
THE
IRON AND STEEL WORKS

OF
THE UNITED STATES

1901

\$ * 669
Cl.

Bk.

1063

Carnegie • Free • Library



ALLEGHENY, PA.

Donated by

Swank

Accession No.

676915

REFERENCE

L

**Carnegie
Library of
Pittsburgh
Main**

26 May '02

r TS301.A6

1901

Directory to the iron and
steel works of the United
States

Philadelphia, Pa. : The
Association,

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

EMBRACING A FULL LIST OF THE BLAST FURNACES, ROLL-
ING MILLS, STEEL WORKS, RAIL MILLS, STRUCTURAL
MILLS, PLATE AND SHEET MILLS, STEEL CASTING
WORKS, TINPLATE WORKS, WIRE-ROD MILLS,
CUT-NAIL WORKS, WIRE-NAIL WORKS, AND
FORGES AND BLOOMARIES, WITH FULL
PARTICULARS OF EQUIPMENT, PROD-
UCTS, OWNERSHIP, OFFICERS, AND
ALL RECENT CONSOLIDATIONS.

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

COMPILED AND PUBLISHED BY
THE AMERICAN IRON AND STEEL ASSOCIATION.

FIFTEENTH EDITION.
CORRECTED TO DECEMBER 31, 1901.

PHILADELPHIA:
THE AMERICAN IRON AND STEEL ASSOCIATION,
No. 261 SOUTH FOURTH STREET.
1901.



Entered, according to act of Congress, in the year 1902,
BY THE AMERICAN IRON AND STEEL ASSOCIATION,
In the office of the Librarian of Congress, at Washington.

Printed by
ALLEN, LANE & SCOTT,
Nos. 1211-1213 Clover Street,
Philadelphia.

CONTENTS.

PARTICULAR attention is called to Part IV—Latest Information—which will be found beginning on page 389. It brings all information down to December 31, 1901.

The names of iron and steel and other firms and companies will be found alphabetically arranged in the Index, which begins on page 411. Also the names of iron and steel works, including tinplate works, and names of brands of pig iron.

	PAGE
PREFACE,	vii-xii
SUMMARY TABLES,	xiii-xv

PART I—CHIEFLY CONSOLIDATIONS.

Introduction,	1
United States Steel Corporation,	2
Carnegie Company,	3-4
Carnegie Steel Company,	4-8
H. C. Frick Coke Company,	8
Carnegie Natural Gas Company,	8
Union Railroad Company,	9
Pittsburgh and Conneaut Dock Company,	9
Trotter Water Company,	9
Youghiogeny Northern Railway Company,	9-10
Youghiogeny Water Company,	10
Mount Pleasant Water Company,	10
Bessemer and Lake Erie Railroad Company,	10-11
Oliver Iron Mining Company,	11
Pittsburgh Steamship Company,	11
Pittsburgh Limestone Company, Limited,	12
Property of the Carnegie Company at Conneaut,	12
Federal Steel Company,	12-19
Illinois Steel Company,	12-17
Lorain Steel Company,	17-18
Minnesota Iron Company,	18
Elgin, Joliet, and Eastern Railroad Company,	18
Coking Coal Lands of Federal Steel Company,	19
National Steel Company,	19-23
National Tube Company,	23-29
American Steel and Wire Company of New Jersey,	29-38
American Tin Plate Company,	39-48
American Steel Hoop Company,	48-52
American Sheet Steel Company,	52-58

Don. E. Z. Warr: or Jones W. Swank

	PAGE
American Bridge Company, (of New Jersey),	58-62
American Bridge Company of New York,	58-59
Shelby Steel Tube Company,	62-64
Lake Superior Consolidated Iron Mines,	64-65
Pittsburgh Steamship Company,	65-67
Lake Superior Iron Ore Mines,	67-68
Coke Plants in Southwest Pennsylvania,	68-69
Republic Iron and Steel Company,	69-77
Barnum Richardson Company,	78
Troy Steel Company,	79-80
Thomas Iron Company,	80-81
Bethlehem Steel Company,	81-83
Empire Steel and Iron Company,	84-86
Lackawanna Iron and Steel Company,	86-88
Phoenix Iron Company,	88-90
Glasgow Iron Company,	90-91
American Iron and Steel Manufacturing Company,	91-93
Reading Iron Company,	93-95
Lukens Iron and Steel Company,	95-96
American Steel Casting Company,	96-97
Susquehanna Iron and Steel Company,	97-99
Pennsylvania Steel Company of New Jersey,	99
Pennsylvania Steel Company,	100-102
Maryland Steel Company,	102-103
Cambria Steel Company,	103-106
Jones & Laughlins, Limited,	106-109
Crucible Steel Company of America,	109-114
St. Clair Furnace Company,	114
St. Clair Steel Company,	114
Standard Chain Company,	115-116
Pressed Steel Car Company,	116-117
Sharon Steel Company,	117-118
Buffalo Union Furnace Company,	118-119
Wheeling Steel and Iron Company,	119-121
American Ship Building Company,	121-122
Colorado Fuel and Iron Company,	122-125
Virginia Iron, Coal, and Coke Company,	126-130
Tennessee Coal, Iron, and Railroad Company,	130-134
Sloss Sheffield Steel and Iron Company,	134-136
Alabama Consolidated Coal and Iron Company,	136-138
Alabama and Georgia Iron Company,	138-139
United States Cast Iron Pipe and Foundry Company,	139-142
Central Foundry Company,	142-143
Southern Car and Foundry Company,	143-144
American Car and Foundry Company,	145-149
National Enameling and Stamping Company,	149-151

PART II—BY STATES AND DISTRICTS.

	PAGE		PAGE
Introduction,			153
Maine,	153	Alabama,	249-255
Massachusetts,	154-156	Texas,	255
Rhode Island,	156-157	Ohio,	256-276
Connecticut,	157-159	Indiana,	276-281
New York,	159-165	Illinois,	281-287
New Jersey,	165-172	Michigan,	287-290
Pennsylvania,	172-229	Wisconsin,	290-293
Delaware,	229-231	Minnesota,	293-294
Maryland,	231-233	Missouri,	294-296
Virginia,	233-238	Kansas,	296
West Virginia,	238-240	Colorado,	296-297
Kentucky,	240-243	Wyoming,	297
Tennessee,	243-247	Washington,	297-298
North Carolina,	247-248	Oregon,	298
Georgia,	248-249	California,	298-299

ABANDONED, DISMANTLED, OR LONG INACTIVE IRON AND STEEL WORKS.

New Hampshire,	300	Georgia,	310
Massachusetts,	300	Alabama,	310
Connecticut,	300-301	Texas,	311
New York,	301	Ohio,	311-313
New Jersey,	301-302	Indiana,	313
Pennsylvania,	302-308	Illinois,	313-314
Delaware,	308	Michigan,	314-315
Maryland,	308-309	Wisconsin,	315
Virginia,	309	Missouri,	315-316
West Virginia,	309	Iowa,	316
Kentucky,	309	Kansas,	316
Tennessee,	310	California,	316

PART III—CLASSIFIED BY PRODUCTS.

Introduction,	317
Bessemer Steel Works,	317-321
Open-hearth Steel Works,	321-330
Crucible Steel Works,	331-335
Steel Casting Works,	335-341
Iron and Steel Rail Mills,	342-345
Iron and Steel Structural Mills,	345-350
Iron and Steel Wire-Rod Mills,	350-352
Plate, Sheet, and Skelp Mills,	353-368
Tinplate and Terne Plate Works,	368-378
Iron and Steel Cut-Nail Works,	379-382
Iron and Steel Wire-Nail Works,	382-387

PART IV—LATEST INFORMATION.

Corrected to December 31, 1901.

	PAGE
Changes in Officers, etc., in Part I,	389-396
Changes in Officers, etc., in Part II,	396-401

THE IRON AND STEEL WORKS OF CANADA.

Corrected to December 31, 1901.

Blast Furnaces, Rolling Mills, and Steel Works in Nova Scotia,	403-405
Blast Furnaces, Rolling Mills, and Steel Works in Quebec,	405-407
Blast Furnaces, Rolling Mills, and Steel Works in Ontario,	407-410
Rolling Mills in New Brunswick,	410
Summary of Iron and Steel Works in Canada,	410

INDEX TO NAMES OF BLAST FURNACES,	411-413
INDEX TO NAMES OF ROLLING MILLS AND STEEL WORKS,	413-416
INDEX TO NAMES OF TINPLATE AND TERNE PLATE WORKS,	416-417
INDEX TO NAMES OF FORGES AND BLOOMARIES,	417
INDEX TO NAMES OF COMPANIES,	418-426
INDEX TO PIG IRON BRANDS,	427-428

PREFACE TO THE FIFTEENTH EDITION.

