. Pennington, Superintendent. Selling agents, Rogers, Brown & Co., Cincinnati, and branch houses; J. E. Cartwright, St. Louis. Owned by the Elliott Pig Iron Company, Gadsden.

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; B. Y. Frost, 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 blown in 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; for lease.

Woodstock Furnace, Woodstock Iron Works, Anniston, Calhoun county. One stack, 50 x 12, blown in April 13, 1873; rebuilt in 1880; hot 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.) *See Woodstock (coke) Furnaces.*

Number of charcoal furnaces in Alabama: 12 completed stacks and 1 stack partly erected. Total number of furnaces in Alabama: 51 completed stacks, 2 stacks partly erected, and 2 stacks projected.

TEXAS.

CHARCOAL.

Jefferson Furnace, Jefferson 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, bog, and carbonate; product, car-wheel pig iron; annual capacity, 13,500 gross tons. Brand, "Lone Star." W. T. Atkins, President; A. H. Schluter, Secretary. For sale. *See Rolling Mills.*

Old Alcalde Furnace, State of Texas, owner; J. S. Rice, 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, Frank A. Daniels, New Orleans, La. Furnace near Rusk, in Cherokee county. One stack, 65 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." For sale.

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.

OHIO.

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; three iron stoves. Anna Furnace, at Struthers, 75 x 17, built in 1869, and rebuilt in 1881 and in 1895; three Julian Kennedy stoves. Fuel, Connellsville coke; ore, Lake Superior; product, gray forge pig iron; total annual capacity, 90,000 gross tons. Brands, "Phœnix" and "Anna." (Falcon Furnace, 55 x 12¾, abandoned in 1893.) Edward H. Williams, Superintendent. *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; four iron stoves; fuel, coke; ores, Lake Superior and native mixed; specialty, "American-Scotch" foundry pig iron; annual capacity, 60,000 gross tons. Brand, "Cherry Valley." *See Rolling Mills.*

Hannah Furnace, Mahoning Valley Iron Company, Youngstown, Mahoning county. One stack, 75 x 16, first put in blast June 14, 1880; rebuilt in 1888; three Cowper-Kennedy stoves, and one Massicks & Crooke stove, 75 x 18, being added; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer and mill pig iron; 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, 76 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." (Furnace to be rebuilt in 1896, and annual capacity increased to 100,000 tons; one Cowper-Kennedy stove and two new blowing engines to be added.) *See Rolling Mills.*

Hubbard Furnaces, The Andrews and Hitchcock Iron Company, Youngstown, Mahoning county. Works at Hubbard, Trumbull county. Two stacks, No. 1, 77 x 17, built in 1867, and No. 2, 76 x 17, built in 1872; No. 1 rebuilt in 1886, and No. 2 rebuilt in 1883 and

in 1894; No. 1 stack has four Cowper-Kennedy stoves, and No. 2 has iron stoves; fuel, Connellsville coke; product, Bessemer and 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; Mrs. C. H. Andrews, 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 and in 1894; three Cowper-Kennedy hot-blast stoves, but may add another stove in 1896; fuel, Connellsville coke; ores, Lake Superior and native blackband; product, Bessemer and strong neutral foundry pig iron; specialty, "Ohio blackband Scotch;" annual capacity, 90,000 gross tons. Brands, "The Mary" for lake ore iron and "Ohio Scotch" for blackband mix. 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., New York and 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, 75,000 gross tons. Brand, "Girard." (Formerly called Girard Furnace.) A. M. Byers, sole owner, Pittsburgh; Henry B. Shields, Manager, Girard.

Seneca Furnace, The Salem Iron Company, Pittsburgh, Pa. Furnace at Leetonia, Columbiana county. One stack, 76 x 17, built in 1866, and rebuilt in 1894; four iron stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer, foundry, and forge pig iron; annual capacity, 72,000 gross tons. Brands, "Seneca" and "Grafton." (One stack, 54 x 15, built in 1872, abandoned in 1894.) John McKeefrey, President; W. D. McKeefrey, Vice-President and Treasurer; N. J. McKeefrey, Secretary; P. W. Murphy, Superintendent. 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, 85,000 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 16½, built in 1889; three Massicks & Crooke stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer and foundry pig iron; annual capacity, 80,000 gross tons. Brand, "Youngstown Scotch." (Formerly known as Tod Furnace No. 2 of The 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: 14 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 in 1877; four Thomas stoves. Bessie Furnace, at New Straitsville, Perry county, one stack, 60 x 14, built in 1877–8, and blown in in 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 containing from 8 to 12 per cent. of silicon; total annual capacity, 85,500 gross tons. Brands, "Bessie" and "Winona" for silvery and "Pencost" for high silicon. 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.

Moxahala 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; an-

nual capacity, 45,000 gross tons. (Formerly called Glasgow Furnace.) *See Franklin Furnace, Miscellaneous Bituminous list. 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. Ohio Iron Company, lessee, Zanesville. Furnaces at 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 furnace property, and Lake Superior; product, foundry and forge pig iron; total annual capacity, 45,000 gross tons. Owned by The Ohio Mining and Manufacturing Company. *See Zanesville Furnace, Miscellaneous Bituminous list. See Rolling Mills and Steel Works.*

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

LAKE COUNTIES—COKE.

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, 200,000 gross tons. *See Rolling Mills and Steel Works.*

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, 70,000 gross tons. Brand, "Emma." Selling agents, The Condit-Fuller Company, Cleveland. *See Rolling Mills.*

Johnson (The) Company, Lorain, Lorain county. Building four stacks, 80 x 20, to be equipped with fourteen Cowper-Roberts fire-brick stoves; fuel, Connellsville coke; ore, Lake Superior and Mesabi; product, Bessemer pig iron; estimated annual capacity, 300,000 gross tons. Brand, "Lorain." *See Rolling Mills and Steel Works in Pennsylvania and Ohio.*

River Furnace, River Furnace and Dock Company, lessee, Cleveland, Cuyahoga county. One stack, 65 x 16½, built in 1879, and remodeled in 1889 and in 1895; three iron stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 72,000 gross tons. Brand, "River." James Corrigan, President; Stevenson Burke, Vice-President; C. W. Maish, Secretary; Price McKinney, Treasurer; Frank M. Kernan, Superintendent. Selling agents, Corrigan, McKinney & Co., Cleveland. Owned by the Cleveland Iron Company.

Number of coke furnaces in the Lake counties, 5 completed stacks and 4 stacks building.

MISCELLANEOUS—BITUMINOUS COAL OR COKE.

Bellaire Nail Works, Bellaire, Belmont county. Two stacks: one, 75 x 17, built in 1873, blown in September 22, 1873, and rebuilt in 1886; and one, 75 x 18, built in 1894–5, and blown in March 7, 1895; eight Massicks & Crooke stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron, consumed in the manufacture of soft Bessemer steel; total annual capacity, 150,000 gross tons. *See Rolling Mills and Steel Works.*

Dover Furnace, The Penn Iron and Coal Company, Canal Dover, Tuscarawas county. One stack, 75 x 16½, built in 1854, and blown in in 1855; rebuilt in 1878–9, and remodeled and enlarged in 1895; three Cowper-Roberts fire-brick stoves, 70 x 18; fuel, raw coal and Connellsville coke; ores, blackband and Lake Superior; specialty, "Tuscarawas" blackband and "Dover" all-lake ore strong foundry, and Bessemer pig iron; annual capacity, 70,000 gross tons. Brands, "Tuscarawas" and "Dover" for foundry pig iron. J. P. Burton, President, Massillon; S. W. Croxton, Treasurer, General Manager, and Selling Agent, Cleveland; H. S. Ream, Secretary, Canal Dover.

Franklin Furnace, The King, Gilbert, and Warner Company, Columbus, Franklin county. One stack, 75 x 17½, completed in November, 1873; rebuilt in 1892 and in 1895; three Massicks & Crooke stoves, each 65 x 18; fuel, Pocahontas coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 90,000 gross tons. *See Moxahala 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. *See Belmont and Top Mill Furnaces and Rolling Mills and Steel Works in West Virginia.*

Mingo Furnaces, Junction Iron and Steel 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 and Steel Works.*

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, 70,000 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, Bessemer, foundry, and forge pig iron; annual capacity, 48,000 gross tons. *See New York Furnaces, Hocking Valley. See Rolling Mills and Steel Works.*

Number of bituminous coal or coke furnaces in Ohio outside of the Mahoning Valley, Hocking Valley, Lake counties, and Hanging Rock districts: 10 stacks.

HANGING ROCK—BITUMINOUS COAL OR COKE.

Belfont Furnace, Belfont Iron Works Company, Ironton, Lawrence county. One stack, 66 x 16, built in 1868, and rebuilt in 1895; three Whitwell stoves; fuel, Pocahontas and West Virginia coke; ores, Lake Superior and native; product, Bessemer, foundry, and forge pig iron; annual capacity, 50,000 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, 30,000 gross tons. Machinery is sufficient for operating only one furnace at a time. George N. Gray, Agent.

Fulton Furnace, Globe Iron Company, Jackson, Jackson county. One stack, 50 x 13½, built in 1868, and rebuilt in 1886–7; one iron pipe stove; fuel, ¾ raw coal and ¼ coke; ore, native; product, high-silicon softeners, from 5 to 12 per cent.; annual capacity, 7,500 gross tons.

Brand, "Globe." (Huron Furnace, 49 x 13, abandoned.) Eben Jones, President; E. Crandall, General Superintendent; J. E. Jones, Secretary and Treasurer. Selling agents, Matthew Addy & Co., Cincinnati; Miller, Wagoner & Bentley, Columbus; F. A. Goodrich & Co., Detroit; W. R. Thomas, New York.

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, Pocahontas coke; ores, native block and limestone and Lake Superior; product, soft foundry pig iron; annual capacity, 25,000 gross tons. Brand, "Hamilton." *See Pine Grove Furnace, Hanging Rock Charcoal list, for names 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 14, built in 1889–90, using machinery removed from Waldorf Furnace, W. Va., and blown in in March, 1891; two Gordon-Whitwell-Cowper stoves; fuel, raw coal and West Virginia coke; ores, native and Bath county, Ky.; product, high-silicon and strong Scotch foundry pig iron; annual capacity, 15,000 gross tons. Brands, "Lawrence" and "Pencost." John Peters, Jr., President, Manager, and Selling Agent; Charles Peters, Vice-President; George Peters, Secretary. Selling agents, F. A. Goodrich & Co., Detroit; The Condit-Fuller Company, Cleveland; S. P. Bacon & Co., Cincinnati; Thomas J. Pope's Sons & Co., New York. Owned by the Lawrence Furnace Company.

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; three Whitwell stoves; fuel, West Virginia coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 40,000 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 W. Va. coke; ores, native limonite and block; product, ferro-silicon and Nos. 1 and 2 silvery gray foundry pig iron; annual capacity, 11,000 gross tons. Brand, "Star." 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; ore, native 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, The Wellston Iron and Steel 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, strong softener, soft foundry, and red-short mill pig iron; total annual capacity, 22,500 gross tons. J. C. Clutts, President; H. A. Marting, Vice-President; L. C. Voglesang, Secretary, Treasurer, and General Manager. Selling agents, Miller, Wagoner & Bentley, Columbus.

Number of bituminous coal or coke furnaces in the Hanging Rock region of Ohio: 12 stacks.

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. 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, General Manager, Secretary, and Treasurer; Henry Stephenson, Furnace Manager. Selling agents, James Collord & Co., Pittsburgh; Rogers, Brown & Co., Cincinnati; Rogers, Brown & Warner, Philadelphia.

Jefferson Furnace, Jefferson Furnace Company, Oak Hill, Jackson county. One stack, 40 x 11½, built in 1854; cold blast; open top; 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; Rogers, Brown & Co., Cincinnati; James Collord & Co., Pittsburgh.

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." J. D. Clare, Financial Manager, Portsmouth, Ohio; A. J. Duteil, General Superintendent, and Andrew Henson, Clerk, Rempel. Selling agents, J. D. Clare, Portsmouth; Miller, Wagoner & Bentley, Columbus; James Collord & Co., Pittsburgh; 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, 3,500 gross tons. Brand, "Mt. Vernon." J. H. Moulton, President and Selling Agent, Ironton; J. W. Campbell, Manager, at the furnace. Selling agents, Rogers, Brown & Co., Cincinnati; C. R. Baird & Co., Philadelphia.

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. Open tops; hot or warm blast; ore, native limestone; product, foundry and car-wheel pig iron; total annual capacity, 8,000 gross tons. Brands, "Olive" and "Buckhorn." W. H. McGugin, Superintendent. Selling agents, A. Pluemer, Cincinnati; J. H. Hillman, Pittsburgh.

Pine Grove Furnace, Means, Kyle & Co., Hanging Rock, Lawrence county. One stack, 34 x 11, built in 1827, and rebuilt in 1844; hot blast; open top; 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, Matthew Addy & Co., Cincinnati; James Collord & Co., Pittsburgh. Idle since May, 1894. *See Hamilton Furnace, Hanging Rock Bituminous list.*

Vesuvius Furnace, The Vesuvius Iron Company, lessee, Pedro, Lawrence county. One stack, 33 x 10½, built in 1832; rebuilt in 1886; cold blast; open top; ore, native limestone; product, pig iron suitable for the manufacture of car-wheels and chilled rolls; annual capacity, 3,000 gross tons. Brand, "Vesuvius." W. C. Amos, President, Treasurer, and General Manager; Horace L. Amos, Secretary and Assistant Manager. Selling agents, James Collord & Co., Pittsburgh. Owned by the Ironton Coal and Iron Company.

Number of charcoal furnaces in the Hanging Rock region: 10 stacks. Total number of furnaces in Ohio: 63 completed stacks and 4 stacks building.

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 Furnace Company, lessee, 1233 Monadnock Building, Chicago. Works at South Chicago, Cook county. One stack, 80 x 18, built in 1880, and blown in in 1881; one Massicks & Crooke and three Foote stoves; fuel, Connellsville coke; ore, Lake Superior; product, foundry and Bessemer pig iron; annual capacity, 75,000 gross tons. Brand, "Calumet." William Barret Ridgely, President; C. F. Stuart, Vice-President; C. H. Wilcox, Secretary and Treasurer; Simpson Musgrave, Superintendent. Selling agents, Rogers, Brown & Co., Cincinnati. Owned by the Calumet Iron and Steel Company.

Illinois Steel Company, Rookery Building, Chicago, Cook county. Fifteen 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 two stacks, Nos. 3 and 4, each 73 x 15⅓, built in 1881, and rebuilt in 1889; seven Sie-

mens-Cowper-Foote stoves; product, spiegeleisen, ferromanganese, and Bessemer pig iron; annual capacity, 120,000 gross tons. (Two stacks at the Union Works, Nos. 1 and 2, each 72 x 14, built in 1869, abandoned in 1895.) 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, 1,205,700 gross tons. *See Coke Furnaces in Wisconsin, and Rolling Mills and Steel Works in Illinois and Wisconsin.*

Iroquois Furnace, 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, 70,000 gross tons. Brands, "Iroquois" for strong iron, "Sterling Scotch" for soft iron, "Peerless" for high-silicon soft iron, and "Malleable Bessemer" for iron suitable for malleable work. 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: 17 coke stacks. No charcoal stacks.

MICHIGAN.

CHARCOAL.

Antrim Iron Company, Mancelona, Antrim county. General office, Grand Rapids. Two stacks, one 48 x 10, put in blast December 25, 1882, burned May 29, 1883, and rebuilt the same year; the other, 60 x 10, built in 1887–8, blown in in April, 1888, and rebuilt in 1895; hot blast; charcoal supplied by 104 round brick kilns of an average capacity of 65 cords each; wood cut from company's land; ore, Lake Superior; product, car-wheel and malleable pig iron; total annual capacity, 55,000 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.

Detroit Iron Furnace Company, Newberry Building, Detroit. One stack, 50 x 10½, 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. C. McMillan, 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, and H. B. Lewis, Secretary, 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. John Desmond, Superintendent of furnace. Idle since December, 1892. *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; one hot blast iron stove; ore, Lake Superior; product, Bessemer, foundry, car-wheel, and malleable pig iron; annual capacity, 20,000 gross tons. Brand, "Excelsior." W. H. Nelson, Superintendent. Selling agents, Pickands, Brown & Co., Chicago.

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, C. F. Ilsley, Vice-President, and Samuel Marshall, 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, William B. Vance, Agent, 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." Owned by William A. Galbraith, Erie, and Arnold A. Pluemer, Franklin, Pa.

Newberry Furnace Company, Newberry, Luce county. Furnace and general office at Newberry. One stack, 52⅔ x 10, built in 1882-3, and blown in in May, 1883; rebuilt in 1892; closed top, with patent charger; four iron stoves; water jackets; 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 William C. McMillan, Treasurer, Detroit; Claude W. Case, Secretary and Manager, Newberry. Selling agents, William F. Jarvis & Co., Detroit.

Northern Furnace Company, Marquette. Furnace at Chocolay, Marquette county. 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, F. A. Goodrich & Co., Detroit.

Peninsular Furnace, The Peninsular Iron Company, Detroit, Wayne county. One stack, 42 x 9½, built in 1863, and 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.

Pioneer Furnace, The Cleveland-Cliffs Iron Company, Mercantile Bank Building, Cleveland, Ohio. Furnace at Gladstone, Delta county. Building one stack, 60 x 12, to be blown in early in 1896; two hot blast stoves; ores, Lake Superior red specular and soft hematites; specialty, malleable and car-wheel pig iron; estimated annual capacity, 30,000 gross tons. Brand, "Pioneer." (Pioneer Furnaces, at Negaunee, two stacks, abandoned in 1895.) William G. Mather, President and Treasurer, J. H. Sheadle, Secretary, and R. C. Mann, Auditor, Mercantile Bank Building, Cleveland, Ohio; Austin Farrell, Manager, Gladstone. 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." Lee Burt, President; Wm. Gerhauser, Secretary and Manager; W. C. Burt, Treasurer. Sole sales agents, F. A. Goodrich & Co., Detroit.

Weston Furnace, Weston Furnace Company, Manistique, Schoolcraft county. One stack, 58 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 Champion." J. D. Mersereau, President; M. H. Quick, Vice-President; H. Duvall, Secretary; W. H. Hill, Treasurer. Sales made by the company.

Number of furnaces in Michigan: 15 completed charcoal stacks and 1 charcoal stack building.

WISCONSIN.

COKE.

Milwaukee Works, Illinois Steel Company, Rookery Building, Chicago. Three stacks, two (Bay View) owned and one (Minerva) leased, all in Milwaukee, Milwaukee county: Bay View Furnaces, Nos. 1 and 2, each 66 x 15⅔, built in 1870–1; six Massicks & Crooke stoves. Minerva Furnace, 56 x 14½, (leased from the Minerva Iron Company,) built and put in blast in the spring of 1873; rebuilt in 1892; two Hugh Kennedy hot blast stoves. Fuel, coke; ores, Lake Superior, Gogebic, and Iron Ridge; product, Bessemer, foundry, and mill pig iron; total annual capacity, 160,500 gross tons. *See Furnaces in Illinois, and 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, 40,000 gross tons. Brand, "Sidney." Irving M. Bean, President; James C. Spencer, Vice-President; W. K. Packman, Secretary; Chas. F. Ilsley, Treasurer.

Number of coke furnaces in Wisconsin: 4 stacks.

CHARCOAL.

Eagle Furnace, Eagle Iron Company, D. B. Dewey, Receiver, Spring Valley, Pierce county. One stack, 65 x 13, built in 1892–3, using machinery formerly used by the Fannie Furnaces, at Shawnee, Ohio; first blown in February 20, 1894; two 60-pipe Pollock stoves; ore, brown hematite, mined 1½ miles from the furnace; annual capacity, 22,000 gross tons. Brand, "Eagle." Aaron Hobart, President, Boston, Mass.; D. M. Sabin, Vice-President, Stillwater, Minn.; H. E. Burt, Manager and Selling Agent, Spring Valley.

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; prod-

uct, 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.

Number of charcoal furnaces in Wisconsin: 2 stacks. Total number of furnaces in Wisconsin: 6 stacks.

MINNESOTA.

COKE.

West Duluth Furnace, Duluth Iron and Steel Company, Duluth. Furnace at West Duluth, St. Louis county. One stack, 75 x 16½, built in 1889-90, and rebuilt in 1893; three Gordon-Whitwell-Cowper stoves; fuel, coke, made principally at Duluth from Connellsville coal; ore, Mesabi; product, principally Bessemer pig iron; annual capacity, 50,000 gross tons. R. S. Munger, President; W. H. H. Stowell, Secretary and Treasurer. For sale or lease.

Number of furnaces in Minnesota: 1 coke stack.

MISSOURI.

COKE.

Jupiter Furnace, James Green, 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." (Formerly called the Jupiter Iron Works.)

Missouri Furnaces, Charles A. McNair, lessee, 415 Locust st., St. Louis. Two stacks, located at South St. Louis, built in 1869, and blown in in 1870; No. 1, 58 x 15, remodeled in 1887; No. 2, 76 x 15, remodeled in 1887, and rebuilt in 1895; one Massicks & Crooke and two Gordon-Whitwell-Cowper stoves; fuel, Connellsville coke; ores, Iron Mountain and Cherry Valley; product, Bessemer pig iron; total annual capacity, 60,000 gross tons. Brand, "Missouri." One furnace only operated at a time. Owned by the Missouri Furnace Company, of which Edwin C. Cushman is President; C. McKinley, Vice-President; Charles A. McNair, Secretary and Treasurer; and F. F. Amsden, Superintendent.

Number of coke furnaces in Missouri: 3 stacks.

CHARCOAL.

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. Sales made by the company from its St. Louis office.

Number of charcoal furnaces in Missouri: 1 stack. Total number of furnaces in Missouri: 4 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, and blown in September 7, 1881; one, 75 x 17, completed in 1887; both 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 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. General sales agent, A. C. Cass, Denver. *See Rolling Mills and Steel Works.*

Number of furnaces in Colorado: 3 coke stacks.

UTAH.

CHARCOAL.

Grace Furnace, Ogden Furnace and Manufacturing Company, Ogden. Furnace at Steelton, Weber county. Building one stack, 55 x 10½, using machinery removed from Katherine Furnace in Pennsylvania; to be equipped with one 48-pipe stove; ores, native hard red oxide and specular limonite; product, pig iron suitable for the manufacture of cast-iron gas and water pipe; estimated annual capacity, 22,500 gross tons. Brand, "Ogden." A. Evans, Jr., President and Treasurer; R. H. Whipple, Vice-President; Charles S. Pulver, Secretary. Sales will be made from the company's office.

Number of furnaces in Utah: 1 charcoal stack building.

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." William M. Ladd, President; Martin Winch, Vice-President; J. Frank Watson, Secretary and General Superintendent. 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, 530 California 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; closed top, with patent bell and hopper; iron stove; 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, and for sale.

Number of furnaces in Washington: 1 charcoal stack.

UNITED STATES.

Total number of furnaces in the United States on December 1, 1895, which were then active or might readily be put in blast: 469 stacks. Of these 96 use charcoal as fuel, 117 use anthracite coal or mixed anthracite coal and coke, and 256 use coke or raw bituminous coal. In addition there were 10 furnaces building and 14 furnaces which were projected, some of which were partly built and work on them temporarily suspended.

FURNACES LONG INACTIVE OR WHICH HAVE RECENTLY BEEN ABANDONED.

Some of the furnaces named in this list have been inactive for several years, but are still equipped with fair machinery, and circumstances may at some time favor their revival; others, however, have been permanently abandoned and will never again make iron. 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.

MASSACHUSETTS.

CHARCOAL.

Lanesborough Furnace, Gilbert West, Pittsfield. Furnace at Lanesborough, Berkshire county. One stack, 33 x 9½, built in 1847, burned in 1882, and rebuilt in 1882–3; idle since the spring of 1889.

CONNECTICUT.

CHARCOAL.

Canaan Furnace, Barnum Richardson Company, Lime Rock, Litchfield county. 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.

Kent Furnace, Kent Iron Company, Kent Furnace P. O., Litchfield county. Telegraph address, Kent. One stack, 34 x 10, built in 1849, and rebuilt in 1884; likely to be long inactive.

NEW YORK.

ANTHRACITE AND MIXED ANTHRACITE AND COKE.

Albany City Iron Works, P. J. McArdle, Albany, Albany county. Two stacks on Van Rensselaer Island, each 60 x 16, built in 1873–4. Idle for several years, and for sale.

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.

Elmira Furnaces, 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; abandoned and dismantled in 1895.

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

Port Henry Furnaces, Port Henry Furnace Company, Port Henry, Essex county. Two stacks, situated on the bank 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, and converted to anthracite in 1868; and Sterling, 42 x 14, built as a charcoal furnace in 1848, and 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.

Millerton Iron Company, Irondale, Dutchess county. Telegraph address, Millerton. One stack, 55 x 9½, built in 1885, and blown in in 1886, taking the place of the old stack destroyed by fire May 15, 1885. M. B. Richardson, Lime Rock, Conn., in charge of property for Bondholders' Committee. Likely to remain long inactive.

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.

Andover Iron Works, Andover Iron Company, Phillipsburg, Warren county. One stack, 75 x 18, built in 1848, and remodeled since that date; fuel, anthracite coal and coke; abandoned.

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

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

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.

Warren Furnace, Warren Iron Company, Hackettstown, Warren county. One stack, 56 x 16, built in 1874–5, and put in blast in 1875; fuel, anthracite coal; likely to be long inactive.

PENNSYLVANIA.

ANTHRACITE AND MIXED ANTHRACITE AND COKE.

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

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; 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. Two stacks: one, 52 x 13, built in 1855, dismantled in 1893; and one, 52 x 14, built in 1864, dismantled in 1894.

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; abandoned.

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

Columbia Furnaces, Grove Brothers, Danville, Montour county. Two stacks: one, 39 x 14, built in 1840, abandoned; and one, 50 x 14, built in 1860, likely to be long inactive.

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; abandoned and dismantled.

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.

Cornwall Anthracite Furnaces, Lackawanna Iron and Steel Company, Scranton. New York office, 52 Wall st. Furnaces at Cornwall, Lebanon county. Two stacks: No. 1, 38 x 12, built in 1854; No. 2, 38 x 13, remodeled in 1885 and 1889; abandoned, and now used as roasters.

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.

Katherine Furnace, C. W. Ahl's Son, Carlisle. Works at Boiling Springs, Cumberland county. One stack, 50 x 11, built in 1881–2; abandoned and dismantled; machinery being utilized in erecting Grace Furnace, at Steelton, Weber county, Utah.

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

Irondale Furnaces, The Bloomsburg Water Company, Bloomsburg, Columbia county. Two stacks: one, 36 x 12, and one, 36 x 14, built in 1844 and 1845; abandoned and dismantled.

Lackawanna Furnace, Lackawanna Iron and Steel Company, Scranton, Lackawanna county. New York office, 52 Wall st. One stack, 75 x 18, built in 1852; abandoned in 1895.

Lucinda Furnace, Lucinda Furnace Company, Norristown, Montgomery county. One stack, 55 x 14, built in 1856; rebuilt and enlarged in 1888–9; likely to be long inactive.

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.

Montour Furnaces, Philadelphia and Reading Coal and Iron Company, Philadelphia. Furnaces at Danville, Montour county. Two stacks, each 52 x 15, built in 1842; abandoned.

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.

Thomas (The) Iron Company, Hokendauqua, Lehigh county. No. 2 stack, at Hokendauqua, 60 x 16, built in 1855; abandoned and dismantled in 1894.

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. 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.

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. Owned by the First Mortgage

Bondholders, who are represented by Aug. S. Landis, of Hollidaysburg. Idle for several years; for sale or lease.

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.

Ruby Furnace, Albert Ferguson & Co., Colebrook, Lebanon county. One stack, 30 x 6½, built and blown in in 1885; abandoned and dismantled.

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; abandoned and dismantled.

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.

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; 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 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, of 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.

Principio Furnace, Whitaker Iron Company, Wheeling, West Va. Furnace at Principio Furnace P. O., Cecil county. One stack, (No. 1,) 35 x 9, first built in 1723, and rebuilt in 1836; abandoned in 1894.

Stickney (The) Iron Company, 11 South Gay st., Baltimore. Furnace at Canton, Baltimore county. One stack, Furnace A, 50 x 9½, built in 1854 and rebuilt in 1871; dismantled in 1894.

VIRGINIA.

CHARCOAL.

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

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.

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; 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.

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. 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. Both likely to be long inactive.

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.

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. George W. Chipman, Assignee for Dudley C. Hall, owner, 110 Tremont st., Boston, Mass. Idle for several years, and for sale.

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.

Cardiff Coal and Iron Company, Cardiff, Roane county, began building in 1890 one coke stack, 75 x 16; foundations started; work suspended; abandoned.

Rockwood Furnaces, Roane Iron Company, Rockwood, Roane county. Main office at Chattanooga. Two stacks, each 65 x 15, one built in 1869 and the other in 1872; dismantled.

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.

Butler Furnace, Doe Valley Association, 218 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; idle since 1885.

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 9⅓, 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.

COKE.

Edwards Furnace, Bessemer Land and Improvement Company, Bessemer. Furnace at Woodstock, Bibb county. One stack, 70 x 15, first blown in June 10, 1880; remodeled in 1887 and in 1890; to be torn down and removed to Bessemer.

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.

TEXAS.

CHARCOAL.

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

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 12¾, built about 1850; abandoned.

Fannie Furnaces, Shawnee, Perry county. Two stacks: No. 1, 47 x 11⅚, 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.

Huron Furnace, T. S. Matthews, Trustee for Portsmouth National Bank, of Portsmouth, and First National Bank, of Jackson. Furnace at Jackson, Jackson county. One stack, 49 x 13, first blown in April 19, 1875, and rebuilt in 1889; likely to be long inactive.

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

Milton Furnace, C. H. Bunker, Monroe st. and Fifth ave., Chicago, Ill. Furnace at Wellston, Jackson county. One stack, 60 x 14, built in 1873–4; put in blast June 6, 1874; likely to be long inactive.

Proton Furnace, Cleveland Iron Company, Cleveland, Cuyahoga county. One stack, 60 x 16, built in 1869, and rebuilt in 1878; torn down in 1889.

Seneca Furnace, The Salem Iron Company, Pittsburgh, Pa. Furnace at Leetonia, Columbiana county. One stack, 54 x 15, built in 1872; abandoned in 1894.

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.

Union Works, Illinois Steel Company, Rookery Building, Chicago, Cook county. Two stacks, located at Ashland ave. and Thirty-first st. Nos. 1 and 2, each 72 x 14, built in 1869, and rebuilt in 1885; abandoned and dismantled in 1895.

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.

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; partly dismantled.

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.

Gogebic (The) Furnace Company, of Milwaukee, proposed to erect a charcoal stack, 60 x 12, at Ironwood, Gogebic county, Michigan, in the spring of 1894; project abandoned.

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.

Pine Lake Furnace, Pine Lake Iron Company, Ironton, Charlevoix county. One stack, 50 x 11, built in 1880–1, and put in blast in February, 1881; dismantled.

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; abandoned in 1895.

WISCONSIN.

COKE.

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; abandoned.

CHARCOAL.

Florence Furnace, Florence, Florence county. One stack, 40 x 8, built in 1880, and first blown in November 13, 1881; dismantled.

Fond du Lac Furnace, Fond du Lac Iron Company, Fond du Lac, Fond du Lac county. One stack, 52 x 10½, built in 1873–4, and first put in blast in 1883; burned in 1895; for sale.

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 a partly-erected furnace at West Superior.

National Furnace, National Furnace Company, De Pere, Brown county. One stack, 45 x 10½, built in 1869, and put in blast in February, 1870; abandoned and property sold.

Sauk Furnace, Iron Mountain Ore and Furnace Company, Ironton, Sauk county. Telegraph address, La Valle. One stack, 30 x 8½, built in 1857; likely to remain long inactive.

York Iron Company, West Superior, Douglas county, began in 1892 the erection of a blast furnace at West Superior, utilizing machinery from the dismantled Minneapolis Furnace, of Black River Falls; construction suspended in 1893; abandoned.

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.

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; abandoned in 1894.

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.

WASHINGTON.

COKE.

Great Western Iron and Steel Company, of Seattle, King county, contemplated erecting at Kirkland one stack, 75 x 17; abandoned.

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.

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. Unless otherwise stated the annual capacity given is on double turn. 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-inch guide, one 18-inch bar, and one 18-inch muck); product, merchant bar iron, railroad spikes, angle and plain fish-plates, and angle and bridge iron; annual capacity, 15,000 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, (two 100 x 28-inch plate and one 12-inch bar,) 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; annual capacity, 16,500 gross tons. Brand, "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, 1 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. John E. Sanford, Luke P. Willard, and Arthur E. Denison, Trustees. 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; again burned in 1894, and rebuilt in 1895; 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, 54 gross tons. J. H. Warr, Manager. Owned by the Estate of James C. Warr.

General Electric Company, Steel Foundry Department, 42 Centre st., Lynn. General office, Schenectady, New York. W. C. Fish, General Manager Lynn Works. Two 15-gross-ton open-hearth steel furnaces erected in 1892, and first steel made March 4, 1893; product, steel castings; annual capacity, 5,000 gross tons. W. P. Darling, Manager Steel Foundry Department.

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, 11,000 gross tons. Brands of bar iron, "Kinsley" and "G. K." Fuel used, coal and oil. A forge is connected with the works for the production of wagon axles, etc.; also a foundry and a machine shop. Frank M. Ames, Treasurer.

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 cut-nail machines, and two 18-inch trains of rolls; product, nails, skelp iron, tack and shovel plate, etc.; annual capacity, single turn, 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, 134 South Water st., Providence, Rhode Island.

Robinson Iron Company, Plymouth, Plymouth county. Built about

1800; 6 heating furnaces, 2 trains of rolls, and 18 cut-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 150 cut-nail machines; steam and water power; annual capacity, 30,000 gross tons of steel ingots, with mill facilities for finishing them, and 200,000 kegs of cut nails. Brands, "Percha plates" and "Percha nails." Horace P. Tobey, Treasurer. Goods sold at the factory and at the company's store in Boston.

United States Navy Yard, Charlestown, Suffolk county. Mill built in 1868; 19 forge fires, 11 chain fires, 6 heating furnaces, and 2 trains of rolls (one 10 and one 18-inch); product, bar iron for chain cables, etc.; annual capacity, single turn, 245 gross tons. Fuel used, bituminous coal.

Washburn and Moen Manufacturing Company, Worcester, Worcester county. Quinsigamond, or South Works: rolling mill built in 1846; 12 heating furnaces and 10 trains of rolls (nine rod and one billet); product, billets and iron and steel wire rods and wire; annual capacity, 115,000 gross tons of rods. 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; two 20-gross-ton open-hearth furnaces now being erected. The company also operates the 10-gross-ton open-hearth furnace of the Worcester Cycle Manufacturing Company, at Worcester. (Grove Mill, or North Works, built in 1868, now produces wire only, rod train having been recently removed to the Quinsigamond Works.) 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; F. H. Daniels, General Superintendent. Selling agents, R. K. Dana, 16 Cliff st., New York; T. H. Dibble, Scranton, Pa.; T. E. Hughes, Pittsburgh; C. T. Boynton, 107 Lake st., Chicago; George A. Cragin, Houston, Texas; F. L. Brown, 10 Pine st., San Francisco, California. *See Rolling Mills in Illinois.*

Worcester Cycle Manufacturing Company, Worcester, Worcester county. Principal office, 55 Franklin st., New York. 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. The 10-gross-ton open-hearth furnace is operated by the Washburn and Moen Manufacturing Company, of Worcester; the remainder of the equipment mentioned above is idle. (Formerly called New England Steel Works.) The company also operates an iron foundry and manufactures bicycles. Charles S. Boyd, President and Manager; A. J. Cahill, Secretary.

Number of rolling mills and steel works in Massachusetts: 11. Of these 1 makes Clapp-Griffiths steel and 4 make open-hearth 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 horseshoe machines; product, bars for the horseshoe 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 (one muck and one 8 and one 10-inch finishing); product, merchant iron, machine forged and hot pressed nuts, washers, wrought butts, and hinges; annual capacity, single turn, 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, fourteen 2-pot steel-melting holes, and one 24-pot Siemens gas steel-melting furnace; 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, single turn, 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 and Bessemer 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, 20,000 gross tons. Brand, "N. H." Pierce N. Welch, President and Treasurer; E. S. Wheeler, Secretary; C. S. Poronto, Superintendent; Frank E. Williams, Agent; Frank E. Williams and H. F. Hall, Managers.

Thames (The) 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, single turn, 4,000 gross tons. John Mitchell, President; Albert G. Mitchell, Secretary and Treasurer; Charles Mitchell, Superintendent.

Wilmot (The) and Hobbs Manufacturing Company, Bridgeport, Fairfield county. Hot Rolling Mill Department, built in 1887; product, hoop, band, and plate and sheet steel; annual capacity, 30,000 gross tons. Brand, "Swedoh." Also operates a cold-rolling department. S. R. Wilmot, President; F. A. Wilmot, Vice-President and Treasurer; P. L. Bryning, Secretary; Albert N. Stanton, 2d Vice-President; Calhoun Latham, Assistant Treasurer; C. D. S. Miller, Superintendent of Manufacture.

Windsor Locks Steel Works, Farist & Windsor, Bridgeport. Works at Windsor Locks, Hartford county. Built in 1860; 2 Stubblebine heating furnaces, 3 trains of rolls, (one 10, one 12, and one 18-inch,) and ten 4-pot steel-melting holes; steam and water power; product, merchant steel, tack plate, and tool and die steel; annual capacity, single turn, 5,500 gross tons. (Formerly operated by The Windsor Locks Steel Company.) Idle and 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 1 hammer; use scrap iron only; product, merchant bar and horseshoe iron; annual capacity, 4,000 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, horseshoes, 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, Brooklyn, Kings county. Office and works, Kent ave. and Keap and Hooper sts. New York office, 11 Pine st. Built in 1869; 7 heating furnaces, 7 hammers, nine 6-pot steel-melting holes, and 3 trains of rolls (one 12, one 18, and one 24-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, 3,500 gross tons. Brand, "Chrome." C. P. Haughian, President; F. E. Canda, Vice-President; C. J. Canda, Secretary; J. G. Dunscomb, Treasurer.

Cohoes Rolling Mill, Morrison, Colwell & Page, 253 River st., Troy. Works at Cohoes, Albany county. Built in 1864; burned and rebuilt in 1883; 11 double puddling furnaces, 2 scrap and 5 Swindell gas heating furnaces, and 4 trains of rolls; water-power; product, band and bar iron; specialty, high-grade iron for edge tools, butts, hinges, and boiler flues; annual capacity, 10,000 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. Adding two 20-gross-ton basic open-hearth steel furnaces, to be completed early in 1896. Milton A. Fowler, President; N. D. Doxey, General Manager; Jesse L. Cooley, Secretary and Treasurer.

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 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, 4 trains of rolls, (9, 10, 12, and 16-inch,) and 25 wire-nail machines; product, wire rods, consumed in the works in the manufacture of wire, wire nails, bale ties, and fencing; annual capacity, 27,000 gross tons. T. S. Kilmer, President; D. S. Waring, Vice-President; W. A. Kilmer, Secretary and Treasurer; M. D. 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, horseshoe iron and small flats and rods; annual capacity, 1,800 gross tons of horseshoe iron and 900 tons of flats and rods. Brand for horseshoe iron, a horseshoe inclosing the letters "J. L."

Monhagen Steel Works, Wheeler, Madden, and Clemson Manufacturing Company, Middletown, Orange county. Operated by the National Saw Company; general office, 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 horseshoe bars; annual capacity, 6,000 gross tons. For sale or lease.

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, 31,000 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; Francis H. Nye, Jr., Secretary and Treasurer; Peter Eckel, General Manager; M. Cunningham, Purchasing and Sales Agent.

Osborne (D. M.) & Co., Auburn, Cayuga county. Built in 1881; 5 heating furnaces, 2 trains of rolls, (one 8 and one 10-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 and General Manager.

Phœnix Horse Shoe Company, Poughkeepsie, Dutchess county. Built in 1873; one single puddling furnace, 2 gas and 4 coal heating furnaces, and 5 trains of rolls; specialty, horseshoes; annual capacity, 7,200 gross tons. Charles W. Miller, President and Manager; E. H. Miller, 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 high grades of merchant puddled bar, stay-bolt, plow-bolt, horseshoe, snow-ball horseshoe, hexagon and beveled-edge tire, screw, hoop, and band iron; high-grade refined iron branded "Rome," and a superior quality branded "J. G.;" annual capacity, single turn, 12,000 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, 3 annealing furnaces, 2 steel cementing furnaces, 10 hammers, 3 trains of rolls, (9, 10, and 12-inch,) and one 24-pot and four 12-pot Siemens gas steel-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, 5,000 gross tons. Brand, "Sanderson Bros. & Co." C. H. Halcomb, President and Treasurer; G. D. Green, 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 a tin-box establishment, and 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, coal. *See Tinplate Works.*

Standard Rolling Mill, M. J. Dempsey, Fortieth st. and Eleventh ave., New York City. Built in 1891; 1 regenerative gas heating furnace and 2 trains of rolls (10 and 18-inch); product, merchant bar and

horseshoe iron; annual capacity, 6,000 gross tons. Brand, "Standard." William S. Dempsey, Superintendent.

Syracuse Works, The American Steel Casting Company, Thurlow, Pa. Works at Geddes, Onondága 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. (Formerly operated by the Syracuse Steel Foundry Company.) *For list of branch offices and full list of officers see Thurlow Works, Pennsylvania. See Thurlow, Norristown, and Sharon Works in Pennsylvania, and Alliance Works in Ohio.*

Troy (The) Steel Company, Troy, Rensselaer county. Property formerly owned by the Troy Steel and Iron 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, boiler rivets, and steel forgings; 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, special and agricultural steels, and merchant steel of all kinds; annual capacity of rail mill, 110,000 gross tons; of merchant mill, 22,500 tons. Brands of steel, "XX Gun," "XX Special Dead Soft," "XX Gun Barrel," and a variety of other special grades. Bessemer steel works built in 1864; now being removed to Breaker Island and enlarged; first blow made February 15, 1865; three 15-gross-ton basic converters, 4 cupolas, 4 spiegel cupolas, two 5-hole Hainsworth pit furnaces, and 24 soaking pits; annual capacity, 200,000 gross tons of ingots; blooming department contains one 35-inch 2-high reversing mill, with 42 x 60-inch reversing engines. *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, horseshoe iron, rounds, squares, hexagons, and fancy shapes of all kinds; annual capacity, 6,000 gross tons. Brand, for horseshoe iron, "W" inside of a horseshoe.

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 and 1 open-hearth steel plant is being built, 4 make crucible steel, and 2 make blister steel.

NEW JERSEY.

American Horse Shoe Company, Phillipsburg, Warren county. Built in 1865; 6 heating furnaces and 3 trains of rolls (one 9-inch guide, one 16-inch puddle, and one 18-inch bar); product, a superior grade of horseshoe bars; specialty, horseshoes; annual capacity, 5,000 gross tons. (Formerly called the Delaware Rolling Mill.) Charles H. Holton, President; Philip S. Dyer, Secretary and Treasurer.

American Sheet Iron Works, American Sheet Iron Company, Phillipsburg, Warren county. Sales office, Havemeyer Building, New York. Built in 1867; enlarged in 1870, 1873, 1882, and 1892; 2 double puddling furnaces, 1 heating furnace, 3 sheet-finishing furnaces, 1 pair furnace, 3 annealing furnaces, 7 trains of rolls, (one 22-inch muck, one 22-inch bar, and three 22-inch sheet, hot, and two 22-inch cold,) 1 rotary squeezer, and 1 hammer; product, best qualities of sheet iron and sheet steel and black plates for tinning; annual capacity, triple turn, 2,400 gross tons of sheets and 1,400 tons of black plates. 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 steel-melting furnaces, one 7 and one 15-gross-ton Siemens open-hearth steel furnace with complete foundry equipment for open-hearth steel castings, 3 steam hammers, and 3 trains of rolls, (two 8 and one 16-inch.) Harrison Works, (formerly called New Jersey Steel Works,) located at Harrison, Hudson county, (opposite Newark,) built in 1888-9, and put in operation in April, 1889; 6 trains of rolls, (one 8-inch, two 9-inch, one 10-inch, one 12-inch, and one 16-inch,) 14 steam 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, "Champion," "Champion Extra," 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; Henry G. Atha, Treasurer; John Illingworth, Vice-President and Manager; A. C. Denman, Secretary; Robert H. Illingworth, Superintendent.

Boonton Iron Works, Boonton Iron and Steel Company, lessee, Boon-

ton, 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." (Cut 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, 207 Walnut Place, Philadelphia. Built in 1814; 10 double puddling furnaces, 4 heating furnaces, two 18-inch trains of rolls, and 90 cut-nail machines; steam and water power; product, cut 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, 207 Walnut Place, Philadelphia.

Dover Iron Works, 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.

Elizabeth Tin Plate Company, Dix Building, Elizabeth, Union county. Building a rolling mill, to contain 8 heating furnaces and 10 trains of rolls (4 hot and 6 cold); product, to be black plates for tinning; estimated annual capacity, 7,500 gross tons. Fuel to be used, coal. Thomas P. Edwards, President and Treasurer; Alex. S. Bacon, Vice-President; H. Pritchard, Secretary and Manager. *See Tinplate Works.*

Harvey Steel Company, Brill's Station, Newark, Essex county. New York office, 52 Wall st. Built in 1889; 6 heating furnaces, one 10-inch train of rolls, two 4-pot crucible steel-melting holes for experimental purposes, and 14 treating furnaces. Treats armor plate and other iron and steel products under the Harvey patents. Stephen S. Palmer, President; Thomas W. Harvey, 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, 2 hammers, (one 2 and one 8-ton,) and one 10-inch train of rolls; product, crucible steel, used by the firm in manufacturing tools, rasps, and files; annual capacity, single turn, 600 gross tons.

Jersey City Spike and Bolt Works, W. Ames & Co., 312 Washington st., Jersey City, Hudson county. Built in 1850; 1 heating furnace, 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, 10,000 gross tons.

New York Frog and Switch Company, Hoboken, Hudson county. One 7-gross-ton acid open-hearth steel furnace built in 1894; first steel made in August, 1894; product, open-hearth steel castings; annual capacity, 4,500 gross tons. W. H. Furman, President; J. L. Nevin, Vice-President; A. A. Franck, Secretary; W. C. Meeker, Treasurer and General Manager.

Oxford Iron and Nail Company, Oxford, Warren county. New York office, 26 Exchange Place. Built in 1866; 26 puddling furnaces, 2 regenerative gas heating furnaces, 4 Smith and 8 Taylor gas producers, using anthracite coal, 4 spike furnaces, 103 cut-nail machines, and 3 trains of rolls (one 12 and two 23-inch); product, bar iron and iron cut nails; annual capacity, 5,000 gross tons of bar iron and 200,000 kegs of nails. Brand, "Oxford." Samuel Sloan, President, John I. Blair, Vice-President, and A. D. Chambers, Secretary and Treasurer, 26 Exchange Place, New York; Edmund T. Lukens, General Manager, at the works. *See Furnaces.*

Passaic Rolling Mills and Bridge Works, The Passaic Rolling Mill Company, Paterson, Passaic county. New York office, 45 Broadway. Built in 1867 and incorporated 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 and enlarged in 1894, contains three 20-ton open-hearth furnaces, (two acid and one basic,) 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 25,000 tons of open-hearth steel. The plant includes a bridgebuilding 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, (one 9 and one 18-inch,) 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, single turn, 2,700 gross tons. Brand, "Pompton." Erastus Corning, President; James W. Cox, Jr., Vice-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 the 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, 36,000 tons. Charles G. Roebling, President; Washington A. Roebling, Vice-President; Ferdinand 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; 1 single and 2 double puddling furnaces, 6 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 and locomotive axles and similar forgings; annual capacity, in axles, 7,000 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 (The) Iron Company, Trenton, Mercer county. New York office, Cooper, Hewitt & Co., 17 Burling Slip. Built in 1845; 2 double puddling furnaces, 6 heating furnaces, 2 hammers, (one 2½ and one 3-ton,) and 4 trains of hot rolls (one 8, one 10, one 12, and one 20-inch); cold-rolling department contains thirty-three 6-inch, fourteen 8-inch, four 10-inch, and one 12-inch trains of cold rolls; wire works, with 965 blocks; product, wire rods, merchant rods, iron and steel wire, cold rolled steel, wire rope, and wire-rope tramways (Bleichert system) for transportation of material; annual capacity of rods, 18,000 gross tons. Abram S. Hewitt, President, and Peter Cooper Hewitt, 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 all kinds of 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 steel furnace, not yet put in operation; product, to be cast steel vises. Peter Wilkes, President and Secretary; Samuel K. Wilson, Treasurer. For sale.

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, hot, and two 12-inch cold,) one wire-drawing plant with two 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: 20 completed and 1 building. Of these 4 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, two 10-inch 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, single turn, 1,600 gross tons.

Fair Hill Rolling Mill, Gaulbert, McFadden & Caskey, York and American 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, single turn, 450 gross tons.

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. 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: R. J. Hughes, President and Secretary; Walter Hatfield, Vice-President and Treasurer. *See Tin-plate Works.*

Keystone Horse Shoe Works, Merchants Trust Company, Assignee for benefit of creditors, 611 Chestnut st., Philadelphia. Works at Seventeenth and Clearfield sts. First put in operation January 1, 1873; rebuilt in 1884; 4 heating furnaces and 3 trains of rolls, arranged to make the rolling partly continuous; product, merchant bar, band, hoop, and skelp iron; annual capacity, 13,500 gross tons. Idle and for sale.

Keystone Saw, Tool, Steel, and File Works, Henry Disston & Sons, (incorporated,) Tacony, Philadelphia. Branch offices: Boston, Mass.; Chicago, Ill.; Louisville, Ky.; New Orleans, La.; and San Francisco, Cal. 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, Assistant Treasurer; Samuel Disston, Secretary.

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

Oxford Iron and Steel Works, William & Harvey Rowland Incorporated, 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,

President; Joseph G. H. Miller, Vice-President; Charles Rowland, Treasurer; William Rowland, Secretary.

Pencoyd Iron Works, A. and P. Roberts Company, 261 South Fourth st., Philadelphia. Works in Montgomery county, opposite Manayunk. Built in 1852; 7 regenerative gas heating furnaces, 6 coal-fired heating furnaces, 3 regenerative gas pit furnaces, and 5 trains of rolls, (one 12, two 23, one 28, and one 2-high 36-inch reversing.) Steel department, added in 1887 and since enlarged, contains 8 open-hearth furnaces, (two 25 and six 30-gross-ton.) Forge shop has 6 hammers, (two 2-ton, two 3-ton, one 4-ton, and one 20-ton.) Product, open-hearth steel channel bars from 2 to 15 inches, beams from 3 to 20 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 steel, shafting, and steel blooms; annual capacity, 100,000 gross tons of finished material. Specialties, structural shapes, axles, shafting, and bar and bridge steel. 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 12 inches wide; annual capacity, 50,000 gross tons. Percival Roberts, President; Percival Roberts, Jr., Vice-President; P. W. Roberts, Treasurer; Frederick Snare, Secretary. Selling agents, William H. Wallace & Co., 66 Broadway, New York; Harrington, Robinson & Co., 125 Milk st., Boston; General Railway Equipment Company, Rookery Building, Chicago.