THE fifteenth edition of the Directory to the Iron and Steel Works of the United States presents to the American iron trade a thoroughly revised description of all the blast furnaces, rolling mills, steel works, and tinplate works in the United States; also of the few remaining forges and bloomaries. The iron and steel works of Canada are also described. It was intended to have this edition completed and in the hands of the manufacturers and others as early as November 1, 1901, but unexpected difficulties arose while the book was being printed, resulting in serious delay in its appearance. These difficulties were of two kinds: first, notwithstanding the utmost industry upon our part, many manufacturers could not for many reasons promptly furnish us with the information they were asked to send us about their own works; second, changes in equipment, officers, etc., were constantly taking place, so that the printer's proofs had to be altered from day to day. Even after the principal part of the book had been completed and printed it was found necessary to add a supplementary chapter which would embody the changes that had taken place while it was going through the press. We have succeeded in giving to the iron trade a Directory that is complete in all essential details down to the close of 1901, but at the sacrifice of the symmetry which we would have been glad to impart to it. On page 1, where the general descriptions begin, the reader will find the phrase, "corrected to August 31, 1901," and on page 389, where the supplementary chapter begins, he will also find the phrase, "corrected to December 31, 1901." The supplementary chapter shows how numerous and important are the changes in the American iron trade that can take place in a few months. Indeed the whole Directory is a record of marvelous changes and even upheavals in every branch of the American iron trade since the appearance of its predecessor in the summer of 1898. The present edition of the Directory is divided into four parts, as follows:

Part I, occupying 151 pages, is chiefly devoted to the presentation of a full list of the consolidations and reorganizations that have taken place in the American iron trade during the last few years, with a full account of their capitalization and of the properties absorbed by them, mentioning also the names of previous owners of the properties. The names of directors, executive committees, and other officers are given in full. Coal and iron ore mines, coke ovens, lake vessels, railroads, limestone quarries, and all properties other than iron and steel works that have been acquired by the consolidated or

reorganized companies are fully described, as are the iron and steel works themselves. Some of the older manufacturing companies of the country, which have been neither consolidated nor reorganized, are also for special reasons included in Part I. All the iron and steel works and other properties of each consolidated, reorganized, or other company that is mentioned in Part I are described in one connected narrative, no matter in how many States they may be situated, and under a displayed title. In other words, a chapter is devoted to each company that is described in Part I. This is an entirely new feature of the Directory.

Part II, occupying 164 pages, embodies a complete description of all iron and steel works in the United States that are not described in Part I. The arrangement in Part II is by States and districts, as in previous editions of the Directory, but with this difference, that all the iron and steel enterprises in each State and district are grouped together, the furnaces coming first and then the rolling mills and steel works and forges and bloomaries. A complete list of recently abandoned iron and steel works, classified by States, is a feature of Part II.

Part III occupies 71 pages and is devoted to the classification by States of the iron and steel works of the whole country (except blast furnaces) according to their products—the Bessemer steel works, the open-hearth steel works, the crucible steel works, all the steel casting works, the iron and steel rail mills, the structural mills, the plate, sheet, and skelp mills, the tinplate and terne plate works, the cut-nail works, the wire-rod mills, and the wire-nail works. This classification will be found to be very convenient for ready reference.

Part IV occupies 13 pages. While Parts I, II, and III were passing through the press in the late months of 1901 changes were taking place in the officers of many of the companies whose works are described in its pages and some new enterprises noted in the Directory as having been undertaken were completed. All these and some other changes which had taken place prior to December 31, 1901, are fully noted in this part of the Directory, so that the whole book may be regarded as complete down to the date mentioned. We have even noted some changes in officers, etc., that have since taken place.

This edition of the Directory also contains a complete account of the iron and steel enterprises in the Dominion of Canada which had been completed or undertaken down to December 31, 1901, occupying 8 pages. The names of officers, descriptions of plants, etc., are given in full detail, with proper geographical classification in each case. We have not thought it necessary in this edition to consider the iron and steel works of Mexico. We know of only one addition to the list of iron and steel enterprises of that country as it was given in the Directory for 1898, and this enterprise is not yet in operation.

It will be seen that the arrangement of the new Directory differs in

some material respects from that of its predecessors, but the innovations have all been rendered necessary by the radical changes that have taken place in the iron trade itself. All the essential descriptive features of previous editions have been retained.

Blast Furnaces.—In the edition of the Directory for 1898 we described 420 completed furnaces as being then active or as having been reported to us as likely to be some day active. We added, however, that we felt certain that about 50 of these furnaces would never make another ton of pig iron, thus reducing the number of furnaces that were then active or likely to become active to 370. We gave the annual capacity of these furnaces as amounting in round numbers to 18,000,000 gross tons, not all of which capacity could, of course, be employed at the same time. In the present edition we describe 406 completed furnaces, either active or reported to us as likely to be some day active. Eliminating some of the furnaces in the latter category as being in our opinion dead for all time there remain less than 400 live furnaces to-day. But many of these are the largest that the world has ever seen. Their annual capacity we place in round numbers at 24,000,000 gross tons, an increase since 1898 of exactly $33\frac{1}{3}$ per cent. Our actual production of pig iron in 1901 was 15,878,354 gross tons. Since 1898 we have transferred 58 furnaces to the abandoned, dismantled, or inactive list.

When the Directory for 1898 appeared 4 furnaces were being built, 2 in Pennsylvania and 2 in Ohio. To-day we enumerate 12 furnaces as in course of erection, of which 2 are in New York, 1 is in New Jersey, 3 are in Pennsylvania, 1 is in West Virginia, 2 are in Alabama, 1 is in Michigan, and 2 are in Colorado. In these figures for both years we do not include merely projected furnaces, or furnaces that had been undertaken and work upon which had been suspended.

The 420 furnaces described in the edition for 1898 were classified as follows: 79 used charcoal as fuel and 341 used anthracite and bituminous fuel. Of the 406 furnaces that are now described 55 are reported as using charcoal, 5 as using mixed charcoal and coke, and 346 as using anthracite and bituminous fuel. The decline in the number of charcoal furnaces will be noticed, but it is also worthy of notice that many of the charcoal furnaces that are still active are of large capacity. The annual production of charcoal pig iron is not decreasing, although it is decreasing relatively as compared with the production of pig iron with coke and other fuels. In 1900 Georgia and Tennessee produced 44,608 tons of pig iron with mixed charcoal and coke. This was a larger tonnage than the total production of pig iron in that year with anthracite alone, which amounted to 40,682 tons. In 1901 we produced 23,294 tons of pig iron with mixed charcoal and coke.

The average annual capacity of the 79 charcoal furnaces in 1898 was 12,119 gross tons, and the average annual capacity of the 55 charcoal and 5 mixed charcoal and coke furnaces that are now described is

14,179 tons. The average annual capacity of the mineral fuel furnaces in 1898 was 53,150 tons, and the average annual capacity of these furnaces to-day is 69,252 tons.

Rolling Mills and Steel Works.—In the edition of the Directory for 1898 we enumerated 504 completed rolling mills and steel works and 4 in course of erection. In the present edition we enumerate 527 completed rolling mills and steel works, 28 in course of erection, and 1 being rebuilt, making a total of 556. In addition the Directory mentions 1 plant which is to be rebuilt and 6 plants that are projected.

Puddling Furnaces.—The number of puddling furnaces in April, 1898, each double furnace counting as two single furnaces, was 3,889. In November, 1901, there were 3,251 puddling furnaces. The highest number of puddling furnaces reported in any edition of the Directory was in 1884, when 5,265 were mentioned.

Bessemer Steel Works.—The total number of completed Bessemer steel works in April, 1898, including 2 Clapp-Griffiths plants and 1 Robert-Bessemer plant, was 45, and the whole number of converters was 100. In November, 1901, there were 35 standard Bessemer steel works with 81 converters, 1 Clapp-Griffiths plant with 1 converter, 2 Robert-Bessemer plants with 3 converters, and 9 Tropenas and "special" Bessemer steel plants with 15 converters; total number of Bessemer plants, 47; total number of converters, 100, the same number as in 1898. The increase in the number of small Bessemer plants in the last few years is noteworthy. Since April, 1898, seven standard Bessemer plants have been placed on the retired list, but the capacity of the remaining standard plants has been increased. The annual capacity of the completed Bessemer converters in April, 1898, was 10,633,000 gross tons; in November, 1901, the capacity of the built and building converters was 12,998,700 tons.