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.,) 1 forge, and 21 treating tanks; product, high-grade tool steel made from open-hearth and low-grade Bessemer steel. B. K. Jamison, Vice-President; R. M. Smith, Secretary and Treasurer; Walter J. Scott, Superintendent. Selling agents, Tool Steel Supply Company, 942 Drexel Building, Philadelphia.

Penn Treaty Iron Works, Marshall Brothers & Co., Beach and Marlborough sts., Philadelphia. Built in 1856; 3 single puddling furnaces, 5 heating furnaces, and 8 trains of rolls (one 3-high puddle, one 3-high bar, one 3-high plate, one sheet, three tinplate, and one cold rolling); product, sheet and plate iron and black plates for tinning; annual capacity, 10,000 gross tons. Brands, "Penn Treaty" and "Keystone" for sheets, and "M. B." for plates. *See Tinplate Works.*

Number of rolling mills and steel works in Philadelphia and vicinity: 12. Of these 2 make open-hearth steel, 4 make crucible steel, 2 make blister steel, and 1 makes special steel.

EASTERN PENNSYLVANIA, EXCEPT PHILADELPHIA.

Allentown (The) Rolling Mills, 229 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. 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, Cleveland, Louisville, St. Louis, San Francisco, and Portland, Oregon. Built in 1889; 2 gas heating furnaces, 4 trains of rolls, (9, 10, 14, and 16-inch,) and 76 wire-nail machines; product, wire rods drawn into wire and chiefly used by the company in the manufacture of barb wire and wire nails; annual capacity, 60,000 gross tons of wire rods and 500,000 kegs of wire nails; fuel used, anthracite coal and oil gas; F. E. Patterson, Manager, New York. A galvanizing plant is connected with the works. (Formerly operated by the Iowa Barb Wire Company.) William Edenborn, President; John Lambert, Vice-President and General Manager; Alfred Clifford, Treasurer; E. T. Schuler, Assistant Treasurer and Secretary. *See Pittsburgh Works in Allegheny County and Beaver Falls Mills in Western Pennsylvania; see Cleveland Works in Ohio.*

Bethlehem (The) Iron Company, South Bethlehem, Northampton county. Main office, South Bethlehem; Philadelphia office, 421 Chestnut st.; New York office, 80 Broadway. Established in 1860. Iron mills started in 1863; Bessemer steel works started in 1873; one single and 7 double puddling furnaces, 1 forge fire, 19 heating furnaces, (6 ordinary reverberatory and 13 bituminous coal, gas, and fuel oil,) 45 gas producers, 8 trains of rolls, (10, 12, 21, 22, 25, 28, 32, and 48-inch,) and 5 hammers, ranging from 1,500 pounds to 10 tons each; four 7½-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, axle, spring, screw, and wire steel, etc., and castings; annual capacity, 205,000 gross tons of rails, 55,000 tons of merchant forms, and 250,000 tons of ingots. Forging and Plate Department, making open-hearth steel: first steel melted August 11, 1888; 4 completed open-hearth steel melting furnaces and 2 building (one 10, one 20, and

two 40-gross-ton completed and two 40-gross-ton building); an ingot weighing 110 gross tons can be cast; annual capacity of ingots, about 60,000 gross tons. Adding to this department 4 soaking pits, 2 reheating furnaces, 29 bituminous gas producers, and 3 trains of rolls (26, 32, and 34-inch); product, to be boiler plate, tank, slabs, and special billets. 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' pressure,) one hammer with a falling weight of 125 gross tons, 5 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 cementation process. This department also contains 46 gas producers and 46 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, 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. *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 cut-nail machines; steam and water power; product, nails and muck bar; annual capacity, 250,000 kegs of cut 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; 4 double and 4 single puddling furnaces, 3 heating furnaces, rotary squeezers, and 3 trains of rolls (one muck, and one 8 and one 11-inch finishing); 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, 15,000 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. Building two 35-gross-ton open-hearth steel furnaces, (one acid and one basic,) and adding one 3-high 132-inch plate train, Siemens heating furnaces, cranes, etc.; also adding a large guillotine shear, with knives 154 inches long; estimated annual capacity of open-hearth furnaces, 40,000 gross tons of ingots; of plate mill, 40,000 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." Idle and for sale.

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, and trimming, clipping, punching, and cleaning machinery. Product, "Boss" and "Bryden" forged horse and mule shoes, made from purchased muck bar, and "Covington" and "Kent" racing plates from the best grades of steel; annual capacity, single turn, 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,) 9 hammers, (one 400-lb., one 750-lb., two 1,000-lb., one 1,500-lb., one 1-ton, one 3,500-lb., 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 annually 3,000 tons of open-hearth steel; annual capacity, single turn, 5,000 gross tons of crucible steel, 3,000 tons of projectiles, and 2,000 tons of Carpenter air-hardening steel. Brand, "Carpenter Steel." Also operates a machine shop with 52 lathes and a wire-drawing plant. Contemplates erecting one 5-gross-ton open-hearth steel furnace in 1896. John C. Barron, President; Henry M. Hawkesworth, 1st Vice-President; W. B. Kunhardt, 2d Vice-President; Robert W. Hawkesworth, Secretary; Lewis 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, 10 trains of rolls, (two 3-high and one 18-inch 2-high muck, two 10, one 15, one 18, and one 21-inch bar, and one 22-inch 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 for bar iron, "Catasauqua Refined," "Catasauqua Rivet," and "Catasauqua Staybolt;" for plates, "Refined," "Shell," "Flange," and "Fire-box." J. S. Elverson, President; Henry Davis, Secretary and Treasurer. Selling agents, Charles K. Barns & Co., 224 South Fourth st., Philadelphia; Samuel K. Wilmurt, 29 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 steel 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, single turn, 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 7 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, "Blue Annealed" iron and steel, "Hope," "Anchor," "R. G.," "Special Electric," "Best Bloom," and "Soft Steel." John Wood, President; George W. Wood, Vice-President and General Manager; Charles M.

Wood, Secretary; William M. Wood, Treasurer. Selling agents, A. C. Jessup, New York; W. E. Clark, Boston; Scully Steel and Iron Company, Chicago. *See Plymouth Rolling Mill.*

Crum Lynne Iron and Steel Works, Crum Lynne Iron and Steel Company, Crum Lynne, Delaware county. Philadelphia office, 216 South Third st. Built in 1887–8; 2 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 grooved iron and steel skelp; annual capacity, 9,000 gross tons. Contemplate adding another double puddling furnace. (Formerly operated by the Crum Creek Iron and Steel Company.) Walter E. Rex, President; J. Jones Hudson, Treasurer and General Manager.

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. Contemplates 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, steel and refined sheets; annual capacity, 1,000 gross tons. Brand, the letter "R" in a diamond.

Eureka Cast Steel Company, Chester, Delaware county. Works at Lamokin, one mile south of Chester. Built in 1877. 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, a machine shop being added. (Crucible steel plant, erected in 1885, abandoned in 1893.) E. H. Johnston, President; Samuel Lyons, Treasurer; H. B. Faunce, Secretary; G. P. Denis, 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., Telephone Building, 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. H. M. M. Richards, Chairman; J. H. Craig, Secretary and Treasurer.

Keystone Nail Works, Ellis and Lessig Steel and Iron Company Limited, Pottstown, Montgomery county. Built in 1884–5; rebuilt in 1894; 22 double puddling furnaces, 2 regenerative gas heating furnaces, one 9-inch and four 22-inch trains of rolls, and 105 cut-nail machines; product, muck bar, shovel and nail plate, and "Keystone" iron and steel cut nails; annual capacity, 27,000 gross tons of muck bar, 14,500 tons of nail and shovel plate, and 300,000 kegs of nails. George B. Lessig, Chairman and Manager; J. B. Lessig, Secretary and 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. H. A. DuPont, attorney for owners, 100 Maryland ave., Wilmington, Delaware. Idle and for sale.

Longmead Iron Works, Longmead Iron Company, Conshohocken, Montgomery county. Built in 1882 and put in operation in November, 1882; enlarged in 1894; 6 double puddling furnaces, 1 gas producer, 1 gas heating furnace, and 2 trains of rolls (one 20-inch muck and one 16-inch skelp); product, muck bar and grooved skelp iron; annual capacity, 10,000 gross tons of muck bar or 9,000 tons of skelp iron. Jawood Lukens, President and Treasurer; A. L. Murphy, Secretary; S. Anderson, Superintendent.

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 x 34 inches and hydraulic automatic tables,) 1 hammer, large guillotine shears with knives 110 inches long, and 1 new 110-ton hydraulic guillotine shear, with knives 14 feet long, capable of shearing plates 2½ inches thick when cold; 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, 50,000 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 30-gross-ton open-hearth steel furnaces, with hydraulic ladle, ingot cranes, and 8 gas producers, erected in 1891, and first steel made early in 1892; two 30-gross-ton furnaces added in 1894, with 6 gas producers; now adding two 30-gross-ton basic furnaces; product, ingots for steel plates; annual capacity, when new furnaces are completed, 75,000 gross tons. Charles Huston, President; A. F. Huston, 1st Vice-President; Charles L. Huston, 2d Vice-President; Joseph Humpton, Secretary and Treasurer. Selling agents, Scully Steel and Iron Company, Chicago; Western Iron and Supply Company, St. Louis; M. Generelly, New Orleans; R. C. Hoffman & Co., Baltimore; J. F. Corlett, Cleveland; Charles Neblett, Cincinnati; 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 x 25 inches and finishing rolls 81 x 25 inches,) and one 3-ton hammer; product, every variety of steel and iron plates; annual capacity, 7,500 gross tons. Brand, "McIlvain." *See Bloomaries.*

Norristown Iron Works, Executors Estate of 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. For sale or lease. *See Furnaces in the Schuylkill Valley.*

Norristown Works, The American Steel Casting Company, Thurlow. Works at Earnest Station, Norristown, Montgomery county. 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. (Formerly operated by the Norristown Steel Company.) *For list of branch offices and full list of officers see Thurlow Works. See Syracuse Works in New York, Thurlow and Sharon Works in Pennsylvania, and Alliance Works in Ohio.*

Parkesburg Iron Works, The Parkesburg Iron Company, Parkesburg, Chester county. First started in April, 1873; enlarged in 1887 and 1889; 4 double puddling furnaces, 9 charcoal finery fires, 8 heating furnaces, one 20-inch train of 3-high muck rolls, three 2-high plate trains, (two 23 x 50 inches and one 22 x 60 inches,) and 2 hammers; product, boiler tube skelp and iron and steel boiler plate; annual capacity, 12,500 gross tons. Brand, "P. I. Co." Horace A. Beale, President; William H. Gibbons, Vice-President; W. C. Michener, Secretary; Samuel R. Parke, Treasurer; A. J. Williams, General Manager.

Penn Steel Casting 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. Also manufactures cast steel pipe. M. H. Bickley, President; John T. Dickson, Secretary; Charles W. Andrew, 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 20-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 x 26-inch 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.) Selling agent, for New York City only, Daniel F. Cooney, 88 Washington st.

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, (one 22-inch bar, and one 22 x 44, one 22 x 56, and one 22 x 60-inch plate and sheet,) and 12 cut-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 tons of finished material. Brands, "Soft Steel" and "Blue Annealed" iron and steel. Owned by R. D. Wood & Co., Philadelphia. *See Conshohocken, Pennsylvania, and Corliss Iron Works.*

Pottsgrove Iron Works, Potts Brothers Iron Company Limited, Pottstown, 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 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. Built in 1863 and enlarged in 1867; 22 double puddling furnaces, 13 Siemens heating furnaces, 95 cut-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, cut nails, and boiler, ship, bridge, and tank plate; annual capacity, 35,000 gross tons of muck bar, 50,000 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-gross-ton Siemens open-hearth steel 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. 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, single turn, 35,000 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, single turn, 35,000 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 and 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; 4 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 especially, bolts, nuts, washers, rivets, rods, and irons for bridges and buildings, etc.; annual capacity, 20,000 gross tons. Brand, "S." An addition to the rolling mill department is now being made, which will include a 10-inch and an 18-inch train of rolls, with the necessary furnaces and other equipment. *See The Kansas City Bolt and Nut Company, Kansas City, Mo.*

Reading Iron Company, Reading, Berks county. 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. Oley Street Mills, now in course of erection, to contain 12 double puddling furnaces, 2 scrap furnaces, 2 gas heating furnaces, and 2 trains of 3-high rolls (one 20-inch puddle and one 23-inch skelp); product, grooved skelp iron; estimated annual capacity, 20,000 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; T. O. Yarington, Jr., Secretary. *See Montour Rolling Mills, Central Pennsylvania. See Crumwold Furnace, Lehigh Valley, and 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; 14 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. Brand, "Reading." (Formerly called Philadelphia and Reading Rolling Mill.) Francis H. Saylor, President; P. R. Foley, Secretary and Treasurer; J. L. Rake, Manager. 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; 13 double puddling furnaces, 20 heating and 4 grate furnaces, 8 trains of rolls, and one hammer; product, sheet and plate iron and steel; annual capacity, 20,000 gross tons. Adding one train of cold rolls. 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 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 3 trains of rolls (10, 16, and 20-inch); product, merchant bar iron; annual capacity, 7,500 gross tons. W. L. Williams, President; S. DeLong, Secretary and Treasurer; Edward Edwards, Business Manager; William P. Hopkins, General Superintendent.

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 horseshoe 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, Malvern. Idle and for sale.

Thurlow Works, The American Steel Casting Company, principal office, Thurlow, Delaware county. Branch offices: Havemeyer Building, New York; Western Union Building, Chicago; 23 Davis st., San Francisco. 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, 10,000 gross tons. (Formerly operated by the Standard Steel Casting Company.) Daniel Eagan, President; W. M. Wilson, Vice-President; J. W. Booth, Secretary and Treasurer; S. A. Watson, General Sales Agent. *See Syracuse Works in New York, Norristown and Sharon Works in Pennsylvania, and Alliance Works in Ohio.*

Tidewater Steel Works, (The 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 Steel Company, Thurlow, Delaware county. 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. Brand, "Wellman." (Formerly operated by the Wellman Iron and

Steel Company.) William Burnham, President; J. Tatnall Lea, Treasurer; D. G. Stokes, Secretary. Selling agents, J. Tatnall Lea & Co., 125 South Fourth st., Philadelphia. *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, 1 open-hearth steel plant is being erected, and 1 open-hearth steel plant is projected; 2 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, 18,000 gross tons. Brand, "Altoona." John Fullerton, President; H. K. McCauley, Secretary and Treasurer; Robert Smiley, Manager of mill.

Bellefonte Iron and Nail Works, James B. Bailey, lessee, Harrisburg. Works at 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, one 16-inch nail-plate, and one 17-inch muck,) and 53 cut-nail machines; product, muck bar, bar iron, and nails and spikes; annual capacity, 4,500 gross tons of bar iron and 125,000 kegs of cut nails. Brand, "Bellefonte." Owned by the Bellefonte Iron and Nail Company.

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 furnaces; boiler plate mill contains one gas and 6 coal 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, 50,000 tons of universal plates, and 9,000 tons of muck bar. Charles L. Bailey, President; Edward Bailey, Vice-President; S. B. Boude, Secretary; G. M. McCauley, Treasurer; John N. Binnix, Superintendent.

Chesapeake Nail Works, Charles L. Bailey & Co., (incorporated,) Har-

risburg, 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 cut-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, 14,000 gross tons. Brand, "C. I. C." Frank A. Bennet, President; J. W. Yocum, Secretary and Treasurer; C. C. Kauffman, General Manager. Selling agents, W. H. Wallace & Co., 66 Broadway, New York.

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, 16,500 gross tons. Brand, "Columbia." John Q. Denney, President and General Manager; John 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 cut-nail machines; product, muck bar and iron and steel nails; annual capacity, 250,000 kegs of nails. Owned by W. H. Conyngham, Wilkesbarre. Idle and for lease.

Duncannon (The) Iron Company, Duncannon, Perry county. Office, 122 Race st., Philadelphia. Built in 1836; 20 single puddling furnaces, 7 heating furnaces, 4 trains of rolls, (one 8, one 16, and two 20-inch,) and 50 cut-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. Brand, "Duncannon." 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. Idle. *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, muck

bar and merchant bar iron; annual capacity, 5,000 gross tons of muck bar and 10,000 tons of bar iron. H. H. Light, President and Manager; H. O. Nutting, Secretary; Wm. P. Nutting, Treasurer.

Eleanor (The) Iron Company, Tyrone. Works at Hollidaysburg, Blair county. Built and put in operation in 1866; 15 single puddling furnaces, 2 heating furnaces, rotary squeezer, 2 trains of rolls, (10 and 18-inch,) and 30 cut-nail machines; product, merchant bar iron, rounds, squares, hexagons, and flats, pipe skelp iron, and cut nails and spikes; annual capacity, 8,000 gross tons of bar and skelp iron and 150,000 kegs of cut nails. Brands for bar iron, "Eleanor" and "Juniata." (Formerly called the Juniata Rolling Mill.) Owned by the First Mortgage Bondholders of the Hollidaysburg and Gap Iron Works, who are represented by Aug. S. Landis, of Hollidaysburg. R. C. Neal, President, Harrisburg; H. L. Sholly, Secretary and Treasurer, Tyrone.

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, toe-calk steel, light forgings, and general machine work; annual capacity, 5,500 gross tons. Brand, "Green Ridge Iron Works." Fuel used, anthracite culm. D. B. Atherton, General Manager; I. M. Vought, Foreman. Selling agent, P. W. Brown, 33 Wall st., New York.

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 cut-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." V. C. McCormick, Treasurer. Owned by The Paxton Iron and Steel 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, 24,000 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 cut-nail machines; product, merchant bar, channel, skelp, and hoop iron, flat and small T rails,

and cut nails and spikes; annual capacity, single turn, 5,000 gross tons of bar iron. Brand, "IXL." J. D. Hemphill, President; J. W. Bracken, Treasurer and General Manager; T. 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; 9 double puddling furnaces, 5 heating furnaces, and 3 trains of rolls (one 12 and two 3-high 18-inch); product, merchant bar iron and forgings; annual capacity, 18,000 gross tons. Brand, "Berwick." Also builds cars and manufactures 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. Built in 1893–4 and first put in operation in September, 1894; 3 heating furnaces and 2 trains of rolls (one 12 and one 18-inch); product, merchant bar iron and steel; annual capacity, 8,000 gross tons. Joseph Janson, President; Valentine Janson, Secretary and Treasurer; Frank Janson, Manager.

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, 230,000 gross tons of steel rails, 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, 275,000 gross tons of ingots and 240,000 tons of rails. Both works use anthracite culm for fuel under boilers. Brand, "Lackawanna." Walter Scranton, President, and J. P. Higginson, Secretary, New York; A. Williams, Assistant Secretary, C. W. McKinney, General Manager, and Henry Wehrum, Chief Engineer and Superintendent, Scranton. *See Lackawanna Furnaces, Upper Susquehanna Valley, and Colebrook Furnaces, Lower Susquehanna Valley.*

Lalance and Grosjean Manufacturing Company, Harrisburg, Dauphin county. Main office, 19 Cliff st., New York; branch offices, Boston and Chicago. 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, 7 trains of rolls, (1 sheet, 3 tinplate, and 3 cold,) and one 5,000-lb. hammer; product, sheet iron and sheet steel and black plates for tinning; annual capacity, 2,500 gross tons of sheets and 5,500 tons of black plates. Brand, "L. & G." Contemplates erecting an open-hearth steel plant in the spring of 1896. F. Grosjean, President; Aug. J. Cordier, Vice-President; James Cochran, Secretary; E. W. Martin, Treasurer; E. Stanford, Manager. *See Tinplate Works.*

Lebanon Iron Company, Lebanon, Lebanon county. Built in 1882–3; 7 double puddling furnaces, 3 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, 20,000 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 cut-nail machines. W. D. Himmelreich, President; Alfred Hayes, Secretary and Treasurer. Plant may be sold to L. O. Phillips, Harrisburg, Pa.

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 cut-nail machines; annual capacity, 50,000 kegs of nails. Idle and for sale.

Logan Iron and Steel Works, Logan Iron and Steel Company, Burn-

ham, Mifflin county, 4 miles from Lewistown, on the M. & C. C. R. R. Philadelphia office, Harrison Building, southwest corner Fifteenth and Market sts. Started in 1869, partly destroyed by fire in 1894, and rebuilt in the same year; one single and 10 double puddling furnaces, 6 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, switch iron, skelp, and drill rods to 6 inches in diameter; annual capacity, 24,000 gross tons of finished iron. A chain works is partly erected; work suspended. H. T. Townsend, President, R. F. Kennedy, Treasurer, and S. H. Pitcher, Secretary, Philadelphia; R. H. Lee, Superintendent, and H. J. Power, Assistant Superintendent, Lewistown. *See Emma Furnace, Juniata Valley, and 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. From October, 1894, until December, 1895, the works manufactured structural tubing, covered by patents, consisting of round unwelded tubing from ½ to 3 inches in diameter, angles, channels, odd shapes, and small zee bar mouldings; annual capacity, 10,000 gross tons. Selling agents, National Structural Tubing Company, Potter Building, New York. The entire plant is to be sold, subject to the bonds and interest. Abraham S. Patterson, Receiver, from December 26, 1893.

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; of rod mill, 1,350 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, 5,000 gross tons. S. J. Shimer, President; E. S. Shimer, Secretary and Treasurer; G. S. Shimer, Superintendent.

Milton Nail Works, F. 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 89 cut-nail machines; product, 4 and 5-inch muck bar and iron and steel cut nails and spikes; annual capacity, 15,000 gross tons of muck bar and 200,000 kegs of nails and spikes. Brands for nails, "Fuller Mills" and "Godcharles." C. A. Godcharles, Manager. Selling agents, Fuller Brothers & Co., 139 Greenwich st., New York.

Milton Rolling Mill and Forge, The 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 tons of forgings, and 7,500 axles. Brand, "Milton." W. A. Schreyer, President; John M. Young, Treasurer; F. S. Chapin, Secretary; John Jenkins, General Manager.

Montour Rolling Mills, Reading Iron Company, Reading. Works at Danville, Montour county. Built in 1845; 20 double puddling furnaces, 11 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, angle iron, splice bars, and grooved skelp iron; annual capacity, 36,000 gross tons. Theo. F. Patterson, Superintendent. (Formerly called the Montour Iron and Steel Works.) *See Reading Iron Company, Eastern Pennsylvania. See Crumwold Furnace, Lehigh Valley, and Reading and Keystone Furnaces, Schuylkill 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, never put in operation, 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 tons of plates and skelp iron. Edward Samuel, President; F. P. Howe, Vice-President and General Manager; William Selfridge, Treasurer; Charles M. Griffith, Secretary; R. K. Polk, Manager. Selling agents, William Wharton, Jr., & Co., Incorporated, Twenty-fifth st. and Washington ave., Philadelphia. *See North Branch Furnaces, Upper Susquehanna Valley.*

Northumberland Iron and Nail Works, Van Alen & Co., Northumberland, Northumberland county. Two mills: one built in 1883 and first put in operation in January, 1884; 10 double puddling furnaces, 2 heating furnaces, 2 trains of rolls, (one 18-inch muck and one 20-inch plate,) and 94 cut-nail machines; product, iron and steel nails and muck bar; annual capacity, 250,000 kegs of cut nails and 13,250 gross tons of muck bar; brand, "Van Alen & Co.;" (formerly operated by Taggarts & Howell.) The other mill, built in 1867, is idle and is for sale or lease; it contains one double and 8 single puddling furnaces, one 25-ton regenerative gas heating furnace, and one 16-inch train of muck and plate rolls; product, axe bar, nail plate, and muck and scrap bar; annual capacity, 6,000 gross tons of muck bar and 7,500 tons of nail plate. (A nail factory, containing 53 cut-nail machines, formerly connected with this plant, was destroyed by fire on December 29, 1894.)

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 and one 30 x 72-inch 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 x 126 inches. Product, plate iron and steel; total annual capacity, 48,000 gross tons. Brand, "Paxton." John Q. Denney, Superintendent. Owned by The Paxton Iron and Steel 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, one gas and 6 coal heating furnaces, and

6 trains of rolls (one 20-inch puddle, and one 8, one 10, two 12, and one 16-inch finishing); product, bar iron and steel, car forgings, bolts, nuts, washers, etc.; annual capacity, 40,000 gross tons. Arthur Brock, President; Horace Brock, Vice-President; James Lord, Secretary and Treasurer.

Pennsylvania Steel Works, The Pennsylvania Steel Company, Steelton, Dauphin county. Office, 312–19 Girard Building, Broad and Chestnut sts., Philadelphia; New York office, 2 Wall st.; Boston office, 8 Oliver 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, 300,000 gross tons of ingots, worked into blooms and slabs for structural purposes, plates, nail slabs, rails of all sections, street rails, 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, 150,000 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, Chairman of Executive Committee, Effingham B. Morris, President, E. F. Barker, Secretary, and Edmund N. Smith, Treasurer, Philadelphia; E. C. Felton, General Manager, H. H. Campbell, Superintendent, and Frank Tenney, Assistant Superintendent, Steelton. 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, 3 coal and 2 gas heating furnaces, and 6 trains of rolls, (18 and 20-inch muck, 15-inch bar, 7 and 10-inch hoop, and 8-inch guide,) and 40 cut-nail machines; product, iron and steel bars, bands, angles, hoops, cotton-ties, and nails; annual capacity, 45,000 gross tons of finished iron and steel and 120,000 kegs of cut nails. 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.

Standard (The) Steel Works, Harrison Building, Philadelphia. Works at Burnham, Mifflin county. Built in 1869; 14 heating furnaces, 5 hammers, (10-ton and 15-ton Tannet & Walker, 7-ton Sellers, 30-cwt. Morris, 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; annual capacity, 15,000 gross tons of steel tires and 1,000 tons of forged wrought-iron wheel centres. Steel department, added in 1895, contains two 12-gross-ton Wellman revolving acid open-hearth steel furnaces; first steel made March 18, 1895; product, ingots and castings; annual capacity, 15,000 gross tons. Brand, the word "Standard" between two anchors. Fuel used, bituminous coal and producer gas. William P. Henszey, President; Theo. J. Lewis, Secretary; William Burnham, Manager and Treasurer; J. P. Stevenson, Superintendent; A. A. Stevenson, Mechanical Engineer. Selling agents, John Kent, 70 Kilby st., Boston; Arthur Bradley, 325 Cuyahoga Building, Cleveland; E. A. Kinsey & Co., 229 West Fourth st., Cincinnati; Fitz-Hugh & Spencer, 1634 Monadnock Building, Chicago; Andrew Warren, 516 North Third st., St. Louis; T. L. Courtney, Jr., 1433 Main st., Richmond, Va.

Sunbury Iron Works, Sunbury, Northumberland county. Built in 1883 and first put in operation in August, 1883; 2 single and 4 double puddling furnaces, 1 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.) Newton R. Turner, President; A. B. Miller, Vice-President; James B. McCamant, Treasurer; C. F. Miller, Secretary.

Susquehanna Iron Works, Susquehanna Iron Company, Columbia, Lancaster county. Built in 1860, partly destroyed by fire in 1895, and rebuilt in the same year; 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.

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. Fuel, producer gas. 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 18-inch rolls; water-power; product, muck bar; annual capacity, 4,000 gross tons. Brand, "Nittany." John P. Harris, President; Robert Valentine, Secretary and Treasurer. *See Furnaces in the Juniata Valley.*

Watsontown Nail Works, D. C. Kaseman, Watsontown, Northumberland county. Built in 1886–7 and put in operation in May, 1887; 3 double puddling furnaces, one heating furnace, one forge fire, 2 trains of rolls, (one muck and one nail plate,) and 47 cut-nail machines; product, muck bar and iron and steel nails; annual capacity, 70,000 kegs of cut nails. Brand, "Watsontown Nail Works." Selling agents, Fuller Brothers & Co., 139 Greenwich st., New York.

West End Rolling Mill Company 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 horseshoe 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 cut-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. C. LaRue Munson, President; John M. Young, Treasurer; J. Y. Schreyer, Secretary; John Jenkins, General Manager.

York Rolling Mill, Steacy and Denney Company, 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 Rolling Mill." 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: 50. Of these 5 make Bessemer steel, 3 make open-hearth steel, and 1 open-hearth steel plant is projected.

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; 71 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, 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. Adding a continuous finishing mill. Henry W. Oliver, President; John Phillips, Vice-President; A. R. Fraser, 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; 15 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. Open-hearth steel department added in 1895; two 40-gross-ton basic furnaces; first steel made September 28, 1895. 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, 400,000 gross tons of steel billets and blooms and 300,000 tons of finished materials. Will manufacture steel only after January 1, 1896. 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 tons of shafting and finger bars; of the chain factory, 10,000 tons of chain and railroad coupling links; of the bolt factory, 8,000 tons of bolts, spikes, and railroad coupling pins; and of the shops for fitting structural materials, 24,000 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; 4 expanded metal machines for producing steel fire-proof lathing, fencing, screens, etc.; fuel used, coal for steam and producer gas for heating and annealing.

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 operate 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 Works, Carbon Steel Company, Thirty-second st., Pittsburgh. Built in 1862 and rebuilt in 1888; 4 Siemens heating furnaces, 2 direct air heating furnaces, 5 soaking pits, two 15 and six 30-gross-ton open-hearth steel furnaces built in 1888 and subsequent years, and 3 trains of rolls (one 22-inch sheet, one 36-inch universal, and one 124-inch plate); 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 tons of finished plates and sheets. Fuel used, natural gas except under boilers. C. M. Raymond, President; H. W. Lash, General Manager; A. H. Keith, General Agent. Selling agents, James B. Brady, Havemeyer Building, New York; Wm. M. Wilson, Western Union Building, Chicago.

Carnegie (The) Steel Company, Limited, general offices, Carnegie Building, Pittsburgh. Five mills in Allegheny county: Edgar Thomson Steel Works, at Bessemer, on Pennsylvania, Baltimore and Ohio, and Pitttsburgh 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,) 21 Siemens and 2 reverberatory heating furnaces, one 3-high 40-inch blooming mill, two 3-high rail trains, (one 23-inch and one 25-inch,) and hot saws and finishing machinery; iron and brass foundry; forge contains one 6-ton hammer and 2 heating furnaces; product, Bessemer steel rails and billets, and iron and brass castings; annual capacity, 1,000,000 gross tons of ingots, 450,000 tons of rails or billets, and 50,000 tons of castings; fuel, natural gas. 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, 16 soaking pits, and 4 trains of rolls (two 21-inch, one 26-inch, and one 28-inch); product, rails, billets, and splice bars; annual capacity, 450,000 gross tons of ingots; fuel, natural gas. 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 steel department built by Carnegie, Phipps & Co., Limited, and The Carnegie Steel Company, Limited; 7 furnaces completed in October, 1886, one in July, 1890, 8 in September, 1890, and 4 in September, 1895; 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, and one 119-inch plate mill; one 12-gross-ton, six 20-gross-ton, eight 25-gross-ton, and five 35-gross-ton open-hearth steel furnaces; one 3,000 and one 10,000-ton hydraulic press; 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, and steel castings; annual capacity, 375,000 gross tons of Bessemer steel ingots and 400,000 tons of open hearth steel ingots; fuel, natural gas. 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; 19 heating furnaces and 7 trains of rolls (one 8, one 12, one 18, and one 20-inch, and two plate and one skelp); product, structural steel, steel bars, and steel universal mill plates; annual capacity, 140,000 gross tons; fuel, natural gas and coal. 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, 65,000 gross tons; fuel, natural gas and coal. General officers of the company: H. C. Frick, Chairman Board of Managers; J. G. A. Leishman, President; H. M. Curry, Treasurer; F. T. F. Lovejoy, Secretary; L. C. Phipps, Assistant Treasurer; William P. Palmer and Millard Hunsiker, Assistants to President; Alex. R. Peacock, General Sales Agent; John Pontefract, Supply Agent. Sales offices: Atlanta, 10 Decatur st.; Boston, 125 Milk st.; Buffalo, 451 Main st.; Chicago, 1021 Marquette Building; Cincinnati, 104 West Fourth st.; Cleveland, 103 Superior st.; Denver, Peoples Bank Building; Detroit, 122 Griswold st.; Minneapolis, Guaranty Building; New York, 44–46 Wall st.; Philadelphia, Harrison Build-

ing, southwest corner Fifteenth and Market sts.; St. Louis, 604 Pine st.; San Francisco, 258 Market st. *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, 5 trains of rolls, (32, 38, and 48-inch hot and 32 and 50-inch cold,) and one 4-ton hammer; product, sheet iron and sheet steel; annual capacity, 6,000 gross tons. Brand, "Chartiers." Fuel used, natural gas except under boilers. 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. New York office, 15 Cortlandt st. Mill on the South Side. Built in 1846; 7 double and 19 single puddling furnaces, 11 heating furnaces, and 2 trains of rolls (one 18-inch muck and one 22-inch plate); product, plate iron; annual capacity, 15,000 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, 242–44 First ave., 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 have a drill-rod shop, a wire shop, and a shop for making coiled springs. Fuel used, natural gas, coal, and coke. Reuben Miller, President; Julius Bieler, Secretary and Treasurer.

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 and steel 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 except for puddling furnaces. George A. Chalfant, Manager.

Fort Pitt Foundry, Mackintosh, Hemphill & Co., Pittsburgh. Works, foot of Twelfth st. Open-hearth steel works built in 1882 and started in August of that year; two 12-gross-ton furnaces; product, steel castings. (Two 20-gross-ton open-hearth steel furnaces abandoned.) 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, tie plates, and merchant steel; annual capacity, 45,000 gross tons of spikes and 21,000 tons of bar steel and tie plates. Spike brand, "Dilworth, Porter & Co.;" merchant steel brand, "Glendon." Fuel used, natural gas and coal. Charles R. Dilworth, Chairman; Samuel T. Owens, Vice-Chairman; J. 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 5-gross-ton converters; first blow made August 26, 1881; 2 heating furnaces and one train of 32-inch rolls; product, billets, blooms, and slabs, from 4 x 4 inches to 20 x 8 inches; annual capacity, 120,000 gross tons. Fuel used, natural gas and coal. (Formerly operated by the Pittsburgh Steel Casting Company.) George T. Oliver, President; J. H. Fraser, Secretary; George L. Brown, Treasurer. *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 tons of machinery steel, 1,800 tons of plow steel, and 1,800 tons of spring steel. Fuel used, natural gas 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. 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 Steel Company, Pittsburgh. Works, Fifteenth and Etna sts. Established in 1824; 17 gas producers, 13 single puddling furnaces, 16 heating furnaces, 1 soaking pit, 4 annealing furnaces, 12 trains of rolls, (one 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 34 x 127-inch plate train, one nail-plate train, one blooming-mill train, and one continuous train,) and 12 horseshoe 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 17, 1886. Product, steel plates, sheet steel, fire-box steel, iron and steel horse and mule shoes, steel blooms and billets, horseshoe bar, and toe calks; annual capacity, 200,000 gross tons. Fuel used, natural gas and bituminous coal. C. L. Fitzhugh, President; J. Z. Speer, 1st Vice-President; G. A. Steiner, 2d Vice-President; E. P. Loy, Secretary; J. M. Brownson, Treasurer. *See Shoenberger Furnaces, Allegheny County.*

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, bars, flat rails, and 12 to 30-lb. T rails; annual capacity, 12,000 gross tons. Fuel used, natural gas and coal. Henry Lloyd, President; John W. Lloyd, Vice-President; Henry Balken, Secretary; William F. Lloyd, Treasurer.

Keystone Rolling Mill, John Robinsteen & Co., lessees, Pittsburgh. Works, Second ave. near Morris st., Soho. Built in 1865; 36 single puddling furnaces, 7 heating furnaces, and 5 trains of rolls (two muck and one 9, one 16, and one 23-inch plate); product, skelp and bar iron and cotton-ties; annual capacity, 30,000 gross tons. Brand, "Keystone." Fuel used, coal. J. O. Edwards, Superintendent. Sales made from the mill. Works owned by the Keystone Rolling Mill Company Limited.

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; Severn P. Ker, Assistant Secretary; Hugh D. Smith, Treasurer. Selling agents, Wetherell Brothers, 31 Oliver st., Boston, and 93 Liberty st., New York; Byron H. White, 68 South Canal st., Chicago.

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. William G. Park, President; George Wright, Jr., Treasurer.

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 agricultural steel, and cold-condensed shafting; unusual shapes a specialty; daily capacity, 105 gross tons. Brand, "Linden." Fuel used, natural gas, producer 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 McKee's Rocks, Allegheny county. 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, 20,000 gross tons of finished rolled iron and steel. Brands, "Vulcan" and "Lockhart." Fuel used, natural gas and coal. 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 black and planished; specialty, patent planished sheet iron; 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, Carnegie Building, Pittsburgh. Post-office address, Box 215. Works at Hay's Station, Pittsburgh and Lake Erie Railroad and Pennsylvania Railroad, in Allegheny county. Built and put in operation in 1891; 20 single puddling furnaces and one train of rolls; product, fine grade irons for special work; annual capacity, 10,000 gross tons. Fuel used, coal. Robert A. Carter, President and Manager; H. L. Brunt, Secretary and Treasurer.

Monongahela Tin Plate Company, Pittsburgh. Built in 1894-5 and first put in operation February 14, 1895; 12 heating furnaces and 19 trains of rolls (nine 24 x 32-inch hot and ten 20 x 34-inch cold); product, sheet bars and black plates for tinning; annual capacity, 12,500 gross tons. Fuel used, natural gas and coal. Henry W. Oliver, President; Richard R. Quay, Vice-President and Treasurer; E. G. Applegate, Secretary; John C. Oliver, Manager.

National Tube Works Company, McKeesport, Allegheny county. Rolling Mills Department built from 1878 to 1890; equivalent of 120 single puddling furnaces, 25 heating furnaces, 16 trains of rolls, 5 steam hammers, 20 charcoal knobbling fires, and 2 refinery fires; product, muck bar, refined charcoal metal, charcoal iron blooms and bars, Swedish bars, charcoal boiler tube irons, and pipe irons and steel; total annual capacity, 180,000 gross tons; fuel used, coal and producer gas; brand, "National;" (one 18-gross-ton open-hearth steel furnace, built in 1886, abandoned in 1895;) Christian I. O'Connor, Superintendent of Rolling Mills 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, ingots, blooms, slabs, and billets; annual capacity, 190,000 gross tons; William B. Schiller, Manager, and Taylor Allderdice, Superintendent, Steel Department. D. W. Hitchcock, President; A. F. Luke, Secretary and Treasurer; E. C. Converse, Vice-President and General Manager; Horace Crosby, Assistant General Manager; J. H. Pierce,

Assistant Manager. *See Republic Iron Works. See Monongahela Furnaces, Allegheny County.*

Oliver Wire Company, 1001 Muriel 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, 187; annual capacity, 75,000 gross tons of drawn wire, 25,000 tons of barb wire and fencing specialties, and 900,000 kegs of wire nails. Brand, "Oliver." Fuel used, natural gas and coal. (Formerly called the Oliver and Roberts Wire Company.) George T. Oliver, President; Stephen W. Tener, Secretary; William H. Cassidy, Treasurer; James H. Fraser, Assistant Secretary. Selling agents, Fuller Brothers & Co., New York; Colburn & Lupton, Cincinnati.

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, 36,000 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 1834; 16 heating furnaces and 9 trains of rolls (six 8, one 9, one 10, and one compound 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, skelp, and hinge iron; annual capacity, 100,000 gross tons. Brand, "Painter." Fuel used, natural gas, producer gas, and coal. A. E. W. Painter, President; Jacob Painter, Jr., Secretary; C. K. Reppert, Treasurer. Selling agents, Bacon & Co., Boston; Ogden & Wallace, New York; William F. Robertson Iron and Steel Company, Cincinnati; Casey & Day, Chicago; L. McGilvray & Co., St. Louis; A. C. Brainard & Sons, San Francisco.

Pittsburgh Steel and Iron Manufacturing Company, (successor to the 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. (Formerly called the Soho Iron and Steel Works.) James Andrews, President; C. F. Stuart, Vice-President; E. E. Andrews, Secretary and Treasurer; A. P. King, Manager; W. W. Andrews, Assistant Manager. *See Soho Furnace, Allegheny County.*

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. Open-hearth steel plant added in 1895; two 20-gross-ton acid furnaces. Product, open-hearth and crucible steel castings; annual capacity, 12,000 gross tons. Fuel used, producer gas, natural gas, coal, and coke. (One 10-gross-ton Bessemer steel converter, added in 1890, abandoned.) Stewart Johnston, President; William B. Munnis, Vice-President and Superintendent; E. D. Riddle, Secretary and Treasurer.

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, single turn, 13,500 gross tons. Fuel used, natural gas, obtained from the firm's own territory, and coal. Adding a department for the manufacture of finished tools. David Shaw, Superintendent. Sole proprietors, Herbert DuPuy and David Shaw. Selling agents, Garson Myers, Chicago; E. E. McCargo, sole Eastern agent, Philadelphia and New York.

Pittsburgh Wire Company, Braddock, Allegheny county. Branch office, 232 Fifth ave., Pittsburgh. Built in 1891 and put in operation in February, 1892; 2 heating furnaces, 3 trains of rolls, (9, 12, and 16-inch,) and 62 wire-nail machines; product, steel wire rods, wire, barb wire, and wire nails; annual capacity of rolled and drawn products, 40,000 gross tons; of wire nails, 350,000 kegs. Fuel used, bituminous coal. Alex. Dempster, President; Thomas Walker, Treasurer; Thomas W. Fitch, Superintendent.

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, 4 trains of rolls,

(two 9, one 12, and one 18-inch,) and 98 wire-nail machines; 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 and 700,000 kegs of wire nails. Fuel used, bituminous coal and natural gas. A galvanizing plant is connected with the works. (Formerly operated by the Braddock Wire Company.) W. H. Rowe, Manager, and T. B. Coles, Assistant Manager, Pittsburgh. *See Allentown Works in Eastern Pennsylvania for a full list of officers and branch offices; see Beaver Falls Works in Western Pennsylvania and Cleveland Works in Ohio.*

Reliance Steel Casting Company Limited, Pittsburgh. Works, corner Thirty-sixth st. and A. V. R. R. Built in 1889; one 24-pot crucible steel-melting furnace; first steel made in September, 1889. Open-hearth steel plant added in 1895; one 5-gross-ton acid furnace. Product, crucible and open-hearth steel castings; annual capacity, single turn, 2,000 gross tons. Fuel used, natural gas and producer gas. 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, and one 24-inch, and one 3-high plate); 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 tons of sheet iron, and 7,000 tons of plate iron. Brand, "Republic." An extensive galvanizing department is connected with the works. Fuel used, natural gas and coal. 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. Original works 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.) Sheet mill added in 1895; 4 heating furnaces, 2 annealing furnaces, and 4 trains of rolls, (1 pair roughing, 2 pair finishing, and 1 pair cold.) Product, special irons for use in forging and machine-shop work and railway supplies, including heavy sizes of flats and squares made on universal rolls, high-grade horseshoe bar, and smooth-finished steel and iron sheets; annual capacity, 22,500 gross tons of bar iron and 5,000 tons of sheets. Brand, "Sable." Fuel used, natural gas and coal. Charles H. Zug, Chairman; Charles H. Reid, Secretary and Treasurer. Eastern sales agents, Horne Brothers, Boston.

Singer, Nimick & Co., Incorporated, 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 operate 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, President; G. Bruce Harton, Vice-President; George Singer, Jr., Secretary and Treasurer. Western branch office, 100–104 West Washington st., Chicago; Eastern agents, Hogan & Son, 243 Pearl st., New York.

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.

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 7 trains of rolls (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, 45,000 gross tons. Brands, "Solar" and "Clark" for steel and "Delta" for cotton-ties. Fuel used, natural gas and coal. General Western agents, Manufacturers and Merchants Warehouse Company, Chicago; San Francisco office, F. L. Alderson, manager, 23 Davis st.; New York office, F. Wayland Smith, manager, 26 Cortlandt st.; Boston office, Horne Brothers, managers, 8 Oliver st.

Spang (The) Steel and Iron Company, Pittsburgh. Office and works, Etna, Allegheny county. Built in 1880–1; one 30-gross-ton and two 10-ton open-hearth steel furnaces, 7 heating furnaces, one 4-hole soaking pit, one hammer, and 4 trains of rolls (one 30-inch blooming, one 30-inch universal, one 18-inch bar, and one 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. Walter C. Steele, 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, Baltimore; Houston & Adams, Cincinnati; Francis T. West, Chicago.

Star Iron and Steel Works, Lindsay & McCutcheon, Allegheny. Office and works, 88 Rebecca st. Branch office, 29 Broadway, New York, Pierson & Co., managers. Built in 1862; 38 single puddling furnaces, 12 heating furnaces, and 8 trains of rolls (four 8, one 10, and one 12-inch, and two muck); product, hoops, bands, horseshoe bar, and cotton-ties; also strap and T hinges, wrought steel shelf brackets, and wrought steel and iron washers; annual capacity, 30,000 gross tons. Brand, "Star." Fuel used, natural gas and coal.

Star Tin Plate Company, foot of Twelfth st., Pittsburgh. Built in 1895; 8 double heating furnaces and 17 trains of rolls (eight 24-inch hot and nine 22-inch cold); product, black plates for tinning; annual capacity, 12,500 gross tons. Fuel used, bituminous coal. N. A. Hemphill, President; W. F. Dutton, Secretary and Treasurer. *See Tinplate Works.*

Sterling Steel Company, Westinghouse Building, Pittsburgh. Works at Demmler, Allegheny county. Established in 1875; two 24-pot crucible steel-melting furnaces, 9 heating furnaces, 5 hammers, (800 lbs. to 5 tons,) and 2 trains of rolls (one 8 and one 12-inch); 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, 4,700 gross tons; of projectiles, twenty 10-inch per day or their 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. Sole agents for the United States and Canada, Abbott, Wheelock & Co., Boston, New York, and Chicago.

Superior Steel Company, Pittsburgh. Works at Carnegie, Allegheny county. Built in 1892 and first put in operation January 3, 1893; 5 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. James H. Hammond, President; E. M. S. Young, Secretary and Treasurer; H. J. Williams, Superintendent. Selling agents, Ely & Williams, 10 Mason Building, Boston; 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 pud-

dling furnaces, 3 heating furnaces, 2 scrap furnaces, 8 double sheet-mill furnaces, 7 annealing furnaces, one squeezer, one train of bar rolls, and 8 trains of sheet rolls; product, specialties in refined and cold-rolled black sheet iron, Bessemer and open-hearth steel sheets, 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.;" and dripping pans branded "U. S." Fuel used, coal for boilers and puddling furnaces and natural gas and crude oil for the remainder of the works. 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; St. Louis office, 502 Commercial Building, W. J. Wetstein, agent. *See Tinplate Works.*

Vesuvius Iron and Nail Works, Moorhead, Brother & Co., Incorporated, 1312-14 Carnegie 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, bridge, tank, and bar iron and steel; annual capacity, 22,500 gross tons. Brand, "Vesuvius." Fuel used, natural gas and coal. John Moorhead, Jr., President; J. R. Moore, Secretary and Treasurer.

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 crucible steel-melting furnaces, and one 45-ton cementing furnace; product, merchant bar iron and rolled and hammered crucible steel; annual capacity, 16,500 gross tons of iron and 6,500 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 steel furnace, 3 heating furnaces, one 8-ton hammer, and 2 trains of rolls (one 14 and one 18-inch); product, steel sheet and other bars, 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, natural gas, and coal. 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: 64. Of these 7 make Bessemer steel, 2 make Clapp-Griffiths steel, 20 make open-hearth steel, 10 make crucible steel, and 3 make blister steel.

WESTERN PENNSYLVANIA, EXCEPT ALLEGHENY COUNTY.

Aliquippa Steel Works, Aliquippa Steel Company, 512 Times 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 15-gross-ton basic open-hearth steel furnace, with an annual capacity of 6,000 gross tons of ingots; one 36 and one 24-pot crucible steel-melting furnace, with an annual capacity of 4,500 gross tons of ingots; product, special qualities of plate and sheet steel; annual capacity, 8,000 gross tons of finished products. Fuel used, producer gas, natural gas, and coal. Joseph S. Kaufman, President; C. D. Greenlee, Vice-President; B. Forst, Secretary and Treasurer. Selling agents, D. C. Templeton, 515 Western Union Building, Chicago; Hugh Russell, Temple Building, Montreal, Canada.

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 15 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 agents, Fuller Brothers & Co., 139 Greenwich st., New York. Commenced in 1895 to erect a plant at Vandergrift, near Apollo, to be equipped with open-hearth steel furnaces, trains of rolls, etc. *See Tinplate Works.*

Arethusa Iron Works, George W. Johnson, New Castle, Lawrence county. Built in 1873 and rebuilt in 1895; 1 double and 4 single puddling furnaces, 17 heating furnaces, 6 annealing furnaces, 4 squaring shears, 11 trains of rolls, and one squeezer; product, sheet iron and steel; annual capacity, 15,000 gross tons. Fuel used, natural gas and coal. W. L. Johnson, General Manager.

Aschman (The) Steel Casting Company, Sharon, Mercer county. Built in 1890–1 and first steel made June 5, 1891; partly destroyed by fire in 1894 and rebuilt in 1895; one 5-gross-ton open-hearth steel furnace; product, steel castings; annual capacity, 3,600 gross tons. Fuel used, producer gas. E. A. Wheeler, President; W. K. Naylor, Secretary; J. J. Spearman, Treasurer; John W. Davis, 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. Three mills, one owned and two leased: New Castle Works, at New Castle, owned by the company; 3 double and 25 single puddling furnaces, 5 heating furnaces, 55 cut-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.) Atlantic Works, at Sharon, Mercer county, leased from P. L. Kimberly & Co.; built in 1867; 32 puddling furnaces, 8 heating furnaces, 6 trains of rolls, and 40 cut-nail machines; product, bar, plate, hoop, and rod iron, and nails; annual capacity, 27,000 gross tons; fuel used, coal. Greenville Rolling Mill, at Greenville, Mercer county, leased from P. L. Kimberly & Co.; 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;" fuel used, coal. Edwin N. Ohl, President; A. W. Thompson, Secretary and Treasurer; George A. Baird, Assistant Secretary and Assistant Treasurer. *See Atlantic Furnaces, Shenango Valley.*

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 of crucible steel ingots and 4,000 tons of rolled products. Brand, "Beaver." Fuel used, producer gas and coal. James M. May, Treasurer and Superintendent.