Open Hearth Steel Works.—In the Directory for 1898 we described 99 completed open-hearth steel plants, with 281 completed furnaces, and in the present Directory we describe 112 completed plants, with 403 completed furnaces. In 1898 no new plants were being built. In November, 1901, 12 open-hearth plants with 40 furnaces were building, 1 plant was to be rebuilt, 13 plants were projected, and 6 furnaces were being added to existing plants. The annual capacity of the 403 completed and the 46 building open-hearth furnaces, in ingots and direct castings, in November, 1901, was 8,289,750 gross tons, against 3,522,250 tons of the completed furnaces in 1898.

Growth of Basic Steel.—In the Directory for 1898 we indicated the character of the product made at our open-hearth steel works, whether acid or basic steel, or both. Of the 99 completed open-hearth plants in April of that year 43 were prepared to make basic steel, and of 10 open-hearth plants that were projected at that time a majority would probably make basic steel. In the present Directory 167 open-

hearth furnaces are described as making acid steel and 236 as making basic steel: total, 403 furnaces. The acid furnaces have an annual capacity of 1,874,650 gross tons of ingots and castings, and the basic furnaces of 6,415,100 tons.

Crucible Steel Works.—In November, 1901, there were 45 completed crucible steel plants, 3 building, and 1 plant projected. The number of pots in the completed plants was 2,896, and the aggregate annual capacity of these plants was 175,000 gross tons of ingots and castings.

Steel Castings.—In 1898 there were 47 open-hearth plants which were prepared to make steel castings, and in November, 1901, there were 56, but in the meantime the capacity of many of the old plants had been increased. The production of open-hearth steel castings has greatly increased since 1898. As already mentioned, the number of small Bessemer plants has also increased since 1898, all of which make steel castings. Steel castings are also made by 14 crucible plants.

Rail Mills.—In the edition of the Directory for 1898 we enumerated 51 rolling mills which were prepared to make standard, girder, light T, and other iron and steel rails. In the present edition we enumerate 45 completed rail mills and 3 building.

Structural Mills.—The whole number of works which are now equipped to manufacture all kinds of rolled structural material, including beams, beam girders, zee bars, tees, channels, angles, bridge rods, building rods, plates for bridge work, structural tubing, etc., is 67. This branch of the American iron trade, like the production of steel castings, has made marvelous progress since the appearance of our last Directory. It has been a leading factor in the development of our open-hearth steel industry and in the enlargement of our Bessemer steel industry beyond the production of rails.

Plate, Sheet, and Skelp Mills.—In the present Directory we enumerate 223 completed plate, sheet, and skelp mills, 13 building, and 2 projected. In the Directory for 1898 we enumerated 230 completed, 2 building, 1 partly built, and 1 projected.

Tinplate and Terne Plate Works.—In April, 1898, there were 69 completed tinplate and terne plate works, 1 building, and 1 projected. In the present Directory we enumerate 55 completed works, 7 building, and 1 projected.

Cut Nail Works.—In April, 1898, there were 46 rolling mills which were devoted in whole or in part to the manufacture of cut nails and spikes, and in addition there were 9 nail factories which bought their nail plate, the whole number containing 4,544 nail and spike machines. In November, 1901, there were 43 works of all kinds which made cut nails and spikes, equipped with 3,385 nail and spike machines.

Wire Rods.—In 1898 we enumerated 24 completed wire-rod mills and 1 projected mill. In November, 1901, there were 32 completed wire-rod mills, 4 building, 1 rebuilding, and 1 projected mill.

Wire Nail Works.—In the edition of the Directory for 1898 we enumerated 79 completed wire-nail works and 1 works building. In the present edition we enumerate 64 completed wire-nail works, 3 building, 1 rebuilding, and 1 to be rebuilt.

Forges and Bloomaries.—The number of pig and scrap iron bloomaries not connected with rolling mills in April, 1898, was 10, of which several were then idle. The number enumerated in the present Directory is 8, nearly all of which were active in 1901. The number of forges which make blooms directly from the ore is reduced to 2, one in New York and one in North Carolina. The latter is idle.

Natural Gas.—In the Directory for 1898 we enumerated 94 completed iron and steel works which used natural gas in whole or in part and 2 in course of erection, as follows: 41 in Allegheny county and 20 in other parts of Western Pennsylvania, with 1 building; 2 in West Virginia; 7 in Ohio; and 24 in Indiana, with 1 building: total 96. The total number of works which used natural gas in November, 1901, was 110, and in addition 7 works to use natural gas were being erected, as follows: 43 completed and 2 building in Allegheny county and 24 completed and 4 building in other parts of Western Pennsylvania; West Virginia, 7 completed and 1 building; Kentucky, 2; Ohio, 11; Indiana, 22; and Illinois, 1.

Canada.—Canada now has 14 completed blast furnaces, 4 building, and 4 projected. The completed and building furnaces have an annual capacity of 958,000 gross tons of coke pig iron, 7,300 tons of charcoal and coke pig iron, and 125,000 tons of charcoal pig iron. The total annual capacity of all these furnaces is 1,090,300 gross tons. There are now in Canada 18 completed rolling mills and steel works and 2 building. Of the steel works 1 makes steel in a special Bessemer converter, 1 makes Tropenas steel, and 2 standard Bessemer steel plants are being built; 4 make open-hearth steel, and 1 open-hearth steel plant is being built. The annual capacity in ingots and castings of the completed steel plants and of those in course of erection is as follows: Standard Bessemer, Tropenas, and special Bessemer, 301,400 gross tons; open-hearth, 537,000 tons: total, 838,400 tons. The annual capacity of the rolling mills in rolled products is 981,900 tons. The Directory fully describes all these Canadian enterprises.

In June, 1898, Canada had only 8 completed blast furnaces and 1 furnace was in course of erection. Only two or three of the completed furnaces could be called large furnaces. Since the date mentioned the Dominion Iron and Steel Company has built four large blast furnaces and a large steel plant at Sydney, Nova Scotia. Other new iron and steel enterprises have in the meantime been undertaken in Canada, some of which are now in operation and others are approaching completion.

J. M. S.

No. 261 SOUTH FOURTH STREET, PHILADELPHIA, JANUARY 31, 1902.

SUMMARY BY STATES.

BLAST FURNACES.

STATES.	Furnaces Completed, November 1, 1901.					Annual Capacity of Completed Furnaces, November 1, 1901, in gross tons.				
	Anthracte.*	Bituminous.	Charcoal.	Charcoal and coke.	Total.	Anthracte.*	Bituminous.	Charcoal.	Charcoal and coke.	Total—Gross tons.
Massachusetts,			3		3			15,000		15,000
Connecticut,			4		4			20,000		20,000
New York,	10	6	3		19	369,000	365,500	50,000		784,500
New Jersey,	10	1			11	395,862	35,000			430,862
Pennsylvania,	65	78	4		147	2,425,225	8,235,000	12,800		10,673,025
Maryland,		5	1		6		373,000	6,000		379,000
Virginia,		22	4		26		859,000	22,750		881,750
West Virginia,		3			3		255,000			255,000
Kentucky,		8			8		235,000			235,000
Tennessee,		15	1	5	21		745,000	4,000	144,000	893,000
North Carolina,		2			2		40,200			40,200
Georgia,		1	4		5		36,000	61,500		97,500
Alabama,		39	6		45		2,269,500	94,000		2,363,500
Texas,			4		4			55,000		55,000
Ohio,		51	8		59		4,640,000	34,700		4,674,700
Illinois,		20			20		1,955,000			1,955,000
Michigan,			9		9			241,000		241,000
Wisconsin,		5	1		6		292,000	45,000		337,000
Minnesota,		1			1		60,000			60,000
Missouri,		1	1		2		70,000	20,000		90,000
Colorado,		3			3		306,000			306,000
Washington,			1		1			10,000		10,000
Oregon,			1		1			15,000		15,000
Total,	85	261	55	5	406	3,190,087	20,771,200	706,750	144,000	24,812,037

* Includes furnaces which use anthracite coal alone for fuel as well as anthracite coal and coke mixed.

On November 1, 1901, there were 12 furnaces in course of erection, located in the following States: New York, 2 bituminous; New Jersey, 1 anthracite and coke; Pennsylvania, 3 bituminous; West Virginia, 1 bituminous; Alabama, 2 bituminous; Michigan, 1 charcoal; and Colorado, 2 bituminous: total, 1 anthracite and coke, 10 bituminous, and 1 charcoal. In addition there were 7 furnaces which were projected, one of which was partly built and work on it suspended, located in the following States: Pennsylvania, 2 bituminous; Virginia, 2 bituminous, 1 of which is partly erected; Colorado, 2 bituminous; and New Jersey, 1 anthracite coal. Since November 1, 1901, 1 charcoal furnace in Michigan has been abandoned, but this furnace is necessarily included in the above table. One charcoal furnace, which is not included in the table, has also been revived in Pennsylvania.

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 Bloomeries.
				Bessemer.	Clapp-Griffiths.	Robert-Bessemer.	Tropenas and Special Bessemer.	Open-hearth.		
Maine,	1	1	..	..	..	..	..	..	..	..
Massachusetts, . . .	9	7	343	..	1	..	..	4	1	..
Rhode Island, . . .	2	2	..	..	..	..	..	1	..	..
Connecticut,	7	5	25	..	..	..	1	1	2	..
New York,	24	21	..	1	..	..	..	6	3	1
New Jersey,	22	17	90	..	..	..	..	4	5	..
Pennsylvania,	233	209	909	15	..	..	3	55	23	24
Delaware,	7	7	..	..	..	..	..	1	..	..
Maryland,	6	6	25	1	..	..	..	1	..	2
Virginia,	6	6	137	1	..	..	..	..	1	..
West Virginia, . . .	12	12	577	2	..	..	..	..	2	..
Kentucky,	9	9	126	1	..	..	..	2	..	1
Tennessee,	3	2	..	..	..	..	..	1	1	..
North Carolina, . . .	..	..	..	..	..	..	..	..	..	1
Georgia,	2	2	..	..	..	..	..	..	..	..
Alabama,	12	10	72	..	..	..	..	4	..	..
Ohio,	76	69	676	7	..	1	..	11	3	12
Indiana,	34	28	191	2	..	..	..	6	1	4
Illinois,	27	21	192	3	..	..	1	8	2	3
Michigan,	6	6	..	..	..	1	..	1	..	2
Wisconsin,	9	4	7	1	..	..	1	3	4	..
Minnesota,	4	3	..	..	..	..	1	2	..	..
Missouri,	7	5	..	..	..	..	1	1	..	1
Kansas,	1	1	..	..	..	..	..	..	..	..
Colorado,	2	2	..	1	..	..	..	..	..	..
Wyoming,	1	1	..	..	..	..	..	..	..	..
Washington,	1	1	..	..	..	..	..	..	..	..
Oregon,	1	1	..	..	..	..	..	..	..	..
California,	3	2	15	..	..	..	1	..	..	..
Total,	527	460	3,385	35	1	2	9	112	45	55

* Excludes all steel works that do not contain hot trains of rolls.

On November 1, 1901, there were 28 rolling mills and steel works being erected in the United States, as follows: Rhode Island, 1; New York, 1; New Jersey, 1; Pennsylvania, 14; West Virginia, 1; Kentucky, 1; Ohio, 6; Indiana, 2; and Illinois, 1. In addition 1 plant in Connecticut was being rebuilt and 1 plant in Ohio was to be rebuilt. Six rolling mills and steel works were also projected, as follows: Pennsylvania, 3; Ohio, 1; Illinois, 1; and Washington, 1. On the same date 7 tinplate and terne plate works were being erected, as follows: Pennsylvania, 3; West Virginia, 2; Ohio, 1; and Wisconsin, 1. In addition 1 plant was projected in Illinois.

The number of iron and steel cut-nail works in the United States is 43, located in 14 States, as follows: Massachusetts, 6; Connecticut, 1; New Jersey, 1; Pennsylvania, 11; Maryland, 1; Virginia, 1; West Virginia, 5; Kentucky, 1; Alabama, 1; Ohio, 6; Indiana, 3; Illinois, 4; Wisconsin, 1; and California, 1.

GRAND SUMMARY.

NUMBER AND CAPACITY OF IRON AND STEEL WORKS.	November, 1901.	April, 1898.
Number of completed Blast Furnaces—261 Bituminous, 85 Anthracite and Coke, 55 Charcoal, and 5 Charcoal and Coke mixed: total,	406	420
Number of Blast Furnaces building,	12	4
Annual capacity of completed Blast Furnaces, gross tons, . . .	24,812,087	19,081,587
Annual capacity of the Bituminous Furnaces, gross tons, . . .	20,771,200	15,114,700
Annual capacity of the Anthracite and Anthracite and Coke Furnaces, gross tons,	3,190,087	3,009,487
Annual capacity of the Charcoal Furnaces, gross tons,	706,750	957,400
Annual capacity of the mixed Charcoal and Coke Furnaces, . .	144,000	. . . . .
Number of completed Rolling Mills and Steel Works,	527	504
Number of Rolling Mills and Steel Works building,	28	4
Number of Single Puddling Furnaces, (a double furnace counting as two single furnaces,)	3,251	3,889
Number of Heating Furnaces,	3,723	3,479
Annual capacity in finished products of completed Rolling Mills, double turn, gross tons, (omitting all forged products,)	23,220,350	17,929,850
Number of Cut-nail Factories, including those not connected with rolling mills,	43	55
Number of Cut-nail Machines,	3,385	4,544
Number of Wire-nail Works—64 completed, 3 building, 1 rebuilding, and 1 to be rebuilt,	64	79
Number of completed standard Bessemer Steel Works,	35	42
Number of standard Bessemer Converters,	81	95
Annual capacity of these converters (built and building) in ingots and direct castings, gross tons,	12,938,000	10,552,000
Number of completed Clapp-Griffiths Steel Works,	1	2
Number of Clapp-Griffiths Converters,	1	3
Number of completed Robert-Bessemer Steel Works,	2	1
Number of Robert-Bessemer Converters,	3	2
Number of Tropenas and Special Bessemer Steel Works, . . .	9	. . . . .
Number of Tropenas and Special Bessemer Converters,	15	. . . . .
Number of completed Open-Hearth Steel Works,	112	99
Number of Open-Hearth Steel Works building,	12	. . . . .
Number of Open-Hearth Steel Furnaces—403 completed, 46 building, 3 partly built, and 1 to be rebuilt,	403	281
Annual capacity of these furnaces (built and building) in ingots and direct castings, gross tons,	8,289,750	3,522,250
Number of completed Crucible Steel Works,	45	45
Number of building Crucible Steel Works,	3	. . . . .
Number of Steel-melting Pots in completed works which can be used at each heat,	2,896	2,952
Annual capacity of these pots in ingots and direct castings, gross tons,	175,000	177,000
Number of completed Tinplate and Terne Plate Works,	55	69
Number of Tinplate and Terne Plate Works building,	7	1
Number of Forges making wrought iron from ore,	2	4
Annual capacity in blooms and billets, double turn, gross tons,	6,075	4,075
Number of pig and scrap iron Bloomaries,	8	10
Annual capacity in blooms, double turn, gross tons,	25,575	30,050

THE IRON AND STEEL WORKS OF THE UNITED STATES.

PART I—CHIEFLY CONSOLIDATIONS.

CORRECTED TO AUGUST 31, 1901.

IN previous editions of the Directory the descriptions of all iron and steel works have been so arranged that the furnaces were classified together, the rolling mills and steel works by themselves, etc., etc. By this arrangement furnaces and rolling mills and steel works owned by the same firm or company were often widely separated. The consolidation in recent years of so many iron and steel enterprises that had previously been independently operated makes it not only possible but absolutely necessary to now group a large number of iron and steel works according to ownership rather than with regard to their technical character or geographical location, the latter considerations being secondary to ownership. The geographical classification by States heretofore observed is retained, however, wherever possible, but in combination with the new feature of grouping together all works owned by one firm or company. This new feature is especially prominent in Part I, but in Part II it is made subordinate to geographical divisions.

In Part I of the Directory are included all the numerous consolidations that have taken place in the last few years. The organization of each of the consolidations is given with sufficient fullness, including the capitalization, list of officers, etc., and also a complete description of the properties owned or controlled by it. Since the last edition of the Directory was published in 1898 there have been many consolidations, and the changes in ownership have affected hundreds of plants. The utmost pains have been taken to correctly note all these changes, including the names of the previous owners of the plants that have been absorbed. In virtually every instance the information given has been authorized, although changes, especially in officers, may have taken place since this part of the Directory was ordered to be printed.

THE UNITED STATES STEEL CORPORATION.

This Corporation does not operate any iron or steel works, iron-ore mines, coal mines, coke ovens, railroads, or lake vessels.

The United States Steel Corporation; offices, Empire Building, New York. *Executive Committee*: E. H. Gary, Chairman; Daniel G. Reid, Wm. Edenborn, E. C. Converse, Percival Roberts, Jr., and Charles Steele. *Finance Committee*: Robert Bacon, Chairman; Henry H. Rogers, Norman B. Ream, and P. A. B. Widener. *Officers*: Charles M. Schwab, President; James Gayley, First Vice-President; Arthur F. Luke, Treasurer; Richard Trimble, Secretary; and Edward Shearson, Comptroller. *Directors*: J. Pierpont Morgan, John D. Rockefeller, Francis H. Peabody, Henry H. Rogers, Charles M. Schwab, Elbert H. Gary, Robert Bacon, Charles Steele, Marshall Field, Norman B. Ream, P. A. B. Widener, William H. Moore, James H. Reed, Henry C. Frick, Daniel G. Reid, E. C. Converse, Percival Roberts, Jr., John D. Rockefeller, Jr., Alfred Clifford, William E. Dodge, Nathaniel Thayer, William Edenborn, Abram S. Hewitt, and Clement A. Griscom.