Beaver Falls Works, Consolidated Steel and Wire Company, general office, Rookery Building, Chicago. Works at Beaver Falls, Beaver county. Built in 1883 by the Hartman Steel Company Limited and enlarged by Carnegie, Phipps & Co. Limited; nail mill destroyed by fire in 1894 and rebuilt in 1895. Operations first began September 1, 1883. Combination rod train run by 3 engines; 4 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, 80,000 gross tons of wire rods and 850,000 kegs of wire nails. Fuel used, producer gas and coal. P. McIlvried, Superintendent. (Formerly operated by The Carnegie Steel Company Limited.) *See Allentown Works in Eastern Pennsylvania for full list of officers and branch offices; see Pittsburgh Works in Allegheny County and Cleveland Works in Ohio.*

Blairsville Rolling Mill and Tin Plate Company, Blairsville, Indiana county. Built in 1892 and put in operation in November, 1892; 2 doubling furnaces, one annealing and 2 pair furnaces, two 22-inch

hot trains of rolls, and one 18-inch cold 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, W. F. Potts Son & Co., Philadelphia. *See Tinplate Works.*

Cambria Iron Company, Harrison Building, southwest cor. Fifteenth and Market streets, Philadelphia. Works at Johnstown, Cambria county, first built in 1853. Bessemer steel works made their first blow July 10, 1871; rebuilt and enlarged in 1889 and 1891; four 11½-gross-ton converters; annual capacity, 600,000 gross tons of ingots. Open-hearth steel works, containing three 20-gross-ton open-hearth steel furnaces, built in 1878-9; annual capacity, 36,000 tons of ingots. Also one 15-ton Krupp washer; annual capacity, 25,000 tons of washed metal. Blooming mill contains 10 Siemens heating furnaces, one 48-inch blooming mill, one set, one 40-inch blooming mill, one set, and one 28-inch billet and slab mill, two sets. Rolling mills contain 9 Siemens furnaces, 30 reverberatory furnaces, one 28-inch rail mill, three sets, one 21-inch light rail and structural mill, 3 sets, two 21-inch structural and bar mills, three sets each, one 12-inch splice bar mill, four sets, and one 22-inch 2-high puddle mill, four sets; also the following merchant steel mills: one 16-inch 2-high mill, one 10 and 12-inch train, nine sets, one 9-inch train, six sets, one 10-inch train, eight sets, one 12-inch train, four sets, one 14-inch train, eight sets, one 16-inch train, three sets, one 20-inch train, three sets, and one 12-inch cold-rolling train and a cold-drawing plant, with full equipment of furnaces, shears, hammers, and special machinery. Annual capacity of finished steel, 268,000 gross tons of steel rails and 200,000 tons of structural shapes and merchant steel for tire, spring, toe-calk, machinery, plow steel, finger bars, harrow discs, rake teeth, etc. Fuel used, coal and producer gas. Officers in Philadelphia. Powell Stackhouse, President; John W. Townsend, Vice-President; J. Lowber Welsh, 2d Vice-President; William S. Robinson, Secretary and Treasurer; A. P. Robinson, Assistant Secretary and Assistant Treasurer. Officers at Johnstown: Charles S. Price, General Manager, and Cyrus Elder, Solicitor and General Agent. Branch offices, New York City: For rails, W. A. Washburne, 33 Wall st.; for merchant and agricultural steel, Thomas F. Russell, 102 Chambers st.; for axles and forgings, Coolbaugh & Pomeroy, 256 Broadway. Chicago, Ill.: For rails, merchant steel, and agricultural steel, C. J. Ellis, Western Union Building; for structural steel, L. S. Boomer, Rookery Building. Detroit, Mich.: For rails and structural steel, W. F. Jarvis & Co., Newberry Building. Toledo, Ohio: For rails, W. E. C. Coxe, "The Nasby." Cincinnati, Ohio: For rails, Puchta, Pund & Co., corner Elm and Pearl sts.; for structural steel, Houston & Adams, Neave Building. Cleveland, Ohio:

For structural steel, The Condit-Fuller Company, Perry-Payne Building. Chattanooga, Tenn., and Atlanta, Ga.: F. I. Stone. St. Louis, Mo.: Ezra H. Linley, 714 North Second st. Omaha, Neb.: Joseph R. Lehmer, 303 South Thirteenth st. St. Paul, Minn.: George M. Kenyon, 109 Endicott Arcade. Pittsburgh: For street rails, H. C. Morrison, Times Building. Philadelphia: For merchant and agricultural steel, J. G. Rittenhouse, Bourse Building. Boston: H. W. Hayes & Co., 70 Kilby st. *See Blair Furnace in the Juniata Valley and Coke Furnaces in Western Pennsylvania.*

Canonsburg Iron and Steel Company, Canonsburg, Washington county. Branch office, Germania Bank Building, Pittsburgh. Built in 1882; 5 single puddling furnaces, 1 knobbling fire, 1 single and 4 double sheet furnaces, 5 pair, 3 pile, and 5 annealing furnaces, 5 trains of hot rolls, (two 22½ and three 24-inch,) and 6 stands of 22-inch cold rolls; product, finest quality of sheet iron and steel for stamping and tinning purposes; annual capacity, triple turn, 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 Manager; L. A. Meyran, Secretary and Treasurer; Paul C. Herrosee, Auditor; John F. Budke, General Superintendent of works. *See Tinplate Works.*

Cold Rolled Steel Works, B. H. Woodsum Company, 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 and tack plate; annual capacity, 5,000 gross tons. Fuel used, bituminous coal. Works will be enlarged in 1896 and equipped for the manufacture of tacks. (Formerly operated by the Cold Rolled Steel Company of Pittsburgh.) Rufus H. Woodsum, President; B. Herbert Woodsum, Treasurer; Wilford F. Woodsum, Secretary.

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. Idle and for sale.

Connellsville Sheet Iron and Tin Plate Company, Connellsville, Fayette county. Building a rolling mill at South Connellsville, to contain 8 heating furnaces and 8 sheet mills (4 hot and 4 cold); product, to be black plates for tinning; estimated annual capacity,

9,000 gross tons. George J. Humbert, President; George W. Humbert, Secretary. *See Tinplate Works.*

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 Works, Ellwood Tin Plate Company, Perry-Payne Building, Cleveland, Ohio. Works at Ellwood City, Lawrence county. Built in 1892–3 and first put in operation April 1, 1893; 8 heating furnaces (4 pair and 4 sheet) and 8 trains of rolls (three 24 x 30-inch and one 24 x 32-inch hot and four 22 x 32-inch cold); product, iron and steel sheets, black plates for tinning, and cold-rolled steel sheets; annual capacity, 7,500 gross tons. Fuel used, coal. (Formerly operated by the Ellwood Steel Company.) H. A. Bishop, President; A. W. Brown, Vice-President and General Manager; J. R. Phillips, Secretary; Charles Babcock, Treasurer. Sales made by the company. *See Tinplate Works.*

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; one 10-inch train of rolls; product, tool steel and oil-well tools; annual capacity, 200 gross tons. Brand, "Emporium Steel." J. P. Felt, President; S. S. Smith, Vice-President; L. K. Huntington, Secretary; C. H. Felt, Treasurer. Selling agents, L. Emery, Jr., & Co., Bradford, Pa.

Franklin Steel Casting Company, Franklin, Venango county. Built in 1895; two 10-gross-ton Siemens open-hearth steel furnaces; first steel made in December, 1895; product, steel castings; specialties, M. C. B. automatic couplers, draft boxes, and truck bolsters; annual capacity, 4,500 gross tons. Fuel used, natural gas and coal. Charles W. Mackey, President; James W. Rowland, Vice-President; Robert McCalmont, Secretary; W. J. Bleakley, Treasurer; J. N. Maher, Manager.

Hussey, Binns & Co. Limited, 64 Fourth avenue, 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; coal under boilers. Ralph H. Binns, Chairman; George V. Willson, Secretary, Treasurer, and General Manager; Frank B. Newton, Superintendent.

Hyde Park Iron and Steel Works, Hyde Park Iron and Steel Company, Hyde Park, Westmoreland county. Built in 1895 and first put in operation September 1, 1895; 2 pile furnaces and 4 trains of rolls (38, 44, and 52-inch hot and 48-inch cold); product, all grades of soft steel sheets and roofing iron; annual capacity, 7,500 gross tons. Fuel used, natural gas. Brand, monogram of the company. Joseph D. Orr, President; W. E. Lloyd, Vice-President; E. F. Schauwecker, Secretary and Treasurer; J. H. Miller, Manager. Selling agents, Justice Cox, Jr., 218 South Fourth st., Philadelphia; Stephen F. Sullivan & Co., 416 New York Life Building, Chicago.

Johnson (The) Company, Johnstown, Cambria county. Principal office, Lorain, Ohio. Original works built in 1887–8 and put in operation May 13, 1888; 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 producer gas; annual capacity, 6,500 gross tons of street railroad specialties. Also operates switch and drop-forging works, an electric welding plant, and an iron foundry for making rolls and general castings. (One 27-inch train of rolls removed to Lorain, Ohio, in 1895.) *See Rolling Mills and Steel Works in Ohio for a full list of officers and selling agents. See Furnaces in Ohio, Lake Counties.*

Kittanning Iron and Steel Manufacturing Company, 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 exclusively. James Mosgrove, President; J. A. Colwell, Vice-President; Henry A. Colwell, Secretary, Treasurer, and Superintendent; Charles T. Neale, General Agent. *See Rebecca Furnace, Western Pennsylvania.*

Latrobe Steel Company, Latrobe, Westmoreland county. Main office, 1200 Girard Building, Broad and Chestnut sts., 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. (Formerly operated by the Latrobe Steel Works.) Marriott C. Smyth, President; Walter H. Bryant, Secretary; Ellwood W. Kimber, Treasurer; Guilliaem Aertsen, Manager; Julian Kennedy, Chief Engineer; J. K. Griffith, Superintendent.

Laufman (P. H.) & Co. Limited, Apollo, Armstrong county. Pittsburgh office, Germania Bank Building. Two works: Apollo Sheet Iron Mills, in Westmoreland county, built in 1886; new mill added in 1889; 8 heating furnaces, 4 double 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; fuel used, natural gas exclusively. Saltsburg Rolling Mills, Saltsburg, Indiana county, (leased from the Saltsburg Rolling Mill Company,) built in 1894-5 and first put in operation July 1, 1895; 8 heating furnaces, 4 double annealing furnaces, 2 trains of roughing rolls, one set of bar rolls, one 48 and two 38-inch trains of finishing rolls, and one 48-inch train of cold rolls; will soon add another train of cold rolls; product, fine sheet iron and decarbonized sheet steel; annual capacity, 6,000 gross tons; fuel used, natural gas and coal. Brands: for sheet iron, "No. 1 decarbonized;" for terne plates, "Laufman's Apollo." P. H. Laufman, Chairman; Frank W. Jackson, Secretary; W. B. Laufman, Treasurer. *See Tinplate Works.*

Leechburg Iron Works, Kirkpatrick & Co. Limited, Leechburg, Armstrong county. Branch office, Second National Bank Building, Pittsburgh. Built in 1872; 4 single puddling furnaces, 4 knobbling fires, 16 heating furnaces, 8 annealing furnaces, and 9 trains of rolls (5 hot and 4 cold); one 20-gross-ton basic and one 30-gross-ton acid open-hearth steel furnace; planished steel department contains 2 hammers and 5 furnaces; product, iron and steel sheets; annual capacity, 9,000 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 export office, 9 Stone 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.

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 8 trains of rolls (one 3-high bar and 6 plate, hot, and one cold, with 6 stands); product, black plates, consumed in the company's tinplate plant; annual capacity, 12,000 gross tons. Brand, "New Castle." Fuel used, bituminous coal. Adding 12 trains of hot rolls and 12 stands of cold rolls; when these are completed the annual capacity of the works will be from 30,000 to 35,000 gross tons of black plates. George Greer, President; John Stevenson, Jr., Vice-President; Charles Greer, Secretary; W. S. Foltz, Treasurer. *See Tinplate Works.*

New Castle Tube Works, New Castle Tube Company, New Castle, Lawrence county. Built in 1895 and first put in operation in December, 1895; 4 forge fires, 2 heating furnaces, 2 trains of rolls, and

two 150-lb. hammers; product, seamless steel tubes; annual capacity, 4,000 gross tons. Fuel used, coal. John Stevenson, Jr., President; D. C. Wallace, Secretary and Treasurer; John H. Preston, General Manager.

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; 3 gas heating furnaces, 4 trains of rolls, (9, 10, 12, and 16-inch,) one hammer, and 272 wire-nail machines; product, wire rods, wire, and wire nails; annual capacity, 60,000 gross tons of rods, 54,000 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.) William Patterson, President; Edward King, Vice-President; Rufus Patterson, Secretary; John P. H. Cunningham, Treasurer; John Stevenson, Jr., Manager.

Ohio River Sheet Iron and Tinplate Company, Agnew, Beaver county. Building a rolling mill at Remington Station, P., F. W., & C. R. R., to contain one pair of tin furnaces, one pair of sheet furnaces, and 5 trains of rolls (3 hot and 2 cold); product, to be sheet iron and black plates for tinning; estimated annual capacity, 3,750 gross tons. Fuel to be used, coal. Alexander Saulters, President and Manager; George E. Wood, Vice-President; Thomas McDonough, Secretary; Matthias Sweeney, Treasurer.

Pennsylvania Tin Plate Company, New Kensington, Westmoreland county. New York office, Temple Court. Built in 1894 and first put in operation in 1895; 9 heating furnaces and 3 trains of rolls (one 22-inch bar and one 4-stand 24 x 32-inch plate, hot, and one 4-stand 22 x 32-inch cold); product, tinplate bars, fine sheet steel, and black plates for tinning; annual capacity, 7,500 gross tons. Fuel used, coal. Philip Goldsmith, President; Berthold Goldsmith, Vice-President; Julius L. Goldsmith, Secretary and Treasurer. Selling agents, Robert Crooks & Co., 138 Front st., New York. *See Tinplate Works.*

Pittsburgh (The) Separating and Casting Company, P. O. Box 276, Pittsburgh. Works at West Bridgewater, Beaver county. Steel plant has one Swindell open-hearth furnace for producing steel castings; idle. Works also contain appliances for the manufacture of light castings of iron, solder, or Babbitt metal. Fuel used, natural gas, producer gas, coal, and coke. (Formerly operated by the National Separating and Manufacturing Company.) Thomas H. Campbell, Manager.

Pittsburgh Tin Plate Works, New Kensington, Westmoreland county. Tinning plant built in 1891–2; rolling mill added in 1894 and first black plates made in December, 1894; 6 heating furnaces, 2 annealing furnaces, and 2 trains of rolls (one 24 x 32-inch hot, with 3 stands, and one 22 x 36-inch cold, with 4 stands); product, soft stamping sheets and black plates for tinning; annual capacity, 5,500

gross tons. Fuel used, bituminous coal. Charles Parkin, President; C. W. Tindle, Vice-President; W. P. Beaver, Secretary; W. N. Voegtly, Treasurer; J. B. Strawbridge, Manager. Selling agents, Robert Crooks & Co., 138 Front st., New York. *See Tinplate Works.*

Pittsburgh Tool Steel Company, Ferguson Block, 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.,) one 12-pot crucible steel-melting furnace, 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. J. C. Jamison, President; A. M. Johnston, Vice-President and Manager. Selling agent, D. P. Thomas, Ferguson Block, Pittsburgh.

Scottdale Iron and Steel Company Limited, Scottdale, Westmoreland county. Built in 1873 and remodeled in 1894; 2 single puddling furnaces, 3 pile heating and 3 scrap furnaces, 6 sheet and 3 double pair heating furnaces, 5 box annealing furnaces, one sheet-bar mill, one muck mill, 6 sheet mills, and 3 cold-rolling mills; product, iron and steel sheets; annual capacity, 12,500 gross tons. Brand, "Scottdale." Fuel used, coal. P. S. Loucks, Chairman; J. R. Stauffer, Treasurer; C. Grazier, Secretary; R. Skemp, Superintendent.

Sharon Iron Company Limited, Sharon, Mercer county. Built in 1850; 10 single and 14 double puddling furnaces, 12 heating furnaces, and 11 trains of rolls (one 8-inch guide, one 12, one 16, and one 18-inch bar, one 20 and three 22-inch sheet, and one 24-inch plate, hot, and two 24-inch sheet cold); product, bar, band, hoop, tank, and sheet iron and steel, and light T rails; annual capacity, 30,000 gross tons. Uses producer gas in heating furnaces. A galvanizing plant is connected with the works. F. H. Buhl, President; T. D. Buhl, Treasurer; David Adams, Secretary; John M. Evans, General Manager. *See Furnaces in the Shenango Valley.*

Sharon Works, The American Steel Casting Company, Thurlow. Works at Sharon, Mercer county. Built in 1887 and first steel made August 26, 1887; one 7-gross-ton and one 15-gross-ton open-hearth steel furnace; product, open-hearth steel castings of all kinds; annual capacity, 9,000 gross tons. Fuel used, producer gas. (Formerly operated by the Sharon Steel Casting Company. Commenced the erection of one 4-gross-ton Bessemer converter in 1891; work suspended; abandoned.) *For list of branch offices and full list of officers see Thurlow Works. See Syracuse Works in New York, Norristown and Thurlow Works in Pennsylvania, and Alliance Works in Ohio.*

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, 180,000 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 "B B" low-phosphorus bars and hammered blooms for making crucible and open-hearth steel; annual capacity, 11,600 gross tons. Brand, "Stewart." Fuel used, coal. Fayette Brown, Chairman, Harvey H. Brown, Treasurer and Selling Agent, 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. New York office, 39 Cortlandt st. 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," "Tyler," and "Diamond T." 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.

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, three 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, 9,000 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 Works, Wheatland, Mercer county. 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. Owned by the Estate of James and Hannah Woods, deceased; The Safe Deposit and Trust Company of Pittsburgh, Trustee and Treasurer. Idle and for sale.

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 MILL COMMENCED BUT NOT COMPLETED.

Iron City (The) and Hammondville Improvement Company, 216-17 Ferguson Block, Pittsburgh. Purchased at sheriff's sale on December 5, 1892, 25 acres of land and the partly 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.

STEEL WORKS PROJECTED.

Frankford Steel Company, Ellwood City, Lawrence county. Works removed from Frankford, Philadelphia; plant at Ellwood City built in 1895; 4 heating furnaces, 3 steam hammers, and machine shop fully equipped with tools for rough machining and finishing all classes of forgings; product, forged steel axles and locomotive and general steel forgings; annual capacity, 2,000 gross tons. Contemplates erecting one 10-gross-ton open-hearth steel furnace in 1896. Adam Tindel, proprietor.

Number of rolling mills and steel works in Western Pennsylvania except Pittsburgh and Allegheny county: 44 completed, 3 building, 1 partly built, and 1 projected. Of these 3 make Bessemer steel; 10 make open-hearth steel, 1 open-hearth steel plant is being erected, and 1 open-hearth steel plant is projected; 5 make crucible steel; 1 makes blister steel; and 1 makes special steel.

Total number of rolling mills and steel works in Pennsylvania: 223 completed, 3 building, 1 partly built, and 1 projected. Of these 19 make Bessemer steel; 2 make Clapp-Griffiths steel; 1 makes Robert-Bessemer steel; 46 make open-hearth steel, 2 open-hearth steel plants are being erected, and 3 open-hearth steel plants are projected; 21 make crucible steel; 6 make blister steel; and 4 make special steel.

DELAWARE.

Diamond State Iron Company, Wilmington. New York office, 29 Broadway; Philadelphia office, Bourse Building. 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, horseshoe iron, horse and mule shoes, forgings, and castings; total annu-

al 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.

Johnson Forge Company, Wilmington. Built in 1889; 7 puddling furnaces, one heating furnace, and 2 trains of rolls (one 3-high muck and one 12-inch bar); product, muck and merchant bar iron; annual capacity, 10,000 gross tons of muck bar and 7,500 tons of merchant bar. Operated in connection with a forge. DeHaven Morris, President and Treasurer.

Marshallton Iron and Steel Company, 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, 4,000 gross tons. Brands, "Star" and "Delaware cleaned." A factory for the manufacture of pans and elbows added in 1889; daily capacity, 2 gross tons. (Formerly operated by the Marshallton Iron Works.) J. R. Bringhurst, President; James W. Wilson, Vice-President; J. A. Robinson, Secretary and Treasurer; James Clark, Superintendent.

Minquas Iron Works, McCullough Iron Company, Equitable Building, Wilmington. Built in 1873 and put in operation in 1875; 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, 5,000 gross tons. Also manufactures galvanized sheet iron and steel, having acquired the galvanizing works of The McDaniel and Harvey Company, of Philadelphia, and removed and re-erected them at Wilmington. Operated by The Girard Life Insurance, Annuity, and Trust Company, of Philadelphia, and Henry Whiteley, Receivers. *See McCullough Iron Company, Maryland.*

Newport Rolling Mills, Marshall Iron Company, Newport, New Castle county. Built in 1873; 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, Nos. 18 to 28; annual capacity, 2,200 gross tons. Brands, a rooster and a diamond. Edward Mendinhall, President; 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.) Jonathan Rowland, President; H. C. Vansant, Secretary; William R. McIlvain, Treasurer. For lease.

Wilmington Malleable Iron Company, Wilmington, New Castle county. One 8-gross-ton Siemens open-hearth steel furnace built in 1895; product, malleable iron castings, but can make steel castings; daily capacity, 20 gross tons. Fuel used, oil. J. H. Baily, President; James Baily, Treasurer; Charles R. Miller, Secretary.

Wilmington Rolling Mills, The Seidel and Hastings Company, Wilmington, New Castle county. 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 iron boiler plates and plate iron generally; annual capacity, day turn, 3,000 gross tons of blooms and 5,000 tons of plate iron. W. Hastings, President; E. T. Canby, Vice-President; W. P. Hastings, Secretary and Treasurer.

ROLLING MILL COMMENCED BUT NOT COMPLETED.

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.

Number of rolling mills and steel works in Delaware: 9 completed and 1 partly built. Of these 1 has an open-hearth steel furnace.

MARYLAND.

Baltimore (The) Iron, Steel, and Tinplate Company, Locust Point, Baltimore. Built in 1862 and enlarged since; 8 heating furnaces and 8 trains of rolls (4 hot and 4 cold); product, black plates and tin and terne plates; annual capacity, 7,000 gross tons. Brand, "Locust." (Formerly called Locust Point Iron and Steel Works.) James E. Ingram, President; John M. Ingram, Secretary; R. W. Applegarth, Treasurer; R. M. Stevenson, 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. Idle and for lease.

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, one 20-inch, and one 24-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 capacity, 12,000 gross tons of rolled steel, 1,200 tons of forgings, and 7,500 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; J. W. Humbird, Treasurer.

McCullough Iron Company, North East and Rowlandsville, Cecil county. Office, Equitable Building, Wilmington, Del. Two works in Cecil county: North East Works, at North East, and Octoraro Works, at Rowlandsville. The North East Works were originally built in 1847 and were partly destroyed by fire in 1894; rebuilt in 1895; 6 heating and 2 annealing 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 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 North East Works; product, sheet iron for galvanizing and "Harvey's patent cleaned" sheet iron, branded "Octoraro;" annual capacity, 1,800 gross tons. Operated by The Girard Life Insurance, Annuity, and Trust Company, of Philadelphia, and Henry Whiteley, Receivers. *See Minquas Iron Works, Delaware.*

Maryland Steel Company, Girard Building, Broad and Chestnut sts., Philadelphia. New York office, 2 Wall st.; Boston office, 8 Oliver st. 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 ship-

building plant is connected with the works. F. W. Wood, President, Sparrow's Point; Edmund N. Smith, Secretary and Treasurer, Philadelphia. Selling agents, Stephen W. Baldwin, New York; C. S. Clark, Boston. *See Furnaces.*

Stickney (The) Iron Company, 11 South Gay st., Baltimore. Works at Canton, a suburb of Baltimore, Baltimore county. Built in 1895 and first put in operation November 5, 1895; 2 pair furnaces and 5 trains of rolls (two 24 x 32-inch hot and three 24 x 36-inch cold); product, black plates for tinning; annual capacity, 3,300 gross tons. Brand, "Stickney." Fuel used, bituminous coal. George H. Stickney, President; William Harvey, Secretary; John L. Reed, Treasurer. Selling agents, Reed, Stickney & Co., Baltimore. *See Furnaces. See Tinplate Works.*

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: 7 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; 10 puddling furnaces, 3 heating furnaces, 3 spike machines, and 2 trains of rolls (one 15-inch and one 9-inch); product, merchant bar, band, and hoop iron, horse and mule shoes, and railroad and boat spikes; annual capacity, 10,000 gross tons. Brand, "Crescent." Logan M. Bullitt, President, and Charles S. Thorne, Secretary and Treasurer, Philadelphia; T. F. McGinnes, Superintendent, Max Meadows; C. T. Kensil, Purchasing and Sales Agent, 770 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; 1 single and 15 double 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 137 cut-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, 90,000 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; R. M. Blankenship, General Superintendent. *See Tinplate Works.*

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. O. S. Allen, President; Dudley McDonald, Secretary and Treasurer; R. W. Jeffery, General Superintendent.

Roanoke Iron Company, David W. Flickwir, Receiver, 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. Idle and for lease.

Roanoke Rolling Mill, Crozer Iron Company, Roanoke, Roanoke county. General office, Upland, Pa. 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. (Formerly owned by the Roanoke Rolling Mill Company.) Idle and for sale or lease. *See Furnaces.*

Tredegar Iron Works, The Tredegar Company, Richmond, Henrico county. Built in 1836; 4 coal and 7 gas heating furnaces, 1 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 horseshoes; annual capacity, 45,000 gross tons. Foundry, run by water-power, contains one air and one brass furnace and 4 cupolas; has melting capacity of 135 gross tons per day, and makes car-wheels and castings of all kinds; machine, blacksmith, and boiler shops make car forgings and machinery. Brands for horseshoes, "Piedmont," "Cranberry," and "Prairie." Archer Anderson, President; R. S. Archer, Superintend-

ent of rolling mills; F. T. Glasgow, Superintendent of foundry and machine and smith shops; John T. Anderson, General Sales Agent. Selling agents, Crerar, Adams & Co., Chicago.

Virginia Nail and Iron Works, 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. Idle and for sale.

ROLLING MILLS COMMENCED BUT NOT COMPLETED.

Goshen Rolling Mill, C. R. Baird & Co., Bullitt Building, Philadelphia. Works at Goshen Bridge, Rockbridge county. Rolling mill partly erected in 1890–1; 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. For sale.

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, 2 heating furnaces, 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, 16,000 gross tons. David W. Flickwir, President, Shenandoah; H. E. Gerhard, Secretary and Treasurer, Philadelphia. *See Gem Furnace.*

Number of rolling mills and steel works in Virginia: 9 completed and 2 partly built. Of these 1 has a Bessemer steel plant.

WEST VIRGINIA.

Crescent Iron Works, Whitaker Iron Company, Wheeling, Ohio county. Built in 1855; partly destroyed by fire in 1893 and remodeled and rebuilt in 1894; 4 double puddling furnaces, 3 bar and 16 sheet heating furnaces, and 14 trains of rolls (one bar, seven 22-inch sheet, and one 22-inch black plate, hot, and five 22-inch cold); product, iron and steel sheets, black plates for tinning, and galvanized sheets; annual capacity, 20,000 gross tons. Brand, "Crescent." Fuel used,

natural gas and bituminous coal. N. E. Whitaker, President; A. C. Whitaker, Secretary. *See Principio Furnace, Maryland.*

La Belle Iron Works, Wheeling, Ohio county. Built in 1852 and enlarged since; incorporated December 3, 1875; 2 single puddling furnaces, 2 regenerative gas heating furnaces, 8 trains of rolls, (four 24 x 32-inch hot and four 22 x 32-inch cold,) and 173 cut-nail machines; product, steel nails, steel sheet bars, steel tack plate, steel skelp, and black plates for tinning; annual capacity, 400,000 kegs of cut nails, 7,700 gross tons of steel sheet bars, and 9,000 tons of black plates. Brand, "La Belle." Fuel used, producer gas and bituminous coal. (One 3-high 24-inch mill not in use.) C. A. Robinson, President; J. E. Wright, Secretary; W. H. Travis, General Manager. *See Tinplate Works.*

Riverside Iron Works, Wheeling. Works at Wheeling, Ohio county, and at Benwood, Marshall county. Built in 1859 and enlarged since; 8 regenerative gas heating furnaces, 4 coal heating furnaces, 224 cut-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 cut nails. Bessemer steel works built in 1883–4; two 5-gross-ton converters; first blow made June 11, 1884; two 3-hole soaking pits; product, steel, used for general purposes; annual capacity, 125,000 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, contain 6 large regenerative gas heating furnaces, 2 small regenerative gas heating furnaces, and 2 coal heating furnaces; first tube made August 11, 1887; annual capacity, 75,000 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 list) in Ohio.*

Wheeling Steel and Iron Company, Wheeling. 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; 18 single puddling furnaces, 3 regenerative gas heating furnaces, 4 forge fires, 2 trains of rolls, and 152 cut-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 cut-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 and 2 annealing furnaces, 130 cut-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 steel plant built in 1885–6; first blow made August 12, 1886; two 6-gross-ton Bessemer converters, 2 soaking pits, and one 2-high 36-inch blooming mill; product, steel nail slabs, billets, and blooms; annual capacity, 150,000 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; Charles C. Woods, Assistant Secretary and Treasurer; H. G. Tinker, Sales Agent. *See Belmont and Top Mill Furnaces in West Virginia and Martin's Ferry Furnace (Miscellaneous Bituminous list) in Ohio.*

Number of rolling mills and steel works in West Virginia: 7. Of these 2 make Bessemer steel.

KENTUCKY.

American Iron and Bolt Company, 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, roofing, and stove-pipe iron, bridge rods, bolts and nuts, and gimlet-pointed coach screws; annual capacity, 12,000 gross tons. (Formerly called the Anchor Iron and Steel Works.) Seward Heidelbach, President; Isaac Joseph, Vice-President and General Manager; Robert Kuhn, Secretary and Treasurer; Morris Joseph, Sales and Purchasing Agent.

Ashland Steel Company, Ashland, Boyd county. Built in 1891; two 5½-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, 500 gross tons. I. A. Kelly, President; John Russell, Vice-President; B. H. Burr, Secretary; L. R. Putnam, Treasurer.

Ewald Iron Company, 941 North Second street, St. Louis. 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, Jefferson county, 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; Thomas Shaver, Secretary; George P. Hermann, Assistant Secretary; A. G. Richardson, General Sales Agent.

Licking Iron Works, Licking Rolling Mill Company, Covington, Kenton county. Built in 1845; 6 double puddling, 4 Lauth heating, and 2 scrap furnaces, one steam hammer, and 6 trains of rolls (one 8, one 12, one 16, and two 24-inch hot and one 22 x 38-inch cold); product, merchant bar, bridge, boiler, and sheet iron, angle, tee, jail, and sash iron; also black plates for tinning for their own use; special products, boiler plate, shafting, charcoal bar, angle, and tee iron; annual capacity, 12,000 gross tons. I. Droege, Sr., President; F. J. Droege, Vice-President; J. C. Droege, Treasurer; I. Droege, Jr., Secretary. *See Tinplate Works.*

Mitchell, Tranter & Co., Second and Elm sts., Cincinnati. Works at Covington, Kenton county. Built in 1873; 4 knobbling, 11 puddling, 3 scrap, 2 slab, 2 plate-mill, 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, single turn, 15,500 gross tons. Brand, "Crown" horseshoe bar and refined iron. James Tranter, President; Watson W. Tranter, Vice-President; George M. Clark, Treasurer; James A. Sebastiani, Secretary.

Newport Rolling Mill Company, Newport, Campbell county. Built in 1857 and rebuilt throughout in 1891; 8 single puddling and 8 heating furnaces, 4 box annealing furnaces, and 6 trains of rolls (5 hot and one cold); product, steel sheets for roofing, corrugating, and galvanizing purposes; annual capacity, triple turn, 10,000 gross tons. Brands, "Newport Best Juniata" and "Newport Steel." (Formerly called Swift's Iron and Steel Works.) A. L. Andrews, President; J. A. Andrews, Secretary and Treasurer.

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 cut-nail machines, and 2 trains of rolls (one 20 and one 22-inch); product, steel nails; annual capacity, 350,000 kegs. Brand, "Norton." M. H. Houston, President; T. M. Adams, Vice-President; John Russell, Treasurer; J. Russell Houston, Secretary. Colburn & Lupton, general agents, 3 Johnston Building, Cincinnati.

Watts (The) Steel and Iron Syndicate Limited, Middlesborough, Bell

county. Built in 1890–3; seven 25-gross-ton basic open-hearth steel furnaces, (4 completed and 3 partly completed,) two 4-hole soaking pits, and one 32-inch blooming mill; 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; Edgar Watts and Frank Watts, Managing Directors in America; P. N. Cunningham, General Superintendent. *See Furnaces.*

Number of rolling mills and steel works in Kentucky: 9. Of these 1 makes Bessemer steel and 2 make open-hearth steel.

TENNESSEE.

Buffalo Iron Company, Nashville. Works (formerly owned by The Central 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. 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. Robert Ewing, President; J. A. Cooper, Secretary and Treasurer. Idle, and will not be operated by the present owners. *See Charcoal Furnaces in Tennessee and Alabama.*

Harriman Iron Company, Chattanooga. Works at Harriman, Roane county. 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. (Formerly operated by the Lookout Iron Company.) H. S. Chamberlain, President; J. D. Roberts, Vice-President; O. L. Hurlbut, Secretary and Treasurer.

Harriman Rolling Mill, D. W. Duke, 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. W. R. Muir, Manager.

Knoxville Iron Company, Knoxville, Knox county. Built in 1865; 10 single and 3 double puddling furnaces, one coal and 2 gas heating furnaces, 41 cut-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." William P. Chamberlain, President; T. I. Stephenson, Vice-President and General Manager; Otis A. Brown, Secretary and Treasurer.

Southern (The) Steel Works, John Leighton & Sons, 610-14 Boyce street, Chattanooga, Hamilton county. Removed from Kingston in 1877; remodeled and enlarged in 1883; one single puddling and one heating furnace, two 8-pot crucible steel-melting furnaces, and one 2,000-lb. hammer; product, crucible tool steel, forgings, and steel castings.

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.

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 in Georgia: 1.

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 cut-nail machines; product, merchant bar iron and nails; annual capacity, 12,000 gross tons. (Formerly called the 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, The DeKalb Company, lessee, Fort Payne, DeKalb county. Built in 1889–90; two 15-gross-ton basic open-hearth steel 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 the Fort Payne Rolling Mill.) E. N. Cullom, President; H. A. Yeaton, Treasurer; S. C. Adams, Secretary. Owned by the Alabama Steel Works, (incorporated.)

Anniston Rolling Mills, Anniston Iron and Steel Company, lessee, Anniston, Calhoun county. Built in 1890–1; 12 single puddling furnaces, 2 large heating furnaces, and 2 trains of rolls, (3-high 20-inch muck and 3-high 12-inch finishing.) J. K. Dimmick, President; H. B. Cooper, Vice-President and General Manager; John S. Mooring, Secretary and Treasurer. Owned by the Anniston Rolling Mills Company.

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, (one 20-inch muck, one 8-inch guide, one 16-inch bar, one 22-inch sheet, and one 26-inch plate,) and 3 Siemens gas producers; product, bar, guide, plate, and sheet iron; annual capacity, 27,000 gross tons. Owned by Morris Adler, of Birmingham, and others. Idle since the spring of 1891 and for sale.

Birmingham Rolling Mills, Birmingham Rolling Mill Company, Birmingham, Jefferson county. Built in 1880 and first put in operation in July, 1880; enlarged in 1887 and 1895; 11 double and 24 single puddling furnaces, one scrap furnace, 7 gas, 4 box annealing, 2 pair, and 4 sheet heating and annealing furnaces, and 9 trains of rolls (two 8-inch guide, one 16-inch bar, two 18-inch forge, two 24-inch sheet, one 26-inch plate, and one 24-inch finishing); product, iron and steel bars, plates, sheets, angles, round-edge tire, small T rails, fish-plates, etc.; annual capacity, 70,000 gross tons. Fuel used, producer gas and coal. Contemplates erecting an open-hearth steel plant. James G. Caldwell, President; Thomas Ward, General Manager; J. D. Dwyer, Superintendent; J. H. Mohns, Salesman.

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. Brand, "Jefferson." (This furnace takes the place of one experimental Henderson open-hearth steel 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 the Central Iron Works.) Company failed; works idle for several years. Address, Joseph F. Johnston, Birmingham.

United States (The) Car Company, Anniston, Calhoun county. Chicago office, 1480 Old Colony 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. David Cornfoot, President, London, England; Thomas Sturgis, Vice-President, New York; J. M. Maris, General Manager, Chicago; O. M. Stimson, General Superintendent, Anniston.

STEEL WORKS PROJECTED.

Bessemer Land and Improvement Company, Bessemer, Jefferson county, contemplates erecting an open-hearth steel plant at Bessemer in the spring or summer of 1896. *See Furnaces.*

Number of rolling mills and steel works in Alabama: 9 completed and 1 projected. Of these 2 have basic open-hearth steel plants and 2 open-hearth steel plants are projected.

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 (one 9-inch and one 16-inch); product, merchant iron and cotton-ties. J. T. Munson, President. For sale.

Texas Iron Rolling Mill, H. H. Rowland, 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. For sale or lease.

ROLLING MILL COMMENCED BUT NOT COMPLETED.

Jefferson Iron Company, Jefferson, Marion county. Rolling mill partly erected in 1891 by the Lone Star Iron Company; to contain 15 single puddling furnaces, 3 heating furnaces, and 3 trains of rolls (one 18-inch muck and one 8-inch and one 12-inch bar); buildings partly erected and all the machinery on the ground; work suspended; property sold to present owners in 1894. *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, 100,000 gross tons. Fuel used, coal. Also operates a wire-drawing plant. James B. Savage, President; A. B. Manship, Secretary.

Britton (The) Rolling Mill Company, 66 Hoyt ave., Cleveland, Cuyahoga county. Built in 1890–1 and started in May, 1891; 2 heating furnaces, 2 annealing furnaces, and one 24-inch tinplate train, with 2 hot mills and 3 stands of cold rolls; product, soft steel sheets and black plates for tinning; annual capacity, 4,000 gross tons. Fuel used, coal and petroleum. J. W. Britton, President; F. W. Britton, Vice-President and General Manager; C. R. Britton, Secretary; A. M. Britton, Treasurer. *See Tinplate Works.*

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. Fuel used, bituminous coal. 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 tons of blooms, billets, and slabs. Rail mills built in 1857 and remodeled in 1895; 5 heating furnaces and one train of rolls; annual capacity, 100,000 tons of standard rails, girder rails, beams, channels, etc. Two rod mills; annual capacity, 100,000 tons. Wire mills built in 1868 have an annual output of 70,000 tons of finished wire. Also a barb-wire plant; annual capacity, 15,000 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 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 tons of plates and 4,000 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 steel blooms, billets, and slabs, beams, channels, angles, and other structural shapes, Bessemer steel rails, girder 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. Fuel used, bituminous coal. William Chisholm, President; W. B. Chisholm, Vice-President; Ed. S. Page, Secretary. *See Furnaces, Lake Counties.*

Cleveland (The) Steel Casting Company, 14 Winter st., Cleveland, Cuyahoga county. Built in 1893 and first steel made January 9, 1895; one 15-gross-ton open-hearth steel furnace; product, steel castings; annual capacity, 9,500 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; remodeled in 1894; 6 heating furnaces and 3 trains of rolls, containing 2 plate and 6 sheet mills; product, light steel plates and sheets; annual capacity, 36,000 gross tons. Fuel used, oil and coal. (Formerly operated by the Britton Iron and Steel Company.) Frank Rockefeller, President; John A. Potter, Vice-President; L. H. Severance, Secretary and Treasurer.

Cleveland Works, Consolidated Steel and Wire Company, general office, Rookery Building, Chicago. Works at Cleveland, Cuyahoga county. Wire-drawing plant and 118 wire-nail machines built in 1890-1; rod mill added in 1892; product, wire rods, wire, and wire nails; annual capacity, 60,000 gross tons of rods, 36,000 tons of wire, and 750,000 kegs of nails. Brand for nails, purple-blue hoops. A galvanizing plant is connected with the works. Fuel used, producer gas and coal. (Formerly operated by The Baackes Wire Nail Company.) *See Allentown Works in Eastern Pennsylvania for a full list of officers and branch offices; see Pittsburgh Works in Allegheny County and Beaver Falls Works in Western Pennsylvania.*

Crescent (The) Sheet and Tin Plate Company, Cleveland, Cuyahoga county. Built in 1895 and first put in operation June 1, 1895; 4 pair and 4 heating furnaces and 8 trains of rolls (4 hot and 4 cold); product, black plates for tinning and stamping; annual capacity, 7,000 gross tons. Fuel used, coal. H. P. McIntosh, President; A.

B. Foster, Vice-President; J. A. Mathews, Secretary and Treasurer; James Paton, Superintendent. *See Tinplate Works.*

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 330 wire-nail machines; product, steel wire rods, wire nails, staples, tacks, rivets, and wire; annual capacity, 50,000 gross tons of rods or wire and 1,250,000 kegs of wire nails. Galvanizing plant connected with the works has an annual capacity of 4,500 gross tons of wire. Fuel used, slack coal and producer gas. S. H. Chisholm, President; C. B. Beach, Vice-President; A. T. DeForest, Secretary. Selling agents, J. C. McCarty & Co., New York; John Wales Company, Boston.

Johnson (The) Company, Lorain, Lorain county. Cleveland office, Cuyahoga Building. Built in 1894–5, using rail mill machinery removed from the company's works at Johnstown, Pa.; 4 gas heating furnaces and one 27-inch train of rolls; product, girder and T rails and street railroad specialties; annual capacity, 180,000 gross tons. Bessemer steel department contains two 12-gross-ton acid converters; first steel made April 1, 1895; 12 soaking pits; product, Bessemer steel ingots; annual capacity, 250,000 gross tons. Fuel used, coal and producer gas. A. J. Moxham, President; Tom L. Johnson, 1st Vice-President; Daniel Coolidge, 2d Vice-President; P. M. Boyd, Secretary; William A. Donaldson, Treasurer; Max M. Suppes, General Manager. Selling agents, H. C. Evans, Mutual Life Building, New York; W. E. Boughton, Bullitt Building, Philadelphia; O. C. Evans, Mitchell Building, Cincinnati; Littlefield & Meysenburg, Monadnock Building, Chicago, and Bank of Commerce Building, St. Louis; S. P. S. Ellis, Penn Building, Pittsburgh; William W. Kingston, Equitable Building, Atlanta; A. R. Adams, Mills Building, San Francisco. *See Rolling Mills and Steel Works in Pennsylvania. See Furnaces in Ohio, Lake Counties.*

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. Fuel used, bituminous coal in the rolling mill and fuel oil in the nut and bolt works. W. C. Scofield, President; Edward Lewis, Vice-President; C. W. Scofield, Secretary and Treasurer; F. R. Scofield, Superintendent of nut and bolt works.

Otis (The) Steel Company Limited, Cleveland, Cuyahoga county. 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, forgings, and castings; annual capacity, 50,000 gross tons of rolled and forged products and 2,500 tons of castings. Brand, "Otis." Two 5-gross-ton converters for the production of Bessemer steel added in 1884, and first blow made August 5, 1884; product, steel for wire rods; annual capacity, 100,000 gross tons. Fuel used, coal. Alex. Young and J. T. Smith, London, England, and P. J. Benbow and Alvin Carl, Cleveland, Ohio, Receivers; George Bartol, Superintendent. Selling agents, S. W. McMunn, Old Colony Building, Chicago; Andrew Warren, 516 North Third st., St. Louis; Robert Barry, Boreel Building, New York.

Toledo (The) 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, 10 heating furnaces, 8 trains of rolls, and one 5-ton hammer; product, extra quality assorted merchant bar, band, shafting, plate, sheet, and tank iron and steel; annual capacity, 40,000 gross tons. Fuel used, coal. Brand, "T. R. M. Co." (Formerly called the Maumee Rolling Mill.) A. W. Houston, President, Treasurer, and Manager.

Union Rolling Mill Company, Cleveland, Cuyahoga county. Works and office at Newburgh, in the city of Cleveland. Built in 1866–7; 13 single and 2 double puddling furnaces, 5 heating furnaces with Siemens gas producers, 4 trains of rolls, (8 and 9-inch guide, 18-inch bar, and 3-high muck,) and one squeezer; product, nut, bolt, bridge, and rivet iron, soft steel bars, bar iron, and shafting; specialties, "Union Refined" bar and cold-straightened shafting; daily capacity, 125 gross tons of finished iron. Fuel used, coal. 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, Lake Counties.*

Number of rolling mills and steel works in the Lake Counties: 14. Of these 3 make Bessemer steel and 3 make open-hearth steel.

MAHONING VALLEY DISTRICT.

Akron (The) Iron and Steel Company, Akron, Summit county. Built in 1866; one single and 6 double puddling furnaces, 2 scrap furnaces, 6 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 12 and 16 lbs. per yard; specialties, patent calendered iron and steel shafting and iron for agricultural implements; annual capacity, 20,000 gross tons. Fuel used, coal exclusively. (Formerly operated by the Akron Iron Company.) H. F. Holloway,

President and Treasurer; Lewis Miller, Vice-President; W. A. Pardee, Secretary.

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. Cut-nail factory abandoned. (Formerly called the 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, 25,000 gross tons. Brand, "Cherry Valley." Fuel used, coal. (Formerly called the Leetonia Iron and Coal Company.) C. N. Schmick, President and Treasurer; W. H. Potter, Vice-President; S. E. Welker, Secretary and General Manager. *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, 11,000 gross tons. Fuel used, coal. Henry B. Shields, President; J. Morgan Coleman, Vice-President; James D. Shields, Secretary and Treasurer.

Falcon Iron and Nail Company, Niles, Trumbull county. Two mills: Falcon Iron and Nail Works built in 1867; 18 single puddling furnaces, 11 heating furnaces, 3 scrap furnaces, 6 box annealing furnaces, 44 cut-nail machines, and 5 trains of rolls (one 21 and four 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, (two 21 and one 22-inch.) Product, skelp iron, sheet iron, and sheet steel; annual capacity, 27,000 gross tons of skelp iron and 13,500 tons of sheet iron, sheet steel, and galvanized iron. Fuel used, bituminous coal and slack. Warner Arms, President; Tod Ford, Vice-President; Myron I. Arms, Secretary and Treasurer. Selling agents, Edward C. Brainard and W. E. Stockton, Chicago; George H. Ismon, New York.

Falcon Tin Plate and Sheet Company, Niles, Trumbull county. Built in 1892–3 and first put in operation in April, 1893; 12 heating fur-

naces (6 pair and 6 sheet) and 14 trains of rolls (seven 2-high 24-inch hot and seven 2-high 22-inch cold); 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 7,600 tons of black plates. Fuel used, bituminous coal and slack. Warner Arms, President; Tod Ford, Vice-President; W. DeP. Knowlton, Secretary; Myron I. Arms, Treasurer; William E. Harris, Manager. Selling agents, Edward C. Brainard and W. E. Stockton, Chicago; George H. Ismon, New York. *See Tinplate Works.*

Falls Hollow Staybolt Company, Cuyahoga Falls, Summit county. Built in 1865; rebuilt in 1884; 2 heating furnaces and one 10-inch train of rolls; product, safety hollow staybolt iron; annual capacity, 800 gross tons. Brand, "Falls Hollow Staybolt Iron." Fuel used, crude oil. (Formerly called the Stirling Works.) Selling agents, John W. Walsh and C. M. Walsh, Cuyahoga Falls; Wm. H. McElroy, 202 Walnut Place, Philadelphia; J. & H. Taylor, 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, 10 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, 40,000 gross tons. Brand, "Haselton." Fuel used, coal and slack. L. E. Cochran, President and General Manager; Mrs. C. H. Andrews, Vice-President; H. W. Heedy, Secretary and Treasurer. Western office, New York Life Insurance Building, Chicago, John McLauchlin, Manager; Eastern office, 77 White Building, Buffalo, New York, W. S. Johnston, Manager. *See Furnaces in the Mahoning Valley.*

Mahoning Valley (The) Iron Company, Youngstown. Two works: Mahoning Valley Works, at Youngstown, Mahoning county, built in 1871; 3 single and 30 double puddling furnaces, 8 coal and 5 gas heating furnaces, 7 trains of finishing rolls, and 55 cut-nail machines; product, merchant bar iron, angles, tank, plate, and sheet iron, boat spikes, bridge rivets, and steel cut nails; annual capacity, 65,000 gross tons; also makes "Acme" polished shafting; daily capacity, 18 gross tons; brands, "M. V. I." for shafting, "I. X. L." for horseshoe bars, "B. Q." for bridge iron, and "M. S. B." for staybolt iron; fuel used, bituminous coal. Hubbard Works, at Hubbard, Trumbull county, built in 1872 and first put in operation in 1873; 10 single and 6 double 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; (formerly operated by The Hubbard Co-operative Iron Company;) for sale or lease. C. D. Arms, President; W. Scott Bonnell, Vice-President; James L. Botsford, Secretary and Treasurer. *See Hannah Furnace, Mahoning Valley.*

Ohio (The) Steel Company, Youngstown, Mahoning county. Built in 1893–4; two 10-gross-ton acid Bessemer converters; first steel made February 4, 1895; three 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, sheet and tinplate bars, slabs, and billets to 1½ inches square; annual capacity, 400,000 gross tons of ingots or 360,000 tons of rolled products. Fuel used, coal. Henry Wick, President; J. G. Butler, Jr., Vice-President; William H. Baldwin, Secretary; Thomas McDonald, Superintendent.

Struthers (The) Iron and Steel Company, Struthers, Mahoning county. Built in 1881–2 and entirely rebuilt in 1895; 4 double puddling furnaces, one large scrap furnace, 2 pair furnaces, 2 sheet furnaces, 4 large box annealing furnaces, one sheet bar furnace, and 4 trains of rolls (three 24 x 40-inch hot and one 22 x 38-inch cold); product, muck and scrap bar and all sizes of iron and steel sheets; annual capacity, 5,000 gross tons of muck and scrap bar and 5,500 tons of sheets. Brand, "Struthers." Fuel used, coal and coke. (Formerly called the Summers Iron Works.) J. Warner, Manager and Treasurer.

Union (The) Iron and Steel Company, Youngstown, Mahoning county. (Successor 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; 23 single and 2 double 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, 3 gas heating and 4 coal heating furnaces, one tire-straightening machine, and 6 trains of rolls (20-inch muck, and one 7, one 8, two 10, and one 12-inch finishing); product, bar, hoop, band, hame, box, tongue-cap, and tire iron and steel, angles, special shapes, and cotton-ties; annual capacity, 40,000 gross tons. Lower Mill, at Youngstown, Mahoning county, built in 1863, 1874, and 1890; 10 single and 18 double puddling furnaces, 10 heating furnaces, (3 using producer gas,) and 10 trains of rolls (3 muck, and one 6, one 7, three 8, one 10, and one 16-inch finishing); product, hoops, bands, horseshoe iron, bar iron, guide iron, shapes, and steel cotton-ties; annual capacity, 55,000 gross tons; brand, "Eagle."