The United States Steel Corporation was incorporated on February 25, 1901, under the laws of the State of New Jersey. Its authorized capital stock is \$1,100,000,000, of which \$550,000,000 is 7 per cent. cumulative preferred and \$550,000,000 is common. It had issued to July 1, 1901, about \$508,000,000 of preferred and \$506,000,000 of common stock. In addition it has outstanding \$304,000,000 of 5 per cent. collateral trust gold bonds. It owns practically all the stock of

The Carnegie Company,
Federal Steel Company,
National Steel Company,
National Tube Company,
American Steel and Wire Company of New Jersey,
American Tin Plate Company,
American Steel Hoop Company,
The American Sheet Steel Company,
The American Bridge Company, and the
Lake Superior Consolidated Iron Mines.

It also owns a majority of the stock of the Shelby Steel Tube Company and one-sixth of the stock of the Pittsburgh Steamship Company and the Oliver Iron Mining Company.

Complete details concerning the officials of all the companies named above and properties owned by them, and their equipment, products, etc., will be found in the following pages.

THE CARNEGIE COMPANY.

Practically all the stock of The Carnegie Company is now owned by The United States Steel Corporation.

The Carnegie Company; offices, No. 525 Main st., East Orange, New Jersey, and Carnegie Building, Pittsburgh. *Officers:* W. E. Corey, President; W. W. Blackburn, Secretary and Treasurer; James J. Campbell, Assistant Secretary and Auditor; and W. C. McCausland, Assistant Treasurer, all at Pittsburgh. *Board of Directors:* W. E. Corey, Charles M. Schwab, E. H. Gary, W. W. Blackburn, and James B. Dill.

The Carnegie Company was incorporated on March 24, 1900, under the laws of the State of New Jersey. The capital stock issued amounts to \$160,000,000, divided into shares of the par value of \$1,000 each. The collateral trust five per cent. 100-year bonds issued amount to \$160,000,000. The securities of the company are not listed. The entire issue was subscribed and is held by the shareholders of the constituent companies, no responsibilities to the public being incurred. In February, 1901, the company was vested with the ownership or control of the various manufacturing, mining, and transportation properties formerly owned by or allied to The Carnegie Steel Company, Limited.

In February, 1901, The Carnegie Company owned the entire capital stock of the following companies:

- The Carnegie Steel Company,
- The H. C. Frick Coke Company,
- The Carnegie Natural Gas Company,
- The Union Railroad Company,
- The Pittsburgh and Conneaut Dock Company,
- The Trotter Water Company,
- The Youghiogheny Northern Railway Company,
- The Youghiogheny Water Company, and
- The Mount Pleasant Water Company.

It owned a controlling interest in the following companies:

- The Pittsburgh, Bessemer, and Lake Erie Railroad Company, whose road and property have since been leased to the Bessemer and Lake Erie Railroad Company,
- The Oliver Iron Mining Company,
- The Pittsburgh Steamship Company, and
- The Pittsburgh Limestone Company, Limited.

The Carnegie Company also owned a one-half interest in the Pewabic Company, which operates extensive iron-ore mines in the Menominee Range of the Lake Superior region.

CARNEGIE STEEL COMPANY.

Carnegie Steel Company, Carnegie Building, Pittsburgh. *Officers:* W. E. Corey, President; H. P. Bope, First Vice-President and General Manager of Sales; W. W. Blackburn, Second Vice-President and Secretary; James J. Campbell, Assistant Secretary and Auditor; W. C. McCausland, Treasurer; and William R. Conrad, Assistant Treasurer. *Board of Directors:* W. E. Corey, H. P. Bope, W. W. Blackburn, W. C. McCausland, James H. Reed, Thomas Morrison, Charles M. Schwab, Daniel M. Clemson, William H. Singer, J. E. Schwab, and E. H. Gary. *Sales Agencies:* Equitable Building, Atlanta, Georgia; No. 125 Milk st., Boston, Massachusetts; No. 451 Main st., Buffalo, New York; Rookery Building, Chicago, Illinois; No. 104 West Fourth st., Cincinnati, Ohio; No. 103 Superior st., Cleveland, Ohio; People's Bank Building, Denver, Colorado; Union Trust Building, Detroit, Michigan; Guaranty Building, Minneapolis, Minn.; Empire Building, New York City; Harrison Building, Philadelphia; No. 721 Olive st., St. Louis, Missouri; and No. 258 Market st., San Francisco, California. *Foreign:* Bell Telephone Building, Montreal, Canada; Apartado No. 924, City of Mexico, Mexico; and Nos. 71-72 King William st., London, England. The company operates the following works, all located in Allegheny county, Pennsylvania.

BLAST FURNACES—19.

Carrie Furnaces, at Rankin, one-half mile from Pittsburgh, on the Baltimore and Ohio, Pittsburgh and Lake Erie, and the Union Railroads, and the Monongahela river. Four stacks, two of which were built by the Carrie Furnace Company and two by the Carnegie Steel Company. No. 1, 85 x 18½, removed from Ohio in 1883, blown in February 29, 1884, and rebuilt in 1893; No. 2, 85 x 18½, built in 1888-89, blown in July 19, 1889, and rebuilt in 1895; eight Massicks & Croke stoves, 85 x 19½. No. 3 and No. 4, each 100 x 23, commenced building in November, 1899; No. 3 completed in 1901 and blown in February 25 of the same year, and No. 4 completed in 1901 and blown in April 24 of the same year; eight Massicks & Croke stoves, 100 x 21. Molten metal from these furnaces is shipped direct to the Homestead Steel Works. Fuel, Connellsville coke; ore, Lake Superior; product, basic pig iron; annual capacity, 650,000 gross tons. Equipped with one double Uehling pig-iron casting machine. Fur-

naces Nos. 1 and 2 will be rebuilt in 1901. A. C. Dinkey, General Superintendent; G. K. Hamfeldt, Furnace Superintendent.—*Active in 1901.*

Duquesne Furnaces, at Cochran, (post office address, Duquesne,) four miles from Pittsburgh, on the Pennsylvania and the Union Railroads and the Monongahela river. Four stacks: Nos. 1, 2, and 3, each 100 x 22, and No. 4, 100 x 21; sixteen Kennedy-Cowper stoves, each 97 x 21. First blasts: No. 1, June 8, 1896; No. 2, October 7, 1896; No. 3, May 7, 1897; and No. 4, June 21, 1897. Fuel, Connellsville coke; ore, Lake Superior; product, Bessemer and basic pig iron; annual capacity, 750,000 gross tons. Equipped with one Uehling pig-iron casting machine. Guy R. Johnson, Superintendent.—*Active in 1901.*

Edgar Thomson Furnaces, at Bessemer, (post office address, Braddock,) two miles from Pittsburgh, on the Pennsylvania, the Baltimore and Ohio, the Pittsburgh and Lake Erie, the Pittsburgh, Bessemer, and Lake Erie, and the Union Railroads, and the Monongahela river. Nine stacks, four of which were built by the Edgar Thomson Steel Company, Limited, and five by Carnegie Brothers & Co., Limited. Furnace A, 80 x 15½, has four fire-brick stoves, each 65 x 15, and one fire-brick stove 75 x 18; Furnaces B, 81 x 19½, and C, 82 x 20, have eight fire-brick stoves, six 75 x 20 and two 75 x 21; Furnaces D, 80 x 20, and E, 90 x 22, have eight fire-brick stoves, four 78 x 21 and four 90 x 21; Furnaces F, 90 x 21, and G, 90 x 22, have seven fire-brick stoves, each 90 x 21; and Furnaces H and I, each 90 x 20, have seven fire-brick stoves, each 90 x 21. First blasts: A, January 3, 1880; B, April 4, 1880; C, November 4, 1880; D, April 18, 1882; E, June 28, 1882; F, October 19, 1886; G, June 21, 1887; H, March 1, 1890; and I, August 17, 1890. Fuel, Connellsville coke; ores, Lake Superior and foreign; product, Bessemer and basic pig iron and spiegeleisen and ferromanganese; annual capacity, 1,100,000 gross tons. Equipped with one Uehling pig-iron casting machine. Thomas Morrison, General Superintendent, and Charles Dinkey, Assistant General Superintendent.—*Active in 1901.*

Lucy Furnaces, at Fifty-first st., Pittsburgh, on the Allegheny Valley Railroad. Built by the Lucy Furnace Company and enlarged by Carnegie, Phipps & Co., Limited. Two stacks, Nos. 1 and 2, each 85 x 20; No. 2 rebuilt in 1898; eight fire-brick stoves, each 75 by 21. First blasts: No. 1, May 18, 1872, and No. 2, September 27, 1877. Fuel, Connellsville coke; ores, Pennsylvania and Lake Superior; product, Bessemer, basic, forge, and foundry pig iron; annual capacity, 240,000 gross tons. These furnaces are equipped with one Uehling pig-iron casting machine. James Scott, Superintendent.—*Active in 1901.*

Total annual capacity of the 19 stacks: 2,740,000 gross tons.