Total annual capacity of the four works, 150,000 gross tons. Fuel used, coal in all the works. Myron C. Wick, President; George D. Wick, Vice-President; William E. Taylor, Secretary and Treasurer. Sales offices, Room 32, No. 277 Broadway, New York; Room 430, Rookery Building, Chicago; Room 200, American Central Building, St. Louis.

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 and washed metal; annual capacity of washed metal, 40,500 gross tons. Fuel used, producer gas. Tod Ford, President; Paul Jones, Vice-President; John Stambaugh, Jr., Secretary and Treasurer; E. L. Ford, General Superintendent. *See Tod Furnace, Mahoning Valley.*

Number of rolling mills and steel works in the Mahoning Valley District: 18. Of these 1 makes Bessemer steel and 1 has an open-hearth steel plant.

INTERIOR COUNTIES.

Alliance Works, The American Steel Casting Company, Thurlow, Pa. Works at Alliance, Stark county. Built in 1883 and since enlarged; one 6-gross-ton and three 15-gross-ton open-hearth steel furnaces; product, steel castings; annual capacity, 12,000 gross tons. (Formerly operated by The Solid Steel Company. One small experimental Bessemer converter abandoned.) Stewart Johnston, Superintendent. *For list of branch offices and full list of officers see Thurlow Works, Pennsylvania. See Syracuse Works in New York, and Norristown, Thurlow, and Sharon Works in Pennsylvania.*

Cambridge (The) Iron and Steel Company, Cambridge, Guernsey county. Built in 1889–90 and put in operation in July, 1890; one single puddling furnace, 2 scrap furnaces, 2 gas and 11 coal heating furnaces, and 6 trains of rolls (one 22-inch muck and five 24-inch sheet); product, sheet iron and sheet steel; annual capacity, 12,000 gross tons. Brand, "Cambridge." Fuel used, coal. Also operates a galvanizing plant. A. Beyer, President; A. W. Brown, Vice-President, General Manager, and Treasurer; A. J. McCullough, Secretary. Selling agents, T. G. Williams, Pittsburgh; A. C. Dallas, Chicago; J. H. Heimbuecher, St. Louis.

Canton Rolling Mill Company, Canton, Stark county. Built in 1894 and first put in operation in August, 1894; 2 pair, 2 sheet, and 3 annealing furnaces and 4 trains of rolls (two 24 x 40-inch hot and one 22 x 38 and one 22 x 42-inch cold); product, iron and steel black sheets for stamping, galvanizing, and roofing; annual capacity, triple turn, 5,000 gross tons. Fuel used, coal and petroleum. W. W. Irwin, President; C. H. Truby, Vice-President; E. L. Burchfield, Sec-

retary; E. E. Hicks, Assistant 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. A. French, President; R. H. Bulley, Vice-President and General Manager; 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 5 trains of rolls (one muck, and one 8, one 10, one 12, and one 17-inch finishing); 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.

Crucible (The) Steel Casting Company, Canton, Stark county. Built in 1895; twelve 2-pot crucible steel-melting holes; first steel made April 15, 1895; product, steel castings up to 1,200 lbs.; annual capacity, 435 gross tons. Fuel used, coke. Also operates an iron foundry. Edwin Hagy, President; John B. Blythe, Vice-President; C. E. Whippy, Secretary; Henry E. Thomas, Treasurer; John Holroyd, Superintendent. Selling agent, Charles A. Parsons, Cleveland.

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 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. J. D. Briggs, President; Samuel Sayward, Vice-President; H. W. Briggs, Secretary, Treasurer, and Manager. The property is in the hands of M. B. Gary, Assignee, and is for sale.

Kellogg (The) Weldless Tube Company, Findlay, Hancock county. Eastern office, 45 Milk st., Boston. Built in 1888 and enlarged in 1891; remodeled in 1895; one 8-gross-ton and one 12-gross-ton basic open-hearth steel furnace, with an annual capacity of 12,000 gross tons of ingots; 2 heating furnaces and 2 continuous trains of 16-inch rolls with 7 sets of rolls in each train; product, weldless steel tubes. Fuel used, natural gas, producer gas, coal, and oil. (Formerly

operated by The Kellogg Seamless Tube and Manufacturing Company.) John R. Bothwell, President and Manager, Findlay; W. F. Almy, Treasurer, Boston. Selling agents, W. J. Haines & Co., Philadelphia; M. T. Miles & Son, Chicago; C. R. Talbott & Co., Cincinnati; Henry L. Coe, Cleveland; The Kellogg Weldless Tube Company, Boston and Buffalo.

King, (The) Gilbert, and Warner Company, Columbus, Franklin county. Built in 1894-5 and put in operation May 2, 1895; two 4½-gross-ton Bessemer steel converters, one soaking pit, one heating furnace, and 3 trains of rolls (one 32-inch reversing blooming, one 20-inch sheet bar, and one 24-inch small billet); product, steel slabs, billets, and sheet bars; annual capacity, 120,000 gross tons. Fuel used, coal. May add another soaking pit and a heating furnace in 1896. R. M. Gilbert, President; J. H. King, Vice-President; R. S. Warner, Secretary and Treasurer. *See Moxahala Furnace, Hocking Valley; see Franklin Furnace, Miscellaneous Bituminous list.*

Lima (The) Locomotive and Machine 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, bituminous coal. (Formerly operated by The Lima Steel Casting Company.) George H. Marsh, President; G. W. Disman, Vice-President and Manager; W. T. Agerter, Secretary and Treasurer.

Massillon Rolling Mill, Joseph Corns & Son, Massillon, Stark county. Built in 1873 and put in operation January 4, 1875; 4 single puddling furnaces, 4 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.

Morton (The) Tin Plate Company, Cambridge. Works at Guernsey, Guernsey county. Built in 1894 and first put in operation January 1, 1895; 6 heating furnaces, 2 annealing furnaces, and 2 trains of rolls (one 24 x 32-inch hot, with 3 stands, and one 20 x 32-inch cold, with 4 stands); product, fine sheet steel for tinning; annual capacity, 6,000 gross tons. Brand, "Morton." Fuel used, bituminous coal. John W. Marquand, President; Charles L. Campbell, Vice-President and Treasurer; John C. Beckett, Secretary; Ambrose Beard, Jr., General Manager. *See Tinplate Works.*

New Philadelphia (The) Iron and Steel Company, New Philadelphia, Tuscarawas county. Built in 1883; 2 double and 10 single puddling furnaces, one gas and 7 coal heating furnaces, and 9 trains of rolls (two muck and five 38-inch and one 48-inch hot and one 50-inch cold); product, common and refined sheet iron and sheet steel; annual capacity, 15,000 gross tons. Brands, "The N. P. I. & S. Co." and

the letters N P in a diamond. Fuel used, coal and coke. A galvanizing plant is connected with the works. George Reeves, President; A. G. Reeves, Secretary and Treasurer. Selling agents, J. Garner Wright, 217 Lake st., Chicago; Charles Westlake, from home office; Baldwin & McInnes, Philadelphia.

Piqua (The) Rolling Mill Company, Piqua, Miami county. Built in 1889; 6 single puddling furnaces, 2 heating furnaces, one pair furnace, one softening furnace, 3 combined pair and softening furnaces, 4 annealing furnaces, and 5 trains of rolls (one 3-high 22-inch muck and four 24-inch sheet); product, iron and steel sheets; annual capacity, 8,000 gross tons. Brand, "Piqua." Fuel used, coal and crude oil. J. G. Battelle, President and General Manager; W. P. Orr, Vice-President; J. Hicks, Secretary and Treasurer; W. H. Bailey, Superintendent. Selling agent, The Cincinnati Corrugating Company, Piqua.

Reeves (The) Iron Company, Canal Dover, Tuscarawas county. Built in 1865–6 and enlarged in 1895; 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, 40,000 gross tons; fuel used, coal; (formerly called the Dover Rolling Mill.) New mill added in 1895; 9 trains of rolls (three 24 x 30-inch black plate, three 24 x 38-inch sheet, and three 24 x 32-inch cold); product, black plates for tinning and sheet iron and steel; annual capacity, 13,500 gross tons. Jeremiah Reeves, President and General Manager; Jabez Reeves, Vice-President and Superintendent; P. S. Cooper, Secretary; S. J. Reeves, Treasurer.

Wellston Steel and Nail Mill, First National Bank, Ironton. Works at Wellston, Jackson county. Built in 1886; 2 heating furnaces, one 22-inch train of rolls, and 65 cut-nail machines; product, steel cut nails; annual capacity, 160,000 kegs. Idle and for sale.

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 New York Furnaces, Hocking Valley, and Zanesville Furnace, Miscellaneous Bituminous list.*

Number of rolling mills and steel works in the Interior Counties: 17. Of these 1 makes Bessemer steel, 5 make open-hearth steel, and 1 makes crucible steel.

OHIO RIVER COUNTIES.

Ætna-Standard Iron and Steel Company, Bridgeport, Belmont county. Three mills in Bridgeport: Ætna Works built in 1873 and put in operation January 1, 1874; enlarged in 1883 and 1891; 18 single puddling furnaces, 2 scrap furnaces, 1 reverberatory and 6 regenerative gas heating furnaces, 3 sheet mill softening furnaces, 3 sheet mill pair furnaces, 6 box annealing furnaces, and 10 trains of hot rolls (one 20-inch muck, one 16 and one 24-inch bar, and one 8 and one 9-inch guide, all 3-high; one 21, one 22, and one 24-inch sheet; and two 24-inch black plate, the latter equipped with 4 heating furnaces and 3 stands of cold rolls); product, iron and steel bars, sheets, plates, bands, light T street rails, angles, tees, channels, and miscellaneous shapes; annual capacity, 27,000 gross tons; brand, "Ætna;" (formerly operated by the Ætna Iron and Steel Company.) Standard Sheet Mill Works built in 1882-3 and put in operation April 1, 1883; remodeled in 1888 and 1892; 7 pair heating furnaces, 7 softening furnaces, 9 annealing furnaces, 7 trains of finishing rolls, (one 20, two 22, and four 24-inch,) and one stand of cold rolls; product, iron and steel sheets, galvanized iron, corrugated iron, and other forms of roofing iron; annual capacity, 10,000 gross tons; brand, "Standard;" (formerly operated by the Standard Iron Company.) Standard Black Plate Mills, formerly operated by the Standard Iron Company as a sheet mill; 4 pair heating furnaces, 4 softening furnaces, 2 double annealing furnaces, four 24-inch black plate mill trains, and 5 stands of 22-inch cold rolls; product, black plates for tinning; annual capacity, 5,500 gross tons. Fuel used in all the 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.*

Beaver (The) Tin Plate Company, Lisbon, Columbiana county. Built in 1894-5 and first put in operation April 10, 1895; 4 sheet, 4 pair, and 4 double annealing furnaces, and 8 trains of rolls (four 24 x 32-inch hot and four 22 x 34-inch cold); product, black plates for tinning and light sheets of No. 30 gauge and under; annual capacity, 7,000 gross tons. Fuel used, bituminous coal. C. W. Bray, President; I. M. Scott, Secretary and Treasurer; George D. Evans, Superintendent. *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 cut-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 list.*

Bellaire Nail Works, Bellaire, Belmont county. Built in 1867 and put in operation in February, 1868; rebuilt in 1893 and in 1895; 2 heating furnaces, 3 trains of 24-inch rolls, and two 20-ton electric traveling cranes; product, sheet and tinplate bars, skelp steel, bridge plates, etc.; annual capacity, 100,000 gross tons. (Cut-nail factory containing 125 cut-nail machines abandoned.) 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, 125,000 gross tons. Intend enlarging converters to 10-gross-tons in 1896. Fuel used, coal. J. R. McCortney, President; A. B. Carter, Secretary and Treasurer. *See Furnaces in the Miscellaneous Bituminous list.*

Brilliant Tube and Pipe Works, Brilliant, Jefferson county. Rolling mill started in September, 1883; 20 single puddling furnaces, 4 gas heating furnaces, 2 coal heating furnaces, and 4 trains of rolls, (8, 12, 18, and 20-inch.) Works being remodeled for the manufacture of skelp for tubes; tube works in course of erection. (Formerly operated by the Brilliant Steel and Iron Company.) J. R. Jackson, President and Manager; Thomas Hackett, Secretary and Treasurer.

Burgess Steel and Iron Works, Portsmouth, Scioto county. 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, 7 trains of rolls, (4 hot and 3 cold,) 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, five-ply safe steel, and spring, tire, and machinery steel; annual capacity, 40,000 gross tons. (Portsmouth Iron and Steel Works, built in 1832, dismantled in 1892.) L. D. York, President and Superintendent; J. L. Watkins, Jr., Secretary and Treasurer. Selling agents, Houston & Adams, Cincinnati; G. W. Weyer, St. Louis.

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; 7 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); product, muck bar and iron and steel sheets; annual capacity, 12,500 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., Irondale, Jefferson county. Branch office, 246 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 cold); product, black plates for tinning; annual capacity, 1,200 gross tons. Fuel used, coal. Tinning plant added in 1891-2. Selling agents, Casey & Day, Rookery Building, Chicago. *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 furnaces for bar and guide mills, 2 pair and 2 heating furnaces for sheet mills, 1 scrap and 2 annealing furnaces, and 5 trains of rolls (one 18-inch muck, one 3-high 16-inch bar, one 9-inch guide, and two 22 x 38-inch sheet); product, bar and sheet iron and steel; annual capacity, 15,000 gross tons. Fuel used, producer gas and bituminous coal. H. A. Marting, President and General Manager; S. B. Steece, Vice-President; H. H. Mittendorf, Secretary and Treasurer; George F. Thomas and Thomas W. Hughes, Assistant Managers. 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 cut-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; W. H. McClinton, Vice-President and General Manager; G. P. Harden, Secretary. *See Furnaces in the Miscellaneous Bituminous list.*

Junction Iron and Steel Company, Mingo Junction, Jefferson county. Principal office, Wheeling, W. Va. (Formed by a consolidation of the Junction Iron Company and the Laughlin and Junction Steel Company in September, 1894.) Original plant (formerly operated by the Junction Iron Company) built in 1882 and put in operation November 1, 1882; remodeled in 1895; now consists of 3 gas heating furnaces, one 3-high 20-inch mill, and one continuous and Belgian mill; product, sheet and tinplate bars and merchant bars and small billets; annual capacity, 50,000 gross tons of sheet and tinplate bars and 60,000 tons of merchant bars and billets; (cut-nail factory, containing 142 nail machines and a nail plate train, abandoned in 1895.) Steel department (formerly operated by the Laughlin and Junction Steel Company) built in 1885-6; two 5-gross-ton Bessemer converters; first blow made February 8, 1886; 3 gas heating furnaces, one 5-hole soaking pit, and a blooming mill; product, blooms, slabs, and billets; annual capacity, 120,000 gross tons. Fuel used, coal and pro-

ducer gas. M. J. Urquhart, President and General Manager; George A. Dean, Secretary and General Superintendent; W. H. Eaton, General Sales Agent. *See Mingo Furnaces, Miscellaneous Bituminous list.*

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 cut-nail machines; product, muck bar and iron and steel cut nails and spikes; annual capacity, 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 list.*

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; 7 gas heating furnaces, 10 trains of rolls, (5 hot and 5 cold,) 2 hammers, and 225 cut-nail machines; product, steel cut nails and spikes and black plates for tinning; annual capacity, 600,000 kegs of cut nails and 7,000 gross tons of black plates. Brand, "Laughlin." Fuel used, coal. W. L. Glessner, President; F. M. Strong, Secretary; George G. Spencer, Salesman, Rookery Building, Chicago. *See Tinplate Works.*

Pomeroy Mill, The Pomeroy Iron and Steel Company, Pomeroy, Meigs county. Built in 1847; 11 single puddling furnaces, 4 heating furnaces, and 4 trains of rolls (one muck, and one 7, one 8, and one 12-inch finishing); product, refined iron and soft steel bars, bands, hoops, horseshoe bars, and cotton-ties; annual capacity, 20,000 gross tons. Fuel used, coal. (Formerly operated by the Union Iron and Steel Company.) George D. Wick, President; W. A. Kingsley, Secretary and Treasurer.

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 and 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, 5,000 gross tons. Fuel used, coal. Persifor F. Smith, President and Manager; R. G. Wood, Vice-President; Alan W. Wood, Treasurer; D. S. Brookman, Secretary.

Number of rolling mills and steel works in the Ohio River Counties: 18. Of these 2 make Bessemer steel, 1 makes open-hearth steel, and 1 makes crucible steel.

Total number of rolling mills and steel works in Ohio: 67. Of these 7 make Bessemer steel, 10 have open-hearth steel plants, and 2 make crucible steel.

INDIANA.

American (The) Cast Steel Company, Hammond, Lake county. One furnace erected in 1895 for the manufacture of steel by a special process; product, steel castings; estimated annual capacity, 12,000 gross tons.

American (The) Tin Plate Company, Elwood, Madison county. Built in 1891–2 and first put in operation in June, 1892; 18 heating furnaces (16 sheet and 2 bar) and 8 trains of rolls (6 hot, with 19 mills, and 2 cold, with 16 mills); product, black plates for tin and terne plates, all consumed by the company in its tinplate works; annual capacity, 30,000 gross tons. 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.

Atlanta (The) Steel and Tin Plate Company, (successor to the Indiana Tinplate Manufacturing Company,) Atlanta, Hamilton county. Built in 1894–5 and first put in operation in March, 1895; 5 heating furnaces and two 24 x 32-inch hot and four 22 x 30-inch cold mills; adding another hot mill and contracts placed for two additional hot mills; product, black plates for tinning and light gauge sheets, not annealed, up to No. 34 gauge, in sizes up to 24 x 72 inches, and annealed sheets in the same gauges in sizes up to 24 x 36 inches. Brand, "Atlanta." Fuel used, natural gas exclusively. C. A. Ford, President; T. D. Morgan, Vice-President and General Manager; E. S. Walton, Secretary and Assistant Treasurer; Daniel Goodykoontz, Treasurer. Selling agents, Hubbert & Hubbert, Louisville. *See Tinplate Works.*

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 9 coal heating furnaces, 6 trains of rolls, (one 8, 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, 15,000 gross tons of rolled and forged iron, 7,000 tons of spikes, and 300,000 turn-buckles. Brand, "Central." Fuel used, block coal. Buildings for a bolt and nut factory

erected; plant not completed. 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, 1114 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, and 2 trains of rolls (one 9-inch and one 12-inch); product, horseshoe bars and horse and mule shoes. Fuel used, petroleum. (One 1¾-gross-ton Robert-Bessemer steel converter abandoned.) Gideon N. Caleb, President; M. T. Atchley, Vice-President; George P. Hukill, Treasurer; Walter S. Caleb, Secretary.

Chicago Truck and Steel Castings Company, 1532 Monadnock Building, Chicago. Works at Montpelier, Blackford county. Building one 10-ton Siemens acid open-hearth steel furnace; product to be steel castings; estimated annual capacity, 15,000 gross tons. Fuel to be used, natural gas. John Fraser, President and Treasurer; George H. Graham, Vice-President and Secretary.

Corning Works, Illinois Steel Company, lessee, Rookery Building, Chicago. Works at Hammond, Lake county. Built in 1892 and first put in operation October 17, 1892; 8 heating furnaces and 7 trains of 22-inch sheet rolls; product, steel sheets; annual capacity, 12,000 gross tons. Fuel used, petroleum and coal. Sidney McCloud, Superintendent. Owned by the Corning Steel Company. *See Rolling Mills and Steel Works in Illinois and Wisconsin. See Furnaces in Illinois and Wisconsin.*

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, 11 heating furnaces, 10 forge fires, 5 hammers, (50-lb., 80-lb., 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 and oil. (Formerly called the National Forge and Iron Works.) Josiah J. Parkhurst, President; Leonard S. Mulford, Secretary; William V. Baker, Treasurer; Frank B. Felt, Manager.

Florence Iron and Steel Company, Muncie, Delaware county. Two works at Muncie: Muncie Rolling Mill, 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; (formerly operated by the Muncie Muck Bar Company.) Park Iron and Steel Works, leased from the Park Iron and Steel Company, 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; (formerly operated by the White River Iron and Steel Company.) Fuel used, natural gas exclusively in both works. Millard Howe, President; J. D. Briggs, Secretary and Treasurer.

Gas City Tinplate Works, The Morewood Company, Gas City, Grant county. Built in 1892–3 and first put in operation in December, 1893; 16 gas heating furnaces, 8 hot mills, (containing 16 pairs of rolls,) and 10 pairs of cold rolls; product, black plates for tin and terne plates; annual capacity, 12,400 gross tons. Fuel used, natural gas. J. H. Rogers, President; H. C. Bond, Vice-President; C. M. Stuart, Secretary; Louis Follet, Treasurer; C. Maliphant, Manager. All sales made by the company. *See Tinplate Works.*

Gould Steel Company, 66 Broadway, New York City. Works at Anderson, Madison county. Built in 1891–2 and first put in operation March 28, 1892; two 15-gross-ton acid open-hearth steel furnaces; product, steel castings; annual capacity, 9,000 gross tons. Fuel used, natural gas. (Formerly operated by the Anderson Steel Casting Company.) Charles A. Gould, President; Charles M. Gould, Vice-President; William E. Kurtz, Secretary and Manager; William A. Gould, Treasurer.

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 cut-nail machines; product, iron and steel cut nails; annual capacity, 150,000 kegs. Fuel used, natural gas. J. H. Moulden, Receiver. For sale.

Indiana Forge and Rolling Mill Company, Cincinnati, Ohio. Works at New Albany, Floyd county. Forge built in 1869; rolling mill added in October, 1887; one double puddling furnace, 8 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, forgings, and bar iron; annual capacity, 4,500 gross tons of axles, 350 tons of forgings, and 9,000 tons of bars. Fuel used, coal and producer gas. (Formerly called the New Albany Forge and Rolling Mill.) Herman Joseph, Manager. Owned by Joseph Joseph & Brother.

Indiana (The) 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; 22 single puddling furnaces, 5 heating furnaces, and 4 trains of rolls (one 3-high 20-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 fin-

ished products. Fuel used, natural gas. L. A. Cobb, President; George O. Cromwell, Vice-President and Treasurer; George M. Bard, Secretary; Charles Kennedy, Superintendent.

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 gas and producer gas. Jacob Christopher, President; J. E. McGettigan, Vice-President; W. R. Brown, Secretary; W. V. Martin, Treasurer. Idle since May, 1893.

Irondale (The) Steel and Iron Company, Middletown, Henry county. Chicago office, 1003 Rookery Building; Cleveland office, 508-9 Garfield Building. Built in 1893-4, utilizing machinery from the company's mill at Anderson, which was destroyed by fire on October 31, 1893; 6 pair and 6 plate heating furnaces and 4 trains of rolls (3 trains of 24-inch hot rolls, with 2 mills each, and one train of cold rolls, with 4 stands); product, black plates for tinning; annual capacity, 10,000 gross tons. Brand, "Crane." Fuel used, natural gas. George A. Laughlin, President, H. O. Crane, Secretary, and W. H. Cooke, Treasurer, Cleveland; L. B. Jackson, Vice-President and General Manager, Middletown. Selling agents, B. P. Crane & Co., Chicago. *See Tinplate Works.*

Lakeside Nail Company, lessee, 647 Rookery Building, Chicago. Works at Hammond, Lake county. Built in 1886-7; 4 gas heating furnaces, 2 trains of rolls, (24-inch slab and 22-inch nail plate,) and 202 cut-nail machines; product, cut nails; annual capacity, 600,000 kegs. Brand, "Lakeside." Fuel used, coal. George S. Griscom, President; W. Scott Bonnell, Vice-President; T. F. Woodman, General Manager and Treasurer; Stephen Ripley, Superintendent. (Works are owned by the Chicago Steel Manufacturing Company. These works contain two 3-gross-ton Bessemer steel converters, which are idle; first blow made November 22, 1887. Formerly called the East Chicago Steel Works.)

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 25-gross-ton and one 35-gross-ton acid open-hearth steel furnace, 5 pair furnaces, 5 sheet furnaces, 6 annealing furnaces, 6 soaking pits, one 30-inch reversing blooming mill, one 3-high bar mill, and 10 stands of rolls (five 24-

inch and two 22-inch hot and three 22-inch cold); product, ingots, blooms, billets, slabs, sheet and tinplate bars, and stamping and tinning sheets; annual capacity, 30,000 gross tons of ingots, billets, and sheet and tinplate bars, and 12,000 tons of sheets and plates. Fuel used, natural gas exclusively. Contemplates erecting a 35-gross-ton acid open-hearth steel furnace in the spring of 1896. R. J. Beatty, President; John A. McVoy, Vice-President; J. R. Wick, Secretary; J. G. Battelle, Treasurer; J. J. Thomas, Superintendent. Selling agents, John H. Heimbuecher, St. Louis; James W. Ross, Chicago.

Montpelier (The) Sheet and Tin Plate Company, Columbus, Ohio. Works at Montpelier, Blackford county. Built in 1894 and first put in operation in May, 1895; 4 heating furnaces, 2 annealing furnaces, and 4 hot and 4 cold mills; product, black plates for tinning; annual capacity, 9,000 gross tons. Fuel used, natural gas. John B. Neil, President; Charles A. Ford, Vice-President; Charles Slavens, Secretary; T. R. Neil, Treasurer; Harry Herbert, Superintendent. Selling agents, Neil, Fahrion & Co., Columbus. *See Tinplate Works.*

Muncie (The) Iron and Steel Company, Muncie, Delaware county. Built in 1893 and first put in operation in April, 1894; 4 single puddling furnaces, 2 heating furnaces, and 3 trains of rolls (one 20-inch muck, one 12-inch breaking down, and one 10-inch finishing); product, hoop, band, and bar iron; annual capacity, 8,000 gross tons. Fuel used, natural gas exclusively. J. C. Griesheimer, President; Richard McGauley, Vice-President; Edward Tuhey, Secretary and Treasurer.

National (The) Tin Plate Company, Anderson, Madison county. Built in 1894–5 and first put in operation August 1, 1895; 6 double heating furnaces, 2 annealing furnaces, and 12 trains of rolls (6 hot and 6 cold); product, black plates for tinning; annual capacity, 13,000 gross tons. Fuel used, natural gas. Philip Matter, President; Joseph I. Irwin, Vice-President; W. H. Donner, Secretary, Treasurer, and Manager. *See Tinplate Works.*

Ohio Falls Iron Works, New Albany, Floyd county. Built in 1866; 14 single puddling furnaces, one scrap furnace, 5 heating furnaces, and 4 trains of rolls (8 and 10-inch guide, 16-inch bar, and 18-inch muck); product, bridge, bar, plow, and staybolt iron; annual capacity, single turn, 18,000 gross tons. Fuel used, coal. Newland 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; annual ca-

pacity, 100 gross tons. Fuel used, coke. James Oliver, President; George Ford, Secretary; J. D. Oliver, Treasurer.

Potter and Hollis Foundry Company, Rookery Building, Chicago. Works at East Chicago, Lake county. One 1,000-lb. standard Bessemer converter, to manufacture steel by the Walrand-Legenisel process, erected in 1895; first steel made October 14, 1895; product, miscellaneous steel castings; annual capacity, 1,350 gross tons. Contemplates erecting an additional converter. E. C. Potter, President; H. L. Hollis, Vice-President.

Premier Steel Company, Indianapolis, Marion county. Built in 1857, 1881–2, 1886–7, and remodeled by the 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. Idle since May, 1893.

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 puddling furnaces, 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, bars, bands, horseshoe and refined iron, and light T rails; annual capacity, 18,000 gross tons. Fuel used, block coal. Works also contain 64 cut-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.

Union Steel Company, 415 Locust st., St. Louis, Mo. Works at Alexandria, Madison county. Built in 1893–5, using part of machinery formerly operated by the New Albany Rail Mill, at New Albany, Indiana, and the Valley Steel Company, at Belleville, Ill.; first put in operation in July, 1895; 20 double puddling furnaces, 8 forge fires, 6 bar heating furnaces, 4 sheet heating furnaces, 4 pair furnaces, 2 double annealing furnaces, 2 soaking pits, and 7 trains of rolls (one 20-inch muck, one 21-inch bar, one 8, one 9, and one 12-inch guide, one 24-inch sheet with 4 finishing stands, and one 32-inch bloom-

ing); product, muck bar, bar iron and steel, railroad splices, sheet iron and steel, billets, ingots, small rails, shapes, etc.; annual capacity, 250,000 gross tons. The Bessemer steel department contains two 5-gross-ton converters, removed from the Valley Steel Company's plant at Belleville, Ill., in 1895; expects to make steel early in 1896; product, Bessemer steel ingots; annual capacity, 150,000 gross tons. Fuel used, natural gas in all departments. Charles A. McNair, President, T. A. Meysenburg, Vice-President, and F. W. Oliver, Secretary and Treasurer, St. Louis; Albert Trinler, Manager, Alexandria. Selling agents, B. S. Adams, St. Louis; H. H. Combs, Chicago and Cincinnati.

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-inch guide, 18-inch bar, and 20-inch muck); product, bars, bands, horseshoe bar, light T rails, etc.; 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 and band iron; annual capacity, 18,000 gross tons. Fuel used, natural gas. A. L. Wetherald, President; A. D. Hilborn, Secretary and Treasurer; H. O. Wetherald, Manager.

Wright Shovel Company, Anderson, Madison county. Built in 1891 and first put in operation January 1, 1892; 10 heating furnaces and two 18-inch trains of sheet rolls; product, sheets for shovels, spades, and scoops; annual capacity, 1,800 gross tons. Shovel works have 3 forge fires and 3 heating furnaces. Fuel used, natural gas exclusively. Thomas W. Wright, President; W. J. Alford, Secretary and Treasurer.

Number of rolling mills and steel works in Indiana: 33 completed and 1 building. Of these 3 have Bessemer steel plants, 1 makes Walrand-Legenisel steel, 3 have open-hearth steel plants and 1 open-hearth steel plant is being erected, 1 makes crucible steel, and 1 has a plant for the manufacture of special steel.

ILLINOIS.

American Steel Foundry Company, Wells Building, St. Louis. Works at Granite City, Madison county. Three modified Siemens 10-gross-ton basic open-hearth steel furnaces erected in 1894; first steel made in November, 1894; product, railway and other large castings; annual capacity, 20,000 gross tons. Fuel used, producer gas. Rolla Wells, President; Edward F. Goltra, Vice-President and Manager; L. J. Hayward, Secretary and Treasurer; J. W. Robinson, Selling Agent.

Calumet Works, Calumet Iron and Steel Company, 1233 Monadnock Building, Chicago. Works at South Chicago, 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 20-inch muck, and one 9, one 14, and one 22-inch,) one 6-ton hammer, and 132 cut-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; F. S. Wheeler, Secretary; C. H. Wilcox, Assistant Treasurer.

Chicago Splice Bar Mill, Sellers Manufacturing Company, Chicago. Office and works, Chicago ave. and the Chicago river. Built in 1878; one forge fire, 2 heating furnaces, and one 15-inch train of rolls; product, "Samson" splice bars; annual capacity, 11,000 gross tons. Fuel used, block coal. Morris Sellers, President; P. J. Gerahty, Secretary and Treasurer; D. H. Lentz, Superintendent.

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.

Granite City Steel Company, corner Cass ave. and Second st., St. Louis. Works at Granite City, Madison county. Built in 1895; two 25-gross-ton Siemens basic open-hearth steel furnaces; first steel made August 30, 1895; product, steel ingots; annual capacity, 25,000 gross tons. Rolling mill contains two 4-hole soaking pits, 4 Lauth heating furnaces, and 4 trains of rolls (one 34-inch blooming, one 14-inch 3-high bar, one 78 x 28-inch plate, with 2-high roughing and 3-high finishing rolls, and one 50-inch sheet); product, billets, slabs, sheet bars, and plates and sheets; annual capacity, 20,000 gross tons. Fuel used, bituminous coal and producer gas. Contemplates erecting two additional 25-gross-ton Siemens open-hearth steel furnaces—one acid and one basic. William F. Niedringhaus, President; F. G. Niedringhaus, Vice-President; Alex. Niedringhaus, Secretary; Albert W. Niedringhaus, Treasurer; G. L. Luetscher, General Superintendent.

Hartmann, Hay & Reis, Belleville, St. Clair county. Built in 1885–6; 2 gas heating furnaces, 1 coal heating furnace, one 22-inch train of rolls, and 62 cut-nail machines; product, cut nails; annual capacity, 75,000 kegs. Fuel used, bituminous coal. (Formerly called the LeClaire Nail Works.) E. E. Wangelin, Manager.

Illinois Steel Company, Rookery Building, Chicago. New York office, 46 Wall st. Four plants in Illinois—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 tons of rails, and 45,000 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, and one 3-high 40-inch blooming and two 3-high finishing trains of rolls; first blow made June 14, 1882; product, Bessemer steel ingots, rails, and billets; annual capacity, 432,000 gross tons of ingots and 360,000 tons of rails. Open-hearth steel department added in 1894–5; first steel made February 11, 1895; four 20-gross-ton Siemens and two 30-gross-ton Wellman rolling furnaces; uses both the acid and basic process; one plate train, with 2 stands of rolls, 34 x 90 and 34 x 132 inches, and 4 gas heating furnaces; product, boiler, ship, and tank plate, and billets and structural steel; annual capacity, 75,000 gross tons of open-hearth ingots and 50,000 tons of finished products. Building four additional 50-gross-ton open-hearth steel furnaces. Joliet Works, located at Joliet, Will county, built in 1870; two 9-gross-ton Bessemer steel converters; first blow made January 26, 1873, and first steel rail

rolled March 15, 1873; annual capacity, 360,000 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, 300,000 gross tons of rails or billets. The wire-rod mill, built in 1888, contains one Garrett mill with three gas furnaces; another rod mill, with 4 gas furnaces, added in 1895; annual capacity, 75,000 gross tons. Spike mill, built in 1895, contains machinery for the production of railroad supplies, including spikes, bolts, nuts, washers, etc.; annual capacity, 30,000 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, one gas bloom and 4 gas ingot heating furnaces, and one 3-high 25-inch rail train; product, Bessemer steel rails and billets; annual capacity, 325,000 gross tons of ingots and 270,000 tons of rails or billets. Fuel used, coal and oil at the North, South, and Joliet Works; oil at the Union Works. Jay C. Morse, Chairman of the Board; John W. Gates, President; W. R. Stirling, 1st Vice-President; Robert Forsyth, 2d Vice-President; the above four officers, with Norman Williams, of Chicago, constitute the Executive Committee; H. A. Gray, Secretary and Treasurer; W. A. Green, Assistant Secretary; W. R. Walker, General Manager; 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 R. Isham, Chief Clerk; South Works, E. A. S. Clarke, General Superintendent, D. S. Mathias, Superintendent, and Charles F. Abbott, Auditor; Union Works, J. C. Walker, Superintendent, and C. H. Hosler, Auditor; Joliet Works, Charles Pettigrew, Manager, W. C. Catlin, Superintendent, and J. F. Wilson, Auditor. *See Rolling Mills in Indiana and Wisconsin. See Furnaces in Illinois and 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 3 hammers; product, bars, angles, tees, channels, agricultural shapes, harrow teeth, plow beams, cultivator attachments, and light T rails; 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, coal and coke in heating furnaces and bituminous coal under boilers. J. E. Porter, President, Ottawa, Ill.; G. H. Jones, Vice-President, J. H. Porter, Secretary, and P. D. Block, Treasurer, Chicago Heights.

Joliet Sheet Mill, Great Western Tin Plate Company, 1233 Monadnock Building, Chicago. Works at Joliet, Will county. Built in 1891–2 and first put in operation May 1, 1892; 3 double heating furnaces, one annealing furnace, and 6 trains of rolls (one 22 x 38-inch and two 24 x 28-inch hot and three 24 x 28-inch cold); product, black plates for tinning; annual capacity, 6,000 gross tons. Fuel used, coal and coke. (Formerly operated by the Joliet Sheet Rolling Mill Company.) C. H. Wilcox, President; F. S. Wheeler, Vice-President and Treasurer; J. D. Lewis, Secretary; N. D. Lewis, Manager. *See Tinplate Works.*

Melrose Park Works, Latrobe Steel Company, Old Colony Building, Chicago. Philadelphia office, Girard Building. Works at Melrose Park, 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 10 and one 12-gross-ton open-hearth furnace; first steel made in February, 1885. Product, tires, castings, automatic steel car couplers, and elliptic and spiral springs; annual capacity, 13,000 gross tons. Fuel used, coal and petroleum. (Formerly operated by the Chicago Tire and Spring Company.) C. H. Ferry, Manager. *See Rolling Mills and Steel Works in Western Pennsylvania.*

Norton Brothers, 813 Masonic Temple, Chicago. Works at Maywood, Cook county. One 6-gross-ton open-hearth steel furnace and the buildings for a rolling mill erected in 1890–1; experimenting with fluid-metal rolling machinery for the production of steel sheets for tinning. Oliver W. Norton, President; Edwin Norton, Vice-President; W. L. Gifford, Secretary; O. P. Swift, Treasurer. *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, 5,000 gross tons. Brand, "Phœnix." Fuel used, petroleum. Charles W. Miller, President; E. H. Miller, Secretary and 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; George Amerman, Vice-President; E. L. Henning, Secretary; W. M. Foster, Treasurer. Idle and for sale or lease.

Pullman Iron and Steel Company, Pullman, Cook county. Chicago office in Pullman Building. Built in 1883–4; 2 forge fires, 3 Swindell gas heating furnaces, 2 coal heating furnaces, and 3 trains of rolls (8-inch, 10-inch, 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 tons of muck bar. Fuel used, coal. John S. Runnels, President; A. S. Weinsheimer, Secretary and 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, 675 Old Colony Building, Chicago. Branch offices: 209 Security Building, St. Louis; 130 Endicott Arcade, St. Paul. 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. Selling agents, Parker & Topping, Portland, Oregon; American Foundry Company, Tacoma, Washington.

Springfield Iron Company's Iron and Steel Works, The Springfield Iron Company, Springfield. Chicago office, Monadnock Building; St. Louis office, Union Trust 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.

Sylvan Steel Company, Moline, Rock Island county. Built in 1894 and first put in operation in December, 1894; 2 large gas busheling furnaces, 5 gas heating furnaces, one coal heating furnace, 2 forge fires, and 5 trains of rolls (one 19 x 48-inch 3-high, and one 8, one 12, and two 16-inch); product, bars, guides, plates, and all kinds of agricultural shapes; annual capacity, 25,000 gross tons. Fuel used, producer gas. Contemplates erecting one 25-gross-ton Siemens open-hearth steel furnace in 1896. G. Watson French, President; Nathaniel French, Vice-President; Thomas B. Carson, Secretary; Stewart Harper, Treasurer; George H. Tatnal, Manager.

Tudor Iron Works, 415 Locust st., St. Louis, Mo. Works at East St. Louis, St. Clair county, Ill. Put in operation in January, 1873; one double and 2 single puddling furnaces, 4 scrap furnaces, 10 heating furnaces, 10 Siemens gas producers, 6 trains of rolls, and 10 automatic and 8 hand spike 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. Built in 1882 and remodeled in 1885–6; one coal and 2 gas heating furnaces, one 23½-inch slabbing train, one 3-high 21-inch nail-plate train, and 85 cut-nail machines; product, steel nails and large flats; annual capacity, 200,000 kegs of nails. Fuel used, bituminous coal. (Two 3-gross-ton Clapp-Griffiths converters formerly in works described above removed and some of the machinery utilized in completing the plant of the Union Steel Company, at Alexandria, Indiana. Works built in 1869–70, containing two 4-gross-ton Bessemer steel converters and several trains

of rolls also abandoned; machinery also removed to Alexandria, Indiana, and utilized by the Union Steel Company in equipping its works at that place.) Charles A. McNair, President; T. A. Meysenburg, Vice-President; F. W. Oliver, Secretary and Treasurer; B. S. Adams, Selling Agent.

Waukegan Works, Washburn and Moen Manufacturing Company, Waukegan, Lake county. Main office, Worcester, Mass.; Chicago office, 107 Lake st. Built in 1891; 6 heating furnaces for 4-inch steel wire billets, one heating furnace for 1½-inch steel billets, and one wire-rod rolling mill for steel or copper, consisting of one 15-inch, two 12-inch, and two 11-inch trains of rolls; product, wire rods and wire; annual capacity, 100,000 gross tons. Fuel used, coal and coke. The works also produce all kinds of coarse steel and copper wire, galvanized wire, bale ties, barb fencing, staples, etc. *See Rolling Mills and Steel Works in Massachusetts for a list of officers and selling agents.*

Western Tube Company, (formerly Haxtun Steam Heater Company,) Kewanee, Henry county. Built in 1883 and put in operation in November, 1883; 5 double busheling furnaces, one squeezer, 5 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, 40,000 gross tons. Fuel used, coal and producer gas. The company manufactures everything, except boilers, used in the construction of steam heating apparatus for all kinds of buildings. J. H. Pierce, President; J. C. Williams, Vice-President; A. M. Hewlett, Secretary; C. E. McCullough, Treasurer.

Number of rolling mills and steel works in Illinois: 27. Of these 5 make Bessemer steel, 1 makes Robert-Bessemer steel, 7 have open-hearth steel plants and 1 open-hearth steel plant is projected, and 1 makes crucible steel.

MICHIGAN.

American Bell Foundry Company, Northville, Wayne county. Built in 1895; one furnace for the production of special steel; product, cast steel bells. Fuel used, coke. F. R. Beal, President; E. K. Simonds, Vice-President; Charles Booth, Secretary; L. A. Beal, Treasurer; R. F. Diserens, Manager.

Detroit Steel and Spring Works, The Detroit Steel and Spring Company, Michigan and Hubbard avenues, Detroit. First put in operation in May, 1882; 11 large and 20 small oil heating furnaces, 3 trains of rolls, (9, 12, 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. Fuel used, producer gas, petroleum, and coal. Brand, the letter "D" in a triangle. (Robert-Bessemer plant first operated under the name of the Michigan Steel Works.) T. H. Newberry, President and Treasurer; Dewitt Loomis, Vice-President and General Manager; Allen W. Atterbury, Secretary; J. S. Newberry, Assistant Manager.

Eureka Iron and Steel Works, Wyandotte, Wayne county. Built in 1855; partly destroyed by fire in 1895; 6 double and 2 single puddling furnaces, 6 forge fires, 8 heating furnaces, 5 trains of rolls, (8, 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 tons of bars. Fuel used, oil and producer gas. (Formerly called Wyandotte Rolling Mills.) George Hendrie, President, and Fred. T. Sibley, Secretary, Detroit; W. Van Miller, Treasurer, and J. S. Van Alstyne, Agent, Wyandotte. Idle and for sale. *See Furnaces.*

Michigan-Peninsular Car Company, (successor to the Michigan Forge and Iron Company,) Detroit, Wayne county. Office, Newberry Building. Forge originally built in 1870 and rolling mill in 1877; destroyed by fire in November, 1892, and immediately rebuilt; 13 heating furnaces, 5 hammers, and 3 trains of rolls (9, 16, and 20-inch); product, bar iron, car axles, links and pins, and miscellaneous forgings; annual capacity, 35,000 gross tons of bar iron, 45,000 car axles, and 5,000 tons of forgings. Fuel used, coal. A cast-iron pipe foundry, two foundries for manufacturing car and other iron castings, two foundries for making car wheels, and car works having a daily capacity of from 75 to 100 freight cars are also operated by the company. James McMillan, Chairman of the Board; F. J. Hecker, President; Charles L. Freer and W. C. McMillan, Managing Directors; S. S. Delano, Treasurer; Joseph Taylor, Secretary; W. J. McBride, Auditor.

Muskegon Iron and Steel Works, Muskegon, Muskegon county. Rolling mill built and put in operation in 1890; 4 scrap furnaces and three 3-high trains of rolls (one 18-inch bar and billet, one 12-inch, and one 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. Charles H. Hackley, owner, Muskegon. Idle and for sale.

Number of rolling mills and steel works in Michigan: 5. Of these 1 makes both Robert-Bessemer and crucible steel, 1 has an open-hearth steel plant, and 1 makes special steel.

WISCONSIN.

Dutcher (The J. A. and P. E.) Company, Milwaukee, Milwaukee county. Six 6-pot Noble's liquid fuel crucible steel-melting furnaces; product, chiefly bicycle and machinery castings; annual capacity, 1,150 gross tons.

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 2 trains of rolls (one 9 and one 16-inch); product, horseshoes, mule shoes, and bar iron; annual capacity, 8,000 gross tons of bar iron or 120,000 kegs of horseshoes. Fuel used, coal and petroleum. George B. Van Norman, President; C. P. Button, Vice-President; L. A. McElroy, Secretary; J. McAlpine, Treasurer.

Milwaukee Works, Illinois Steel Company, Rookery Building, Chicago. Works at Bay View, Milwaukee, built in 1868 and 1874; cut-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 tons of fish-plates, etc. (Cut-nail machines sold in 1891.) Fuel used, coal and oil. Officers at Milwaukee: George L. Reis, Superintendent; J. H. Price, Auditor. *See Rolling Mills and Steel Works in Indiana and Illinois. See Furnaces in Illinois and Wisconsin.*

Shaw (Louis V.) & Co., 128 South Bay st., Milwaukee, Milwaukee county. Three 1-pot crucible steel-melting furnaces erected in 1894; first crucible steel made November 27, 1894; product, steel castings; daily capacity, 600 pounds. Adding two oil crucible steel-melting furnaces of 6 pots each, with a daily capacity of 3 gross tons. J. I. Hickman, President; L. V. Shaw, Secretary; Solomon Shaw, Treasurer.

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 tons of rolled material. Fuel used, producer gas and coal. Robert Kelly, Receiver.

Number of rolling mills and steel works in Wisconsin: 5. Of these 1 has a Bessemer steel plant and 2 make crucible steel.

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 tons of forgings. Fuel used, coal. Large car-building shops and foundry form part of the works. O. H. Simonds, Receiver; George Rupley, Manager; R. L. Ettinger, Superintendent.

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. One 25-gross-ton open-hearth steel furnace erected in 1895; first steel made in June, 1895; annual capacity, 15,000 gross tons of ingots. Building another 25-gross-ton open-hearth steel furnace and about to add a 30-inch slabbing train of rolls. Product, structural steel; annual capacity, 35,000 gross tons. Fuel used, coal. R. T. McCabe, President, and W. R. Heath, Secretary and Treasurer, New York; James E. York, Vice-President and General Manager, Duluth; Henry Grey, General Superintendent, Ironton.

Minneapolis (The) Rolling Mills, Temple Court, Minneapolis. Works at Columbia Heights, Hennepin county. Built in 1894–5; 4 gas heating furnaces, 2 gas puddling furnaces, 2 gas busheling furnaces, one squeezer, and 3 trains of rolls (18-inch muck and 9 and 12-inch bar); bolt works connected with the plant have 4 forge fires; product, bar iron, nuts and bolts, and general forgings; annual capacity, 30,000 gross tons of bar iron. Fuel used, producer gas and coal. 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: 3. Of these 1 makes open-hearth steel.

MISSOURI.

Clinton Rolling Mill and Iron Company, J. A. & C. H. Weber, proprietors, Clinton, Henry county. Built in 1892; one heating furnace, one steam hammer, and 2 trains of rolls (one 9 and one 12-inch); product, high-grade horseshoe bar and refined and common bar iron; annual capacity, 4,000 gross tons.

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 sheets, and black plates for tin and terne plates; annual capacity, 16,500 gross tons. Fuel used, coal. 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 heat-

ing 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. Fuel used, coal. James Green, President; George R. Blackford, 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 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; product, 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 tons of bar iron. Fuel used, coal. G. C. McDonald, President; C. L. McDonald, Secretary and Treasurer.

Shickle, Harrison, and Howard Iron Company, Twelfth st., near Choteau ave., St. Louis. Built in 1892; one 7-gross-ton and one 8-gross-ton basic open-hearth steel furnace; first steel made in September, 1892; product, car couplers, car bolsters, and general railway and machine castings; annual capacity, 9,000 gross tons. Fuel used, producer gas. John W. Harrison, President; Thomas M. Gallagher, Vice-President and General Superintendent; John M. Harrison, Secretary and Treasurer.

Union Steel and Iron Company, St. Joseph, Buchanan county. Built in 1889; one large gas heating furnace, 3 trains of rolls, (one 3-high 10 inch, one 3-high 18-inch, and one 3-high 20-inch,) 50 cut-nail machines, (idle,) and one steam hammer; product, merchant iron and steel, steel nails, railroad car axles, link pins, etc.; annual capacity, 200,000 kegs of nails and 9,000 gross tons of rolled iron and steel. Fuel used, producer gas and coal. Began in 1889 the erection of two 3-gross-ton Robert-Bessemer steel converters; not completed; work suspended. George T. Walker, Vice-President and General Manager.

Number of rolling mills and steel works in Missouri: 7. Of these 1 makes open-hearth steel and 1 has a partly-built Robert-Bessemer steel plant.

IOWA.

Damascus Steel Company, Des Moines, Polk county. Began in 1893 to experiment in the manufacture by the "Dawson" process of soft crucible steel castings from refined wrought iron; company reorganized in 1895. William Connor, President; George G. Sherman, Vice-President; George M. Chappel, Secretary; J. H. Kern, Treasurer; S. R. Dawson, Superintendent of Laboratory.

Williams Rolling Mill Company, I. W. Bollinger, 10-20 West Water st., Chicago. Works at 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. Fuel used, coal.

Number of rolling mills and steel works in Iowa: 2. Of these 1 has an experimental crucible steel plant.

KANSAS.

Kansas City Steel and Iron Works, H. M. Wooster, Receiver, Kansas City, Kansas. Works at Argentine, Wyandotte county. Built in 1895; one 18-pot crucible steel-melting furnace; first steel made in June, 1895; product, fine crucible steel castings; annual capacity, 1,250 gross tons. Fuel used, producer gas. (Formerly operated by R. Seeburger, of Des Moines, Iowa.) To be sold in March, 1896.

Number of steel works in Kansas: 1 crucible plant.

COLORADO.

Colorado Fuel and Iron Company, Pueblo. Principal office, Boston Building, Denver; New York office, 18 Broadway; Chicago office, Rookery Building. Works at Bessemer, near Pueblo, Pueblo county. 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, 3 pig iron and 2 spiegel melting cupolas, 2 gas-fired soaking pits, 2 Siemens bloom-heating furnaces, one 3-high 23-inch rail and one 3-high 35-inch blooming train, 5 scrap heating furnaces, one 12 and 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, 120,000 gross tons of steel rails, 50,000 tons of bar iron and steel, mine rails, and angle bars, and 80,000 kegs of railroad spikes, bolts, and nuts. Also operates a cast-iron pipe foundry with an annual capacity of 18,000 gross tons. Fuel used, coal and producer gas. (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, and C. H. Parmelee, Assistant Secretary and Assistant Treasurer. At Denver: Henry R. Wolcott, 1st Vice-President; J. A. Kebler, 2d Vice-President and General Manager; A. C. Cass, 3d Vice-President and General Sales Agent; John L. Jerome, Secretary and Treasurer; J. A. Writer, Auditor; M. S. Donnelly, Purchasing Agent. At Bessemer: T. W. Robinson, General Superintendent. *See Furnaces.*

Denver (The) Rolling Mills and Iron Company, Denver, Arapahoe county. Built in 1894; one coal-fired heating furnace and one 10-inch train of rolls; product, merchant bar iron, iron mine rails, spikes, nuts, and bolts; annual capacity, 1,000 gross tons. Fuel used, coal. (Formerly operated by the Queen City Scrap Iron Company.) A. Goodstein, President and Treasurer; I. Goodstein, Vice-President and Manager; A. Greinetz, Secretary; J. J. Fisher, Superintendent.