ROLLING MILLS AND STEEL WORKS—6.

- Duquesne Steel Works, at Cochran, (post office address, Duquesne,) four miles from Pittsburgh, on the Pennsylvania and the Union Railroads and the Monongahela river. 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 Bessemer steel converters in February, 1889, and first steel rolled in March, 1889; two 10-gross-ton Bessemer converters, twelve 50-gross-ton basic open-hearth steel furnaces, 36 soaking pits, and 6 trains of rolls (one 16, two 21, one 26, one 38, and one 40-inch); product, billets, blooms, slabs, sheet bars, and splice bars; annual capacity, 600,000 gross tons of Bessemer steel ingots, 400,000 tons of open-hearth steel ingots, and 750,000 tons of finished products. Adding one 10 and one 13-inch merchant bar mill; estimated annual capacity, 120,000 tons. Fuel, natural gas and coal. A. R. Hunt, General Superintendent.
- Edgar Thomson Steel Works, at Bessemer, (post office address, Brad-dock,) two miles from Pittsburgh, on the Pennsylvania, the Baltimore and Ohio, the Pittsburgh and Lake Erie, the Pittsburgh, Bessemer, and Lake Erie, and the Union Railroads, and the Monongahela river. Built in 1874-5 by the Edgar Thomson Steel Company, Limited, and enlarged by Carnegie Brothers & Co., Limited, and the Carnegie Steel Company. First blow made in Bessemer steel converters on August 26, 1875, and first steel rail rolled on September 1, 1875; four 15-gross-ton Bessemer steel converters, 4 spiegel cupolas, (molten Bessemer pig iron is taken from the Edgar Thomson Furnaces to the metal mixers and thence to the converting mill in ladles,) 7 pit furnaces, (32 holes,) 7 Siemens heating furnaces, one 3-high 40-inch blooming and two 3-high rail trains (one 23-inch and one 27-inch); equipment for finishing rails at a low temperature, hot saws, and finishing machinery; iron and brass foundries; a forge connected with the works contains one 6-ton hammer and 2 heating furnaces. Product, Bessemer steel rails, billets, sheet bars, and iron and brass castings; annual capacity, 1,000,000 gross tons of steel ingots, 650,000 tons of steel rails, billets, and sheet bars, and 50,000 tons of castings. Fuel, natural gas. Thomas Morrison, General Superintendent, and Charles Dinkey, Assistant General Superintendent.
- Homestead Steel Works, at Munhall, one mile from Pittsburgh, on the Pennsylvania, the Pittsburgh and Lake Erie, and the Union Railroads, and the Monongahela river. Bessemer steel department built in 1880-81 by the Pittsburgh Bessemer Steel Company, Limited; rebuilt and enlarged by Carnegie, Phipps & Co., Limited, in 1892; first blow made on March 19, 1881; first steel rail rolled on August 9, 1881. Open-hearth steel department built by Carnegie, Phipps & Co., Limited, and The Carnegie Steel Company, Limited; 7 furnaces com-

pleted in October, 1886; 1 in July, 1890; 8 in September, 1890; 4 in September, 1895; 5 in April, 1898; 5 in May, 1898; 5 in June, 1899; 5 in July, 1899; and 4 in December, 1899; four 50-gross-ton furnaces now being added. Two 12-gross-ton Bessemer steel converters, and one 20-gross-ton, nineteen 40-gross-ton, and twenty-four 45-gross-ton basic open-hearth steel furnaces; one 200-gross-ton mixing furnace; one 28 and one 38-inch reversing blooming mill; one 33-inch 3-high and one 40-inch reversing cogging mill; one 32-inch and one 30-inch universal slabbing mill; one 23-inch, one 33-inch, and one 35-inch 3-high train for structural shapes; one 119-inch and one 128-inch 3-high sheared plate mill; one 48-inch and one 42-inch universal plate mill; and one 10-inch guide mill; 91 heating pits and 30 heating furnaces; one beam fitting shop; one steel foundry with an annual capacity of 2,500 gross tons of steel castings; one armor plate plant, consisting of a press shop, with one 2,000-ton and one 10,000-ton forging press and 10 heating furnaces, a carbonizing shop with 8 furnaces, and a machine shop for finishing armor plate. Product, blooms, billets, slabs, structural shapes, structural work, boiler plates, ship plates, tank plates, universal plates, armor plates, and steel castings; annual capacity, 400,000 gross tons of Bessemer steel ingots, 1,500,000 tons of basic open-hearth steel ingots, and 1,300,000 tons of rolled products. Finishing capacity of armor-plate department, 5,000 gross tons per year. Fuel, coal, coke, and natural gas. A. C. Dinkey, General Superintendent.

Howard Axle Works, at Howard, one-half mile from Pittsburgh, on the Pennsylvania, the Pittsburgh and Lake Erie, and the Union Railroads, and the Monongahela river. Built by the Carnegie Steel Company in 1899-1900; operations commenced in April, 1900; one 24-inch train of rolls with 2 continuous heating furnaces, ten 7,000-pound steam hammers, 3 axle straightening presses, and 51 axle turning lathes; product, car axles; annual capacity, 90,000 gross tons. Fuel, coal. A. C. Dinkey, General Superintendent; William Whigham, Superintendent.

Lower Union Mills, at Twenty-ninth st., Pittsburgh, on the Allegheny Valley Railroad. Built in 1861-2 by Kloman & Phipps and enlarged by Wilson, Walker & Co., Limited, and by Carnegie, Phipps & Co., Limited. Ten heating furnaces, 4 trains of rolls, (one 9, one 12, one 15, and one 78-inch,) 11 forge fires, and 12 hammers, (400 to 8,000 pounds,) and 4 spring pointing machines; product, sheared plates, forgings, and bar steel; annual capacity, 90,000 gross tons of rolled and 1,200 tons of forged products. Fuel, natural gas, coal, and oil. L. T. Brown, General Superintendent.

Upper Union Mills, at Thirty-third st., Pittsburgh, on the Allegheny Valley Railroad. Built in 1863-4 by the Cyclops Iron Company; enlarged by Carnegie, Kloman & Co., Carnegie Brothers & Co., Lim-

ited, and Carnegie, Phipps & Co., Limited. Nineteen heating furnaces and 7 trains of rolls (one 8, one 12, one 18, and one 20-inch, two plate, and one 17-inch); product, structural steel, steel bars, and steel universal plates; annual capacity, 230,000 gross tons, including 15,000 tons of columns, girders, and other fitted structural work. Fuel, natural gas and coal. L. T. Brown, General Superintendent. Total annual capacity of the 6 rolling mills and steel works: Bessemer steel ingots, 2,000,000 gross tons; open-hearth steel ingots, 1,900,000 tons; iron and brass castings, 50,000 tons; steel castings, 2,500 tons; finished armor plate, 5,000 tons; all other finished rolled and forged products, including the building merchant bar mill, 3,231,200 tons.

CAR-AXLE WORKS—1.

Howard Axle Works, at Howard. Product, car axles; annual capacity, 90,000 gross tons.

H. C. FRICK COKE COMPANY.

H. C. Frick Coke Company; general offices, Scottdale, Pa.; branch offices, Carnegie Building, Pittsburgh. *Officers*: Thomas Lynch, President; William C. Magee, Vice-President; M. M. Bosworth, Secretary; and Philip Keller, Treasurer. *Board of Directors*: Thomas Lynch, W. W. Blackburn, Thomas Morrison, Daniel M. Clemson, William C. Magee, O. W. Kennedy, and Philip Keller.

The property of the H. C. Frick Coke Company consists of 40,000 acres of coal land, 20,000 acres of surface land, and 11,652 coke ovens, with all the necessary equipment, all located in Westmoreland and Fayette counties, Pennsylvania. Also 2,628 railroad cars. In addition to the production of its own coke ovens the company markets the production of 5,463 ovens belonging to the constituent companies of The United States Steel Corporation, and also the production of about 1,600 other ovens.

CARNEGIE NATURAL GAS COMPANY.