Number of rolling mills and steel works in Colorado: 2. Of these 1 makes Bessemer steel.

WYOMING.

Laramie Rolling Mills, The Laramie Rolling Mill Company, lessee, Laramie, Albany county. Built in 1874–5 and put in operation in April, 1875; 5 heating furnaces, 1 puddling furnace, 1 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, and coupling pins and railway forgings; annual capacity, 18,000 gross tons. Otto Gramm, Manager. Owned by the Union Pacific Railway Company.

Number of rolling mills in Wyoming: 1.

WASHINGTON.

Western Iron and Steel Company, Lakeview, Pierce county. Built in 1894, using machinery from the dismantled mill of the Holcomb-Brown Iron Company, of Burlington, Iowa; first put in operation May 1, 1895; 3 coal heating furnaces, 2 trains of rolls, (9 and 16-inch,) and one 60,000-lb. hammer; product, merchant bar iron; annual capacity, 24,000 gross tons. Fuel used, bituminous coal. M. T. Evans, President; P. M. Joyce, Vice-President; C. C. Beckwith, Secretary and Treasurer; W. W. Nevegold, Manager.

ROLLING MILL COMMENCED BUT NOT COMPLETED.

Pennsylvania Iron and Steel Company, Edmonds, Snohomish county. Commenced building a rolling mill in 1894 to contain 4 double puddling furnaces, 5 heating furnaces, and 3 trains of rolls (one 10-inch, one 24 x 48-inch, and one 20 x 72-inch); product to be plates, sheets, bars, and round and square iron and steel; estimated annual capacity, 10,000 gross tons. Fuel to be used, bituminous coal.

Buildings completed; machinery not yet in place; work temporarily suspended. William F. Jaxtheimer, President; Charles S. Wallace, Secretary and Manager; Francis Felton, Treasurer.

Number of rolling mills in Washington: 1 completed and 1 nearly completed on which work has been temporarily suspended.

OREGON.

Portland Rolling Mills, 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, 8,000 gross tons. Fuel used, bituminous coal. (Formerly operated by N. E. Ayer & Co.) W. B. Ayer, President; H. C. Jefferds, Secretary; N. E. Ayer, Treasurer and Manager.

Number of rolling mills in Oregon: 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, cor. Howard and Beale sts., San Francisco. Built in 1882; 4 coal heating furnaces, one 4-door 7 x 18 gas heating furnace, 4 trains of rolls, (one 8, one 10, and two 16-inch,) 13 cut-nail machines, and 4 wire-nail machines; product, bar iron, tack plate, tacks and fine lath and cut nails, and structural and agricultural shapes; annual capacity, 11,000 gross tons of finished iron. Brand, "Judson." H. E. Bothin, President and General Manager; W. J. Weatherly, Vice-President; John Gillson, Secretary; W. H. Christie, Assistant General Manager. Sales made from 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 put in operation August 27, 1894; 2 direct heating furnaces (one pair and one sheet furnace) and 4 trains of rolls (one 3-high 20 x 84-inch muck, one 3-high 22 x 60-inch plate, one 26 x 60-inch sheet roughing, and one 22 x 42-inch sheet finishing); product, iron and steel sheets and light plates; annual capacity, 7,000 gross tons. Brand, "Los Angeles Iron and Steel Co." Fuel used, petroleum. A galvanizing plant is being added to the works. A. S. Robbins, President, Henry L. Pinney, Vice-President, S. G. Chamberlain, Assistant Secretary and Treasurer, J. G. Chamberlain, Manager, and F. R. Harris, Superintendent, Los Angeles; W. B. Smith, Secretary, Denver, Colorado. Sales made from the Los Angeles office.

Pacific Iron and Nail Company, 132 Market 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, 1 muck-bar train, 1 nail-plate train, 1 hammer, 50 cut-nail machines, 22 wire-nail machines, and 20 barb-wire machines; product, wire nails, barb fence wire and market wire, iron cut nails, and steel cut nails from imported slabs; annual capacity, 200,000 kegs. Also makes nails of combined iron and steel. The company has a complete wire-drawing plant, with 22 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, The 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, 1 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, horseshoe 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 horseshoe works, which is operated in connection with this plant. Edward Coleman, President; W. P. Sullivan, Secretary; C. M. Keeney, General Manager; Patrick Noble, Superintendent.

Number of rolling mills and steel works in California: 5. Of these 1 makes open-hearth steel.

UNITED STATES.

Total number of rolling mills and steel works in the United States in January, 1896: 505 completed, 5 building, 7 partly completed but work suspended, and 2 projected. Of these 43 have Bessemer steel plants; 3 have Clapp-Griffiths steel plants; 3 have Robert-Bessemer steel plants and 1 Robert-Bessemer steel plant is partly built; 1 has a Walrand-Legenisel steel plant; 88 have open-hearth steel plants, 4 open-hearth steel plants are being built, and 6 open-hearth steel plants are projected; 45 have crucible steel plants; 9 have plants for making blister steel; and 7 have plants for making special steel.

ROLLING MILLS LONG INACTIVE OR WHICH HAVE RECENTLY BEEN ABANDONED.

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 long been abandoned will be found in the Directories for 1892 and 1894.

MASSACHUSETTS.

Washburn and Moen Manufacturing Company, Worcester, Worcester county. Grove Mill, or North Works, built in 1868; now produces wire only; rod train removed to the Quinsigamond Works.

Washburn Car-Wheel Company, Hartford, Conn. Works at Worcester, erected in 1864; product, crucible steel car-wheel tires used by the company; idle.

NEW YORK.

Gatling Ordnance Company, Buffalo, contemplated erecting at Gatling, Erie county, in 1894, works for the manufacture of heavy ordnance, structural steel, car-wheels, etc.; abandoned.

PENNSYLVANIA.

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; product, muck bar; idle for several years.

Rohrerstown Rolling Mill, Rohrerstown, Lancaster county. Enlarged in 1872 and 1890; product, muck bar; abandoned and dismantled.

Safe Harbor Rolling Mill, Safe Harbor, Lancaster county. Built in 1848; product, muck bar; abandoned.

VIRGINIA.

Buena Vista Steel Company, Buena Vista, Rockbridge county. Philadelphia office, Bullitt Building. Part of foundations built in 1891 for a steel plant and a 26-inch blooming mill; work suspended.

Glasgow Rolling Mill, C. R. Baird & Co., Bullitt Building, Philadelphia. 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; work suspended; machinery sold and project abandoned.

Richlands Iron Company, Richlands, Tazewell county. Philadelphia office, 333 Walnut st. Built in 1891; product, muck bar. Idle and for sale.

ALABAMA.

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.; product, merchant bar iron; abandoned; machinery being sold.

OHIO.

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; product, steel slabs, billets, and nails; a small part of the machinery removed to Columbus, Ohio, in 1894-5, and used by the company in erecting new works at that place.

Portsmouth Iron and Steel Works, Burgess Steel and Iron Works, Portsmouth, Scioto county. Built in 1832; iron products, plates, sheets, bars, hoops, railroad spikes, small T rails, splice bars, and bolts; steel products, boiler plate, spring steel, etc.; abandoned and dismantled.

Russia Mill, Joshua S. Ingalls & Co., Troy, Miami county. Experimental works started in 1886; began operations in 1889; one train of cold rolls; product, "Craig" polished sheet steel, similar to Russia sheet iron, made from purchased sheets; abandoned; machinery removed to Leechburg Iron Works, Leechburg, Pa.

INDIANA.

Emlyn (The) Steel and Tin Plate Company, Summitville, Madison county. Commenced building a rolling mill in 1893 for the manufacture of black plates for tinning; buildings partly erected; abandoned.

New Albany Rail Mill Company, New Albany, Floyd county. Built in 1864; product, T rails, (8 to 25 lbs.,) tram rails, street rails, bars, angles, fish-plates, spikes, washers, etc.; dismantled; machinery removed to Alexandria, and used in equipping the plant of the Union Steel Company.

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. Bessemer plant built in 1887-8; 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 Forge and Bolt Company, Fortieth st. and Stewart ave., Chicago. Built in 1888 and burned in December, 1888; rebuilt in 1889; product, light steel angles, tees, channels, etc.; abandoned for rolling mill purposes; machinery being sold.

Valley Steel Company, Belleville, St. Clair county. Office, American Central Building, St. Louis, Mo. Built in 1869–70 and remodeled in 1886–7; product, 12 to 40-lb. rails, billets, slabs, shafting, angles, channels, bars, flats, fish-plates, etc.; dismantled, and part of machinery used in equipping the plant of the Union Steel Company, at Alexandria, Ind.

MISSOURI.

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; product, steel slabs, blooms, billets, and rails. (Formerly called the Vulcan Works.) Idle and for sale.

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.

IOWA.

Holcomb-Brown Iron Company, Burlington, Des Moines county. Put in operation in 1885; enlarged in 1887; product, hammered merchant bar, heavy and light bands, car irons, horseshoe bar, staybolt iron, etc.; dismantled, and machinery used by the Western Iron and Steel Company in erecting a rolling mill at Lakeview, State of Washington.

COLORADO.

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; abandoned; property for sale.

Trinidad Rolling Mill, The Colorado Fuel and Iron Company, Denver. Works at Trinidad, Las Animas county. Built in 1888–9; product, merchant bar iron and steel, mine T rails, and railroad spikes; abandoned; part of machinery removed to company's works at Bessemer.

CALIFORNIA.

San Diego Iron and Steel Company contemplated erecting a plant at San Diego, in 1894, for making wrought iron by the Eames direct process; also a steel plant and rolling mill; abandoned.

STEEL WORKS RECENTLY ABANDONED.

A list of steel works which have long been abandoned will be found in the editions of the Directory for 1892 and 1894.

Alliance Works, The American Steel Casting Company, Thurlow, Pa. Works at Alliance, Stark county, Ohio. One small experimental Bessemer steel converter, built by The Solid Steel Company; abandoned.

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.

Atlanta Iron and Steel Castings Company, Atlanta, Fulton county, Ga. Built a furnace in 1891 for converting iron castings into steel by the Bates process; abandoned.

Buena Vista Steel Company, Buena Vista, Rockbridge county, Va. Part of foundations built in 1891 for a basic open-hearth steel plant of two 15-gross-ton furnaces; work suspended.

Centralia Iron and Steel Works, Centralia, Ill. One 2-gross-ton Bessemer steel converter built in 1887–8. Idle and for sale.

Chicago (The) Horse Shoe Company, East Chicago, Lake county, Indiana. Office, 1114 Ashland Block, Chicago. Built in 1888–9; one 1¼-gross-ton Robert-Bessemer steel converter; abandoned.

Chicago Steel Casting Company, Chicago, Ill. One 7-ton open-hearth steel furnace and one 8-pot crucible steel-melting furnace erected in 1892; burned in 1895; abandoned.

Drexel (The) Railway Supply Company, Rookery Building, Chicago, Ill. Works at East Chicago, Indiana. One 2-gross-ton Robert-Bessemer converter erected in 1894; product, steel castings; abandoned.

Emmens Metal Company, Youngwood, Westmoreland county, Pa. Built in 1891; two 4-pot crucible steel-melting furnaces; abandoned.

Eureka Cast Steel Company, Chester, Delaware county, Pa. Works at Lamokin, one mile south of Chester. Crucible steel plant built in 1885; three 4-pot steel-melting holes; abandoned in 1893.

Frankford Steel Company, Frankford, Philadelphia, Pa. Built in 1865; 20 two-pot crucible steel-melting holes; product, tool steel; dismantled.

Gatling Ordnance Company, Buffalo, contemplated erecting at Gatling, Erie county, N. Y., in 1894, an open-hearth steel plant; abandoned.

King (The) and Andrews Company, 218–22 North Union st., Chicago, Ill. Crucible steel plant added to an iron foundry in 1894; four 4-pot steel-melting holes; product, steel castings; abandoned.

Middleport Steel and Nail Works, The King, Gilbert, and Warner Company, Columbus, Ohio. Works at Middleport, Meigs county. Bessemer steel plant built in 1887; two 4-gross-ton converters; abandoned.

National Tube Works Company, McKeesport, Pa. One 18-gross-ton open-hearth steel furnace, built in 1886; abandoned in 1895.

New Castle Steel Casting Company, New Castle, Lawrence county, Pa. Crucible steel plant, with a capacity of 22 pots at each heat, built in 1891; product, steel castings. Idle.

Philadelphia Steel Works, Hallahan, Gross & Frank, Philadelphia, Pa. Built in 1890–1; five 2-pot crucible steel-melting holes; abandoned.

Pittsburgh Steel Casting Company, Twenty-sixth and Railroad sts., Pittsburgh, Pa. Bessemer steel plant containing one 10-gross-ton converter built in 1890; product, steel castings; abandoned in 1895.

Portsmouth Iron and Steel Works, Burgess Steel and Iron Works, Portsmouth, Scioto county, Ohio. Built in 1832; one 10-gross-ton open-hearth steel furnace added in 1879; rebuilt to a 25-ton furnace in 1891; product, boiler plate, spring steel, etc.; 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.

San Diego Iron and Steel Company, of San Diego, California, contemplated erecting a steel plant at San Diego in 1894; abandoned.

Sharon Works, The American Steel Casting Company, Thurlow, Pa. One 4-gross-ton Bessemer steel converter partly erected by the Sharon Steel Casting Company at Sharon, Pa., in 1891 for the manufacture of castings; work suspended; abandoned.

Springfield Steel Casting Foundry, The Lima Steel Casting Company, Lima, Ohio. Works at Springfield, Clark county. Built in 1892–3; one 6-gross-ton Galvin open-hearth steel furnace; dismantled.

Superior Steel Company, Carnegie, Allegheny county, Pa. Began building a crucible steel plant in 1894; never completed; abandoned.

Valley Steel Company, Belleville, St. Clair county, Illinois. Office, American Central Building, St. Louis, Mo. Two works: One plant built in 1869–70 and remodeled in 1886–7; two 4-gross-ton Bessemer steel converters; removed to Alexandria, Indiana. The other plant built in 1882 and remodeled in 1885–6; two 3-gross-ton Clapp-Griffiths steel converters; steel department abandoned; rolling mill machinery still in operation.

Washburn Car-Wheel Company, Hartford, Conn. Works at Worcester, Mass., erected in 1864; sixteen 4-pot crucible steel furnaces; idle.

BESSEMER STEEL WORKS.

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, the Robert-Bessemer process, and the Walrand-Legenisel 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 (THE) STEEL COMPANY, Troy. Three 15-ton basic converters.

PENNSYLVANIA—22.

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 7½-ton converters.

Birdsboro Nail Works, E. and G. Brooke Iron Company, Birdsboro. Two small converters; idle.

CAMBRIA IRON COMPANY, Harrison Building, Philadelphia. Works at Johnstown. Four 11½-ton converters.

CARNEGIE (THE) STEEL COMPANY, LIMITED, Carnegie Building, 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 (The) Iron and Steel Works, Uniontown. Two 5-ton converters; idle and for sale.

Hainsworth Steel Company, Pittsburgh. Two 5-ton converters.

Juniata Iron and Steel Works, Shoenberger Steel Company, Pittsburgh. Two 6-ton converters.

LACKAWANNA IRON AND STEEL COMPANY, Scranton. New York office, 52 Wall st. Two works at Scranton: 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; never put in operation.

Oliver Iron and Steel Company, Pittsburgh. Two 2-ton Clapp-Griffiths converters.

PENNSYLVANIA STEEL WORKS, The Pennsylvania Steel Company, Steelton. Office, Girard Building, Philadelphia; New York office, 2 Wall street; Boston office, 8 Oliver street. Two 7-ton and three 8-ton converters.

Pottstown Iron Company, Pottstown. Philadelphia office, 400 Chestnut st. Three 10-ton basic converters.

Shenango Valley Steel Company, New Castle. Two 8-ton converters.

Spang (The) Steel and Iron Company, Pittsburgh. Office and works, Etna. Two 3-ton Clapp-Griffiths converters.

Wellman Steel Company, Thurlow, Delaware county. Two 3-ton converters.

MARYLAND—1.

MARYLAND STEEL COMPANY, Girard Building, Philadelphia. New York office, 2 Wall st.; Boston office, 8 Oliver st. 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, in the city of Richmond. Two 3-ton converters. Idle since 1888.

WEST VIRGINIA—2.

Riverside Iron Works, Wheeling. Works at Benwood. Two 5-ton converters.

Wheeling Steel Works, Wheeling Steel and Iron Company, Wheeling. Works at Benwood. Two 6-ton converters.

KENTUCKY—1.

Ashland Steel Company, Ashland. Two 5½-ton converters.

TENNESSEE—1.

BUFFALO IRON COMPANY, Nashville. Works at Chattanooga. One 5-ton converter. Experimented with the basic process in 1891. Idle, and will not be operated by the present owners.

OHIO—7.

Bellaire Nail Works, Bellaire. Two 5-ton converters. Intend enlarging converters to 10 tons in 1896.

CLEVELAND ROLLING MILL COMPANY, Cleveland. Works chiefly located at Newburgh. Two 10-ton converters.

JOHNSON (THE) COMPANY, Lorain. Cleveland office, Cuyahoga Building. Two 12-ton converters.

Junction Iron and Steel Company, Mingo Junction. Principal office, Wheeling, W. Va. Two 5-ton converters.

King, (The) Gilbert, and Warner Company, Columbus. Two 4½-ton converters.

Ohio (The) Steel Company, Youngstown, Mahoning county. Two 10-ton converters.

Otis (The) Steel Company Limited, Cleveland. Two 5-ton converters.

INDIANA—4.

East Chicago Steel Works, Chicago Steel Manufacturing Company, Hammond. Two 3-ton converters. Idle.

Potter and Hollis Foundry Company, Rookery Building, Chicago. Works at East Chicago. One 1,000-lb. converter for manufacturing Walrand-Legenisel steel.

Premier Steel Company, Indianapolis. Two 4-ton basic converters. Idle since May, 1893.

Union Steel Company, 415 Locust st., St. Louis. Works at Alexandria. Two 5-ton converters.

ILLINOIS—6.

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. New York office, 46 Wall st. 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. Chicago office, Monadnock Building; St. Louis office, Union Trust Building. Two 5-ton converters.

MICHIGAN—1.

Detroit Steel and Spring Works, The 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. Works at Bessemer, near Pueblo. Two 5-ton converters.

UNITED STATES.

Total number of Bessemer steel works: 50 completed and 1 partly built. Of these 3 are Clapp-Griffiths plants with 5 converters, 3 are Robert-Bessemer plants with 5 converters and 1 Robert-Bessemer plant with 2 converters is partly built, and 1 is a Walrand-Legenisel plant with 1 converter. Total number of converters: 109 completed and 2 partly built.

OPEN-HEARTH STEEL WORKS.

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.

Tremont Nail Company, West Wareham. One 20-ton furnace.

Washburn and Moen Manufacturing Company, Worcester. One 12-ton and one 20-ton furnace; adding two 20-ton furnaces. Also operates under lease the 10-ton furnace of the Worcester Cycle Manufacturing Company.

Worcester Cycle Manufacturing Company, Worcester. One 4-ton and one 10-ton furnace. Product, steel castings. The 10-ton furnace is operated under lease by the Washburn and Moen Manufacturing Company, of Worcester.

NEW YORK—3 COMPLETED AND 1 BUILDING.

Buffalo Steel Foundry, Pratt and Letchworth Company, Buffalo. Two furnaces. Product, steel castings.

Elmira Rolling Mills, Elmira Iron and Steel Rolling Mill Company, Elmira. Building two 20-ton basic furnaces, to be completed early in 1896.

Johnson (Isaac G.) & Co., Spuyten Duyvil, New York City. One 8-ton furnace. Product, steel castings.

Syracuse Works, The American Steel Casting Company, Thurlow, Pa. Works at Geddes. Two 10-ton furnaces. Product, steel castings. *See Pennsylvania and Ohio.*

NEW JERSEY—4.

Newark Steel Works, The Benjamin Atha and Illingworth Company, Newark. One 7-ton and one 15-ton furnace.

New York Frog and Switch Company, Hoboken. One 7-ton furnace. Product, steel castings.

Passaic (The) Rolling Mill Company, Paterson. New York office, 45 Broadway. Three 20-ton furnaces—two acid and one basic.

Trenton Steel Company, Trenton. One 7-ton furnace. Idle.

PENNSYLVANIA—EASTERN DISTRICT—13 COMPLETED, 1 BUILDING, 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 completed, and two 40-ton furnaces building.

Brandywine Rolling Mills, Worth Brothers, Coatesville. Building two 35-ton furnaces—one acid and one basic.

Carpenter Steel Company, Reading. New York office, 1 Broadway. Contemplates erecting one 5-ton furnace in 1896.

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; Boston office, 8 Oliver st.; New York office, 29 Broadway. Four 30-ton acid furnaces completed and two 30-ton basic furnaces building.

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

Norristown Works, The American Steel Casting Company, Thurlow. Works at Earnest Station, Norristown. Two 15-ton furnaces. Product, ingots and castings. *See Thurlow and Sharon Works, in Pennsylvania; see New York and Ohio.*

Pencoyd Iron Works, A. and P. Roberts Company, 261 South Fourth st., Philadelphia. Works in Montgomery county, opposite Manayunk. Two 25-ton and six 30-ton furnaces.

Penn Steel Casting and Machine Company, Chester. Two 20-ton furnaces. Product, steel castings.

Phœnix Iron Company, 410 Walnut st., Philadelphia. Works at Phœnixville. Four 20-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. Two 20-ton furnaces.

Thurlow Works, The American Steel Casting Company, Thurlow. Branch offices: Havemeyer Building, New York; Western Union Building, Chicago; 23 Davis st., San Francisco. Two 8-ton and two 20-ton furnaces. Product, steel castings. *See Norristown and Sharon Works, in Pennsylvania; see New York and Ohio.*

Wellman Steel Company, Thurlow. Two 15-ton and two 20-ton furnaces.

PENNSYLVANIA—CENTRAL DISTRICT—3 COMPLETED AND 1 PROJECTED.

Lalance and Grosjean Manufacturing Company, Harrisburg. Main office, 19 Cliff st., New York; branch offices, Boston and Chicago. Contemplates erecting an open-hearth steel plant in 1896.

North Branch Steel Company, Danville. Philadelphia office, Twenty-fifth st. and Washington ave. One 15-ton furnace.

Pennsylvania Steel Works, The Pennsylvania Steel Company, Steelton. Office, Girard Building, Philadelphia; New York office, 2 Wall st.; Boston office, 8 Oliver st. One 5-ton, one 7-ton, two 15-ton, two 30-ton, and six 50-ton furnaces.

Standard (The) Steel Works, Harrison Building, Philadelphia. Works at Burnham, Mifflin county. Two 12-ton Wellman acid revolving furnaces.

PENNSYLVANIA—WESTERN DISTRICT—30 COMPLETED, 1 BUILDING, AND 1 PROJECTED.

Aliquippa Steel Works, Aliquippa Steel Company, 512 Times Building, Pittsburgh. Works at Aliquippa, Beaver county. One 15-ton basic furnace.

American Iron and Steel Works, Jones & Laughlins Limited, Pittsburgh. Two 40-ton basic furnaces.

Apollo Rolling Mills, Apollo Iron and Steel Company, Pittsburgh. Works at Apollo, Armstrong county. Two 20-ton furnaces. Also commenced in 1895 to erect an open-hearth steel plant at Vandergrift.

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 Company, Harrison Building, Philadelphia. Works at Johnstown. Three 20-ton Pernot furnaces and one 15-ton Krupp washer.

Carbon Steel Works, Carbon Steel Company, Thirty-second st., Pittsburgh. Two 15-ton and six 30-ton furnaces.

Fort Pitt Foundry, Mackintosh, Hemphill & Co., Pittsburgh. Two 12-ton furnaces. Product, steel castings.

Frankford Steel Company, Ellwood City. Contemplates erecting one 10-ton furnace in 1896.

Franklin Steel Casting Company, Franklin. Two 10-ton furnaces. Product, steel castings.

Homestead Steel Works, The Carnegie Steel Company, Limited, Carnegie Building, Pittsburgh. Works at Munhall. One 12-ton, six 20-ton, eight 25-ton, and five 35-ton furnaces.

Howe, Brown & Co. Limited, Penn ave. and Seventeenth st., Pittsburgh. One 20-ton and one 30-ton furnace.

Johnson (The) Company, Johnstown. Principal office, Lorain, Ohio. One 2-ton and one 7-ton furnace.

Juniata Iron and Steel Works, Shoenberger Steel Company, Pittsburgh. Two 12-ton furnaces.

La Belle Steel Works, La Belle Steel Company, Pittsburgh. Works in Allegheny. Two 15-ton furnaces.

Latrobe Steel Company, Latrobe. Main office, Girard Building, Philadelphia. Two 20-ton furnaces. Product used in making tires. *See Melrose Park Works, Illinois.*

Leechburg Iron Works, Kirkpatrick & Co. Limited, Leechburg. Branch office, Second National Bank Building, Pittsburgh. One 20-ton basic and one 30-ton acid 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. Branch office, 111 Water st., Pittsburgh. Two 20-ton furnaces.

Millvale Rolling Mill, Millvale Iron Company Limited, lessee, Bennett, Millvale borough, Allegheny county. Two 15-ton furnaces.

Pittsburgh (The) Separating and Casting Company, P. O. Box 276,

Pittsburgh. Works at West Bridgewater. One Swindell furnace. Product, steel castings. Idle.

Pittsburgh Steel and Iron Manufacturing Company, Pittsburgh. Two 15-ton furnaces.

Pittsburgh Steel Casting Company, Twenty-sixth and Railroad sts., Pittsburgh. Two 20-ton furnaces. Product, steel castings.

Pittsburgh Steel Works, Anderson, DuPuy & Co., 8 Wood st., Pittsburgh. Works at Chartiers. One 20-ton furnace.

Reliance Steel Casting Company Limited, Pittsburgh. One 5-ton furnace. Product, steel castings.

Sharon Works, The American Steel Casting Company, Thurlow. Works at Sharon. One 7-ton and one 15-ton furnace. Product, steel castings. *See Thurlow and Norristown Works, in Pennsylvania; see New York and Ohio.*

Singer, Nimick & Co., Incorporated, Pittsburgh. One 10-ton furnace.

Solar Steel Works, William Clark's Son & Co., Pittsburgh. Two 12-ton furnaces.

Spang (The) Steel and Iron Company, Pittsburgh. Office and works, Etna. One 30-ton and two 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.

DELAWARE—1.

Wilmington Malleable Iron Company, Wilmington. One 8-ton furnace. Product, malleable iron castings, but can make steel castings.

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, 4 completed and 3 partly built; designed to use the basic process.

TENNESSEE—1.

Buffalo Iron Company, Nashville. Works at Chattanooga. Two 10-ton furnaces designed to use the basic process. Idle, and will not be operated by the present owners.

ALABAMA—2 COMPLETED AND 2 PROJECTED.

Alabama Steel Works, The DeKalb Company, lessee, Fort Payne. Two 15-ton basic furnaces.

Bessemer Land and Improvement Company, Bessemer. Contemplates erecting an open-hearth steel plant in 1896.

Birmingham Rolling Mills, Birmingham Rolling Mill Company, Birmingham. Contemplates erecting an open-hearth steel plant.

Jefferson Steel Company, Birmingham. One 15-ton basic furnace.

OHIO—10.

Alliance Works, The American Steel Casting Company, Thurlow, Pa. Works at Alliance. One 6-ton and three 15-ton furnaces. Product, steel castings. *See New York and Pennsylvania.*

Burgess Steel and Iron Works, Portsmouth. One 8-ton and one 10-ton furnace.

Canton Steel Works, Canton Steel Company, Canton. General office, Twenty-first and Liberty streets, Pittsburgh, Pa. Two 10-ton furnaces.

Cleveland Rolling Mill Company, Cleveland. Works chiefly located at Newburgh. Two 15-ton furnaces.

Cleveland (The) Steel Casting Company, 14 Winter street, Cleveland. One 15-ton furnace. Product, steel castings.

Kellogg (The) Weldless Tube Company, Findlay. Eastern office, 45 Milk st., Boston. One 8-ton and one 12-ton basic furnace.

Lima (The) Locomotive and Machine Company, Lima. One 10-ton furnace. Product, steel castings.

Otis (The) Steel Company Limited, Cleveland. Seven 15-ton furnaces.

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 BUILDING.

Chicago Truck and Steel Castings Company, 1532 Monadnock Building, Chicago. Works at Montpelier. Building one 10-ton furnace. Product, to be steel castings.

Gould Steel Company, 66 Broadway, New York City. Works at Anderson. Two 15-ton furnaces. Product, steel castings.

Midland Steel Company, Muncie. One 25-ton and one 35-ton furnace. Contemplates building one 35-ton furnace in the spring of 1896.

Premier Steel Company, Indianapolis. Two 15-ton furnaces. Idle since May, 1893.

ILLINOIS—7 COMPLETED AND 1 PROJECTED.

American Steel Foundry Company, Wells Building, St. Louis. Works at Granite City. Three 10-ton basic furnaces. Product, steel castings.

Granite City Steel Company, cor. Cass ave. and Second street, St. Louis. Works at Granite City. Two 25-ton basic furnaces. Con-

templates erecting 2 additional 25-ton Siemens furnaces—one acid and one basic.

Illinois Steel Company, Rookery Building, Chicago. New York office, 46 Wall st. South Works, at South Chicago: Four 20-ton Siemens and two 30-ton Wellman rolling furnaces. Uses both the acid and basic process. Adding four 50-ton furnaces.

Melrose Park Works, Latrobe Steel Company, Old Colony Building, Chicago. Philadelphia office, Girard Building. Works at Melrose Park, Cook county. One 10-ton and one 12-ton furnace. Product, castings. *See Pennsylvania, Western District.*

Norton Brothers, 813 Masonic Temple, Chicago. Works at Maywood, Cook county. One 6-ton furnace.

Sargent (The) Company, 675 Old Colony Building, Chicago. Branch offices: 209 Security Building, St. Louis; 130 Endicott Arcade, St. Paul. 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. Chicago office, Monadnock Building; St. Louis office, Union Trust Building. Two 20-ton Siemens-Pernot furnaces and one Pernot furnace for dephosphorizing pig metal.

Sylvan Steel Company, Moline. Contemplates erecting one 25-ton Siemens furnace in 1896.

MICHIGAN—1.

Muskegon Iron and Steel Works, Muskegon. One 15-ton furnace. Idle and for sale.

MINNESOTA—1.

Ironton (The) Structural Steel Company, Lyceum Building, Duluth. Main office, 29 Broadway, New York. Works at Ironton. One 25-ton furnace completed and one in course of erection.

MISSOURI—1.

Shickle, Harrison, and Howard Iron Company, Twelfth st., near Choteau ave., St. Louis. One 7-ton and one 8-ton basic furnace. Product, general railway and machine castings.

CALIFORNIA—1.

Pacific (The) 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: 88 completed, 4 building, and 6 projected. Number of furnaces: 225 completed, 17 building, and 3 partly built.

CRUCIBLE STEEL WORKS.

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.

CONNECTICUT—3.

Collins Company, Collinsville. 52 pots. Product used by the company in its works in the manufacture of "Collins" edge tools, steel plows, etc.

Farist (The) Steel Company, Bridgeport. 24 pots.

Windsor Locks Steel Works, Farist & Windsor, Bridgeport. Works at Windsor Locks. 40 pots. Idle and for sale.

NEW YORK—4.

Chrome Steel Works, Brooklyn. Office and works, Kent ave. and Keap and Hooper sts. New York office, 11 Pine st. 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. Operated by the National Saw Company; general office, Newark, New Jersey. 96 pots. Product used in making saws.

Sanderson Brothers Steel Company, Syracuse. Branch house, 11-13 South Jefferson st., Chicago. 72 pots.

NEW JERSEY—6.

Benjamin (The) Atha and Illingworth Company, Newark. Two works: Newark Steel Works, at Newark; 60 pots. Harrison Works, at Harrison, 30 pots.

Harvey Steel Company, Brill's 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. 160 pots. Product, cast steel and railway car springs.

West Bergen Steel Works, Spaulding, Jennings & Co., Jersey City. 96 pots.

PENNSYLVANIA—21.

Aliquippa Steel Works, Aliquippa Steel Company, 512 Times Building, Pittsburgh. Works at Aliquippa. 60 pots.

Beaver Falls Steel Works, Beaver Falls. 24 pots.

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

Carpenter Steel Company, Reading. New York office, 1 Broadway. 144 pots.

Crescent Steel Works, Crescent Steel Company, 242-44 First ave., Pittsburgh. Works, Forty-ninth st. to Fifty-first st. 180 pots.

Cyclops Steel Works, Charles Burgess, Titusville, Crawford county. 36 pots.

Diamond Steel Company, Reading. 48 pots.

Fairmount Steel Works, Alexander Foster & Co., 2325 Spring Garden st., Philadelphia. 24 pots.

Howe, Brown & Co. Limited, Penn ave. and Seventeenth st., 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. Branch offices: Boston, Chicago, Louisville, New Orleans, and San Francisco. 102 pots. Product used in making saws, files, etc.

La Belle Steel Works, La Belle Steel Company, Pittsburgh. Works in Allegheny. 120 pots.

Midvale (The) Steel Company, Nicetown, Philadelphia. Declines to give information concerning its works.

Oxford Iron and Steel Works, William & Harvey Rowland Incorporated, Frankford, Philadelphia. 32 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, Pittsburgh and Lake Erie Railroad. 66 pots.

Pittsburgh Tool Steel Company, Ferguson Block, Pittsburgh. Works at Greensburg. 12 pots.

Reliance Steel Casting Company Limited, Pittsburgh. 24 pots. Product, steel castings.

Singer, Nimick & Co., Incorporated, 83 Water st., Pittsburgh.

Sterling Steel Company, Westinghouse Building, Pittsburgh. Works at Demmler. 48 pots.

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, 610-14 Boyce st., Chattanooga. 16 pots. Product, tool steel, forgings, and castings.

OHIO—2.

Burgess Steel and Iron Works, Portsmouth. 24 pots.

Crucible (The) Steel Casting Company, Canton. 24 pots. Product, steel castings.

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—1.

Sargent (The) Company, 675 Old Colony Building, Chicago. Branch offices: 209 Security Building, St. Louis; 130 Endicott Arcade, St. Paul. Works at Fifty-ninth and Wallace sts. 24 pots. Product, brake shoe inserts and general castings.

MICHIGAN—1.

Detroit Steel and Spring Works, The Detroit Steel and Spring Company, Michigan and Hubbard avenues, Detroit. 30 pots.

WISCONSIN—2.

Dutcher (The J. A. and P. E.) Company, Milwaukee. 36 pots. Product, chiefly bicycle and machinery castings.

Shaw (Louis V.) & Co., 128 South Bay st., Milwaukee. 3 pots. Adding two 6-pot furnaces. Product, steel castings.

IOWA—1.

Damascus Steel Company, Des Moines. One small experimental furnace.

KANSAS—1.

Kansas City Steel and Iron Works, H. M. Wooster, Receiver, Kansas City, Kansas. Works at Argentine. 18 pots. Product, fine steel castings. Idle and for sale.

UNITED STATES.

Total number of crucible steel works in the United States: 45. Number of pots which can be used at each heat in completed works, 3,094.

PLATE AND SHEET MILLS.

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 the plants named 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, Elmira Iron and Steel Rolling Mill Company, Elmira. Iron plates.

Monhagen Steel Works, Wheeler, Madden, and Clemson Manufacturing Company, Middletown. Operated by the National Saw Company; general office, 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 (The) Steel Company, Troy. Steel sheets.

NEW JERSEY—2 COMPLETED AND 1 BUILDING.

American Sheet Iron Company, Phillipsburg. Sales office, Havemeyer Building, New York. Iron and steel sheets and black plates, or sheets, for tinning.

Elizabeth Tin Plate Company, Dix Building, Elizabeth. Building. Will make black plates, or sheets, for tinning.

Passaic (The) Rolling Mill Company, Paterson. New York office, 45 Broadway. Iron and steel plates.

PENNSYLVANIA—EASTERN DISTRICT—25.

Bethlehem (The) Iron Company, South Bethlehem. Philadelphia office, 421 Chestnut st.; New York office, 80 Broadway. 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 and steel sheets.

Gibraltar Iron Works, Simon Seyfert, Reading. Iron plates.

Glasgow Iron Company, Pottstown. Philadelphia office, Bullitt Building. Iron and steel plates.

Keystone Iron Works Limited, Reading. Iron plates.

Keystone Saw, Tool, Steel, and File Works, Henry Disston & Sons, (incorporated,) Tacony, Philadelphia. Branch offices, Boston, Chicago, Louisville, New Orleans, and San Francisco. Steel sheets and saw and engravers' plates.

Laurel Iron Works, Laurel. Iron plates and sheets. Idle.

Lukens Iron and Steel Company, Coatesville. Philadelphia office, Bullitt Building; Boston office, 8 Oliver st.; New York office, 29 Broadway. Iron and steel plates.

McIlvain (William) & Sons, Reading. Iron and steel plates.

Oxford Iron and Steel Works, William & Harvey Rowland Incorporated, 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, 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. Philadelphia office, 400 Chestnut st. 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. Philadelphia office, Bullitt Building. Iron and steel plates.

Viaduct Iron Works, Coatesville Rolling Mill Company, Coatesville. Iron and steel plates and sheets.

Wellman Steel Company, Thurlow. Steel plates.

PENNSYLVANIA—CENTRAL DISTRICT—7.

Central Iron Works, Harrisburg. Iron and steel plates.

Lalance and Grosjean Manufacturing Company, Harrisburg. Main office, 19 Cliff st., New York City; branch offices, Boston and Chicago. Iron and steel sheets and black plates, or sheets, for tinning.

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 Works, The Pennsylvania Steel Company, Steelton. Office, Girard Building, Philadelphia; New York office, 2 Wall st.; Boston office, 8 Oliver st. Steel plates.

York Rolling Mill, Steacy and Denney Company, York. Iron plates.

PENNSYLVANIA—WESTERN DISTRICT—44 COMPLETED AND 2 BUILDING.

Aliquippa Steel Company, 512 Times 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. Will not manufacture iron after January 1, 1896.

Anchor Nail and Tack Works and Central Expanded Metal Company, Chess Brothers, Pittsburgh. Works at Rankin Station. Light steel plates for stamping and die work.

Apollo Iron and Steel Company, Pittsburgh. Works at Apollo, Armstrong county. Iron and steel sheets and black plates, or sheets, for tinning.

Arethusa Iron Works, George W. Johnson, New Castle. Iron and steel sheets.

Atlantic Iron and Steel Company, New Castle. Atlantic Works, at 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. Branch office, Germania Bank Building, Pittsburgh. Iron and steel sheets for stamping and tinning.

Carbon Steel Company, Pittsburgh. Steel plates and sheets.

Carnegie (The) Steel Company, Limited, Carnegie Building, Pittsburgh. Five works, three of which make steel armor and other plates.

Chartiers (The) Iron and Steel Company Limited, Iron Exchange,

Wood and Water sts., Pittsburgh. Works at Carnegie. Iron and steel sheets.

Clinton Rolling Mill, Clinton Iron and Steel Company, 208 Wood st., Pittsburgh. New York office, 15 Cortlandt st. Iron plates.

Connellsville Sheet Iron and Tin Plate Company, Connellsville. Building works at South Connellsville. Product to be black plates, or sheets, for tinning.

Ellwood Tin Plate Company, Perry-Payne Building, Cleveland, Ohio. Works at Ellwood City. Iron and steel sheets and black plates, or sheets, for tinning.

Howe, Brown & Co. Limited, Penn ave. and Seventeenth st., Pittsburgh. Steel plates and sheets.

Hyde Park Iron and Steel Company, Hyde Park. Soft steel sheets and roofing iron.

Juniata Iron and Steel Works, Shoenberger Steel Company, Pittsburgh. Steel plates and sheets.

Laufman (P. H.) & Co. Limited, Apollo. Pittsburgh office, Germania Bank Building. Two works: Iron and steel plates and sheets.

Leechburg Iron Works, Kirkpatrick & Co. Limited, Leechburg. Branch office, Second National Bank 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, both black and planished.

Millvale Rolling Mill, Millvale Iron Company Limited, lessee, Bennett, Millvale borough, Allegheny county. Iron and steel plates.

Monongahela Tin Plate Company, Pittsburgh. Black plates, or sheets, for tinning.

New Castle Steel and Tin Plate Company, (incorporated,) New Castle. Black plates, or sheets, for tinning, consumed in the company's tinplate works.

Ohio River Sheet Iron and Tinplate Company, Agnew. Building works at Remington Station, P., F. W., & C. R. R. Product to be sheet iron and black plates, or sheets, for tinning.

Pennsylvania Tin Plate Company, New Kensington. New York office, Temple Court. Steel sheets and black plates, or sheets, for tinning.

Pittsburgh Steel and Iron Manufacturing Company, Pittsburgh. Iron and steel plates and sheets.

Pittsburgh Steel Works, Anderson, DuPuy & Co., 8 Wood st., Pittsburgh. Works at Chartiers. Steel plates and sheets.

Pittsburgh Tin Plate Works, New Kensington. Soft stamping sheets and black plates, or sheets, for tinning.

Republic Iron Works Department of National Tube Works Company, Twenty-fifth st., South Side, Pittsburgh. Iron plates and sheets.

Sable Iron Works, Zug & Co. Limited, Pittsburgh. Iron and steel sheets.

Scottdale Iron and Steel Company Limited, Scottdale. Iron and steel sheets.

Sharon Iron Company Limited, Sharon. Iron and steel plates and sheets.

Singer, Nimick & Co., Incorporated, 83 Water st., Pittsburgh. Steel plates and sheets.

Sligo Rolling Mills, Phillips, Nimick & Co., Pittsburgh. Iron plates and sheets.

Spang (The) Steel and Iron Company, Pittsburgh. Office and works at Etna. Steel plates.

Star Tin Plate Company, Pittsburgh. Black plates, or sheets, for tinning.

United States Iron and Tin Plate Manufacturing Company, Demmler, (Eighth ward, McKeesport.) Branch office, 626 Liberty st., Pittsburgh. Iron and steel sheets and black plates, or sheets, for tinning.

Vesuvius Iron and Nail Works, Moorhead, Brother & Co., Incorporated, 1312-14 Carnegie Building, Pittsburgh. Works at Sharpsburg. Iron and steel plates.

West Penn Steel Works, Jennings Brothers & Co. Limited, Pittsburgh. Office, Preble ave., Allegheny. Rolling mill at Leechburg. Steel sheets, light plates, and cold-rolled plates for tinning.

Wheatland Iron Works, Wheatland. Iron plates. Idle and for sale.

DELAWARE—6.

Edge Moor Iron Company, Edge Moor. Philadelphia office, 1600 Hamilton st. Plate mill not in operation.

Marshallton Iron and Steel Company, Marshallton. Iron sheets.

Minquas Iron Works, McCullough Iron Company, Equitable Building, Wilmington. Iron and steel sheets. *See Maryland.*

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—6 COMPLETED AND 1 PARTLY ERECTED.

Baltimore (The) Iron, Steel, and Tinplate Company, Locust Point, Baltimore. Black plates, or sheets, for tinning.

Cumberland Rolling Mill, Baltimore and Ohio Railroad Company,

Cumberland. Main office, Mount Clare, Baltimore. Plate iron. Idle and for lease.

Cumberland Steel and Tin Plate Company, Cumberland. Black plates, or sheets, for tinning.

McCullough Iron Company, North East and Rowlandsville, Cecil county. Office, Equitable Building, Wilmington, Del. Two works in Cecil county. Iron sheets. *See Minquas Works, Delaware.*

South Baltimore Rolling Mill Company, 44 South st., Baltimore. Works at South Baltimore. Partly erected. Plates.

Stickney (The) Iron Company, 11 South Gay st., Baltimore. Works at Canton, a suburb of Baltimore. Black plates, or sheets, for tinning.

WEST VIRGINIA—4.

Crescent Iron Works, Whitaker Iron Company, Wheeling. Iron and steel sheets and black plates, or sheets, for tinning.

La Belle Iron Works, Wheeling. Black plates, or sheets, for tinning.

Riverside Iron Works, Wheeling. Steel plates.

Top Mill, Wheeling Steel and Iron Company, Wheeling. Iron and steel sheets.

KENTUCKY—5.

American Iron and Bolt Company, Newport. 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; also black plates, or sheets, for tinning for their own use.

Mitchell, Tranter & Co., Second and Elm streets, Cincinnati, Ohio. Works at Covington. Iron and steel plates and sheets.

Newport Rolling Mill Company, Newport. Steel sheets.

ALABAMA—2.

Bessemer (The) Rolling Mills, Bessemer. Iron plates and sheets. Idle and for sale.

Birmingham Rolling Mill Company, Birmingham. Iron and steel plates and sheets.

OHIO—30.

Ætna-Standard Iron and Steel Company, Bridgeport. Three works: Iron and steel plates and sheets, and black plates, or sheets, for tinning.

Beaver (The) Tin Plate Company, Lisbon. Light sheets and black plates, or sheets, for tinning.

Bellaire Nail Works, Bellaire. Steel bridge plates.

Britton (The) Rolling Mill Company, 66 Hoyt ave., Cleveland. Soft steel sheets and black plates, or sheets, for tinning.

Brown Bonnell (The) Iron Company, Youngstown. Iron plates and sheets.

Burgess Steel and Iron Works, Portsmouth. Iron and steel boiler plates.

Cambridge (The) Iron and Steel Company, Cambridge. Iron and steel sheets.

Canton Rolling Mill Company, Canton. Iron and steel black sheets for stamping, galvanizing, and roofing.

Cincinnati Rolling Mill Company, 298 East Pearl street, Cincinnati. Works at Riverside. Iron and steel sheets.

Cleveland Rolling Mill Company, Cleveland. Iron and steel plates and sheets.

Cleveland (The) Steel Company, Cleveland. Light steel plates and sheets.

Crescent (The) Sheet and Tin Plate Company, Cleveland. Black plates, or sheets, for tinning and stamping.

Falcon Iron and Nail Company, Niles. Two works: Iron and steel sheets.

Falcon Tin Plate and Sheet Company, Niles. Iron and steel sheets, cold-rolled and pickled, and black plates, or sheets, 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., Irondale. Branch office, 246 Third ave., Pittsburgh. Black plates, or sheets, for tinning.

Ironton Rolling Mill, The Eagle Iron and Steel Company, Ironton. Iron and steel sheets.

Laughlin Nail Company, Wheeling, W. Va. Works at Martin's Ferry. Black plates, or sheets, for tinning.

Mahoning Valley (The) Iron Company, Youngstown. Iron plates and sheets.

Morton (The) Tin Plate Company, Cambridge. Works at Guernsey. Steel black plates, or sheets, for tinning.

New Philadelphia (The) Iron and Steel Company, New Philadelphia. Iron and steel sheets.

Otis (The) Steel Company Limited, Cleveland. Steel plates.

Piqua (The) Rolling Mill Company, Piqua. Iron and steel sheets.

Reeves (The) Iron Company, Canal Dover. Iron and steel sheets and black plates, or sheets, for tinning.

Struthers (The) Iron and Steel Company, Struthers. Iron and steel sheets.

Toledo (The) Rolling Mill Company, Toledo. Works at East Toledo. Iron and steel plates and sheets.

Wellsville Plate and Sheet Iron Company, Wellsville. Iron and steel plates and sheets.

INDIANA—9.

American (The) Tin Plate Company, Elwood. Black plates, or sheets, for tinning, all consumed by the company in its tinplate works.

Atlanta (The) Steel and Tin Plate Company, Atlanta. Light sheets and black plates, or sheets, for tinning.

Corning Works, Illinois Steel Company, lessee, Rookery Building, Chicago. Works at Hammond. Steel sheets. *See Illinois.*

Gas City Tinplate Works, The Morewood Company, Gas City. Black plates, or sheets, for tinning.

Irondale (The) Steel and Iron Company, Middletown. Chicago office, 1003 Rookery Building; Cleveland office, 508-9 Garfield Building. Black plates, or sheets, for tinning.

Midland Steel Company, Muncie. Steel plates and sheets for stamping and tinning.

Montpelier (The) Sheet and Tin Plate Company, Columbus, Ohio. Works at Montpelier. Black plates, or sheets, for tinning.

National (The) Tin Plate Company, Anderson. Black plates, or sheets, for tinning.

Union Steel Company, 415 Locust st., St. Louis, Mo. Works at Alexandria. Iron and steel sheets.

ILLINOIS—6.

Granite City Steel Company, cor. Cass ave. and Second st., St. Louis, Mo. Works at Granite City. Steel plates and sheets.

Illinois Steel Company, Rookery Building, Chicago. New York office, 46 Wall st. South Works, at South Chicago. Steel plates. *See Indiana.*

Joilet Sheet Mill, Great Western Tin Plate Company, 1233 Monadnock Building, Chicago. Works at Joliet. Black plates, or sheets, for tinning.

Norton Brothers, 813 Masonic Temple, Chicago. Works at Maywood. Experimenting with fluid metal rolling machinery for the manufacture of steel sheets for tinning.

Springfield (The) Iron Company, Springfield. Chicago office, Monadnock Building; St. Louis office, Union Trust Building, Steel plates and sheets.

Sylvan Steel Company, Moline. Plates.

MICHIGAN—1.

Eureka Iron and Steel Works, Wyandotte. Iron plates. Idle and for sale.

WISCONSIN—1.

West Superior Iron and Steel Company, West Superior. Steel plates.

MISSOURI—1.

Granite Iron Rolling Mills, St. Louis Stamping Company, Cass ave.

and Second st., St. Louis. Iron sheets for stamping and black plates, or sheets, for tinning.

WASHINGTON—1 PARTLY ERECTED.

Pennsylvania Iron and Steel Company, Edmonds. Buildings completed; machinery not yet in place; work temporarily suspended. Will make iron and steel plates and sheets.

CALIFORNIA—1.

Los Angeles (The) Iron and Steel Company, Los Angeles. Main office, Denver, Colorado. Iron and steel sheets and light plates.

UNITED STATES.

Total number of iron and steel plate and sheet mills in the United States: 156 completed, 3 building, and 2 partly erected.

CUT-NAIL WORKS.

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. 150 nail machines.

NEW JERSEY—2.

Cumberland Nail and Iron Company, Bridgeton. Branch office, 207 Walnut Place, Philadelphia. 90 nail machines.
Oxford Iron and Nail Company, Oxford. New York office, 26 Exchange Place. 103 nail machines.

PENNSYLVANIA—EASTERN DISTRICT—4.

Birdsboro Nail Works, E. and G. Brooke Iron Company, Birdsboro. 118 nail machines.
Keystone Nail Works, 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. Philadelphia office, 400 Chestnut st. 95 nail machines.

PENNSYLVANIA—CENTRAL DISTRICT—15.

Bellefonte Iron and Nail Works, James B. Bailey, lessee, Harrisburg. Works at 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 lease.

Duncannon (The) Iron Company, Duncannon. Office, 122 Race st., Philadelphia. 50 nail machines.

Eleanor (The) Iron Company, Tyrone. Works at Hollidaysburg. 30 nail machines.

Harrisburg Nail Works, Harrisburg. Works at Fairview, Cumberland county. 83 nail machines.

Hollidaysburg Iron Works, Hollidaysburg Iron and Nail Company, Hollidaysburg. 23 nail machines.

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, F. A. Godcharles Company, Milton. 89 nail machines.

Northumberland Iron and Nail Works, Van Alen & Co., Northumberland. 94 nail machines.

Portage Iron Company Limited, Duncansville. New York office, A. R. Whitney & Co., 29 Broadway. 40 nail machines.

Sunbury Iron Works, Sunbury. 41 nail machines.

Watsontown Nail Works, D. C. Kaseman, Watsontown. 47 nail machines.

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. Two mills: New Castle Works, 55 nail machines; Atlantic Works, Sharon, 40 nail machines.

VIRGINIA—1.

Old Dominion Iron and Nail Works Company, Richmond. 137 nail machines.

WEST VIRGINIA—5.

La Belle Iron Works, Wheeling. 173 nail machines.

Riverside Iron Works, Wheeling. 224 nail machines.

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, The DeKalb Company, lessee, Fort Payne. 5 nail machines. Idle.

OHIO—7.

Belfont Iron Works Company, Ironton. 126 nail machines.

Falcon Iron and Nail Company, Niles. 44 nail machines. Idle.

Jefferson Iron Works, Steubenville. 160 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 (The) Iron Company, Youngstown. 55 nail machines.

Wellston Steel and Nail Mill, First National Bank, Ironton. Works at Wellston. 65 nail machines. Idle and for sale.

INDIANA—3.

Greenfield Iron and Nail Company, Greenfield. 50 nail machines. For sale.

Lakeside Nail Company, lessee, 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, 1233 Monadnock Building, Chicago. Works at South Chicago. 132 nail machines. Idle.

Hartmann, Hay & Reis, Belleville. 62 nail machines.

Valley Steel Company, Belleville. Office, American Central Building, St. Louis, Mo. 85 nail machines.

MISSOURI—1.

Union Steel and Iron Company, St. Joseph. 50 nail machines. Idle.

CALIFORNIA—2.

Judson Manufacturing Company, Oakland. Office and salesroom, cor. Howard and Beale sts., San Francisco. 13 nail machines.

Pacific Iron and Nail Company, 132 Market st., San Francisco. Works at Oakland. 50 nail machines.

UNITED STATES.

Total number of rolling mills containing cut-nail machines: 53. Number of nail machines: 4,598.

TINPLATE WORKS.

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 weekly capacity of the works is given as reported by the manufacturers, and, unless otherwise stated, is given in boxes of 112 plates, 14 inches by 20 inches, I. C., full weight of 108 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. The rolling mill or black plate department of tinplate works which make their own black plates is fully described in the list of rolling mills and steel works.

MASSACHUSETTS—1.

Steel Edge Stamping and Retinning Works, The Central Stamping Company, lessee, 23-25 Cliff st., New York City. Works at Millis, Norfolk county. Tinning plant erected in 1889; 4 tinning pots; product used by the company in the manufacture of stamped ware. Fuel used, coal. Buy black plates. Equipment to be removed to Newark, N. J., in 1896. *See Tinplate and Stamping Works in New York and New Jersey.*

NEW YORK—4.

Central (The) Stamping Company, 23-25 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. Fuel used, coal. Buys black plates. David H. James, President; W. M. Aikman, Vice-President; Geo. W. Ketcham, Secretary and Treasurer. *See Tinplate and Stamping Works in Massachusetts and New Jersey.*

Iron Clad Manufacturing Company, 22-24 Cliff st., New York City. Works at Brooklyn, Kings county. Tinning plant erected about 1876 and since greatly enlarged; product chiefly used in its own works in the manufacture of stamped ware. Fuel used, coal. 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.*

Meurer Brothers Company, 571-77 Flushing ave., Brooklyn, Kings county. Built in 1894; first tin and terne plates made in March, 1894; 8 sets, 2 for tinplates and 6 for terne plates; weekly capac-

ity, 500 boxes of tin plates and 2,100 boxes of terne plates. Brands, "Meurer Genuine Tinned Iron Sheets," "Meurer Old Method," "Meurer Roofing IC.," "Flushing IC.," and "Pullman IC." Fuel used, coal. Buys black plates.

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, coal and petroleum. Make black plates. *See Rolling Mills.*

NEW JERSEY—1 BUILDING AND 1 REBUILDING.

Central (The) Stamping Company, 23-25 Cliff st., New York City. Works at Newark, Essex county, destroyed by fire in 1895; rebuilding works, to contain 15 tinning pots; product to be chiefly used in its own works in the manufacture of stamped ware. Fuel to be used, coal. Buys black plates. *See Tinplate and Stamping Works in Massachusetts and New York.*

Elizabeth Tin Plate Company, Dix Building, Elizabeth, Union county. Building a tinning plant to contain 9 sets, 5 for tinplates and 4 for terne plates; estimated weekly capacity, 3,000 boxes of full weight tin and terne plates. Fuel to be used, coal. Will make black plates. *See Rolling Mills for a list of officers.*

PENNSYLVANIA—32 COMPLETED, 1 BUILDING, AND 2 PROJECTED.

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," "Aliquippa," and "Re-roll New Style." Fuel used, natural gas. Buys black plates. W. J. Shaw, President; J. P. Bailey, Secretary; John Warren, Treasurer.

American Tin and Terne Plate Company, 45-47 Richmond st., Philadelphia. Built in 1891-2 and first terne plates made January 17, 1892; 5 sets; weekly capacity, 500 boxes of terne plates, 20 x 28. Brands, "Keystone," "Puritan," "Hancock," and "Amer. M. S." Fuel used, bituminous coal. Buys black plates. Selling agent, Eugene McCarthy, Syracuse, N. Y.

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; two Buckman automatic continuous seaming and tinning machines and two small tinning sets; weekly capacity, 300 boxes of 20 x 28 tinplates and 4,000 rolls of 100 square

feet of terne plates, (equal to 900 boxes of 20 x 28 plates.) Fuel used, anthracite coal. Buys black plates. P. B. Calvert, President; E. B. Smith, Secretary and Treasurer; S. Y. Buckman, Vice-President and Manager. *See Ohio.*

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 for a list of officers and selling agents.*

Apollo Sheet Iron Mills, 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 for a list of officers.*

Black Diamond Tinplate Works, Henry W. Scattergood, 51-53 Laurel street, Philadelphia. Built in 1893; first terne plates made June 1 and first tinplates September 12, 1893; 4 sets, 2 for tinplates and 2 for terne plates; weekly capacity, 420 boxes of tinplates and 420 boxes of terne plates. Brands, "Black Diamond," "Quaker City," "Horse Shoe," "Arrow," "Laurel," "Peerless," "Imperial," and "B diamond D Coke." Fuel used, bituminous coal. 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; 6 sets, 5 for tinplates and one for terne plates; weekly capacity, 1,200 boxes of tinplates and 300 boxes of terne plates. Brands: for tinplates, "P. S. & Co.," "Pansy," and "Juno;" for terne plates, "Devon," "Orient," "Crown," "Potts Old Process," and "Potts A. L. T." Fuel used, coal. Makes black plates. *See Rolling Mills for a list of officers and selling agents.*

Cadwallader, (C. W.,) Pittsburgh. Works in the Twenty-third ward. Built in 1891 and burned and rebuilt in 1894; 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. Buys black plates.

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 1, 1894; 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. Adding another set for terne plates. Brands, "Pennant" for tinplates and "Dawn" for terne plates. Fuel used, natural gas. Makes black plates. *See Rolling Mills for a list of officers.*

Connellsville Sheet Iron and Tin Plate Company, Connellsville, Fayette county. Building a tinplate plant at South Connellsville to contain 10 sets, 5 for tinplates and 5 for terne plates; estimated weekly capacity, 1,000 boxes of tinplates and 2,000 boxes of terne plates. Fuel to be used, coal. Will make black plates. *See Rolling Mills for a list of officers.*

Continental (The) Tin Plate Works, Gummey, McFarland & 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, one for tinplates and 3 for terne plates; 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,) "Mars," (Alloway grade,) and "Champion Bright" (J B grade); for terne plates, "Penn" old method, "Pennsyl" old method, "Genuine Old Style," "Leominster," "Alderly," "Phœnix," "Climax," "Venus," "Flag," "Eagle," "Liberty," "Anchor," "Pioneer," "Hercules," "Stag," "Victor," "Sun," "Colonial," "Neptune," "Continental," and "Zone." Fuel used, bituminous coal. Buy black plates.

Duquesne Tin Plate Works, Thirteenth st. and P. & L. E. R. R., South Side, Pittsburgh. Built in 1893; first terne plates made June 1 and first tinplates November 15, 1893; 5 sets; product, tin and terne plates; weekly capacity, 3,000 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. C. Dreifus, President; L. E. Block, Vice-President; A. Wildberg, Secretary; J. Wildberg, Treasurer and General Manager.

Ellwood Tin Plate Works, Ellwood Tin Plate Company, Perry-Payne Building, Cleveland, Ohio. Works at Ellwood City, Lawrence county. Tinning plant added to rolling mill in 1894 and first tin and terne plates made in January, 1895; 8 sets for tin and terne plates; weekly capacity, 1,500 boxes of tinplates and 1,500 boxes of terne plates. Brands: for tinplates, "Silverine," "Saturn," "Anti-Rust," and "P. O. P." for charcoal, and "American" for coke; for terne plates, "Monogram," "N. C. T.," "Charter Oak," "Banner," and "Weather Proof." Trade-mark, a red star. Fuel used, coal. Make black plates. Sales made by the company. *See Rolling Mills for a list of officers.*

Ferguson Tin Plate Company, East Liberty, Pittsburgh, Allegheny county. Built in 1895; first terne plates made in July, 1895, and first tinplates in September, 1895; 3 sets, one for tinplates and 2 for terne plates; weekly capacity, 360 boxes of 14 x 20 tinplates, 100 lbs. each, and 360 boxes of 20 x 28 terne plates, 200 lbs. each.

Brands, Ferguson's "Extra Coated," "Magnet," "Vulcan," and "Red Cross." Fuel used, nut and slack coal. Buys black plates. Owned by A. C. Ferguson and F. H. Speer.

Filley (The) Tin Plate Company, 701 Girard Building, Philadelphia. Works at Norristown, Montgomery county. Built in 1895 and first terne plates made in April, 1895; 2 sets; product, terne plates; weekly capacity, 125 boxes of 20 x 28 plates, weighing from 190 to 240 lbs. to the box. Brands, "Filley's Old Style," "Filley's," "Fidelity," "Champion," "Union," "Victory," and "Alden." Fuel used, bituminous coal. Buys black plates. James A. Filley, owner.

Follansbee Brothers Company, (formerly James B. Scott & Co.,) 328–32 Second ave., Pittsburgh. Built in 1891–2; first terne plates made in January, 1892; 3 sets; product, tin and terne plates. Brands: for tinplates, "Clifton" for charcoal and "Furnace" for coke; for terne plates, "Scott's Extra Coated," "Triumph Old Style," "Orbit Redipped," "Old Reliable," "Duquesne," "Neville," "Oakmont," "Sherwood." "Pittsburgh," and "Allegheny." Fuel used, coal. Enlarging works and contemplates adding new sets. Buys black plates. B. G. Follansbee, President; William U. Follansbee, Secretary and Treasurer.

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.

Lalance and Grosjean Manufacturing Company, Harrisburg, Dauphin county. Main office, 19 Cliff st., New York; branch offices, Boston and Chicago. Tinning plant added to rolling mill in 1895; first tin and terne plates made in July, 1895; 4 sets; 2 for tinplates and 2 for terne plates; weekly capacity, 750 boxes of tinplates and 750 boxes of terne plates. Brand, "L. & G." Fuel used, coal. Makes black plates. *See Rolling Mills for a list of officers. See Stamping Works.*

Laufman (The) Tin Plate Company, 421 Wood st., Pittsburgh. Works at Butler Junction, W. P. R. R., Allegheny county. Tinning plant built in 1890 and first terne plates made in June, 1890; 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 obtained from the Apollo Sheet Iron Mills. P. H. Laufman, Proprietor; W. D. Comparet, Manager. Selling agents, Neal Brothers, Pittsburgh; H. R. DeMilt & Co., New York City; Charles Millar & Son, Utica, New York.

Merchant & Co., (incorporated,) 517 Arch st., Philadelphia. Branch offices, 247 Water st., New York; 584 Flushing ave., Brooklyn; 202 Lake st., Chicago. Works on Washington ave. above Twentieth st. Eight sets; product, tin and terne plates. Fuel used, coal. Buy

black plates. Clarke Merchant, President; Henry W. Merchant, Secretary and Treasurer.

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; weekly capacity, 6,000 boxes of tin and terne plates. Brands: for tinplates, "New Castle 'Palm' Coke" and "New Castle Coke" for coke plates, and "New Castle Best 'Palm' Charcoal," "New Castle 'Palm' Charcoal," "New Castle Charcoal," and "Shenango Charcoal" for charcoal plates; for terne plates, "New Castle 'Old Method' Ternes," "New Castle Ternes," and "Juniata Ternes." Building additional tinning sets. Fuel used, coal. Makes black plates. *See Rolling Mills for a list of officers.*

Nivin and Hassard (The) Tin Plate Company Limited, 1313–15 Washington ave., Philadelphia. Built in 1895 and first tin and terne plates made in June, 1895; 3 sets, one for tinplates and 2 for terne plates; weekly capacity, 200 boxes of 14 x 20 tinplates and 300 boxes of 20 x 28 terne plates. Brands: for tinplates, high-grade "Jewel" and second grade "Rambler" for charcoal and "H. P." for coke; for terne plates, "Nivin & Hassard New Method," "N. and H. Roofing," "Old Method," "Nana," "Trilby," "Sensation," "Echo," and "Dandy." Fuel used, bituminous coal. Buys black plates. E. F. Nivin, Chairman; S. D. Hassard, Secretary and Treasurer.

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 tinplates 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.) Fuel used, coal. Buy black plates. Richard Lewis, General Manager. Selling agents, C. S. Trench & Co., 54 Cliff st., New York. Idle.

Pennsylvania Tin Plate Company, New Kensington, Westmoreland county. New York office, Temple court. Built in 1895 and first tin and terne plates made in April, 1895; 7 sets, 5 for tinplates and 2 for terne plates; weekly capacity, 2,000 boxes of tinplates and 1,000 boxes of terne plates. Brands, "Peconic," "B. G.," and "Belmont." Fuel used, coal. Makes black plates. *See Rolling Mills for a list of officers and selling agents.*

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; 7 sets, 5 for tinplates and 2 for terne plates; weekly capacity, 1,500 boxes of tinplates and 500 boxes of terne plates. Brands: for tinplates, "Penn Treaty;" for terne plates, "Penn Treaty," "Girard,"

and "Marshall." Fuel used, bituminous coal. Make 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, 1893; 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." Fuel used, bituminous coal. Buy black plates. *See Rolling Mills for a list of officers.*

Philadelphia (The) Tin Plate Company, Nathan Trotter & Co., proprietors, 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, "Trotter's American New Method," "Trotter's Roofing," "Elziver," "Sharon," "Enid," "Verona," and "Triumph." Fuel used, bituminous coal. Buys black plates.

Phillips Tin Plate Works, Phillips Tin Plate Company, 918 Filbert st., 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, 500 boxes of tinplates and 750 boxes of terne plates. Brands: for tinplates, "Century," "Oak," "Walnut," and "Gladys;" for terne plates, "F. R. P. Extra," "Phillips' Roofing," "Boston," "National," "Columbus," "Republic," and "Zero." Fuel used, coal. Buy black plates. Intend enlarging plant. Sales made by the company.

Pittsburgh Tin Plate Works, New Kensington, Westmoreland county. Built in 1891-2; first terne plates made in February and first tinplates in October, 1892; 10 sets, 6 for tinplates and 4 for terne plates; weekly capacity, 1,650 boxes of tinplates and 600 boxes of terne plates. Brands: for tinplates, "Alba," "B. S. V.," and "Opal;" for terne plates, "Kensington," "Westmoreland," and "Amber." Fuel used, bituminous coal. Make black plates. *See Rolling Mills for a list of officers and selling agents.*

Reading Tin Plate Company, Reading, Berks county. Built in 1895; first terne plates made in March, 1895; 2 sets; product, terne plates; weekly capacity, 270 boxes of 20 x 28 plates. Brands, "America," "Reading Roofing," "Horton," "L. C.," "Mt. Penn," "C. H.," and "H. M." Fuel used, bituminous coal. Buys black plates. Howard L. McIlvain, President; Lewis Crater, Secretary and Treasurer; Charles A. High, Manager.

Star Tin Plate Company, foot of Twelfth st., Pittsburgh. Built in 1895; 10 sets, 8 for tinplates and 2 for terne plates; weekly capacity, 5,200 boxes of tinplates and 800 boxes of terne plates. Fuel used, natural gas. Makes black plates. *See Rolling Mills for a list of officers.*

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; 22 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, Genuine "Taylor Old Style," "The Taylor Roofing Tin," "Old Method," "Columbia," "Maple," "Willow," "Knoxall," and "Globe." Fuel used, coal. 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. *See Rolling Mills for a list of officers and selling agents.*

PROJECTED.

A syndicate of capitalists, represented by F. R. Phillips, of Philadelphia, contemplates erecting a tinplate plant, a rolling mill, and an open-hearth steel plant at Reading, Berks county.

Washington Steel and Tin Plate Mills, Griffiths, Scott & Co., Washington, Washington county. Propose building works to contain 3 hot mills, 2 cold mills, and 5 tinning sets. Will make both tin and terne plates and black plates for tinning. Expect to commence tinning operations May 1st. William H. Griffiths, President and Secretary; John Scott, Vice-President and Treasurer; Joseph Phillips, Manager.

MARYLAND—4.

Baltimore (The) Iron, Steel, and Tinplate Company, Locust Point, Baltimore. Built in 1891-2; first tinplates made May 11, 1892; 4 sets, 3 for tinplates and one for terne plates; weekly capacity, 1,650 boxes of tinplates and 550 boxes of terne plates. Brand, "Locust." Fuel used, coal. Makes black plates. (Works at Canton abandoned; machinery removed to works at Locust Point.) *See Rolling Mills for a list of officers.*

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. Fuel used, coal. Buy black plates. Idle. *See Stamping Works.*

Norton Tin Plate and Can Company, 8 Post Office ave., Baltimore. Chicago office, 813 Masonic Temple. Works at Boston and Hudson sts. Built in 1895; 16 sets, for making either tin or terne plates; weekly capacity, 10,000 boxes. Buys black plates. Edwin Norton, President; O. W. Norton, Vice-President; A. L. Fanning, Secretary; L. Bruce Moore, Treasurer.

Stickney (The) Iron Works, The Stickney Iron Company, 11 South Gay st., Baltimore. Works at Canton, a suburb of Baltimore, Baltimore county. Built in 1895; 4 sets; product, tin and terne plates; weekly capacity, 1,500 boxes of tin and terne plates. Fuel used, coal. Make black plates. *See Rolling Mills for a list of officers and selling agents.*

VIRGINIA—1.

Old Dominion Iron and Nail Works, Old Dominion Iron and Nail Works Company, Richmond, Henrico county. Works on Belle Isle, in the city of Richmond. Tinning plant added to rolling mill in 1894; first terne plates made November 1, 1894; 3 sets, one for tinplates and 2 for terne plates; weekly capacity, 350 boxes of tinplates and 700 boxes of 20 x 28 terne plates. Brands: for terne plates, "Chesapeake," "Potomac," "Albemarle," "Greenbrier," "Kanawha," "Rivanna," "Indian," and "York." Fuel used, bituminous coal. Buy black plates. *See Rolling Mills for a list of officers.*

WEST VIRGINIA—2.

La Belle Iron Works, Wheeling, Ohio county. Tinning plant added to rolling mill in 1895; first tinplates made in July, 1895, and first terne plates January 3, 1896; 6 sets, 4 for tinplates and 2 for terne plates; weekly capacity, 2,300 boxes of tinplates and 500 boxes of terne plates. Brands: for tinplates, "La Belle" for coke and "Woodward" for charcoal; for terne plates, "West Virginia." Fuel used, bituminous coal. Make black plates. Thomas W. Allaway, Manager tinning department. Selling agents, Charles E. Pope & Co., Pittsburgh. *See Rolling Mills for a list of officers.*

Wheeling Corrugating Company, Wheeling, Ohio county. Built in 1895; first tin and terne plates made in the spring of 1895; 4 sets, for making either tin or terne plates; weekly capacity, double turn, 500 boxes of 20 x 28 tinplates and 500 boxes of 20 x 28 terne plates. Brands, "Margaret," "Nelson," "Eleanor," "Wyle," "Ft. Henry," "Ewing," "Wheeling," and "Thayer." Fuel used, bituminous coal. Buys black plates. E. C. Ewing, President; Alex. Glass, Secretary.

KENTUCKY—1.

Licking Iron Works, Licking Rolling Mill Company, Covington, Kenton county. Tinning plant added to rolling mill in 1895; first terne plates made in March and first tinplates in June, 1895; 2 sets, one for tinplates and one for terne plates; weekly capacity, 185 boxes of 20 x 28 tinplates and 185 boxes of 20 x 28 terne plates, 216 lbs. to the box. Brands, "I. D. L." for coke tinplates and "Droege" for terne plates. Fuel used, coal. Make black plates. *See Rolling Mills for a list of officers.*

OHIO—13 COMPLETED AND 2 BUILDING.

Ætna-Standard Iron and Steel Company, Bridgeport, Belmont county. Tinning plant added to rolling mill in 1894; first tin and terne plates made in May, 1894; 8 sets, 6 for tinplates and 2 for terne plates; weekly capacity, 4,000 boxes of 14 x 20 tinplates and 750 boxes of 20 x 28 terne plates. Brands: for tinplates, "Ætna" for coke, and "Ætna" A, AA, and AA 1 for charcoal; for terne plates, "Belmont," "Belmont Special," "Belmont Best," and "Standard." Fuel used, natural gas and coal. Makes black plates. Selling agents, S. Robert Reading, Boston; A. Schroeder, New York; Thomas W. Simpers & Co., Philadelphia; H. L. Green & Co., Chicago; Good & Waterman, St. Louis; John T. Rowntree, Kansas City and Denver; T. H. Speddy, San Francisco. *See Rolling Mills for a list of officers.*

Alcania (The) Tin and Terne Plate Company, Youngstown, Mahoning county. Building works to contain 4 tinning sets, 2 for tinplates and 2 for terne plates; weekly capacity, 1,000 boxes of tinplates and 500 boxes of terne plates. Brands, "Alcania," "Mahoning," and "Shenango." Fuel to be used, coal. Will buy black plates, but may erect a rolling mill in 1896. W. S. Collier, President; W. T. Lewis, Vice-President; David Morris, Treasurer; T. H. Jeremiah, Secretary and Manager.

American (The) Tin Plate Machine and Manufacturing Company, 328 Chestnut st., Philadelphia. Building works at Canal Dover, Tuscarawas county, to contain 2 Buckman automatic continuous seaming and tinning machines and 4 tinning sets, 2 for tinplates and 2 for terne plates; weekly capacity, 4,000 rolls of 100 square feet of terne plates, (equal to 900 boxes, 20 x 28 plates,) and 300 boxes of 20 x 28 tinplates. Fuel to be used, bituminous coal. Buys black plates. *See Tinplate Works in Pennsylvania for a list of officers.*

Beaver (The) Tin Plate Company, Lisbon, Columbiana county. Built in 1894–5 and first tin and terne plates made in April, 1895; 8 sets, 6 for tinplates and 2 for terne plates; weekly capacity, 2,400 boxes of tinplates and 600 boxes of terne plates. Brands: for tinplates, "Beaver" coke, and "Beaver A," "Beaver AA," and "Beaver AAA"

charcoal; for terne plates, "Beaver," "Beaver Special," and "Beaver Best." Fuel used, bituminous coal. Makes black plates. *See Rolling Mills for a list of officers.*

Britton (The) Rolling Mill Company, 66 Hoyt ave., Cleveland, Cuyahoga county. Tinning plant added to rolling mill in 1893; first tinplates made in March and first terne plates in July, 1893; 4 sets, 3 for tinplates and one for terne plates; weekly capacity, 1,500 boxes of tinplates and 300 boxes of terne plates. Brands, for tinplates, "Buckeye" and "Extra Buckeye;" for terne plates, "Buckeye" and "Buckeye Special." Fuel used, coal and oil. Makes black plates. *See Rolling Mills for a list of officers.*

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." Fuel used, coal. Black plates obtained from The Piqua Rolling Mill Company. James Hicks, President; J. G. Battelle, Secretary and Treasurer.

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." Fuel used, coal. Buys black plates. Owned by F. R. Slauson and W. K. Leonard.

Crescent (The) Sheet and Tin Plate Company, Cleveland, Cuyahoga county. Built in 1894-5; 2 tinning sets now erected, but will have 10 in all; expects to make first tinplates in January; will make both tin and terne plates. Fuel used, coal. Makes black plates. *See Rolling Mills for a list of officers.*

Falcon Tin Plate and Sheet Company, Niles, Trumbull county. Tinning plant added to rolling mill in 1895 and first tin and terne plates made in March, 1895; 8 sets, 5 for tinplates and 3 for terne plates; weekly capacity, 2,000 boxes of tinplates and 1,500 boxes of terne plates, ranging from 108 to 135 lbs. to the box. Brands: for tinplates, "Tulip," "Crocus," "Hyacinth," and "Jonquil" for charcoal, and "Clover" for coke; for terne plates, "Cornflower," "Moonflower," "Starflower," "Sunflower," and "Wildflower." Fuel used, bituminous coal and slack. Makes black plates. *See Rolling Mills for a list of officers and selling agents.*

Irondale Rolling Mills and Tin and Terne Plate Works, Wallace, Banfield & Co., Irondale, Jefferson county. Branch office, 246 Third ave., Pittsburgh. Tinning plant added to rolling mill in 1891; enlarged in 1892; 6 sets and 4 automatic tinning machines; product, tin and terne plates; weekly capacity, 2,800 boxes of tinplates and 200 boxes of terne plates. Brands, Irondale "Star" and Irondale "Diamond" in various grades. Fuel used, coal. Make black plates. *See Rolling Mills for a list of selling agents.*

Laughlin Nail Company, Wheeling, West Virginia. Works at Martin's Ferry, Belmont county. Tinning plant added to rolling mill in 1895; first tin and terne plates made June 1, 1895; 8 sets, 7 for tinplates and one for terne plates; weekly capacity, 3,150 boxes of tinplates and 450 boxes of terne plates. Brand, "Laughlin." Fuel used, coal. Makes black plates. *See Rolling Mills for a list of officers.*

McDonald (The James) and Sons Company, Cincinnati, Hamilton county. Built in 1894 and first terne plates made in August, 1894; 2 sets; product, terne plates; weekly capacity, 300 boxes of 20 x 28 plates. Brands, "Eureka," "Special," and "The James McDonald and Sons Co. Old Style." Fuel used, coal. Buys black plates. James McDonald, Sr., President and Treasurer; Edward McDonald, Vice-President; James McDonald, Jr., Secretary. Sales made by the company.

Morton Tin Plate Works, The Morton Tin Plate Company, Cambridge. Works at Guernsey, Guernsey county. Built in 1894; first tin and terne plates made in March, 1895; 4 sets, 2 for tinplates and 2 for terne plates; weekly capacity, 1,000 boxes of tinplates and 1,000 boxes of terne plates. Brands: for tinplates, "Morton" and "Regent" for charcoal and "Guernsey" and "Thistle" for coke; for terne plates, "Cambridge" redipped, "Cambridge" new method, "Leatherwood," "Neptune," and "North Star." Fuel used, natural gas. Make black plates. Sales made by the company. *See Rolling Mills for a list of officers.*

Record Manufacturing Company, Conneaut, Ashtabula county. Built in 1891; first tinplates made March 1, 1892; 2 sets; product, tinplates; weekly capacity, 480 boxes. Brands, "Record Charcoal A" and "Record Charcoal A 1." Fuel used, coal. 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; 3 sets; product, terne plates; weekly capacity, 600 boxes of 216 lbs. each. Brands, "Boaz" and "Queen City Old Style." Fuel used, coal. Black plates supplied by the Cincinnati Rolling Mill Company.

INDIANA—6.

American (The) Tin Plate Company, Elwood, Madison county. Built in 1891–2 and first tin and terne plates made in July, 1892; 45 sets; weekly capacity, 10,000 boxes of tin and terne plates; also various weights of tinplates. Brands: for tinplates, "Premier," "Imperial," and "Peerless" for charcoal, and "Kream," "Kanner," and "Koko" for coke; for terne plates, "Leeds," "Elwood," "Indiana," and "Reid." Fuel used, natural gas exclusively. Makes black plates, all consumed by the company. Sales office, Cincinnati. *See Rolling Mills for a list of officers.*

Atlanta (The) Steel and Tin Plate Company, (successor to The Indiana Tinplate Manufacturing Company,) Atlanta, Hamilton county. Built in 1892-3; first tinplates made in May and first terne plates in June, 1893; 6 sets, 4 for tinplates and 2 for terne plates; weekly capacity, 2,200 boxes of tinplates and 1,100 boxes of terne plates. Brand, "Atlanta." Fuel used, natural gas. Makes black plates. *See Rolling Mills for a list of officers and selling agents.*

Gas City Tinplate Works, The Morewood Company, Gas City, Grant county. Built in 1893; first terne plates made in June and first tinplates in December, 1893; 16 sets, 14 for tinplates and 2 large ones for terne plates; weekly capacity, 4,000 boxes of tinplates and 1,000 boxes of terne plates. Brands: for tinplates, "R. H. J." for coke, and "Jack," "Grace," and "Dorothy" for charcoal; for terne plates, "F. W. B.," (old style,) "J. H. R.," and "P. T. L." Fuel used, natural gas. Make black plates. Sales made by the company. *See Rolling Mills for a list of officers.*

Irondale (The) Steel and Iron Company, Middletown, Henry county. Chicago office, 1003 Rookery Building; Cleveland office, 508-9 Garfield Building. Built in 1894; first tin and terne plates made in November, 1894; 8 sets, 7 for tinplates and one for terne plates; weekly capacity, 4,400 boxes of tinplates and 600 boxes of terne plates. Brands: for tinplates, "Crane Diamond B.," "Crane Charcoal," and "Crane Diamond C.;" for terne plates, "Crane Old Style Redipped," "Crane Terne," and "I. S. I." Fuel used, natural gas. Makes black plates. *See Rolling Mills for a list of officers and selling agents.*

Montpelier (The) Sheet and Tin Plate Company, Columbus, Ohio. Works at Montpelier, Blackford county. Built in 1895 and first tin and terne plates made in June, 1895; 12 sets; 11 for tinplates and one for terne plates; weekly capacity, 3,000 boxes of tinplates and 250 boxes of terne plates, 20 x 28, 216 lbs. to the box. Fuel used, natural gas. Makes black plates. *See Rolling Mills for a list of officers and selling agents.*

National (The) Tin Plate Company, Anderson, Madison county. Built in 1894-5 and first tin and terne plates made in August, 1895; 8 sets; weekly capacity, 4,000 boxes of tin or terne plates. Fuel used, natural gas. Makes black plates. *See Rolling Mills for a list of officers.*

ILLINOIS—3.

Chicago (The) Stamping Company, Congress and Green sts., Chicago. Original works erected in 1865; first tinplates made in January, 1894; 3 sets; product, tinplates; weekly capacity, 600 boxes. Fuel used, oil. Buys black plates. Lee Sturges, President and Treasurer; W. M. Conger, Vice-President and Secretary. *See Stamping Works.*

Great Western Tin Plate Works, Great Western Tin Plate Company, 1233 Monadnock Building, Chicago. Works at Joliet, Will county.

Tinning plant added to rolling mill in 1895; first tin and terne plates made in March, 1895; 6 sets, 3 for tinplates and 3 for terne plates; weekly capacity, 1,500 boxes of 14 x 20 tinplates and 750 boxes of 20 x 28 terne plates. Brands: for tinplates, "Monarch" and "Regina" for charcoal and "Rex" for coke; for terne plates, "Chicago," "White City," and "Garden City." Fuel used, coal. Make black plates. *See Rolling Mills for a list of officers.*

Norton Brothers, 813 Masonic Temple, Chicago. Works at Maywood, Cook county. Built in 1891; 18 Norton automatic sets. Buy black plates. *See Rolling Mills for a list of officers.*

MICHIGAN—1.

Buhl Stamping Company, Detroit, Wayne county. Tinning plant erected in 1888 and rebuilt in 1895; product consumed by the company in the manufacture of milk-can stock, tubular lanterns, and gas meters. Fuel used, coal. Buys black plates. Theo. D. Buhl, President; Charles H. Jacobs, Vice-President and Managing Director; 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; 14 sets, 8 for tinplates and 6 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." Fuel used, coal. Make black plates. *See Rolling Mills for a list of officers. See Stamping Works.*

UNITED STATES.

Number of tinplate works in the United States in January, 1896: 69 completed, 4 building, 1 rebuilding, and 2 projected.

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. Brand, "Ajax." Fuel used, bituminous coal. Buys iron or steel sheets. J. G. Hendrickson, President; F. J. Clamer, Vice-President; J. R. Neison, Secretary and Treasurer.

STAMPING WORKS.

A number of companies engaged in the manufacture of stamped ware operate tinning pots in connection with their works. When not otherwise stated the black plates consumed are purchased. 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 Works, The Central Stamping Company, lessee, 23-25 Cliff st., New York City. Works at Millis. Product, tinned stamped ware. *See Tinplate and Stamping Works in New York and New Jersey.*

CONNECTICUT—6.

Acme 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, galvanized ware, etc.

Mix (G. I.) & Co., Yalesville. Product, tinned spoons and forks.

North Haven Manufacturing Company, New Haven. Works at North Haven. Product, tinned spoons.

Parker (The Charles) Company, Meriden. Product, tinned spoons and forks.

Wallace (R.) and 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.

Central (The) Stamping Company, 23-25 Cliff st., New York City. Works at Brooklyn. Product, tinned stamped ware. *See Tinplate and Stamping Works in Massachusetts and New Jersey.*

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 and Grosjean Manufacturing Company, 19 Cliff st., New York. Works at Woodhaven, Long Island. Product, stamped and enameled sheet metal ware. Makes black plates and tin and terne plates. *See Tinplate Works in Pennsylvania. See Rolling Mills in Central Pennsylvania.*

Shepard (Sidney) & Co., Buffalo. Product, tinned stamped ware and milk-can trimmings.

Troy (The) Stamping Works, J. M. Warren & Co., proprietors, Troy. Product, stamped tin and other metal ware, etc.

NEW JERSEY—1 REBUILDING.

Central (The) Stamping Company, 23-25 Cliff st., New York City. Works at Newark, N. J., destroyed by fire in 1895; rebuilding. Product, tinned stamped ware. *See Tinplate and Stamping Works in Massachusetts and New York.*

PENNSYLVANIA—1.

Dunlap (John) Company, Pittsburgh. Product, tinned stamped ware.

MARYLAND—2.

Evans, Jr., (Henry,) Baltimore. Product, tinned stamped ware.

Matthai, Ingram & Co., Baltimore. Product, tinned stamped ware. *See Tinplate Works.*

OHIO—3.

Avery Stamping Company, Cleveland. Product, tinned stamped ware.

Hunt (H. B.) Stamping Company, Cleveland. Product, tinned shapes.

Knapp and Pratt Manufacturing Company, Geneva. Product, tinned spoons, etc.

ILLINOIS—2.

Adams and Westlake (The) Company, 110 Ontario st., Chicago. Product, tinned stamped ware, lanterns, lamps, bicycles, etc.

Chicago (The) Stamping Company, Congress and Green sts., Chicago. Product, tinned milk-can stock, tinplates, etc. *See Tinplate Works.*

MICHIGAN—1.

Buhl Stamping Company, Detroit. Product, tinned stamped steel milk-can stock, tubular lanterns, and gas meters. *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. Works, Second and Chambers sts. Product, retinned stamped tin-ware.

WISCONSIN—2.

Geuder and Paeschke Manufacturing Company, Milwaukee. Product, pieced, stamped, japanned, and galvanized tin and sheet iron 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: 27 completed and 1 rebuilding.

FORGES AND BLOOMARIES.

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. Capacity is given on double turn.

FORGES.

NEW YORK—7, ALL LOCATED IN THE LAKE CHAMPLAIN DISTRICT.

Chateaugay Ore and Iron Company, Plattsburgh, Clinton county. Five 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. Standish Iron Works, at Standish, Clinton county; built in 1895; 8 fires and one hammer. All run by water-power except Standish, which is run by steam-power; product, charcoal blooms for general purposes and charcoal billets for crucible steel melting stock of high grade, made from Chateaugay ore; total annual capacity, 13,000 gross tons. *See Charcoal Furnaces.*

Sable Iron Works, J. and J. Rogers Company, Ausable Forks, Essex county. Two works: One forge at Ausable Forks, built in 1848; 4 fires. One forge at Black Brook, Clinton county, built in 1832; 8 fires. Total, 12 fires, with 3 hammers; water-power; product, charcoal blooms for best tool steel; total annual capacity, 4,000 gross tons. Idle.

NORTH CAROLINA—1.

Helton Forge, W. J. Pasley, Crumpler, Ashe county. Built in 1859; 2 fires and 1 hammer; product, bar iron; annual capacity, 75 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; idle. E. K. Seguine, President; A. A. Hopkins, Vice-President; P. W. Levering, Secretary and Treasurer.

BLOOMARIES.

NEW JERSEY—1.

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, 2,250 gross tons. Idle.

PENNSYLVANIA—11.

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, 2,000 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; specialty, blooms for boiler plate and rivet and screw rods; annual capacity, 1,800 gross tons. Idle. *See Eagle Iron Works, Central Pennsylvania Rolling Mills.*

Exeter Steam Forge, Reuben B. Seidel, Exeter Station, Berks county. Built in 1868, burned in 1894, rebuilt in the same year, and operations resumed January 1, 1895; one heating furnace and one 1,500-lb. hammer; steam-power; product, bars and forgings made from charcoal blooms and wrought-iron scrap; annual capacity, 300 gross tons. Fuel used, bituminous coal.

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, Lucknow Forge Company Limited, 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, tin-

plates, 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, 2,500 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, 12 gross tons. S. H. Egolf, President; Willis Rogers, 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 lease.

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, 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, 9; number of pig and scrap iron bloomaries, 14: total, 23.

FORGES AND BLOOMARIES RECENTLY ABANDONED.

A list of forges and bloomaries which have long been abandoned will be found in the Directories for 1892 and 1894.

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.

Peterburgh Iron Works, Peter Tremblay, Clayburgh, Clinton county. Forge at Peterburgh. Product, charcoal blooms for steel purposes.

Rogers (J. and J.) Company, Ausable Forks, Essex county. One forge at Black Brook, Clinton county, built in 1832. One forge at Jay, Essex county, built in 1809. Product, charcoal blooms; 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.

Port Oram Forge, Port Oram Manufacturing Company, Port Oram, Morris county. Built in 1878; product, charcoal blooms made from scrap and pig iron; abandoned.

Rockaway Forge, Rockaway, Morris county. Used direct process.

Steam Forge, C. A. Oram, Rockaway, Morris county. Built in 1878. Idle and not likely to run again.

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.

Tom's Creek Forge, on Tom's creek, Surry county. Built in 1862.

WIRE-ROD AND WIRE MILLS.

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 and steel works. Some of the wire works in this list make copper and brass wire as well as iron and steel wire. In giving the capacity of the works the gross ton of 2,240 pounds is used.

MASSACHUSETTS—12.

Gurney, (D. B.,) Whitman. Annual capacity, 1,000 tons of wire.

Lamb (Horace) & Co., Northampton. Annual capacity, from 275 to 300 tons of wire.

Plymouth (The) Mills, Plymouth. Annual capacity, 1,500 tons of wire for their own use.

Prentiss (G. W.) & Co., Holyoke.

Prouty Wire Company, Charlton City. Annual capacity, 150 tons of wire.

Spencer Wire Company, Spencer. Annual capacity, 1,700 tons of wire.

Taunton Tack Company, Branch of the Atlas Tack Corporation, Boston. Works at Taunton. Annual capacity, 1,500 tons of wire.

Washburn and Moen Manufacturing Company, Worcester. Two works: Rods and wire; annual capacity: rods, 115,000 tons; wire, 100,000 tons. *See Illinois.*

Worcester Wire Company, Worcester. Annual capacity, 20,000 tons of wire.

Wright and Colton Wire Cloth Company, Worcester. Two works: Worcester Works, at Worcester; annual capacity, 2,500 tons of wire. Palmer Works, at Palmer; 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 (The) Manufacturing Company, Georgetown. Annual capacity, 2,000 tons of wire. *See Illinois.*

New Haven Rolling Mill Company, New Haven. Rods. Annual capacity, 4,500 tons.

New Haven (The) Wire Manufacturing Company, New Haven. Annual capacity, about 11,000 tons of wire.

Yale (The) Steel Company, New Haven. Works at Westville. Annual capacity, about 25 tons of wire for drill rods.

NEW YORK—8.

Brooklyn Wire Nail Company, 126 Freeman st., Brooklyn. Annual capacity, 7,500 tons of wire.

Giese, (Rudolf,) Dolgeville. Annual capacity, from 85 to 90 tons of piano, spring, and wire for musical instruments.

Griswold, (J. Wool,) Troy. Annual capacity, 3,600 tons of wire.

Igoe Brothers, 470-72 Driggs avenue, Brooklyn.

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. Idle.

Wickwire Brothers, Cortland. Annual capacity, 1,500 tons of wire, all consumed in their own works.

Wolff (R. H.) & Co. Limited, 117th and 118th sts. and Harlem River, New York City. Fine wire of all kinds.

NEW JERSEY—5.

Benjamin (The) Atha and Illingworth Company, Newark. Works at Harrison. Rods. Annual capacity, 5,000 tons.

Roebling's (John A.) Sons Company, Trenton. Rods and wire. Annual capacity, 36,000 tons of rods and 32,000 tons of wire.

Stewart Hartshorn Company, East Newark. Draws wire for its own use in the manufacture of shade rollers. Annual capacity, 600 tons.

Trenton (The) Iron Company, Trenton. Rods and wire. Annual capacity, 18,000 tons of rods and 20,000 tons of wire.

West Bergen Steel Works, Spaulding, Jennings & Co., Jersey City. Rods and wire. Rods all consumed by the firm in their own works in the manufacture of wire. Annual capacity, 2,000 tons of wire.

PENNSYLVANIA—16 COMPLETED AND 1 TO BE REBUILT.

Cambria Iron Company, Harrison Building, Philadelphia. Works at Johnstown. Rods. Annual capacity, 27,000 tons.

Carpenter Steel Company, Reading. New York office, 1 Broadway. Rods and wire. Annual capacity, 1,250 tons of rods and 750 tons of wire.

Consolidated Steel and Wire Company, Rookery Building, Chicago. Three works: Allentown works, at Allentown; rods and wire; annual capacity: rods, 60,000 tons; wire, 65,000 tons. Pittsburgh Works, at Rankin Station, Allegheny county; rods and wire; annual capacity: rods, 50,000 tons; wire, 70,000 tons. Beaver Falls Works, at Beaver Falls; rods and wire; annual capacity: rods, 80,000 tons; wire, 65,000 tons. *See Ohio, Illinois, and Missouri.*

Hazard (The) Manufacturing Company, Wilkesbarre. Draws wire for its own use in the manufacture of wire rope.

Kidd (The) Brothers and Burgher Steel Wire Company, McKee's Rocks. Drill rods and needle, dental, surgical, and other high grades of steel wire. Annual capacity, 180 tons.

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.

Murray (Austin) & Co., Mascher st., above Oxford st., Philadelphia.

New Castle Wire Nail Company, New Castle. Rods and wire. Annual capacity, 60,000 tons of rods and 54,000 tons of wire.

Oliver Wire Company, South Tenth and Muriel sts., 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 Company, North Penn Junction, Philadelphia. Annual capacity, 9,000 tons of wire, all consumed in the company's nail works. Works destroyed by fire in 1895; to be rebuilt in 1896.

Pittsburgh Wire Company, 232 Fifth ave., Pittsburgh. Works at Braddock. Rods and wire. Annual capacity, 40,000 tons of rods and 40,000 tons of wire.

Stewart Wire Works, Stewart Wire Company, Easton. Works at South Easton. Annual capacity, 20,000 tons of wire.

Townsend, (C. C. & E. P.,) New Brighton. Works at Fallston. Annual capacity, 10,000 tons of wire.

WEST VIRGINIA—1.

Columbia Barb Wire and Nail Works, The Biddle Purchasing Company, lessee, Kanawha City. Annual capacity, 18,000 tons of wire. *See Ashley Wire Works, Illinois.*

OHIO—9.

American Wire Company, Cleveland. Rods and wire. Annual capacity, 100,000 tons of rods and 45,000 tons of wire.

Cincinnati Barbed Wire Fence Company, Fairmount Station, Cincinnati. Annual capacity, from 55,000 to 60,000 tons of wire.

Cleveland Rolling Mill Company, Cleveland. Rods and wire. Annual capacity, 100,000 tons of rods and 70,000 tons of wire.

Cleveland Works, Consolidated Steel and Wire Company, Rookery Building, Chicago. Works at Cleveland. Rods and wire. Annual capacity, 60,000 tons of rods and 36,000 tons of wire. *See Pennsylvania, Illinois, and Missouri.*

Cuyahoga Wire Company, Cuyahoga Falls.

H. P. Nail Company, Cleveland. Rods and wire. Annual capacity, 50,000 tons of rods and 50,000 tons of wire, used by the company in making nails.

Salem (The) Wire Nail Company, Salem. Three works: Salem Works, at Salem; annual capacity, 30,000 tons of wire. Findlay Works, at Findlay; annual capacity, 30,000 tons of wire. New Philadelphia Works, at New Philadelphia; annual capacity, 16,000 tons of wire. Product chiefly consumed by the company in the manufacture of wire nails.

INDIANA—1.

American (The) Wire Nail Company, Anderson. Rods and wire. Annual capacity, 45,000 tons of rods and 40,000 tons of wire.

ILLINOIS—13.

Ashley Wire Works, The Biddle Purchasing Company, lessee, Joliet. Annual capacity, 36,000 tons of wire. *See West Virginia.*

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, Ohio, and Missouri.*

Continental Wire Company, Laclede Building, St. Louis, Mo. Works at Granite City. Annual capacity, 22,500 tons of wire.

Dillon-Griswold Wire Company, Sterling. Annual capacity, 36,000 tons of wire.

Garden City Wire and Spring Company, 50 Chester st., Chicago. Annual capacity, 3,000 tons of wire.

Gilbert and Bennett (The) Manufacturing Company, corner Lake and LaSalle sts., Chicago. *See Connecticut.*

Grand Crossing Tack Company, Grand Crossing, Chicago. Annual capacity, 16,200 tons of wire.

Illinois Steel Company, Rookery Building, Chicago. Works at Joliet. Rods. Annual capacity, 75,000 tons.

Laidlaw (The) Bale Tie Company, Joliet. Annual capacity, 7,500 tons of wire.

Rockdale Works, Joliet Enterprise Company, George H. Munroe, Receiver, Joliet. Works at Rockdale, near Joliet. Annual capacity, 45,000 tons of wire. Idle.

Superior Barbed Wire Company, De Kalb. Annual capacity, 50,000 tons of wire.

Waukegan Works, Washburn and Moen Manufacturing Company, Waukegan. Main office, Worcester, Mass.; Chicago office, 107 Lake st. Rods and wire. Annual capacity: rods, 100,000 tons; wire, 60,000 tons. *See Massachusetts.*

WISCONSIN—1.

Cedarburg Wire, Wire Nail, and Screw Company, Cedarburg.

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, Ohio, and Illinois.*

KANSAS—1.

Consolidated Barb Wire Company, Lawrence. Annual capacity, 17,000 tons of wire.

IOWA—1.

McCosh Iron and Steel Company, John T. Remey, Trustee, Burlington. Idle and for sale.

WASHINGTON—2.

Puget Sound Wire Nail and Steel Company, Everett. Annual capacity, 15,000 tons of wire.

Townsend Nail Works, The Port Townsend Steel Wire and Nail Company, Port Townsend. Annual capacity, 10,000 tons of wire.

CALIFORNIA—1.

Pacific Iron and Nail Company, 132 Market street, San Francisco. Works at Oakland.

UNITED STATES.

Number of works in the United States equipped with machinery for rolling wire rods, 23.

Number of works having wire-drawing plants: 73 completed and 1 to be rebuilt.

WIRE-NAIL WORKS.

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 and steel works. The capacity is given in kegs of 100 pounds, and has been furnished by the respective manufacturers.

MASSACHUSETTS—6.

Baker (Charles F.) & Co., 50 Lincoln street, Boston. Sizes, 15, 16, and 17 gauges. Number of nail machines, 54. Annual capacity, 10,000 kegs.

Gurney, (D. B.,) Whitman. Draws wire and makes wire nails. Sizes, up to 20-penny inclusive. Number of nail machines, 33. Annual capacity, 50,000 kegs.

Plymouth (The) Mills, Plymouth. Draw wire for their own use and make wire nails.

Taunton Tack Company, Branch of the Atlas Tack Corporation, Boston. Works at Taunton. Draws wire and makes wire nails. Sizes, up to 4 inches. Number of nail machines, 90. Annual capacity, 15,000 kegs.

Taunton Wire Nail Company, Taunton. Sizes, from $\frac{1}{8}$ to 4 inches. Number of nail machines, 19. Annual capacity, 10,000 kegs.

Wire Goods (The) Company, Worcester. All sizes and kinds of wire nails. Number of nail machines, 100. Annual capacity, double turn, 120,000 kegs.

RHODE ISLAND—1.

American Screw Company, Providence. Draws wire and makes all sizes of wire nails. Number of nail machines, 51.

CONNECTICUT—1.

Russell and Erwin Manufacturing Company, New Britain. Warehouse, 45 Chambers st., New York City.

NEW YORK—6.

Brooklyn Wire Nail Company, 126 Freeman st., Brooklyn. Draws wire and makes wire nails. Sizes, from $\frac{5}{8}$ to 6 inches. Number of nail machines, 75. Annual capacity, 150,000 kegs.

Griswold, (J. Wool,) Troy. Draws wire and makes wire nails. Sizes, from 3-penny fine to 8-inch spikes. Number of nail machines, 20. Annual capacity, double turn, 40,000 kegs.

Hassall, (John,) 63 Elizabeth street, New York City. Works at Clay and Oakland streets, Brooklyn. Sizes, from the smallest nail up to 4 inches. Specialty, escutcheon pins, made of brass, copper, and steel. Number of nail machines, 50. Annual capacity, 5,000 kegs.