Carnegie Natural Gas Company; offices, Carnegie Building, Pittsburgh. *Officers*: Daniel M. Clemson, President; Norwood J. Johnston, Vice-President; W. W. Blackburn, Secretary; H. E. Jeffries, Treasurer; and J. D. DeCoursey, Auditor. *Directors*: Daniel M. Clemson, W. W. Blackburn, James Gayley, George Lauder, and Norwood J. Johnston. The Carnegie Natural Gas Company has under lease 98,000 acres of gas territory in Allegheny, Washington, Armstrong, and Westmoreland counties, Pennsylvania, and in Wetzel and Doddridge counties, West Virginia. The property includes 130 producing gas wells and 300 miles of main and branch pipe lines, supplying about 11,000,000,000 cubic feet of natural gas per annum.

UNION RAILROAD COMPANY.

Union Railroad Company; offices, Carnegie Building, Pittsburgh. *Officers*: James H. Reed, President; D. M. Clemson, Vice-President; George E. McCague, Traffic Manager; R. A. Franks, Secretary and Treasurer; and W. J. Post, Auditor. *Board of Directors*: George E. McCague, William J. Post, Robert A. Franks, James H. Reed, Daniel M. Clemson, W. W. Blackburn, and D. G. Kerr.

This company operates 61.52 miles of track, connecting the Monongahela river plants of the Carnegie Steel Company, and 12.61 miles of leased track between Bessemer and North Bessemer, Pa. The equipment consists of 59 locomotives and 120 freight cars.

PITTSBURGH AND CONNEAUT DOCK COMPANY.

Pittsburgh and Conneaut Dock Company; offices, Carnegie Building, Pittsburgh. *Officers*: J. H. Reed, President; D. G. Kerr, Vice-President; R. A. Franks, Secretary and Treasurer; and W. J. Post, Auditor. *Board of Directors*: James H. Reed, Edwin S. Mills, George E. McCague, Robert A. Franks, W. J. Post, and D. G. Kerr.

This company operates the docks at the lake terminus of the Pittsburgh, Bessemer, and Lake Erie Railroad, at Conneaut Harbor, Ohio, having a daily capacity of 25,000 tons of iron ore and 4,000 tons of coal. The company owns 42.6 per cent. of the capital stock of the Pennsylvania and Lake Erie Dock Company and 25 per cent. of the capital stock of the New York, Pennsylvania, and Ohio Dock Company.

TROTTER WATER COMPANY.

Trotter Water Company; offices, Carnegie Building, Pittsburgh. *Officers*: Thomas Lynch, President; Philip Keller, Treasurer; and M. M. Bosworth, Secretary. *Directors*: Thomas Lynch, O. W. Kennedy, Philip Keller, W. W. Blackburn, and Daniel M. Clemson.

The works of this company are located on the Youghiogheny river, 1½ miles above Connellsville, Pa., and supply water to coke works, railroads, manufacturing establishments, and for public consumption generally, in Dunbar, North Union, and Franklin townships, in Fayette county, Pa. The pumping capacity is 5,000,000 gallons per day.

YOUGHIOGHENY NORTHERN RAILWAY COMPANY.

Youghiogheny Northern Railway Company; offices, Carnegie Building, Pittsburgh. *Officers*: Thomas Lynch, President; W. C. Magee, Vice-

President; Philip Keller, Treasurer; and M. M. Bosworth, Secretary. *Directors*: Philip Keller, O. W. Kennedy, W. C. Magee, W. W. Blackburn, Thomas Morrison, and Daniel M. Clemson.

The line of the Youghiogheny Northern Railway Company extends from Broad Ford to Summit, Fayette county, Pa., about 2.4 miles. The line is leased and operated by the Pittsburgh, McKeesport, and Youghiogheny Railway Company.

YOUGHIOGHENY WATER COMPANY.

Youghiogheny Water Company; offices, Carnegie Building, Pittsburgh.

Officers: Thomas Lynch, President; Philip Keller, Treasurer; and M. M. Bosworth, Secretary. *Directors*: Thomas Lynch, O. W. Kennedy, Philip Keller, W. W. Blackburn, and Daniel M. Clemson.

The plant of this company is located at Broad Ford, Fayette county, Pa., and has a daily pumping capacity of 2,000,000 gallons. Water is supplied to coke works, manufacturing establishments, railroads, and for domestic consumption in Upper Tyrone and Connellsville townships, in Fayette county.

MOUNT PLEASANT WATER COMPANY.

Mount Pleasant Water Company; offices, Carnegie Building, Pittsburgh. *Officers*: Thomas Lynch, President; Philip Keller, Treasurer; and M. M. Bosworth, Secretary. *Directors*: Thomas Lynch, O. W. Kennedy, W. W. Blackburn, Philip Keller, and Daniel M. Clemson.

The works of this company are located at Bridgeport, Fayette county, Pa. The pumping capacity is 4,000,000 gallons per day, and the reservoir capacity is 220,000,000 gallons. Water is supplied to the borough of Mount Pleasant, in Westmoreland county, Pa., and to coke works, railroads, and manufacturing establishments in East Huntingdon, Mount Pleasant, and Hempfield townships.

BESSEMER AND LAKE ERIE RAILROAD COMPANY.

Bessemer and Lake Erie Railroad Company, lessee of the road and property of the Pittsburgh, Bessemer, and Lake Erie Railroad Company; offices, Carnegie Building, Pittsburgh. *Officers*: James H. Reed, President; Daniel M. Clemson, Vice-President; R. A. Franks, Secretary and Treasurer; D. Hum, Jr., Auditor; E. H. Utley, General Freight and Passenger Agent; F. E. House, General Manager; and J. S. Matson, General Superintendent. *Board of Directors*: J. E.

Schwab, Thomas Morrison, R. A. Franks, W. W. Blackburn, Edwin S. Mills, Daniel M. Clemson, George E. McCague, D. G. Kerr, and James H. Reed.

This company leases 203.31 miles of track (including 12.9 miles of leased track) between Conneaut Harbor, Ohio, Erie, Pa., and North Bessemer, Pa. The equipment consists of 65 standard gauge locomotives, 39 passenger cars, 4,729 freight cars, and 119 service cars.

OLIVER IRON MINING COMPANY.

Oliver Iron Mining Company; offices, Duluth, Minnesota. *Officers*: Thomas F. Cole, President and General Manager, Nelson P. Hulst, Vice-President and General Mining Engineer, C. D. Fraser, Secretary, George D. Swift, Assistant Treasurer, and W. M. Jeffery, Auditor, Duluth; and Charles E. Scheide, Treasurer, 71 Broadway, New York City. *Directors*: Thomas F. Cole, Nelson P. Hulst, W. J. Olcott, Daniel M. Clemson, and D. G. Kerr.

This company owns all the stock of the Security Land and Exploration Company, 75 per cent. of the stock of the Lake Superior Iron Company, and 75 per cent. of the stock of the Regent Iron Company.

The company also holds in fee or by lease various iron-ore properties in the Vermilion, Mesabi, Gogebic, Marquette, and Menominee Ranges in the Lake Superior region, producing about 25 per cent. of the entire ore yield of that district. The shipments from the mines for the season of 1900 amounted to about 5,000,000 tons.

PITTSBURGH STEAMSHIP COMPANY.

Pittsburgh Steamship Company; principal office, Duluth, Minnesota; branch office, Cleveland, Ohio. *Officers*: Daniel M. Clemson, President, Carnegie Building, Pittsburgh; A. B. Wolvin, Vice-President and General Manager, George D. Swift, Assistant Treasurer, and W. M. Jeffery, Auditor, Duluth; James H. Hoyt, Secretary, and Edwin S. Mills, Assistant General Manager, Cleveland; and Charles E. Scheide, Treasurer, 71 Broadway, New York City. *Board of Directors*: Daniel M. Clemson, A. B. Wolvin, Edwin S. Mills, D. G. Kerr, and James H. Hoyt.

In February, 1901, this company owned 11 steamships and 2 barges, with an aggregate annual ore-carrying capacity of 1,276,800 gross tons. It now operates all the steamships belonging to the constituent companies of the United States Steel Corporation. [For further information concerning this company see pages 65-7.]

THE PITTSBURGH LIMESTONE COMPANY, LIMITED.

The Pittsburgh Limestone Company, Limited; offices, New Castle, Pa. *Officers:* George W. Johnson, Chairman; James Gayley, Secretary; and William B. Schiller, Treasurer. *Board of Managers:* D. G. Kerr, James Gayley, W. H. H. Smith, George W. Johnson, and William B. Schiller.

This company operates limestone quarries at Tyrone and Williamsburg, in Blair county, and at Wick, in Butler county, Pa. The daily capacity of the quarries is about 4,500 tons.

PROPERTY AT CONNEAUT, OHIO.

The Carnegie Company has purchased 5,000 acres of land on the southern shore of Lake Erie, at Conneaut, Ohio, for mill sites.

FEDERAL STEEL COMPANY.