Igoe Brothers, 470–72 Driggs avenue, Brooklyn. Draw wire and make wire nails. Sizes, from $\frac{3}{8}$ to 5 inches. Number of nail machines, 25.

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. Sizes, 3 inches and smaller. Number of nail machines, 7. Annual capacity, 3,000 kegs.

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, 21. Annual capacity, 30,000 kegs.

PENNSYLVANIA—8 COMPLETED AND 1 TO BE REBUILT.

Consolidated Steel and Wire Company, Rookery Building, Chicago. Three works: Allentown Works, at Allentown; roll rods, draw wire, and make wire nails; number of nail machines, 76; annual capacity, 500,000 kegs. Pittsburgh Works, at Rankin Station, Allegheny county; roll rods, draw wire, and make wire nails; number of nail machines, 98; annual capacity, 700,000 kegs. Beaver Falls Works, at Beaver Falls; roll rods, draw wire, and make wire nails; number of nail machines, 142; annual capacity, 850,000 kegs. *See Ohio, Illinois, and Missouri.*

New Castle Wire Nail Company, New Castle. Rolls rods, draws wire, and makes wire nails. Number of nail machines, 272. Annual capacity, 1,000,000 kegs.

Oliver Wire Company, South Tenth and Muriel sts., Pittsburgh. Rolls rods, draws wire, and makes all sizes of wire nails. Number of nail machines, 187. Annual capacity, 900,000 kegs.

Philips-Townsend Company, North Penn Junction, Philadelphia. Draws wire and makes all kinds of wire nails. Works destroyed by fire in 1895; to be rebuilt in 1896.

Pittsburgh Wire Company, 232 Fifth ave., Pittsburgh. Works at Braddock. Rolls rods, draws wire, and makes wire nails. Number of nail machines, 62. Annual capacity, 350,000 kegs.

South Easton Wire Nail Company, Easton. Office, 105 Chambers st., New York City. Number of nail machines, 7. Idle.

Townsend, (C. C. & E. P.,) New Brighton. Works at Fallston. Draw wire and make wire nails. Sizes, 60-penny and smaller. Number of nail machines, 50. Annual capacity, 150,000 kegs.

WEST VIRGINIA—1.

Columbia Barb Wire and Nail Works, The Biddle Purchasing Company, lessee, Kanawha City. Draws wire and makes standard sizes of wire nails. Number of nail machines, 52. Annual capacity, 225,000 kegs. *See Ashley Wire Works, Illinois.*

OHIO—6.

Cincinnati Barbed Wire Fence Company, Fairmount Station, Cincinnati. Draws wire and makes all sizes of wire nails. Number of nail machines, 50. Annual capacity, 200,000 kegs.

Cleveland Works, Consolidated Steel and Wire Company, Rookery Building, Chicago. Works at Cleveland. Roll rods, draw wire, and make wire nails. Number of nail machines, 118. Annual capacity, 750,000 kegs. *See Pennsylvania, Illinois, and Missouri.*

H. P. Nail Company, Cleveland. Rolls rods, draws wire, and makes all sizes of wire nails. Number of nail machines, 330. Annual capacity, 1,250,000 kegs.

Salem (The) Wire Nail Company, Salem. Three works: Salem Works, at Salem; 106 nail machines; annual capacity, 500,000 kegs. Findlay Works, at Findlay; 100 nail machines; annual capacity, 500,000 kegs. New Philadelphia Works, at New Philadelphia; 60 nail machines; annual capacity, 300,000 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 of nails. Number of nail machines, 30. Annual capacity, 75,000 kegs.

ILLINOIS—10.

Ashley Wire Works, The Biddle Purchasing Company, lessee, Joliet. Draw wire and make wire nails. Sizes, from 2-penny to 20-penny. Number of nail machines, 22. Annual capacity, 40,000 kegs. *See West Virginia.*

Dillon-Griswold Wire Company, Sterling. Draws wire and makes all sizes of wire nails. Number of nail machines, 30. Annual capacity, 60,000 kegs.

Garden City Wire and Spring Company, 50 Chester street, Chicago. Draws wire and makes wire nails. Sizes, from 2-penny to 60-penny. Number of nail machines, 6. Annual capacity, 22,500 kegs.

Grand Crossing Tack Company, Grand Crossing, Chicago. Draws wire and makes all sizes of wire nails. Number of nail machines, 105. Annual capacity, 360,000 kegs.

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. Number of nail machines, 140. Annual capacity, 900,000 kegs. *See Pennsylvania, Ohio, and Missouri.*

Laidlaw (The) Bale Tie Company, Joliet. Draws wire and makes wire nails. Sizes, from 3-penny to 60-penny. Daily capacity, 200 kegs.

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.

Stanley (The George W.) Company, Belleville. 25 nail machines.

Superior Barbed Wire Company, De Kalb. Draws wire and makes standard sizes of wire nails. Number of nail machines, 100. Annual capacity, 300,000 kegs.

WISCONSIN—3.

Cedarburg Wire, Wire Nail, and Screw Company, Cedarburg. Draws wire and makes wire nails. Sizes, from ¾ to 4 inches. Number of nail machines, 9.

Janesville Barb Wire Company, Janesville. Sizes, from the smallest to 60-penny. Number of nail machines, 8. Annual capacity, 50,000 kegs.

Milwaukee Tack Company, P. O. Box 166, Milwaukee. Works at Layton Park. Small wire nails only. Number of nail machines, 9. Annual capacity, about 4,000 kegs.

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. Number of nail machines, 80. Annual capacity, 400,000 kegs. *See Pennsylvania, Ohio, and Illinois.*

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, 71. Annual capacity, 300,000 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—3.

Judson Manufacturing Company, Oakland. Office and salesroom, corner Howard and Beale sts., San Francisco. Number of nail machines, 4.

Pacific Iron and Nail Company, 132 Market st., San Francisco. Works at Oakland. Draws wire and makes wire nails. Number of nail machines, 22. Annual capacity, 60,000 kegs.

Pacific Works, Washburn and Moen Manufacturing Company, San Francisco. Main office, Worcester, Mass.; San Francisco office, 10 Pine st. Sizes, from 2-penny to 12-inch spikes. Number of nail machines, 32. Annual capacity, 120,000 kegs.

UNITED STATES.

Total number of wire-nail works in the United States: 53 completed and 1 to be rebuilt.

BRIDGEBUILDING WORKS.

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 the companies named build both 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. Railroad and highway bridges. Annual capacity, 4,000 tons.

CONNECTICUT—1.

Berlin (The) Iron Bridge Company, East Berlin. Annual capacity, 12,000 tons.

NEW YORK—9.

Buffalo Bridge and Iron Works, Buffalo. Railroad and highway bridges. Annual capacity, 7,500 tons.

Elmira Bridge Company Limited, Elmira. Annual capacity, 30,000 tons.

Groton Bridge Manufacturing Company, Groton. Annual capacity, 10,000 tons.

Havana Bridge Works, Montour Falls. Railroad and highway bridges. Annual capacity, 5,000 tons.

Hilton Bridge Works, Hilton Bridge Construction Company, Commercial Bank Building, Albany. Works, Bridge st., North Albany. Annual capacity, 7,500 tons.

Horseheads Bridge Company, Horseheads. Highway bridges. Annual capacity, 1,500 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.

NEW JERSEY—3.

Passaic Rolling Mills and Bridge Works, The Passaic Rolling Mill Company, Paterson. Annual capacity, 13,500 tons.

Roebling's (John A.) Sons Company, Trenton. Suspension bridges.

Trenton Iron Works, New Jersey Steel and Iron Company, Trenton. Annual capacity, 24,000 tons.

PENNSYLVANIA—14.

Allentown (The) Rolling Mills, Allentown. Highway bridges only. Annual capacity, 3,000 tons.

Keystone Bridge Works, The Carnegie Steel Company, Limited, Carnegie Building, Pittsburgh. Works on Fifty-first st. Annual capacity, 35,000 tons. (Formerly owned by the Keystone Bridge Company.)

Keystone Structural Company, Royersford. Estimated annual capacity, 6,000 tons.

Pencoyd Bridge and Construction Company, A. and P. Roberts Company, 261 South Fourth st., Philadelphia. Works in Montgomery county, opposite Manayunk. Annual capacity, from 35,000 to 55,000 tons.

Penn Bridge Company, Beaver Falls. Annual capacity, 5,000 tons.

Pennsylvania (The) Steel Company, Girard Building, Philadelphia. Works at Steelton. Annual capacity, 16,000 tons.

Philadelphia (The) Bridge Works, Cofrode & Saylor, (incorporated,) 257 South Fourth st., Philadelphia. Works at Pottstown. Annual capacity, from 18,000 to 20,000 tons.

Phœnix Bridge Works, The Phœnix Bridge Company, 410 Walnut st., Philadelphia. Works at Phœnixville. Annual capacity, 50,000 tons.

Pittsburgh Architectural Iron Works, Incorporated, 236 First ave., Pittsburgh. Works at Canonsburg. Weekly capacity, from 150 to 400 tons.

Pittsburgh (The) Bridge Company, Thirty-eighth st. and A. V. Ry., Pittsburgh. Annual capacity, 12,000 tons.

Pottsville Bridge Works, Pottsville Iron and Steel Company, Pottsville. Annual capacity, 7,500 tons.

Schultz Bridge Iron Works, Schultz Bridge Iron Company, McKee's Rocks. Annual capacity, 10,000 tons.

Shiffler Bridge Works, Shiffler Bridge Company, Forty-eighth st. and A. V. Ry., Pittsburgh. Annual capacity, 12,000 tons.

Union Bridge Company, Athens. New York office, 1 Broadway. Railroad bridges only. Annual capacity, from 15,000 to 18,000 tons.

DELAWARE—1.

Edge Moor Bridge Works, Wilmington. Works at Edge Moor. Annual capacity, 30,000 tons.

MARYLAND—2.

Enterprise Iron Works, Campbell and Zell Company, Equitable Building, Baltimore. Works at Fell's Point. Annual capacity, 2,000 tons.

Maryland Steel Company, Girard Building, Philadelphia. Works at Sparrow's Point. Annual capacity, 10,000 tons.

VIRGINIA—1.

Virginia Bridge and Iron Company, Roanoke. Southern office, Anniston, Alabama. Annual capacity, 4,000 tons.

WEST VIRGINIA—1.

West Virginia Bridge Works, Vulcan Road Machine Company, Charlestown. Highway bridges. Annual capacity, 1,200 tons.

KENTUCKY—1.

Louisville Bridge and Iron Company, cor. Oldham and Eleventh sts., Louisville. Annual capacity, 7,500 tons.

ALABAMA—1.

Southern Bridge Company, Birmingham. Works at Avondale. Highway bridges. Annual capacity, 500 tons.

TEXAS—1.

Southwestern Bridge and Iron Company, Fort Worth. Annual capacity, 2,000 tons.

OHIO—14.

Bellefontaine (The) Bridge and Iron Company, Bellefontaine. Works at South Bellefontaine. Highway bridges.

Brackett (The) Bridge Company, 84-85 Smith Building, Cincinnati. Works at Glendale. Annual capacity, 10,000 tons.

Canton (The) Bridge Company, Canton. Annual capacity, 3,500 tons.

Champion Bridge Works, The Champion Bridge Company, Wilmington. Highway bridges only. Annual capacity, 2,000 tons.

Champion (The) Iron Company, Kenton. Highway bridges only. Annual capacity, 5,000 tons.

Iron (The) Substructure Company, Columbus. Office, 82-88 Wesley Block. Highway bridges principally.

King (The) Bridge Works, The King Bridge Company, Cleveland. Annual capacity, 20,000 tons.

Massillon (The) Bridge Company, Massillon. Annual capacity, 8,000 tons.

New Columbus (The) Bridge Company, Columbus. Annual capacity, 5,750 tons.

Standard Boiler and Bridge Company, Bellaire. Light bridges.

Toledo (The) Bridge Company, Toledo. Annual capacity, 10,000 tons.

Variety (The) Iron Works Company, Cleveland. Annual capacity, 6,000 tons.

Wrought Iron Bridge Company, Canton. Works at South Canton. Annual capacity, 10,000 tons.

Youngstown (The) Bridge Company, Youngstown. Annual capacity, 7,500 tons.

INDIANA—3.

Indiana Bridge Company, Muncie. Railroad and highway bridges. Annual capacity, 10,000 tons.

La Fayette (The) Bridge Company, La Fayette. Annual capacity, 5,000 tons.

Wabash Bridge and Iron Works, Wabash. Railroad and highway bridges.

ILLINOIS—4.

American Bridge Works, Fortieth st. and Stewart ave., Chicago. Annual capacity, 30,000 tons.

Chicago Bridge and Iron Company, One-hundred-and-fifth and Troop sts., Chicago. Annual capacity, 10,000 tons.

Kenwood Bridge Company, 617 First National Bank Building, Chicago. Works at Grand Crossing. Annual capacity, 6,500 tons.

Lassig Bridge and Iron Works, 707 Rookery Building, Chicago. Works, corner Clybourn and Wrightwood avenues. Railroad and heavy highway bridges. 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, J. G. Wagner, proprietor, Seventeenth st. and St. Paul ave., Milwaukee. Annual capacity, 8,000 tons.

Wisconsin Bridge and Iron Company, 707 Pabst Building, Milwaukee. Works at North Milwaukee. Annual capacity, 5,000 tons.

MINNESOTA—1.

Gillette-Herzog (The) Manufacturing Company, Minneapolis. Annual capacity, 7,000 tons.

IOWA—3.

Clinton Bridge and Iron Works, Clinton. Highway bridges. Annual capacity, from 5,000 to 6,000 tons.

Fair-Williams Bridge and Manufacturing Company, Ottumwa. Annual capacity, 1,000 tons.

Marshalltown Bridge and Iron Works, Marshalltown. Railroad and highway bridges.

MISSOURI—3.

Koken Iron Works, Manchester road and Missouri Pacific R. R., St. Louis. Annual capacity, 2,000 tons.

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, 8,000 tons.

KANSAS—1.

Missouri Valley Bridge and Iron Works, Leavenworth. Railroad and highway bridges. Annual capacity, 12,000 tons.

CALIFORNIA—3.

Judson Manufacturing Company, office and salesroom, corner Howard and Beale sts., San Francisco. Works at Oakland.

Pacific (The) Rolling Mill Company, 202 Market st., San Francisco. Works at Potrero. Railroad and highway bridges. Annual capacity, 6,000 tons.

Phelps (The) Manufacturing Company, 15 Drumm st., San Francisco. Works at Black Point. Idle.

UNITED STATES.

Total number of bridgebuilding works in the United States: 74.

IRON AND STEEL SHIPBUILDERS.

MAINE—2.

Bath Iron Works Limited, Bath. Yards on Water street. Gunboats, rams, passenger steamers, yachts, etc.

Sewall (Arthur) & Co., Bath. Sailing vessels.

MASSACHUSETTS—3.

Atlantic (The) Works, East Boston. All kinds of vessels up to 300 feet in length.

City Point Works, Harrison Loring, Boston. Yards at City Point, South Boston. Ocean going and inland vessels.

Lawley and Son (George) Corporation, South Boston. Steam and sailing yachts of all kinds.

RHODE ISLAND—1.

Herreshoff Manufacturing Company, Bristol. Torpedo boats and steam and sailing yachts.

NEW YORK—3.

Continental (The) Iron Works, Brooklyn. Ferry-boats and steam and sailing vessels.

Marvel (T. S.) & Co., Newburgh. All kinds of vessels.

Union (The) Dry Dock Company, Buffalo. All kinds of vessels.

NEW JERSEY—3.

Crescent (The) Ship Yard, Lewis Nixon, lessee, Elizabethport. Oil tank vessels, steam and sailing yachts, steam ferry-boats, stern-wheel boats, and steam and towing canal boats.

Dialogue (John H.) & Son, Camden. Cruisers, merchant steamers, sailing vessels, yachts, tugs, etc.

Ramsay, (Hugh,) Perth Amboy. All kinds of vessels.

PENNSYLVANIA—5.

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.

Schultz Bridge Iron Works, Schultz Bridge Iron Company, McKee's Rocks. Steel transfer barges.

DELAWARE—2.

Harlan and Hollingsworth (The) Company, Wilmington. Yards on the Christiana river. Steam vessels of all descriptions.

Pusey and Jones (The) Company, Wilmington. All kinds of vessels.

MARYLAND—3.

Columbian Iron Works, The Columbian Iron Works and Dry Dock Company, Locust Point. All kinds of vessels.

Maryland Steel Company, Girard Building, Philadelphia. Works at Sparrow's Point. All kinds of steam and sailing vessels and barges.

Reeder (The Charles) and Sons Shipbuilding Company, Baltimore. Small vessels.

VIRGINIA—1.

Newport News (The) Shipbuilding and Dry Dock Company, Newport News. Main office, 1 Broadway, New York City. 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. All kinds of vessels.

Globe (The) Iron Works Company, West Centre and Spruce sts., Cleveland. Passenger and freight steamships, barges, yachts, tugs, light-house tenders, revenue cutters, etc.

INDIANA—1.

Howard's Ship Yard, Edward J. Howard, Jeffersonville. Principally river steamers and barges.

ILLINOIS—1.

Chicago Ship Building Company, 1013 Rookery Building, Chicago. Yards at South Chicago. All kinds of vessels.

MICHIGAN—3.

Detroit and Wyandotte Ship Yards, Detroit Dry Dock Company, Detroit. Yards at Detroit and Wyandotte. All kinds of vessels over 100 feet long.

Wheeler (F. W.) & Co., West Bay City. All kinds of vessels.

WISCONSIN—1.

American Steel Barge Works, American Steel Barge Company, West Superior. Principal office, 36 Wall st., New York City. All kinds of vessels; whalebacks principally. *See Washington.*

IOWA—1.

Iowa Iron Works, Dubuque. Torpedo boats, revenue cutters, river steamboats, etc., not exceeding 8 feet draft.

WASHINGTON—2.

American Steel Barge Works, American Steel Barge Company, 36 Wall st., New York City. Yards at Everett. Whalebacks principally, but are equipped for building all kinds of vessels. *See Wisconsin.*

Moran Brothers, Seattle. All kinds of vessels, including torpedo boats, etc.

CALIFORNIA—1.

Union Iron Works, 222 Market st., San Francisco. Yards at Potrero. Battle-ships, steamships, steam-tugs, etc.

UNITED STATES.

Total number of iron and steel ship yards in the United States: 36.

HORSE-NAIL WORKS.

The capacity when given is in net tons of 2,000 pounds and has been furnished 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, 2,000 net tons.

VERMONT—1.

National Horse Nail Company, Vergennes. Office, 97 Chambers street, New York City. Sizes, from No. 2 to No. 12 inclusive. 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. Sizes, from No. 5 to No. 10 inclusive. Brand, "NP."

NEW YORK—4.

Albany Horse Nail Company, Henry L. Smith, Receiver, Albany. Works on Van Rensselaer Island. Idle and for sale.

Ausable 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.

Kankakee Superior Horse Nail Works, Daniel H. Paddock, proprietor, Kankakee. Sizes, from No. 4 to No. 11. Number of machines, 12 Dodge forging and 8 Woodford pointing. Annual capacity, 275 net tons.

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.

Union Horse Nail Company, 603 West Twenty-second st., Chicago. Sizes, from No. 3 to No. 10.

UNITED STATES.

Number of horse-nail works in the United States: 13.

LOCOMOTIVE WORKS.

The following list does not include railroad companies which build locomotives. Unless otherwise stated the works named build freight and passenger locomotives; some also build electric locomotives.

MAINE—1.

Portland Locomotive Works, Portland. All kinds of steam locomotives. Annual capacity, 72.

NEW HAMPSHIRE—1.

Manchester Locomotive Works, Manchester. All kinds of steam locomotives. Annual capacity, 125.

MASSACHUSETTS—1.

General Electric Company, Schenectady, New York. Works at Lynn. Electric locomotives from 2 to 100 tons. Annual capacity, 100. *See New York.*

RHODE ISLAND—1.

Rhode Island Locomotive Works, Providence. Standard and narrow-gauge steam locomotives. Annual capacity, 250.

NEW YORK—5.

Brooks Locomotive Works, Dunkirk. All kinds of steam locomotives. Annual capacity, 400.

Dunkirk Engineering Company, Dunkirk. Geared locomotives from 7 to 50 tons' weight. Annual capacity, 25.

General Electric Company, Schenectady. Electric locomotives from 2 to 100 tons. Annual capacity, 100. *See Massachusetts.*

Hunt (C. W.) Company, 45 Broadway, New York City. Works at West New Brighton. Steam locomotives for industrial railways and mines.

Schenectady Locomotive Works, Schenectady. All kinds, including electric. Annual capacity, 425.

NEW JERSEY—2.

Cooke Locomotive and Machine Company, Paterson. All kinds of steam locomotives. Annual capacity, 180.

Rogers Locomotive Company, Paterson. All kinds of steam locomotives. Annual capacity, 300.

PENNSYLVANIA—6.

Baldwin Locomotive Works, Burnham, Williams & Co., 500 North Broad st., Philadelphia. All kinds of steam, compressed air, and electric locomotives. Annual capacity, 1,000.

Climax Works, Climax Manufacturing Company, Corry. Patent geared steam locomotives for steep grades and sharp curves. Annual capacity, 50.

Dickson Manufacturing Company, Scranton. Standard and special steam locomotives. Annual capacity, 100.

Pittsburgh Locomotive and Car Works, 396 Beaver ave., Allegheny. All kinds of steam locomotives; also prepared to build electric locomotives. Annual capacity, from 250 to 300.

Porter (H. K.) & Co., Pittsburgh. Light steam, electric, and compressed air locomotives; also street motors. Annual capacity, 250.

Vulcan Iron Works, Wilkesbarre. Narrow-gauge steam locomotives. Annual capacity, from 40 to 50.

MARYLAND—1.

Ryan-McDonald Manufacturing Company, Baltimore. Works at South Baltimore. Light steam locomotives of all classes. Annual capacity, 50.

VIRGINIA—2.

Richmond Locomotive and Machine Works, Richmond. All kinds of steam locomotives. Annual capacity, from 150 to 200.

Virginia Iron Works, T. W. Godwin & Co., Norfolk. Narrow-gauge steam locomotives. Annual capacity, 50.

OHIO—1.

Lima (The) Locomotive and Machine Company, Lima. Shay patent and ordinary direct steam locomotives. Annual capacity, 100.

ILLINOIS—1.

Grant Locomotive Works, Siemens and Halske Electric Company of America, 98 Jackson st., Chicago. Works at West Twelfth st. and Robinson ave. All kinds of steam and electric locomotives. Annual capacity, 100.

UNITED STATES.

Total number of locomotive works in the United States: 22.

MALLEABLE IRON WORKS.

The capacity of each works, unless otherwise stated, is given in gross tons of 2,240 pounds.

NEW HAMPSHIRE—1.

Laconia Car Company, Laconia. Four annealing furnaces. Product, car and other castings. Daily capacity, 6 tons.

MASSACHUSETTS—3.

Arcade Malleable Iron Company, Warren McFarland & Co., Worcester. George B. Buckingham, proprietor.

Belcher Malleable Iron Works, Belcher Malleable Iron Company, Easton. Two annealing furnaces. Product, machinery castings of every description; also castings for fire-arms, elevators, agricultural implements, etc. Daily capacity, 1 ton.

Worcester Malleable Iron Works, George B. Buckingham, proprietor, Worcester.

RHODE ISLAND—1.

Rhode Island Malleable Iron Works, Hills Grove. Four annealing furnaces. Daily capacity, 2 tons.

CONNECTICUT—9.

Bridgeport (The) Malleable Iron Company, Bridgeport. Eighteen annealing furnaces. Product, anything required from patterns furnished. Daily capacity, 1¾ tons per furnace.

Fitch (The W. and E. T.) Company, New Haven. Product, saddlery hardware and other castings, chiefly consumed in its own works; also small castings to order.

Malleable Iron Fittings Company, Branford. Seventeen annealing furnaces. Product, steam and gas pipe fittings, railroad and carriage work, and refined castings of every description. Daily capacity, 20 tons.

Malleable Iron Works, New Britain. Product, castings to order.

Mount Carmel Malleable Iron Works, Walter W. Woodruff & Sons, Mount Carmel. Four annealing furnaces. Product, carriage parts and miscellaneous castings. Daily capacity, 2 tons.

Naugatuck (The) Malleable Iron Company, Naugatuck. Works at Union City. Thirteen annealing furnaces. Product, all kinds of castings.

North and Judd (The) Manufacturing Company, New Britain. Nine annealing furnaces. Product, light and medium castings of every description. Daily capacity, 4 tons.

Terry (Andrew) & Co., Pequabuck. Works at Terryville Station. Eight annealing furnaces. Product, light castings, clock keys, and blind hinges. Daily capacity, 5 tons.

Vulcan Iron Works, New Britain. Four annealing furnaces. Product, custom work of all kinds. Daily capacity, 2½ tons per furnace.

NEW YORK—14.

Acme Malleable Iron Works, E. G. Felthousen, proprietor, Buffalo. Product, custom work of all kinds.

Albany Malleable Iron Works, Page & Sill, proprietors, Albany. Four annealing furnaces. Product, all kinds of railroad castings. Daily capacity, 5 tons.

Buffalo Malleable Iron Works, Pratt and Letchworth Company, Buffalo.

Frazer and Jones Company, Syracuse. Product, saddlery hardware and general castings.

Gould Coupler Company, 66 Broadway, New York City. Works at Depew. Ten annealing furnaces. Product, car couplers and railroad castings. Daily capacity, 56 tons.

Johnson (Isaac G.) & Co., Spuyten Duyvil, New York City. Nine annealing furnaces. Product, all kinds of castings. Daily capacity, 18 tons.

Oriskany Malleable Iron Company, Oriskany. Three annealing furnaces. Product, light and heavy castings. Daily capacity, 3 tons.

Osborne (D. M.) & Co., Auburn. Annual capacity, 2,500 tons.

Rood (C. E.) Malleable Iron Works, Lancaster. Product, castings for steam and street railway purposes.

Syracuse Malleable Iron Works, Syracuse. Product, car couplers and other castings.

Torrance Iron Company, Troy. Product, carriage and special castings.

Troy Malleable Iron Company, Troy. Product, general and railroad castings.

Westmoreland Malleable Iron Works, Westmoreland Malleable Iron Company Limited, Westmoreland. Three annealing furnaces. Product, agricultural, saddlery, carriage, traps, hame, and other castings to order. Daily capacity, 3 tons.

Wood (Walter A.) Mowing and Reaping Machine Company, Hoosick Falls. Product, castings for its own use only.

NEW JERSEY—5.

Ballard, (George M.,) Newark. Two annealing furnaces. Product, small castings. Daily capacity, ½ ton.

Barnett, (Estate of Oscar,) Newark. Product, custom work principally.

Meeker, (S. J.,) Newark. Four annealing furnaces. Product, all kinds of castings, from ¼ ounce to 200 lbs. Daily capacity, 6 tons.

Morris & Barlow, Newark. Two annealing furnaces. Product, light castings. Daily capacity, 2 tons.

Trenton Malleable Iron Company, Trenton. Three annealing furnaces.

PENNSYLVANIA—9.

American (The) Malleable Iron Company, Latrobe.

Erie Malleable Iron Company Limited, Erie. Product, all kinds of castings to order. Annual capacity, 6,500 tons.

Jarecki Manufacturing Company Limited, Erie. Six annealing furnaces. Product, iron pipe fittings. Daily capacity, 15 tons.

McConway and Torley (The) Company, Pittsburgh. Product, principally car couplers.

National Hardware and Malleable Iron Works, Thomas Devlin & Co., Third st. and Lehigh ave., Philadelphia. Works at Lehigh ave., American, and Third sts. Five annealing furnaces. Product, carriage, saddlery, wagon, malleable fittings, and tinsmith, trunk, agricultural, and miscellaneous castings. Daily capacity, 7 tons.

Philadelphia Hardware and Malleable Iron Works, Incorporated, Eighth and Jefferson sts., Philadelphia. Six annealing furnaces.

Pittsburgh Malleable Iron Company, Thirty-fourth and Smallman sts., Pittsburgh. Product, air-brake fittings, electric motor gears, gear cases, and miscellaneous castings. Daily capacity, from 10 to 12 tons. Works may be removed to Wilmerding.

Union Malleable Iron Works, Stanley G. Flagg & Co., Nineteenth st. and Pennsylvania ave., Philadelphia. Six annealing furnaces. Product, miscellaneous castings for machinery, hardware, and pipe fittings. Daily capacity, 9 tons.

Union Malleable Iron Works, H. W. Minnemeyer Manufacturing Company, Pittsburgh. Works at Allegheny. Four annealing furnaces. Product, small castings. Daily capacity, 2 tons.

DELAWARE—1.

Wilmington Malleable Iron Company, Wilmington.

MARYLAND—1.

Baltimore Malleable Iron and Steel Casting Company, Charles and Wells sts., Baltimore. Three annealing furnaces. Product, railroad, machinery, and other castings. Daily capacity, 10 tons.

TENNESSEE—1.

Southern Malleable Iron Company, Chattanooga. Eight annealing furnaces. Product, railroad castings, couplers, plow castings, patented articles, etc. Daily capacity, from 8 to 12 tons.

OHIO—12.

Buckeye (The) Malleable Iron and Coupler Company, Columbus. Works at east end of Russell street. Ten annealing furnaces. Product, car couplers, chain links, scissors, and all kinds of castings. Daily capacity, 34 tons.

Canton Malleable Iron Company, Canton. Three annealing furnaces. Product, saddlery hardware and all kinds of patented articles. Daily capacity, 6 tons.

Dayton (The) Malleable Iron Company, Dayton. Product, railroad, car, agricultural, carriage, and other castings to order.

Eberhard (The) Manufacturing Company, Cleveland. Product, saddlery hardware castings.

Elbel & Co., Canton. Three annealing furnaces. Product, saddlery hardware castings. Daily capacity, 2 tons.

Haven (The James L.) Company, 68 Plum st., Cincinnati. One air furnace. Product, carriage and job work. Daily capacity, 4 tons.

Marion Malleable Iron Company, Marion. Four annealing furnaces. Product, general castings. Daily capacity, 4 tons.

National (The) Malleable Castings Company, Cleveland. Two works: One at Cleveland and one at Toledo. Product, general castings to order. *See Indiana and Illinois.*

Springfield Malleable Iron Company, Springfield. Works at George street and C., C., C., and St. L. Railway. Product, general castings to order.

Warder, (The) Bushnell, and Glessner Company, Springfield. Sixteen annealing furnaces. Product, castings for "Champion" binders, mowers, and reapers only. Daily capacity, 13½ tons.

Whiteley Malleable Iron Works, Whiteley Malleable Iron Company, Springfield. Sixteen annealing furnaces. Product, all kinds of agricultural, carriage, and car work, including patent couplers. Daily capacity, 30 tons.

INDIANA—4.

Indianapolis Malleable Iron Works, The National Malleable Castings Company, Indianapolis. General office, Cleveland, Ohio. Works at Haughville, Ind. Product, general castings to order. *See Ohio and Illinois.*

Oliver Chilled Plow Works, South Bend Iron Works, proprietors, South Bend. Four annealing furnaces. Product, small castings for plows. Daily capacity, 3 tons.

Sweet and Clark (The) Company, Marion. Nine annealing furnaces. Product, general castings. Monthly capacity, 225 tons.

Whiteley Malleable Castings Company, Muncie. Fourteen annealing furnaces. Product, agricultural and railroad castings; also manufacturers of "Williams," "National," and "American" car couplers. Daily capacity, 45 tons.

ILLINOIS—10.

Chicago Malleable Iron Works, The National Malleable Castings Company, Chicago. General office, Cleveland, Ohio. Product, general castings to order. *See Ohio and Indiana.*

Crane Company, 10 North Jefferson st., Chicago. Works at 52 Judd st. Ten annealing furnaces. Product, malleable fittings.

Decatur Malleable Iron Works, Decatur. Two annealing furnaces. Product, agricultural implement and carriage castings. Daily capacity, 25 tons.

Deering Harvester Company, 16 Fullerton ave., Chicago. Works on Clybourn ave. Fourteen annealing furnaces. Product, agricultural implement castings, all consumed by the company. Daily capacity, 20 tons.

Illinois Malleable Iron Company, 30 West Monroe st., Chicago. Works at 515 Diversey ave. Six annealing furnaces. Product, pipe fittings and general castings. Daily capacity, 6 tons.

Missouri Malleable Iron Works, Missouri Malleable Iron Company, East St. Louis. Sixteen annealing furnaces. Product, implement, carriage, railroad, street car, and other castings. Daily capacity, 50 tons.

Moline Malleable Iron Company, St. Charles, Kane county.

Rockford Malleable Iron Works, Rockford. Six annealing furnaces. Product, castings for agricultural implements chiefly; also for general purposes. Daily capacity, from 10 to 12 tons.

Union Malleable Iron Company, Moline. Eight annealing furnaces. Product, agricultural castings. Daily capacity, 12 tons.

Western Tube Company, Kewanee. Five annealing furnaces. Product, gas, water, and steam fittings. Daily capacity, 5 tons.

MICHIGAN—3.

Albion Malleable Iron Company, Albion. Six annealing furnaces. Product, agricultural, wagon, carriage, and bicycle castings. Daily capacity, 6 tons.

Michigan Malleable Iron Company, Detroit. Product, car and agricultural castings. Daily capacity, 18 tons.

Standard Malleable Iron Company, Muskegon. Works at Muskegon Heights.

WISCONSIN—7.

Beaver Dam (The) Malleable Iron Company, Beaver Dam. Two double annealing furnaces. Product, all kinds of castings.

Belle City Malleable Iron Company, Racine. Ten annealing furnaces. Product, carriage, wagon, and other castings. Daily capacity, 8 tons.

North-Western Malleable Iron Company, Milwaukee. Fourteen an-

nealing furnaces. Product, agricultural and car work; all castings tested by chemical analysis. Daily capacity, 40 tons.

Racine (The) Malleable and Wrought Iron Company, Racine. Five annealing furnaces. Product, wagon, carriage, saddlery hardware, and other light castings. Daily capacity, 6 tons.

Waukesha Malleable Iron Company, Waukesha. One annealing furnace. Product, farm implements and logging tools. Daily capacity, 5 tons.

Western Malleable and Grey Iron Manufacturing Company, Port Washington. Three annealing furnaces. Product, all kinds of small castings. Daily capacity, 8 tons.

Wisconsin Malleable Iron Company, Milwaukee. Eighteen annealing furnaces. Daily capacity, 35 tons.

MINNESOTA—1.

Leitch Malleable Iron and Bedstead Company, St. Louis Park. Three annealing furnaces. Product, all kinds of castings. Daily capacity, 2,286 pounds.

UNITED STATES.

Number of malleable iron works in the United States: 82.

CAST-IRON PIPE WORKS.

The following list includes manufacturers of cast-iron gas and water pipe and of soil and plumbers' pipe. The daily melting capacity of the works when given has been furnished by the respective manufacturers, and is in gross tons 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, 70 tons.

NEW JERSEY—5.

McNeal (The) Pipe and Foundry Company, Burlington. New York office, 52 Wall st. Sizes, from 1½ to 60 inches inclusive. Manufactures pipe having bell and bead ends, as well as pipe with flanged ends; also pipe with flexible joints for submarine work. Daily melting capacity, 200 tons.

Warren Foundry and Machine Company, Phillipsburg. Office, 160 Broadway, New York City. Sizes, from 3 to 48 inches inclusive. 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—5 CAST IRON AND 1 CAST STEEL.

Emaus Pipe Foundry, Donaldson Iron Company, Emaus. Sizes, from 1½ to 20 inches. Daily melting capacity, 90 tons.

Jackson and Woodin (The) Manufacturing Company, Berwick. Sizes, from 3 to 12 inches. Daily melting capacity, 45 tons.

National Foundry and Pipe Works Limited, Scottdale. Branch office, Pittsburgh. Sizes, from 3 to 48 inches inclusive. Daily melting capacity, 300 tons.

Reading Foundry Company Limited, Reading. Two works. Sizes, from 3 to 48 inches. Daily melting capacity, 140 tons.

CAST STEEL PIPE.

Penn Steel Casting and Machine Company, Chester. Product, cast steel steam pipe, 6 inches and above. Daily melting capacity, 20 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 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, from 3 to 60 inches. Daily melting capacity, 250 tons. *See Ohio.*

Long (Dennis) & Company, Louisville. All sizes. Daily melting capacity, 250 tons.

TENNESSEE—2.

Chattanooga Foundry and Pipe Works, Chattanooga. Sizes, from 3 to 12 inches inclusive. Daily melting capacity, 80 tons. *See Alabama.*

South Pittsburg Pipe Works, South Pittsburg. Sizes, from 3 to 16 inches inclusive. Daily melting capacity, 100 tons.

ALABAMA—3.

Anniston Pipe Works, Anniston Pipe and Foundry Company, Anniston. Sizes, from 3 to 30 inches. Daily melting capacity, 200 tons.

Chattanooga Foundry and Pipe Works, Chattanooga, Tenn. Works at Bridgeport. Sizes, from 14 to 36 inches inclusive. Daily melting capacity, 125 tons. *See Tennessee.*

Howard-Harrison Iron Company, Bessemer. Sizes, from 3 to 60 inches inclusive. Daily melting capacity, 300 tons.

TEXAS—1 COMPLETED AND 1 PARTLY ERECTED.

Jim Hogg Pipe Foundry, State of Texas, owner, Rusk. J. S. Rice, Financial Agent. Sizes, from 4 to 36 inches. Daily melting capacity, 75 tons.

New Birmingham Pipe Works, The New Birmingham Iron and Improvement Company of Texas, New Birmingham. Buildings partly erected; work suspended; when completed will manufacture pipe from 4 to 16 inches, and will have a daily melting capacity of 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.) & Sons, Chicago, Ill. Works at Newcomerstown. Sizes, from 3 to 60 inches. Daily melting capacity, 125 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 36 inches. Daily melting capacity, 125 tons.

ILLINOIS—1.

Massac (The) Iron Company, Metropolis. Sizes, from 4 to 8 inches. Daily melting capacity, 25 tons.

MICHIGAN—1.

Michigan-Peninsular Car Company, Newberry Building, Detroit. Works at West Detroit. Sizes, from 4 to 42 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 16 inches inclusive. Daily melting capacity, 50 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 3 to 24 inches. Daily melting capacity, 60 tons.

OREGON—1.

Oregon (The) Iron and Steel Company, Oswego. Main office, Portland; branch office, 308 Market st., San Francisco. Sizes, from 4 to 32 inches. Daily melting capacity, 40 tons.

SOIL AND PLUMBERS' PIPE.

NEW YORK—7.

Abendroth Brothers, (Corporation,) 109-11 Beekman st., New York City. Works at Port Chester. Sizes, from 2 to 8 inches inclusive. Daily melting capacity, 75 tons.

Beach & Co., Medina. Sizes, from 2 to 8 inches. Daily melting capacity, from 15 to 18 tons.

Bignall (The) Manufacturing Company, Medina. Sizes, from 2 to 6 inches. Daily melting capacity, from 20 to 25 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 (The A. L.) Iron Works, Albert L. Swett, proprietor, Medina. Sizes, from 2 to 8 inches. Daily melting capacity, from 25 to 30 tons.

NEW JERSEY—4.

Columbian Iron Works, The J. D. Johnson Company, 139-43 North Seventh st., Philadelphia. Works at Hainesport. Sizes, from 2 to 15 inches. Daily melting capacity, from 30 to 40 tons.

Foran and Abendroth Manufacturing Company, Flemington. Sizes, from 2 to 6 inches. Daily melting capacity, from 25 to 30 tons.

Monitor Iron Works, 76-80 Centre st., New York City. Works at Newark. Sizes, from 2 to 15 inches. Daily melting capacity, 50 tons. *See New York.*

Salem Iron Works, C. A. Blessing, main office, 516 Montgomery ave., Philadelphia. Works at Salem. Sizes, up to 12 inches. Daily melting capacity, 25 tons.

PENNSYLVANIA—3.

Berlin Iron and Lead Works, The William G. Price Company, Pittsburgh. Works at Penn Station, Westmoreland county. Sizes, from 2 to 14 inches. Daily melting capacity, 50 tons.

Midvale Foundry Company Limited, Allentown. Works at South Allentown. Sizes, from 2 to 6 inches. Daily melting capacity, from 7 to 8 tons.

Phœnix Foundry and Manufacturing Company, Lansdale. Sizes, from 2 to 5 inches. Daily melting capacity, about 10 tons.

DELAWARE—1.

Wilmington Pipe and Foundry Company, Wilmington. Sizes, from 2 to 6 inches inclusive. Daily melting capacity, 20 tons.

MARYLAND—4.

Bartlett, Hayward & Co., Baltimore. New York office, 15 Wall st. Sizes, plumbers' pipe, from 2 to 12 inches; cast-iron flange pipe, from 4 to 30 inches.

McShane (Henry) Manufacturing Company, 441 North st., Baltimore. Two works: One plant on Holliday st., Baltimore, and the other at Dundalk Station, about 3 miles from Sparrow's Point and 6 miles from Baltimore. Sizes, from 2 to 16 inches. Daily melting capacity, from 80 to 90 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 and Ott (The) Manufacturing Company, 327 West Main st., Louisville. Works at Sixth and A sts. Sizes, from 2 to 12 inches inclusive. Daily melting capacity, 40 tons.

TENNESSEE—1.

Shuster Foundry, South Pittsburg. Sizes, from 2 to 12 inches. Daily melting capacity, 30 tons.

ALABAMA—4.

Alabama Pipe Company, Bessemer. Sizes, from 2 to 6 inches inclusive. Daily melting capacity, 30 tons.

Birmingham Soil Pipe Works, Birmingham Soil Pipe Company, Birmingham. Sizes, from 2 to 8 inches. Daily melting capacity, 10 tons.

Gadsden Foundry and Machine Works, Gadsden. Sizes, from 2 to 6 inches. Daily melting capacity, 10 tons.

Hercules Foundry, E. L. Tyler & Co., lessees, Anniston. Sizes, from 2 to 12 inches. Daily melting capacity, 50 tons.

OHIO—3.

Clow (James B.) & Sons, Chicago, Ill. Works at Newcomerstown. Now manufacture cast-iron gas and water pipe only, but expect to make soil and plumbers' pipe in 1896.

Humphryes (The) Manufacturing Company, Mansfield. Sizes, from 2 to 6 inches. Daily melting capacity, 40 tons.

Lorain Pipe Works, Lorain. Idle and for sale. Address James H. Hoyt, Cleveland, Ohio; Edward Woodman, Portland, Maine; or Charles F. Mathewson, 45 William st., New York City.

INDIANA—2.

Bell-Armistead (The) Manufacturing Company, Vincennes. Sizes, from 2 to 15 inches. Daily melting capacity, 50 tons.

Kingsley Foundry Company, Hammond. Sizes, from 2 to 6 inches. Daily melting capacity, 15 tons.

ILLINOIS—4.

Aurora Iron Works, Aurora. Sizes, from 2 to 6 inches. Daily melting capacity, 7 tons.

Bignall (S. L.) Hardware Company, 79-81 Dearborn street, Chicago. Works at St. Charles. Sizes, from 2 to 6 inches. Daily melting capacity, 10 tons.

Russell Brothers & Young, 1155 South Paulina st., Chicago. 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 of pipe and fittings, from 90 to 105 tons.

WISCONSIN—2.

Hoffmann and Billings Manufacturing Company, 100 Second street, Milwaukee. Sizes, from 2 to 12 inches. Daily melting capacity, 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: 33 completed and 1 partly erected.

Number of cast-iron soil and plumbers' pipe works: 36.

Number of cast-steel steam pipe works: 1.

Total number of cast-iron gas and water pipe, cast-iron soil and plumbers' pipe, and cast-steel steam pipe works in the United States: 70 completed and 1 partly erected.

WROUGHT-IRON AND STEEL PIPE WORKS.

In addition to manufacturers of wrought-iron and wrought-steel pipe this list also contains a number of works which manufacture cold-drawn seamless tubes and steel-riveted pipe. When not otherwise stated all the companies named make both wrought-iron and steel pipe. The ton used in giving capacities is the gross ton of 2,240 pounds.

CONNECTICUT—1.

Pope Manufacturing Company, Tube Department, cor. Park and Laurel sts., Hartford. Product, cold-drawn seamless tubes, 2 inches and under.

NEW YORK—2.

Cohoes Tube Works, Aird, Don & Curtis, Cohoes. Sizes, from $\frac{1}{8}$ to 2 inches. Annual capacity, 11,000 tons.

Syracuse Tube Company, Syracuse. Sizes, from $1\frac{1}{4}$ to 8 inches. Annual capacity, 22,500 tons.

NEW JERSEY—2.

Cumberland Nail and Iron Company, Bridgeton. Branch office, 207 Walnut Place, Philadelphia. Product, wrought-iron pipe. Sizes, from $\frac{1}{8}$ to $1\frac{1}{2}$ inches. Annual capacity, 3,200 tons.

East Jersey Pipe Works, Thomas H. Milson, Paterson. Product, steel-riveted pipe. Sizes, 24 inches and upward.

PENNSYLVANIA—22.

Allison (The) Manufacturing Company, Thirty-second and Walnut sts., Philadelphia. Product, wrought-iron pipe.

American Tube and Iron Company, Middletown. Product, wrought-iron pipe. Sizes, from $\frac{1}{16}$ to 16 inches. Annual capacity, 120,000 tons. *See Ohio.*

Byers (A. M.) & Co., (incorporated,) Pittsburgh. Works on the South Side. Product, full weight wrought-iron pipe. Sizes, from $\frac{1}{8}$ inch up.

Chester (The) Pipe and Tube Company, 267 South Fourth st., Philadelphia. Works at South Chester. Product, wrought-iron pipe. Sizes, from $1\frac{1}{2}$ to 12 inches. Annual capacity, 40,000 tons.

Conshohocken Tube Company, Conshohocken. Sizes, from $\frac{1}{8}$ to 4 inches. Annual capacity, 9,000 tons.

Duquesne Tube Works, Duquesne Tube Works Company, Ferguson Block, Pittsburgh. Works at Duquesne. Product, wrought-iron

pipe; also iron and steel boiler tubes. Sizes, from $\frac{1}{8}$ to 8 inches inclusive. Annual capacity, 33,000 tons.

Ellwood Ivins' Tube Company, Oak Lane Station, Philadelphia. Office, 32 Howard st., New York City. Product, cold-drawn steel and other seamless tubes. Sizes, from $\frac{1}{64}$ to 5 inches. Annual capacity, 2,000,000 feet.

Ellwood Weldless Tube Company, Ellwood City. Product, cold-drawn seamless steel tubes. Sizes, from $\frac{1}{4}$ to $2\frac{1}{4}$ inches. Annual capacity, 12,000,000 feet.

Etna Iron and Tube Works, Spang, Chalfant & Co., Pittsburgh. Works at Etna. Sizes, from $\frac{1}{8}$ 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.

Millholland Tube Works, Millholland Tube Company, Reading. Product, cold-drawn seamless steel tubes. Sizes, from $2\frac{1}{2}$ inches outside diameter to minute diameter and gauges; length 12 feet. Annual capacity, 150 tons.

National Tube Works Company, McKeesport. Branch offices, Boston, New York, Pittsburgh, Chicago, and St. Louis. Sizes, from $\frac{1}{8}$ to 24 inches. Annual capacity, 250,000 tons.

New Castle Tube Works, New Castle Tube Company, New Castle. Product, seamless steel tubes. Sizes, from $\frac{1}{8}$ to $2\frac{1}{2}$ inches. Annual capacity, 6,000,000 feet. Enlarging works.

Norristown Iron Works, Estate of James Hooven, Norristown. Sizes, from $\frac{1}{4}$ to $2\frac{1}{2}$ inches, butt welded. Annual capacity, double turn, 5,000 tons. Idle and for sale.

Oil City Tube Company, Oil City. Product, wrought-iron and steel pipe and steel-riveted pipe. Sizes, from $\frac{1}{8}$ to 12 inches. Annual capacity, 50,000 tons.

Oil Well Supply Company, (Continental Tube Works,) Pittsburgh. Sizes, from $\frac{1}{8}$ to 12 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, 165 First ave., Pittsburgh. Works at Soho. Product, wrought-iron pipe. Sizes, from $\frac{1}{8}$ to 30 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, 60,000 tons.

Tyler (The) Tube and Pipe Company, Washington. Product, knobbled charcoal iron tubes exclusively. Sizes, from 1 to 10 inches. Annual capacity, 15,000 tons.

Vulcan Iron Works, James McNeil & Brother, Pittsburgh. Works at Twenty-ninth st. and A. V. Ry. Product, iron and steel riveted pipe. Sizes, from 24 to 61 inches. Annual capacity, 18,000 tons.

DELAWARE—1.

Delaware Iron Company, Morris, Tasker & Co., (incorporated,) New Castle. Office, 222-24 South Third street, Philadelphia. Sizes, from $\frac{3}{8}$ to 16 inches. Annual capacity, 75,000 tons. *See Pascal Iron Works, Pennsylvania.*

WEST VIRGINIA—1.

Riverside Iron Works, Wheeling. Works at Benwood. Product, steel pipe. Sizes, from $\frac{1}{8}$ to 10 inches. Annual capacity, 75,000 tons.

OHIO—5 COMPLETED AND 1 BUILDING.

American Tube and Iron Company, Youngstown. Main office, Middletown, Pa. Product, wrought-iron pipe. Sizes, from $1\frac{1}{2}$ to 20 inches. Annual capacity, 30,000 tons. *See Pennsylvania.*

Brewer (The) Seamless Tubing Company, Toledo. Product, cold-drawn seamless tubes. Sizes, from $\frac{3}{16}$ to 4 inches.

Brilliant Tube and Pipe Works, Brilliant. Building works for the manufacture of tubes.

Kellogg (The) Weldless Tube Company, Findlay. Eastern office, 45 Milk st., Boston, Mass. Product, steel pipe and hot-rolled seamless tubes. Sizes, from $1\frac{1}{2}$ to 7 inches. Annual capacity, 12,000 tons.

Ohio Tube Company, Warren. Sizes, from $\frac{3}{8}$ to 8 inches. Annual capacity, 40,000 tons.

Shelby (The) Steel Tube Company, Shelby. Product, cold-drawn seamless tubes. Sizes, from $\frac{1}{8}$ to 3 inches. Annual capacity, 4,000 tons.

ILLINOIS—2.

Crane Company, 10 North Jefferson st., Chicago.

Western Tube Company, (formerly Haxtun Steam Heater Company,) Kewanee. Sizes, from $\frac{3}{8}$ to 3 inches inclusive, butt welded. Annual capacity, 35,000 tons.

CALIFORNIA—2.

Hooker (J. D.) Company, Los Angeles. Product, steel-riveted pipe. Sizes, from 4 inches to 6 feet in diameter.

Risdon (The) Iron and Locomotive Works, Beale and Howard sts., San Francisco. Product, wrought-iron and steel-riveted pipe. Sizes, from 6 inches up.

UNITED STATES.

Total number of wrought-iron and wrought-steel pipe, iron and steel riveted pipe, and seamless tube works in the United States: 38 completed and 1 building.

CAR-AXLE WORKS.

The following list does not include railroad companies which make car axles. The capacity is given in number of axles in all cases where manufacturers have furnished this information.

MAINE—1.

Eastern Forge Works, Portland. Annual capacity, 15,000. Idle.

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—2.

Boston Forge Company, 340 Maverick st., East Boston. All kinds of axles. Annual capacity, 12,000.

Cape Ann Anchor Works, Gloucester. All kinds of iron and steel axles. Annual capacity, 12,000.

CONNECTICUT—1 BUILDING.

Talcott Forge Works, Lawton & Pratt, New Haven. Building. Iron and steel axles. Estimated annual capacity, 20,000.

NEW YORK—6.

DeLaney Forge and Iron Company, 300 Perry st., 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, 66 Broadway, New York City. Works at Depew. 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 (The) Steel Company, Troy. 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. Car, tender, truck, and locomotive axles. Annual capacity, 8,000 locomotive or 30,000 car axles.

PENNSYLVANIA—19 COMPLETED AND 1 BUILDING.

Allentown (The) Rolling Mills, 229 Drexel Building, Philadelphia. Works at Allentown. Rolled iron axles. Annual capacity, 12,000.

Cambria Iron Company, Harrison Building, Philadelphia. Works at Johnstown. Open-hearth steel axles, annealed and tempered by the Coffin process. Annual capacity, 45,000.

Carnegie (The) Steel Company, Limited, Pittsburgh. Annual capacity, 70,000.

Catasauqua Manufacturing Company, Catasauqua. Rolled iron axles. Annual capacity, 5,200 gross tons.

Dickson Manufacturing Company, Scranton. Makes axles for its own use only.

Erie Forge Company Limited, Erie. Not making car axles at present.

Frankford Steel Works, Frankford Steel Company, Ellwood City. Locomotive, locomotive truck, and passenger car axles. Annual capacity, 2,000 locomotive and 8,000 passenger car axles.

Green Ridge Iron Works, A. L. Spencer, Scranton. Mine car axles only.

Jackson and Woodin (The) Manufacturing Company, Berwick. New York office, 26 Cortlandt st. Straight-rolled iron and steel axles.

Keystone Axle Company, 724 Equitable Building, Baltimore, Md. Building works at Beaver Falls; will manufacture passenger and freight car 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. Hammered wrought scrap axles. Daily capacity, 80.

Lockhart Iron and Steel Company, Pittsburgh.

Midvale Steel Company, Nicetown, Philadelphia.

Milton (The) Iron Company, Milton. Mine and other car axles. Annual capacity, 20,000.

Pencoyd Iron Works, A. and P. Roberts Company, 261 South Fourth street, 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 Car Wheel Company, 505 Times Building, Pittsburgh. Works at Home and Hatfield sts. Street and electric car axles.

Pittsburgh Forge and Iron Company, Pittsburgh. Works at Allegheny. Freight, passenger, driving, and truck axles. Annual capacity, 76,000.

Sheldon Axle Company, Wilkesbarre. Mine car axles and wagon and carriage axles only. Annual capacity, from 6,000 to 8,000 mine car axles and 400,000 sets of wagon and carriage axles.

DELAWARE—1.

Johnson Forge Company, Wilmington. Iron and steel axles. Annual capacity, double turn, 3,500.

VIRGINIA—2.

Johnson (J. R.) & Co., Richmond. Works at Maury Station. Hammered iron and steel car, truck, and locomotive axles. Annual capacity, 60,000.

Tredegar Iron Works, The Tredegar Company, Richmond. Car, engine, and small axles of every description. 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. Works at Sixth st. and Shipp ave. Car, tender, truck, and locomotive axles. 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, 1480 Old Colony Building, Chicago, Ill.; New York office, 45 Broadway. Car and locomotive axles. Daily capacity, 120.

OHIO—7.

Cincinnati Forge and Iron Department, Block-Pollak Iron Company, Fifth and Vine sts., Cincinnati. Works at West Front st. Iron and steel locomotive, truck, and car axles. Annual capacity, 50,000.

Cleveland City Forge and Iron Company, Cleveland. Works at Case ave. and Lake st. Iron and steel car axles. Annual capacity, 110,000.

Dorner and Dutton (The) Manufacturing Company, 50-52 Fall st., Cleveland. Works at Fall and Merwin sts. Axles for electric cars. Annual capacity, 5,000.

Fulton Tool Works, Canal Fulton. Mine car axles. Annual capacity, 10,000.

Lake Erie Iron Company, 155 St. Clair st., Cleveland. Locomotive, driving, truck, and M. C. B. car axles. Annual capacity, 48,000.

Otis Steel Works, The Otis Steel Company Limited, Cleveland. Passenger, freight, and driving axles. Annual capacity, from 75,000 to 100,000.

Toledo Car Wheel and Foundry Company, Toledo. Street car axles.

INDIANA—4.

Akron Steam Forge Works, Akron Steam Forge Company, Elwood. Iron and steel car axles. Annual capacity, 30,000.

Bass Foundry and Machine Works, Fort Wayne.

Central (The) Iron and Steel Company, Brazil. Passenger, freight, locomotive, driving, and engine truck axles. Annual capacity, 25,000.

East Chicago Iron and Steel Company, 828 Monadnock Building, Chicago, Ill. Works at East Chicago. 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 and Bell Company, 708 Western Union Building, Chicago. Works at South Chicago. Annual capacity, 50,000.

MICHIGAN—2.

Michigan-Peninsular Car Company, 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 car axles. Annual capacity, 6,000.

MISSOURI—3.

Helmbacher Forge and Rolling Mills Company, corner Barton and DeKalb sts., St. Louis. Car, tender, truck, and driving axles. Annual capacity, single turn, 24,000.

St. Louis Steam Forge and Iron Works, Main and Miller streets, St. Louis. The nine-bar fagot iron axle for railway cars; also tender, truck, and driving axles. Annual capacity, single turn, 30,000.

Union Steel and Iron Company, St. Joseph. Iron and steel hammered axles from iron bars and steel billets. Annual capacity, 20,000.

COLORADO—1.

Denver (The) Boiler and Sheet Iron Works Company, Wazee and Thirty-fifth sts., Denver. Mine car axles. Annual capacity, from 1,000 to 1,500.

UTAH—1.

Silver Iron Works, Silver Iron Company, Provo. Mine and ore car axles. Annual capacity, 1,000. Idle.

CALIFORNIA—3.

Pacific (The) Rolling Mill Company, 202 Market st., San Francisco. Works at Potrero, San Francisco. Annual capacity, 4,000.

Phelps (The) Manufacturing Company, 15 Drumm st., San Francisco. Works at Black Point. Car and locomotive axles. Annual capacity, 2,000. Idle.

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: 64 completed and 2 building.

CAR-WHEEL WORKS.

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 Car Company, Laconia. Product, cast-iron wheels. Annual capacity, 19,000.

VERMONT—2.

Miltimore Elastic Steel Car Wheel Company, Arlington. Product, steel-tired wheels with elastic steel centres. 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 chilled wheels. Annual capacity, 50,000.

Wason Manufacturing Company, Brightwood. Works at Springfield. Product, cast-iron chilled tread wheels. Annual capacity, 20,000.

CONNECTICUT—2.

Barnum Richardson Company, Lime Rock. Product, cast-iron wheels. Annual capacity, 25,000.

Washburn Car-Wheel Company, Hartford. Product, steel-tired wheels. Annual capacity, 5,000.

NEW YORK—11.

Allen Paper Car Wheel Company, 39 Cortlandt st., New York City. Works at Hudson. Product, steel-tired wheels, paper and metal centres. Annual capacity, from 12,000 to 18,000. *See Illinois.*

Brooks Locomotive Works, Dunkirk. Product, Thurber steel-tired wheels.

Buffalo Car Wheel Works, Buffalo. Works at 534 Louisiana st. Product, cast-iron wheels. Annual capacity, 50,000. Idle.

National Car Wheel Company, P. O. 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 wheels for steam, electric, and street cars. Annual capacity, 200,000.

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, electric, and horse 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, 200,000.

NEW JERSEY—2.

Canda Manufacturing Company, 11 Pine st., New York City. Works at Carteret. Product, Canda contracted chilled wheels. Daily capacity, 350.

Taylor Iron and Steel Company, High Bridge. Product, chilled cast-iron and steel-tired wheels. Annual capacity, 40,000 cast-iron and 5,000 steel-tired.

PENNSYLVANIA—20 COMPLETED AND 1 PROJECTED.

Boies Car Wheel Works, The Boies Steel Wheel Company, Scranton. Product, steel-tired wheels, with forged iron centres. Annual capacity, 10,000.

Cayuta Wheel and Foundry Company, Sayre. Product, chilled cast-iron wheels. Annual capacity, 70,000.

Chester Steel Castings Company, 407 Library street, Philadelphia. Works at Chester. Steel wheels.

Connellsville Machine and Car Company, Connellsville. Product, chilled mine car wheels. Annual capacity, 20,000.

Eagle Iron Works, Henry Walters Sons, Tamaqua. Product, mine car wheels. Annual capacity, about 1,000.

Harman & Hassert, Bloomsburg. Product, mine car wheels. Annual capacity, 20,000.

Harrisburg Car Manufacturing Company, Commonwealth Guarantee, Trust, and Safe Deposit Company, Receiver, Harrisburg. Product, cast-iron wheels. Annual capacity, 36,000. Idle.

Hazleton Iron Works Company, Hazleton. Product, mine car wheels.

Hockensmith Wheel and Mine Car Company, Irwin. Product, mine car wheels. Annual capacity, 31,000.

Hodge Foundry and Machine Shop, The Hodge Manufacturing Company, Greenville. Product, chilled or plain mine car wheels. Annual capacity, 15,000.

Huntingdon Car and Car Wheel Works, M. A. O'Byrne, Savannah, Georgia. Works at Huntingdon. Product, chilled cast-iron wheels. Annual capacity, 20,000. Machinery may be removed to the South in 1896.

Jackson and Woodin (The) Manufacturing Company, Berwick. New York office, 26 Cortlandt street. Annual capacity, 100,000 chilled freight and 55,000 mine car wheels.

Kingston Car Wheel Company, Kingston. Works at Forty Fort. Experimenting with machinery for the manufacture of special wheels under patents. Estimated annual capacity, 100,000.

Kittanning Foundry and Machine Shop, John Marshall & Co., Kittanning. Product, coal car wheels. Annual capacity, from 8,000 to 10,000.

Lehigh Car, Wheel, and Axle Works, McKee, Fuller & Co., Catasauqua. Works at Fullerton. Product, cast-iron and steel-tired wheels. Daily capacity, 300 cast-iron and 50 steel-tired.

Philadelphia Car Wheel Company, 807 Girard Building, Philadelphia. Works at Snyder avenue and Swanson street. 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, wheels for steam, street railway, and mine car service. Annual capacity, 45,000.

Redstone Foundry, U. G. Miller, Uniontown. Product, pit car wheels. Annual capacity, 13,000.

Standard (The) Steel Works, Harrison Building, 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. Annual capacity, 120,000.

PROJECTED.

Facer (The) Forged Steel Car Wheel and Locomotive Wheel Company, Independent Building, Germantown, Philadelphia. Contemplates erecting works at Plymouth, Montgomery county. Product to be solid steel forged wheels for steam and electric cars.

DELAWARE—1.

Lobdell Car Wheel Company, Wilmington. Product, chilled and unchilled wheels. Annual capacity, 150,000.

MARYLAND—1.

Baltimore (The) Car Wheel Company, Baltimore. Works at Fulton Junction, Baltimore. Product, all kinds of chilled wheels and electric motor and cable trucks. Annual capacity, 120,000.

VIRGINIA—3.

Old Atlantic Iron Works, W. A. Anderson, 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, 2,000.

Tredegar Iron Works, The Tredegar Company, Richmond. Product, car, engine, and mine car wheels. Annual capacity, 30,000.

WEST VIRGINIA—2.

Bluefield Iron Works, William A. Cather, Bluefield. Product, mine and logging wheels. Annual capacity, 8,000.

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.

KENTUCKY—1.

Louisville Car Wheel and Railway Supply Company, Louisville. Product, chilled cast-iron wheels. Annual capacity, 50,000.

TENNESSEE—4.

Chattanooga Car and Foundry Company, Chattanooga. Product, all kinds of cast-iron wheels. Annual capacity, 20,000.

Knoxville Car Wheel Company, L. H. Spilman, Receiver, Knoxville. Product, chilled cast-iron wheels. Annual capacity, 50,000. Idle since June, 1892.

Lenoir Foundry Company, Lenoir City. Daily capacity, from 200 to 300 wheels.

Memphis Car and Foundry Company, Memphis. Product, freight and passenger car wheels. Annual capacity, 65,000.

ALABAMA—4.

Decatur Car Wheel and Manufacturing Company, New Decatur. Product, chilled cast-iron wheels. Annual capacity, 75,000.

Elliott (The) Car Company, Gadsden. Product, standard railroad car wheels. Annual capacity, 48,000.

Hood Machine Company, Birmingham. Product, small tram wheels for mining cars. Annual capacity, about 12,000.

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—2 COMPLETED AND 1 PARTLY ERECTED.

Dickson Car Wheel Company, Houston. Product, cast-iron wheels. Annual capacity, 50,000.

Jefferson Iron Company, Jefferson. Buildings partly erected; work suspended.

Marshall Car Wheel and Foundry Company, Marshall. Product, engine, tender, truck, and other car wheels. Annual capacity, 50,000.

OHIO—13.

Ball Bearing (The) Car Wheel and Manufacturing Company, Cleveland. Product, mine and light car wheels. Annual capacity, 25,000.

Barney and Smith Car Company, Dayton. Product, cast-iron steam and street car wheels. Annual capacity, 10,000.

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 and Dutton (The) Manufacturing Company, 50–52 Fall st., Cleveland. Works at Fall and Merwin sts. Product, electric motor and street car wheels. Annual capacity, 12,000.

Fulton Tool Works, Canal Fulton. Product, chilled self-oiling mine car wheels. Annual capacity, 25,000.

Fulton (The) Truck and Foundry Company, Cleveland. Works at Cleveland and 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, The Mowry Car Wheel Works Company, 2401 Eastern avenue, Cincinnati. Product, steam and electric car wheels. Annual capacity, 4,000.

Nelsonville (The) Foundry and Machine Company, Nelsonville. Product, self-oiling chilled mine car wheels. Annual capacity, 70,000.

Paige Car Wheel Company, 185 Euclid ave., Cleveland. Product, steel-tired wheels. Annual capacity, 14,000.

Watt (The) Mining Car Wheel Company, Barnesville. Product, chilled self-oiling mine car wheels. Annual capacity, 60,000.

INDIANA—5.

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. Product, all kinds of cast-iron wheels. Annual capacity, 75,000.

Terre Haute Car and Manufacturing Company, Terre Haute. Product, Barr contracting chilled railroad and street car wheels. Annual capacity, 100,000.

ILLINOIS—12.

Allen Paper Car Wheel Company, Chicago. Works at Pullman. Product, steel-tired wheels, paper and metal centres. Annual capacity, from 12,000 to 18,000. *See New York.*

Barker Mine Car and Foundry Company, Springfield. Product, roller-bearing, self-oiling, and plain chilled car wheels. Annual capacity, from 12,000 to 15,000.

Barnum and Richardson Manufacturing Company, 64 South Jefferson st., Chicago. Product, chilled cast-iron wheels in Barr contracting chills for cars and locomotives; also wheels for motor, horse, and cable cars. Annual capacity, 80,000.

Bass, (J. H.,) 707 Rookery Building, Chicago. Works at Clark and Forty-seventh sts. Product, chilled cast-iron wheels. Annual capacity, 45,000.

Fowler Foundry Company, 1323 Monadnock Building, Chicago. Works

at 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, 250,000. *See Minnesota and Colorado.*

Madison Car Company, 821 Security Building, St. Louis, Mo. Works at Madison. Product, all kinds and sizes of chilled cast-iron wheels. Annual capacity, 120,000.

Mount Vernon Car Manufacturing Company, Mount Vernon. Product, chilled cast-iron car and locomotive wheels. Annual capacity, 80,000.

Pullman's Palace Car Company, Pullman. Product, chilled cast-iron freight and passenger car wheels for its own use only. Annual capacity, 100,000.

Steel Truss (The) Car Wheel Company, Shenandoah and Lemp aves., St. Louis, Mo. Works at Edwardsville. Product, steel-tired and steel-centre wheels. Annual capacity, from 5,000 to 6,000.

Wells and French (The) Company, Western Union Building, Chicago. Works at Paulina and Blue Island avenues. Product, chilled cast-iron wheels. Annual capacity, 95,000.

Whiting Car Wheel Company, 225 Dearborn st., Chicago. Works at Harvey. Product, chilled cast-iron wheels. Annual capacity, from 84,000 to 90,000.

MICHIGAN—9.

Grand Rapids Iron Works, Butterworth & Lowe, Grand Rapids. Product, logging, lumber, and other car wheels. Annual capacity, 10,000.

Griffin Car Wheel Company, Detroit. Product, chilled cast-iron 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, 115 East Washington st., Marquette. Product, mine car wheels. Annual capacity, from 1,000 to 1,200.

Michigan-Peninsular Car Company, 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, 37,500.

Schellenberg Safety Car Wheel Company, Detroit. Truck and locomotive wheels.

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, wrought-steel wheels with self-oiling hubs for ore and mining 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.

Griffin Wheel Company, Phalen and Stillwater aves., St. Paul. Product, all kinds of chilled iron wheels. Annual capacity, 90,000. *See Illinois and Colorado.*

MISSOURI—4.

Missouri Car and Foundry Company, Houser Building, St. Louis. Works at 2301 Kosciusko st. Product, locomotive, passenger, freight, motor, mining, ore, logging, truck, and cable car wheels. Annual capacity, 200,000.

St. Charles Car Company, St. Charles. Product, chilled cast-iron wheels. Annual capacity, 86,000.

St. Louis Car Wheel Company, city office, 607-8 Bank of Commerce Building, St. Louis; general office and works, Spring ave. and Mo. Pac. R. R., St. Louis. Product, cast-iron wheels. Annual capacity, 140,000.

Treat (C. A.) Manufacturing Company, Hannibal. Product, cast-iron wheels. Annual capacity, 25,000.

KANSAS—1.

Kansas City Car and Wheel Company, Kansas City. Product, locomotive, passenger, freight, logging, mining, and street car wheels. Annual capacity, 70,000.

COLORADO—2.

Davis (The F. M.) Iron Works Company, Eighth and Larimer sts., Denver. Product, mine car wheels up to 24 inches. Annual capacity, 50,000.

Griffin Wheel Company, Boston Building, Denver. Works at Overland, a suburb of Denver. Product, chilled cast-iron wheels. Annual capacity, 50,000. *See Illinois and Minnesota.*

UTAH—1.

Silver Iron Works, Silver Iron Company, Provo. Product, mine car wheels, chilled and unchilled. Annual capacity, 2,000. Idle.

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: 112 completed, 1 partly erected, and 1 projected.

CARBUILDING WORKS.

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 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.

Keith Manufacturing Company, Isaac N. Keith & Son, Sagamore. All kinds of freight cars. Annual capacity, 800.

Massachusetts Car Company, Exchange Building, Boston. Works at Ashburnham. Street cars only. Annual capacity, from 300 to 600.

Newburyport Car Manufacturing Company, Newburyport. Street cars only. Annual capacity, 300.

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. All kinds of cars for steam or electric railways. Daily capacity, 1 passenger, 2 electric street, and 6 freight cars.

NEW YORK—11.

Buffalo Car Manufacturing Company, Buffalo. All kinds of freight cars.

Hunt (C. W.) Company, 45 Broadway, New York City. Works at West New Brighton, Staten Island. Narrow-gauge cars, less than 30-inch gauge. Annual capacity, 3,500.

Jones' Car Works, J. M. Jones' Sons, West Troy. Electric, cable, and horse cars only. Annual capacity, 600.

Ramapo Iron Works, Hillburn. New York office, 704 Havemeyer Building. Plantation, mine, logging, and standard or narrow-gauge freight cars. Annual capacity, about 1,500.

Rogers (A. L.) & Co., 108 Wall st., New York City. Works at Van Pelt Manor. Street cars only. Annual capacity, 300.

Stephenson (John) Company Limited, 47 East Twenty-seventh st., New York City. Street railway cars of all kinds. Annual capacity, 700.

Stuebner, (G. L.,) Long Island City. Narrow-gauge iron or wood flat, tip, and bottom dump cars. Annual capacity, 400.

Troy Car Works, Atlantic Trust Company, 39 William st., New York City. Works at Troy. All kinds of cars for both steam and street railways. Idle and for sale.

Turl's Iron Works, John Turl's Sons, 534-36 West Twenty-eighth st., New York City. Plantation, mine, and sugar cars; also all patterns of small iron and steel cars for grain, coffee, coal, etc. Annual capacity, from 50 to 75 plantation and mine and 100 sugar cars.

Union (The) Car Company, Buffalo. Works at Depew. Freight cars of all kinds. Annual capacity, 10,000.

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. Idle.

Brooklyn and New York Railway Supply Company, Third and Pine sts., Elizabeth. Electric, cable, horse, and other street railway cars. Annual capacity, 1,800.

Canda Manufacturing Company, 11 Pine st., New York City. Works at Carteret. Freight and passenger cars. Annual capacity, 6,000.

PENNSYLVANIA—25.

Allison (The) Manufacturing Company, Thirty-second and Walnut streets, Philadelphia. Freight cars of every description and electric trucks.

Billmeyer and Small Company, York. Annual capacity, 200 passenger and 1,500 freight cars.

Bloomsburg Car Manufacturing Company, Bloomsburg. Annual capacity, 1,200 freight, 1,000 dump, and 2,000 mine cars.

Carlin's (Thomas) Sons, 186-90 Lacock st., Allegheny. Works at 386-98 River ave. Narrow-gauge flat, incline, and dump cars; also cars for billets, sheets, bars, etc. Annual capacity, 600 flat and 400 dump cars.

Carlisle Manufacturing Company, Carlisle. Freight and mine cars. Annual capacity, 3,000.

Connellsville Machine and Car Company, Connellsville. Coke, construction, and mine cars. Annual capacity, about 2,500.

Erie Car Works, Erie. All kinds of freight cars. Annual capacity, 5,000.

Everson Car Works, H. C. Frick Coke Company, Everson. Coke cars. Annual capacity, 20,000.

Forest City Car and Manufacturing Company, Forest City. Mine cars only. Annual capacity, 5,000.

Harman & Hassert, Bloomsburg. Annual capacity, 2,000 mine and construction cars.

Harrisburg Car Manufacturing Company, Commonwealth Guarantee, Trust, and Safe Deposit Company, Receiver, Harrisburg. Annual capacity, 4,000 freight cars. Idle.

Hazleton Iron Works Company, Hazleton. Mine cars only.

Hockensmith Wheel and Mine Car Company, Irwin. Mine cars only. Annual capacity, 2,000.

Huntingdon Car and Car Wheel Works, M. A. O'Byrne, Savannah, Ga. Works at Huntingdon. Annual capacity, 3,000 steel freight cars. Machinery may be removed to the South in 1896.

Jackson and Woodin (The) Manufacturing Company, Berwick. New York office, 26 Cortlandt st. Annual capacity, 4,000 freight cars.

Lebanon Manufacturing Company, Lebanon. Annual capacity, 3,500 freight, 150 street, 50 passenger, 200 refrigerator, and 200 mine cars; also 75 tenders.

Lehigh Car, Wheel, and Axle Works, McKee, Fuller & Co., Catasauqua. Works at Fullerton. Daily capacity, 20 freight cars.

Lehigh Valley Car Company, Northampton. Annual capacity, 2,000 freight, coal, and mine cars.

Middletown Car Works, Arthur King, Middletown. Freight, mine, and caboose cars. Annual capacity, 2,500.

Milton Car Works, Murray, Dougal & Co. Limited, Milton. All kinds of freight cars. Annual capacity, 3,500.

New Castle Car Works, The New Castle Car Manufacturing Company, New Castle. Flat, box, mine, and street cars. Annual capacity, 500.

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 1,800 street cars; also 5,000 electric motor trucks.

Phillips Mine Supply Company, Pittsburgh. Works on South Twenty-third st. All kinds of mine cars. Annual capacity, 8,000.

Weimer Machine Works Company, Lebanon. Cinder cars for blast furnaces and other iron cars. Annual capacity, over 200.

DELAWARE—2.

Delaware Car Works, Jackson and Sharp Company, Wilmington. Sleeping, parlor, express, mail, baggage, passenger, electric, street, and cable cars. Sectional work for export a specialty.

Harlan and Hollingsworth (The) Company, Wilmington. New York office, 86 Boreel Building; London office, Dashwood House, 9 New Broad st., E. C. All kinds of parlor, boudoir, sleeping, passenger, and baggage cars. Annual capacity, 400. Sectional work for export a specialty.

MARYLAND—2.

Ryan-McDonald Manufacturing Company, 44 South street, 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—2.

American (The) Car Works, Basic City. Annual capacity, 1,000 freight and express cars. Idle and for sale. Address G. G. Gooch, Staunton, Va., or M. A. Booker, Hampton, Va.

Bodley Wagon Company, Staunton. Plantation, mine, and logging cars. Annual capacity, 10,000.

WEST VIRGINIA—1.

Ensign (The) Manufacturing Company, Huntington. Annual capacity, 4,500 freight cars.

TENNESSEE—3.

Chattanooga Car and Foundry Company, Chattanooga. Freight, oil tank, mine, construction, plantation, and cane cars. Annual capacity, 1,000 freight, 1,000 mine, and 2,000 cane cars.

Lenoir (The) Car Company, Lenoir City. All kinds of freight, mine, logging, and cane cars. Annual capacity, 3,000 coal or box and 2,000 other cars.

Memphis Car and Foundry Company, Memphis. Freight, caboose, tank, logging, and other cars. Daily capacity, 15.

NORTH CAROLINA—1.

North Carolina (The) Car Company, Raleigh. Annual capacity, 600 freight cars.

ALABAMA—5.

Elliott (The) Car Company, Gadsden. Freight cars. Annual capacity, 3,600.

Peacock's Iron Works, George Peacock, Selma. Mine, logging, and other small cars. Annual capacity, 5,000.

Union Iron Works Company, Selma. Logging, push, cane, and other small cars. Annual capacity, 1,200.

United States (The) Car Company, Anniston. Office, 1480 Old Colony Building, Chicago, Ill.; New York office, 45 Broadway. 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, Beaumont. Logging and freight cars. Annual capacity, about 600.

Marshall Car Wheel and Foundry Company, Marshall. Annual capacity, 1,000 logging, 300 flat, and 10,000 cane cars.

OHIO—9.

Ball Bearing (The) Car Wheel and Manufacturing Company, Cleveland. Brick, lumber, mine, pit, and other cars. Annual capacity, 8,000.

Barney 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.

Fulton Tool Works, Canal Fulton. Mine cars only. Annual capacity, 1,500.

Jewett Car Works, Jewett Car Company, Jewett. Electric cars only. Annual capacity, 150.

Kuhlman (G. C.) Company, Cleveland. Annual capacity, 200 electric and 100 suburban cars; also 150 electric sweepers.

Lima (The) 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. For sale.

Watt (The) Mining Car Wheel Company, Barnesville. Annual capacity, 5,000 mine cars.

Youngstown (The) Car Manufacturing Company, Youngstown. Works at Haselton. Freight cars only. Annual capacity, 3,000.

INDIANA—4.

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. 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, 7,500.

ILLINOIS—10.

Barker Mine Car and Foundry Company, Springfield. Mine, brickyard, dry-kiln, and ore cars. Annual capacity, 3,000.

Buda Foundry and Manufacturing Company, Harvey. Hand, push, section, mine, ore, dump, plantation, and other light cars.

Burton (The) Stock Car Company, 558 Rookery Building, Chicago. Works at Forty-seventh and Morgan sts. Horse and cattle cars for its own use.

Corey & Co., 80 Metropolitan Block, Chicago. Works at Elston ave. and C., M., & St. P. R. R. Dump and mine cars.

Harvey Steel Car and Repair Works, 1111 Fort Dearborn Building, Chicago. Works at Harvey. All kinds of cars. Daily capacity, 4.

Madison Car Company, 821 Security Building, St. Louis, Mo. Works at Madison. All kinds of freight cars. Annual capacity, 8,500.

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, 1480 Old Colony Building, Chicago. New York office, 45 Broadway. Annual capacity, 6,000 freight cars. *See Alabama.*

Wells and French (The) Company, Chicago. Annual capacity, 9,000 freight, refrigerator, and street 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, 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, plantation, and other cars. Annual capacity, 10,000.

WISCONSIN—1.

Oshkosh Car Company, Oshkosh. Box and flat cars. Daily capacity, 5. For sale. Address Leander Choate.

MINNESOTA—1.

Duluth Manufacturing Company, Duluth. Annual capacity, 4,500 freight and 3,500 ore, lumber, and mine cars.

MISSOURI—7.

American Car Company, St. Louis. Elevated and suburban street cars. Annual capacity, 1,500.

Brownell Car Company, 2300 North Broadway, St. Louis. Street cars only. Annual capacity, 800.

Laclede Car Company, 4500 North Second st., St. Louis. Street cars only. Annual capacity, 1,000.

Missouri Car and Foundry Company, Houser Building, St. Louis. Works at 2800 DeKalb st. Freight, box, fruit, flat, circus, furniture, coal, caboose, stock, refrigerator, mine, ore, tank, horse, 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, 6900 South Broadway, 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.

Kansas City Car and Foundry Company, Kansas City. Refrigerator, stock, box, coal, flat, caboose, logging, and other cars. Annnal capacity, 2,400.

COLORADO—3.

Denver (The) Boiler and Sheet Iron Works Company, Denver. Mine cars. Annual capacity, from 1,000 to 1,500.

Truax (The) Manufacturing Company, 1717 Wazee st., Denver. Patent automatic steel ore cars.

Woeber Carriage Company, 1346 Eleventh street, Denver. Works at South Denver. Cable and electric street cars. Annual capacity, 300.

CALIFORNIA—3.

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 150 street cars.

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 carbuilding works in the United States: 112.

CANADA.

BLAST FURNACES.

NOVA SCOTIÁ—4.

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, 1891, and 1895; one Ford iron-pipe and three Siemens-Cowper fire-brick stoves; 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. Sales made by the company. *See Rolling Mills.*

Nova Scotia (The) Steel Company Limited, New Glasgow, Pictou county. Main office, New Glasgow; branch office, 405 Board of Trade Building, Montreal. (Formed by the consolidation of the New Glasgow Iron, Coal, and Railway Company Limited and the Nova Scotia Steel and Forge Company Limited.) Furnace at 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." (Formerly operated by the New Glasgow Iron, Coal, and Railway Company Limited.) Joseph D. Fraser, Superintendent. Sales made by the company. *See Rolling Mills and Steel Works.*

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." *See Rolling Mills.*

QUEBEC—3.

Canada Iron Furnace Company Limited, Montreal. Furnace at Radnor Forges, Champlain county. One stack, 40 x 9, built and blown in in 1891; steam and water power; one Drummond pipe stove; fuel, charcoal; ores, lake and bog from the company's mines in the Three Rivers district and Lac-a-la-Tortue; product, special char-

coal pig iron for car wheels, chilled rolls, armor plate, and like purposes; annual capacity, 10,000 gross tons. Brand, "C. I. F." (The present stack takes the place of the old Radnor Furnace.) P. H. Griffin, President, and T. Guilford Smith, Vice-President, Buffalo, New York; 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.

McDougall (John) & Co., 574 William street, 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; warm blast; water-power; fuel, charcoal; ore, local limonite; product, car-wheel pig iron; annual capacity, 4,000 gross tons. George McDougall, Manager.

ONTARIO—1.

Hamilton Furnace, The Hamilton Iron and Steel Company Limited, Hamilton, Wentworth county. One stack, 75 x 16, built in 1894–5; blown in December 30, 1895; three Gordon-Whitwell stoves; fuel, Connellsville coke; ores, Ontario hematite and magnetic; product, foundry pig iron; estimated annual capacity, 60,000 gross tons. Brand, "Hamilton." John H. Tilden, President, and John Milne, Vice-President, Hamilton, Ontario; William V. Reynolds, Secretary, and Joseph J. Morehouse, Treasurer and General Manager, New York City.

ROLLING MILLS AND STEEL WORKS.

NOVA SCOTIA—3 COMPLETED AND 1 BUILDING.

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. Fuel used, Nova Scotia soft coal. Idle for some time and 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, muck bar, bar iron, and nail plate; annual capacity, 9,000 gross tons. Brand, "Siemens." Fuel used, bituminous coal. A. T. Paterson, President; John Turnbull, Vice-President; James Phymister, Secretary; F. C. Budden, Treasurer; C. A. Meissner, General Manager. Sales made by the company. *See Furnaces.*

Nova Scotia (The) Steel Company Limited, New Glasgow, Pictou county. Main office, New Glasgow; branch office, 405 Board of Trade Building, Montreal. (Formed by the consolidation of the New Glasgow Iron, Coal, and Railway Company Limited and the Nova Scotia Steel and Forge Company Limited.) Forge built in 1872 and steel plant in 1882; 12 forge fires, 10 coal and 5 gas heating furnaces, 6 trains of rolls, (two 9, one 12, one 16, one 20, and one 26-inch,) 5 hammers, (3 upright, from 10 cwt. to 5 tons, and 2 helve,) and one 20-gross-ton and one 25-gross-ton acid and one 30-gross-ton basic open-hearth steel furnace; first steel made in 1883; 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, 40,000 gross tons of open-hearth steel ingots and 33,000 tons of finished iron and steel products. Fuel used, bituminous coal and producer gas. (Formerly operated by the Nova Scotia Steel and Forge Company Limited.) Graham Fraser, President and General Manager; John F. Stairs, Vice-President; H. Ritchie, Treasurer; Thomas Cantley, Secretary; S. A. Fraser, Superintendent of Steel Works; H. Graham, Purchasing Agent. Sales made by the company. *See Furnaces.*

Pictou Charcoal Iron Company Limited, Bridgeville, Pictou county. Building a rolling mill to contain 2 double puddling furnaces, one 18-inch train of rolls, and one hammer; product to be iron blooms and bars; estimated annual capacity, 4,000 gross tons. Brand, "B. C." Fuel to be used, bituminous coal. James D. McGregor, President, New Glasgow; A. C. McDonald, Secretary and Treasurer, Pictou; Ernst A. Sjöstedt, General Manager, Bridgeville. *See Furnaces.*

NEW BRUNSWICK—2.

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. Sales made by the firm.

Portland Rolling Mills, The Portland Rolling Mills Company Limited, Strait Shore, 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 railway spike machines, one 5-ton helve hammer, 38 cut-nail machines, and 18 tack and shoe-nail machines; product, bar iron, car axles, nail plate, street and mine

rails, fish-plates, ship and railway spikes, knees for ships, shafting, cut nails, shoe nails, tacks, etc.; annual capacity, 10,000 gross tons of finished products, 150 tons of shoe nails and tacks, and 45,000 kegs of cut nails and spikes. Fuel used, bituminous coal. (Formerly operated by J. Harris & Co.) J. C. Robertson, President; S. Hayward, Vice-President; James Mowat, Secretary and Treasurer.

QUEBEC—5.

Canada Rolling Mills and Horse Shoe Works, Peck, Benny & Co., 319-21 Board of Trade Building, Montreal. Works on Mill st. Built about 1828; water-power; 5 heating furnaces, 3 trains of rolls, 140 cut-nail machines, and 27 wire-nail machines; product, iron and steel cut nails, ship and railroad spikes, tacks, brads, wire nails, bar iron, horseshoes, and horse nails. Annual capacity, 10,000 gross tons. Fuel used, bituminous coal.

Grand Trunk Railway Rolling Mill, Point St. Charles, Montreal. Built in 1891-2 and first put in operation May 9, 1892; 2 heating furnaces, one 3-high 12-inch train of rolls, and 6 wire-nail machines; product, bars, angles, and wire nails; annual capacity, 4,000 gross tons. Fuel used, bituminous coal.

Metropolitan Rolling Mills, Abbott & Co., 219 Delorimier ave., Montreal. Built in 1883; equipped with heating furnaces, trains of rolls, and machinery for producing bar iron, cut nails, railroad spikes, pressed spikes, horseshoes, washers, etc.

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 40 wire-nail machines; product, bar and horseshoe iron, nail plate, skelp, horseshoes, horseshoe nails, cut nails, and iron and steel wire nails; annual capacity, 9,000 gross tons of bar and horseshoe iron, 3,500 tons of skelp, 9,000 tons of nail plate, 25,000 kegs of horseshoes, 25,000 boxes of horseshoe nails, 125,000 kegs of cut nails, and 60,000 kegs of wire nails. Brand, "M. R. M. Co.," inclosed in a semi-circle; trade-mark for steel horseshoes, "XL." Fuel used, producer gas and bituminous coal. Andrew Allan, President; Hugh McLennan, Vice-President; William McMaster, Managing Director; A. F. Macpherson, Secretary and Treasurer. Selling agents, W. D. Taylor, Winnipeg, Manitoba; James Crawford, Vancouver and Victoria, British Columbia; John Peters & Co., Halifax, Nova Scotia.

Pillow and Hersey Manufacturing Company Limited, 118 Board of Trade Building, Montreal. Rolling mills and nail works, 104 St. Patrick st.; tack and bolt works, 105 Mill st. Built in 1859; 8 heating furnaces, 4 trains of rolls, (9-inch guide, 12 and 18-inch bar, and 18-inch plate,) 96 cut-nail machines, and 26 wire-nail machines; prod-

uct, cut nails, wire nails, bar iron, railway and pressed spikes, horseshoes, tacks, bolts, and nuts; annual capacity for cut nails, 118,000 kegs; for wire nails, 25,000 kegs. Fuel used, bituminous and anthracite coal and fuel oil. John A. Pillow, President; John R. Hersey, Vice-President; George A. Mac Agy, Secretary.

ONTARIO—5.

Guelph-Norway (The) Iron and Steel Company Limited, Guelph, Wellington county. Built in 1895 and first put in operation January 6, 1896; 8 forge fires, one heating furnace, 2 trains of rolls, (one 10 and one 18-inch,) and one hammer; product, bar iron and bar steel; annual capacity, 5,000 gross tons. Fuel used, bituminous coal. James Watt, President; C. Kloepfer, Vice-President; James Naismith, Secretary and Treasurer; W. S. Patterson, Mechanical Superintendent.

McDonell (The) Rolling Mill Company, 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, 6,000 gross tons. Fuel used, United States bituminous coal. Richard McDonell, Manager. Selling agents, Leather & Watson, Hamilton, Ontario. 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. Fuel used, Pennsylvania bituminous coal in all the works. C. E. Doolittle, President; C. S. Wilcox, Vice-President and Treasurer; W. A. Child, Secretary.

Number of blast furnaces in Canada: 8. Of these 4 use coke and 4 use charcoal for fuel.

Number of rolling mills in Canada: 15 completed and 1 building. Of these 1 makes open-hearth steel.

MEXICO.

BLAST FURNACES.

DURANGO—2.

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; steam-power; two iron-pipe stoves; fuel, coke and charcoal, the coke being made from coal mined near Sabinas; ore, low in phosphorus, mined near the furnace; product, foundry and mill pig iron; annual capacity, 15,000 gross tons. *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—3.

Corcuera, (Manuel L.,) Guadalajara. Furnace at Sierra de Tapalpa, district of Sayula. One stack, 50 x 9, built and blown in in 1869; hot 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." *See Furnaces in Durango and Hidalgo. See Rolling Mills in Durango and Hidalgo.*

HIDALGO—7.

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 was built about 1850, Encarnacion No. 2 was built in 1892, and Guadalupe was built in 1845; steam-power is 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 company, Valentin, Elcoro & Co., and others. *See Furnaces in Durango and Jalisco. See Rolling Mills in Durango and Hidalgo.*

MEXICO—1.

Ferreria del Salto, LaGlise & Sons, Toluca. One small charcoal blast furnace, located 32 miles west of Toluca; water-power; ore, local hematite.

OAXACA—1.

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—2.

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. Richard Honey, President; J. R. Barcroft, Vice-President; Thomas Phillips, Secretary and Treasurer; J. S. McCaughan, Manager. *See Rolling Mills in Hidalgo. See Furnaces in Durango, Jalisco, and 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—1.

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, washers, and horseshoes; 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. Adding one Siemens gas heating furnace. Enrique C. Creel, President; Juan A. Creel, Manager; Francisco Fletcher, Superintendent. Selling agent, José Ma del Rio, City of Mexico.

JALISCO—1.

Corcuera, (Manuel L.,) 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.*

HIDALGO—2.

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. *See Rolling Mills in Durango. See Furnaces in Durango, Jalisco, and Hidalgo.*

Number of furnaces in Mexico: 14. Of these 13 use charcoal for fuel and 1 uses both coke and charcoal.

Number of rolling mills in Mexico: 6. Of these 1 is erecting an open-hearth steel plant.

LATEST INFORMATION.

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 February.

BLAST FURNACES.

PENNSYLVANIA.

Punxsutawney Iron Company, Punxsutawney, Jefferson county. Contemplates erecting a blast furnace at Punxsutawney in the spring of 1896; stack to be 80 x 18, and to be equipped with three 80 x 18 Cowper-Kennedy stoves; product to be foundry and forge pig iron; fuel to be used, local coke; ore, Lake Superior; annual capacity, about 85,000 gross tons. William A. Rogers, President, and J. G. Munro, Treasurer, Buffalo; Adrian Iselin, Jr., Vice-President, New York City; Robert Kelly, Secretary, and John Kennedy, Superintendent, Punxsutawney.

Crane Iron Works, Catasauqua. Officers are now as follows: Leonard Peckitt, President; J. M. Hodge, Secretary and Treasurer. (Page 9.)

Stewart Iron Company Limited, Sharon. Not likely to again operate its No. 1 stack. (Page 21.)

TENNESSEE.

Carnegie Iron Company, Johnson City. Furnace sold November 22, 1895, to Wilberforce Sully, 29 Broadway, New York City. (Page 35.)

Gracey-Woodward Iron Company, Clarksville. Blew in its furnace for the first time on December 8, 1895. (Page 36.)

NORTH CAROLINA.

Carolina Furnace, The North Carolina Steel and Iron Company, Greensboro. Company reorganized; now known as The Greensboro Furnace Company. J. M. Worth, President; E. P. Wharton, Vice-President; J. D. Kase, General Manager; H. M. Worth, Secretary and Treasurer; R. M. Douglas, General Counsel. (Page 38.)

ALABAMA.

Clifton Iron Company, Ironaton. Changing the size of its No. 1 stack from 55 x 13 to 70 x 16. (Page 40.)

Spathite Furnace, Florence. Formerly owned by The Spathite Iron

Company; furnace sold on November 25, 1895, to the Louisville Banking Company, of Louisville, Ky. (Page 42.)

Woodstock (The) Iron Works, Anniston. Altering and repairing one of their two coke stacks at Anniston. The daily capacity of the furnace will be increased from 125 to 165 gross tons. (Page 43.) They may also dismantle their two charcoal furnaces at Anniston, one of which was partly destroyed by fire in 1891. (Page 46.)

OHIO.

Etna (The) Coal and Iron Company, 60 Broadway, New York City. Purchased the Alice, Blanche, and Ironton furnaces, at Ironton, Ohio. The stacks are to be remodeled and enlarged in 1896. Alice and Blanche will be enlarged to 87 x 21, will make Bessemer pig iron, and will have an annual capacity of about 100,000 gross tons each. Ironton Furnace will be enlarged to 75 x 16, will make foundry or Bessemer pig iron, and will have an annual capacity of about 50,000 tons. Frederick J. Stone, President, and George A. Blood, Secretary, 60 Broadway, New York City; Walston H. Brown, Vice-President, and Herbert P. Brown, Treasurer, 40 Wall st., New York City; E. J. Bird, Jr., Superintendent, Ironton, Ohio. (Pages 52 and 53.)

WISCONSIN.

Eagle Furnace, Eagle Iron Company, D. B. Dewey, Receiver, Spring Valley. Furnace to be sold by order of the court in the near future. (Page 60.)

ROLLING MILLS AND STEEL WORKS.

NEW YORK.

Buffalo Steel Foundry, Buffalo. Now operated by the Pratt and Letchworth Company. O. P. Letchworth, President; Josiah Letchworth, Secretary and Treasurer; C. L. Wiedrich and E. C. Wheeler, Superintendents. (Page 84.)

Troy (The) Steel Company, Troy. Site and buildings of the Rensselaer Iron Works sold to the Ludlow Valve Manufacturing Company; the sale does not include the machinery, which is to be removed to the new plant which the Troy Steel Company is erecting on Breaker Island. F. S. Witherbee, President; George A. Bell, Vice-President and General Manager; F. W. Edmunds, Secretary and General Sales Agent; E. D. Arnold, Chief Engineer and General Superintendent. (Page 87.)

NEW JERSEY.

Carteret Steel Company, 149 Broadway, New York City. Building an open-hearth steel plant at Carteret, Middlesex county, N. J. H. A. Jones, President; J. G. Beemer, Vice-President; J. C. Davis, Secretary and Treasurer.

New York Frog and Switch Company, Hoboken. In hands of Frederick K. Day, Receiver. Will be sold at private sale or leased. (Page 90.)

West Bergen Steel Works, Spaulding, Jennings & Co., Jersey City. Wire-drawing and cold-rolling departments damaged by fire in December, 1895; to be rebuilt immediately. (Page 92.)

PENNSYLVANIA.

Brandywine Rolling Mills, Coatesville. Formerly operated by Worth Brothers; now operated by the Worth Brothers Company. (Page 97.)

Lackawanna Iron and Steel Company, Scranton. C. W. McKinney, General Manager, resigned, and Henry Wehrum, formerly Chief Engineer and Superintendent, elected to fill the vacancy. (Page 110.)

Lickdale Iron Company, Lebanon. Works at Lickdale. Sold in January, 1896, to Samuel Weiss, of Lebanon. For sale. (Page 111.)

Mahoning Rolling Mill, Mahoning Rolling Mill Company, Abraham S. Patterson, Receiver, Danville. Philadelphia office, 330 Walnut st. Works have been leased temporarily by the Receiver to C. H. Frick, who is now operating them. The plant is still for sale. (Page 112.)

American Iron and Steel Works, Jones & Laughlins Limited, Pittsburgh. Dismantled puddling furnaces in February, 1896. Will add four 35-gross-ton basic open-hearth steel furnaces. (Page 118.)

Carnegie (The) Steel Company, Limited, Carnegie Building, Pittsburgh. Officers are now as follows: H. C. Frick, Chairman of Board of Managers; J. G. A. Leishman, President; L. C. Phipps, Vice-President and Treasurer; F. T. F. Lovejoy, Secretary; Millard Hunsiker, Assistant to President; Alex. R. Peacock, General Sales Agent; A. M. Moreland, Assistant Secretary and Auditor; John Pontefract, Purchasing Agent; W. W. Blackburn, Assistant Treasurer. (Pages 119–121.)

Franklin (The) Steel Casting Company, Franklin. Adding one 15-gross-ton open-hearth steel furnace. (Page 136.)

New Castle Tube Works, New Castle Tube Company, New Castle. Adding 2 heating furnaces and 2 trains of 20-inch rolls. (Page 138.)

Washington Steel and Tin Plate Mills, Griffiths, Scott & Co., Washington. Building a rolling mill at Washington, to contain 2 pair heating furnaces, 3 hot mills, and 2 cold mills; product to be black plates for tinning. Will also make tin and terne plates. (Page 229.)

A syndicate of capitalists, represented by F. R. Phillips, of Philadelphia, contemplates erecting a rolling mill and an open-hearth steel plant at Reading, Berks county, in 1896. (Page 229.)

TENNESSEE.

Buffalo Iron Company, Nashville. Rolling mill and Bessemer and open-hearth steel works at Chattanooga sold to Thomas Carlin's Sons, 186–90 Lacock st., Allegheny, Pa. Works will not be operated by present owners, and will probably be dismantled. (Page 152.)

OHIO.

Mahoning Valley Iron Company, Youngstown. C. D. Arms, President, died January 17, 1896. Successor not yet elected. (Page 161.)

ILLINOIS.

Pioneer Rail Renewing Company, 334 Rookery Building, Chicago. May erect works near Chicago for renewing worn steel rails.

Potter and Hollis Foundry Company, Rookery Building, Chicago. Has removed its Bessemer converter from East Chicago, Indiana, to Fifty-ninth and Wallace sts., Chicago. (Page 176.)

Illinois Steel Company, Rookery Building, Chicago. At its annual meeting on February 12th a new Executive Committee was elected, as follows: H. H. Porter, Norman Williams, Marshall Field, A. J. Forbes-Leith, and John W. Gates. Charles Pettigrew, Manager of Joliet Works, and F. H. Treat, Superintendent of North Works, have resigned. (Pages 179–80.)

MINNESOTA.

Duluth Manufacturing Company, Duluth. Works leased by Rupley Iron Company. George Rupley, Manager; R. L. Ettinger, Superintendent. (Page 186.)

MISSOURI.

Shickle, Harrison, and Howard Iron Company, St. Louis. May erect a new open-hearth steel plant near St. Louis. (Page 188.)

IOWA.

Green, (James T. R.,) Des Moines. Contemplates erecting a small rolling mill at Des Moines.

TINPLATE WORKS.

Matthai, Ingram & Co., Baltimore. New York address after May 1, 1896, will be 77–79 Beekman st. (Page 229.)

BRIDGEBUILDING WORKS.

Schuylkill (The) Bridge Works, John Denithorne, Son & Co., Phœnixville, Pa. Highway bridges. Annual capacity, 360 gross tons.

Springfield Construction Company, Phœnix Building, Springfield, Mass. Now operating works at Springfield and Holyoke. Railroad and highway bridges. Annual capacity, 5,000 gross tons. Intends erecting new works at Indian Orchard, Mass., in 1896.

CAR-WHEEL WORKS.

Cleveland Wheel and Foundry Works, Cleveland, Ohio. Succeeded by The Cleveland Wheel and Foundry Company. (Page 283.)

Decatur Car Wheel and Manufacturing Company, New Decatur, Ala. Removing plant to Birmingham, Ala. (Page 283.)

INDEX TO NAMES OF WORKS.

This index includes all the blast furnaces, rolling mills, steel works, tinplate works, and forges and bloomaries which are named in this Directory, and which are now active or which have recently been active.

BLAST FURNACES.

ROLLING MILLS AND STEEL WORKS.

TINPLATE WORKS.

FORGES AND BLOOMARIES.

INDEX TO NAMES OF COMPANIES.

This index includes the names of the firms, companies, or individuals operating or owning the blast furnaces, rolling mills, steel works, tinplate works, and forges and bloomaries in the United States, Canada, and Mexico which are named in this Directory.

INDEX TO PIG IRON BRANDS.

This list comprises the names of all the brands of pig iron so far as they are mentioned by the furnace operators in the descriptions of their blast furnaces.