Practically all the stock of the Federal Steel Company is now owned by The United States Steel Corporation.

Federal Steel Company; general offices, Empire Building, New York City. *Officers:* Elbert H. Gary, President; Edward Shearson, Assistant to the President; Richard Trimble, Secretary and Treasurer; and W. J. Filbert, Auditor. *Board of Directors:* E. H. Gary, Charles M. Schwab, Robert Bacon, Charles MacVeagh, and James Sim. Capital stock issued, \$99,745,200, of which \$53,260,900 is 6 per cent. non-cumulative preferred and \$46,484,300 is common. The Federal Steel Company has no bonded indebtedness, although the companies whose entire capital stock it owns have bonds outstanding in the hands of the public to the amount of \$26,829,000. The Federal Steel Company owns the entire capital stock of the following companies:

THE ILLINOIS STEEL COMPANY.

The Illinois Steel Company; general offices, Rookery Building, Chicago. *Officers:* E. J. Buffington, President; C. H. Foote, First Vice-President; T. J. Hyman, Secretary and Treasurer; T. W. Robinson, General Manager; L. D. Doty, Purchasing Agent; George Baker, General Manager of Sales; F. H. Foote, Manager Blast Furnaces; and E. M. Hagar, Manager of Cement Department. *Officers at the Works:* North Works—W. H. Pratt, General Superintendent, and P. J. Grogan, Auditor; South Works—C. H. McCullough, Jr., General Superin-

tendent, and J. F. Wilson, Auditor; Joliet Works—S. B. Sheldon, Acting Superintendent, and H. Morrison, Auditor; Milwaukee Works—George L. Reis, General Superintendent, and L. W. McNamee, Auditor. *Sales Department*: Chicago—George Baker, General Manager of Sales. New York—Charles W. Baker, Manager, and C. C. Cluff, Assistant Manager, Empire Building. Philadelphia—J. Ogden Hoffman, Manager, and James B. Bonner, Assistant Manager, Harrison Building. Buffalo—T. Guilford Smith, Manager, German Insurance Building. Cleveland—James R. Mills, Jr., Manager, Perry-Payne Building. Cincinnati—W. H. D. Totten, Jr., Manager, Union Trust Building. Atlanta, Ga.—Walter M. Kelley, Manager, Equitable Building. Detroit—N. D. Carpenter, Manager, Union Trust Building. St. Paul—George A. McDougall, Manager, Pioneer Press Building. St. Louis—W. J. Totten, Manager, Chemical Building. Denver—Edward M. Sparhawk, Manager, People's Bank Building. San Francisco—William B. Isaacs, Manager, 258 Market st. Montreal, Canada—Charles Cassils, Manager, Bell Telephone Building. Mexico—W. B. Weston, Manager, 924 Apartado. St. Louis—B. F. Affleck, South Western Agent Cement Department, 324 Odd Fellows' Building. Havana, Cuba—Howard Egleston, Cuban Agent Cement Department, 36 Obispo st. *Board of Directors*: Charles M. Schwab, E. H. Gary, E. J. Buffington, C. H. Foote, E. Shearson, E. C. Converse, Percival Roberts, Jr., T. W. Robinson, W. L. Brown, K. K. Knapp, and T. J. Hyman. *Executive Committee*: E. J. Buffington, E. H. Gary, Charles M. Schwab, C. H. Foote, and T. J. Hyman. The Illinois Steel Company operates the following works:

BLAST FURNACES—18 COMPLETED AND 1 BUILDING.

Joliet Works, Joliet, Will county, Illinois. Three stacks, each 80 x 20: Nos. 1 and 2, built in 1873 and rebuilt in 1891, and No. 3, built in 1889-90; four Siemens-Cowper-Foote, four Massicks & Crooke, and four Whitwell-Gordon stoves; fuel, Connellsville and Pocahontas Flat-Top coke; ores, Lake Superior and Northern ranges; product, Bessemer pig iron; total annual capacity, 330,000 gross tons. Equipped with one Heyl & Patterson pig-iron casting machine. O. O. Laudig, Furnace Superintendent. Selling agents, Pickands, Brown & Co., Chicago.—*Active in 1901.*

Milwaukee Works: Bay View Furnaces, Milwaukee, Milwaukee county, Wisconsin. Two stacks, Nos. 1 and 2, each 66 x 16, built in 1870-1; six Massicks & Crooke stoves; fuel, coke; ores, Lake Superior, Gogebic, and Iron Ridge; product, basic, malleable Bessemer, forge, and foundry pig iron; total annual capacity, 135,000 gross tons. Brands, "Bay View, Nos. 1, 2, and 3," "Gertrude," and "Milwaukee Scotch." John McDonald, Acting Furnace Superintendent. Selling agents, Pickands, Brown & Co., Chicago.—*Active in 1901.*

North Works, Chicago, Cook county, Illinois. Furnaces at the foot of Wabansia avenue, on the north branch of the Chicago river. Two stacks, Nos. 1 and 2, each 66 x 16, built in 1869; engine and boiler equipment sufficient to operate only one furnace at a time; four fire-brick stoves of various types; fuel, Connellsville and Pocahontas coke; ores, Lake Superior, Gogebic, Western, and foreign; product, chiefly spiegeleisen and basic open-hearth and foundry pig iron; total annual capacity, 60,000 gross tons. C. Dann, Furnace Superintendent. Selling agents, Pickands, Brown & Co., Chicago.—*Active in 1901.*

South Works, South Chicago, Cook county, Illinois. Nine completed stacks and one stack building. Completed stacks, Nos. 1, 2, 3, and 4, each 75 x 19, built in 1880-1; sixteen Siemens-Cowper-Foote stoves. Nos. 5, 6, 7, and 8, each 85 x 20, built in 1890-1; sixteen Massicks & Croke stoves. No. 9, 95 x 22, built in 1900-1901, and blown in July 3, 1901; four 4-pass hot blast stoves. Fuel, Connellsville and Pocahontas coke; ores, Lake Superior and Northern ranges; product, Bessemer pig iron; total annual capacity, 1,050,000 gross tons. The furnace now being erected will be known as No. 10, and will be 95 x 22 feet; it will have four 4-pass hot-blast stoves, 100 x 25 feet, an annual capacity of 140,000 tons, and is expected to be ready for blast in October. Equipped with four Heyl & Patterson pig-iron casting machines. Barney Marron, Assistant Furnace Superintendent. Selling agents, Pickands, Brown & Co., Chicago.—*Active in 1901.*

Union Works, Chicago, Cook county, Illinois. Furnaces at Ashland ave. and Thirty-first st., on the south branch of the Chicago river. Two stacks, Nos. 3 and 4, each 73 x 15½, built in 1881 and rebuilt in 1889; seven Siemens-Cowper-Foote stoves; 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; product, spiegeleisen, ferromanganese, and Bessemer pig iron; total annual capacity, 140,000 gross tons. T. N. Conlin, Furnace Superintendent. Selling agents, Pickands, Brown & Co., Chicago.—*Active in 1901.*

Total annual capacity of the 18 completed furnaces: 1,715,000 gross tons; of the building furnace, 140,000 tons.

ROLLING MILLS AND STEEL WORKS—4.

South Works, South Chicago, Cook county, Illinois. Three 12-gross-ton Bessemer steel converters, twelve 10-ingot soaking pits, and one 3-high 40-inch blooming and one 3-high 27-inch finishing train, with 4 stands of rolls; first blow made June 14, 1882; product, Bessemer steel ingots, rails, and billets; annual capacity, 835,000 gross tons of ingots and 675,000 tons of rails and billets. Open-hearth steel department added in 1894-5; first steel made February 11, 1895; one acid and nine basic furnaces (one 35-gross-ton Siemens acid furnace,

four 50-gross-ton basic Wellman rolling, and five 30-gross-ton basic Siemens furnaces); one plate train, with 2 stands of rolls, 34 x 90 and 34 x 132 inches, and 4 gas heating furnaces; product, fire-box, boiler, ship, and tank plate; annual capacity, 240,000 gross tons of open-hearth ingots and 110,000 tons of plates. Slabbing mill added in 1898-9; first put in operation March 16, 1899; one 40-inch mill with rolls 84 inches long to roll slabs, billets, and blooms from 4 x 4 inches up to 24 x 24 inches; annual capacity, 240,000 gross tons of slabs, blooms, and billets. Fuel, coal for steam and manufactured gas, natural gas, and fuel oil for heating purposes. Total annual capacity: ingots, 1,075,000 gross tons; rolled products, 1,025,000 tons. C. H. McCullough, Jr., Superintendent.

Joliet Works, Joliet, Will county, Illinois. Built in 1870; two 10-gross-ton Bessemer steel converters; first blow made January 26, 1873, and first steel rail rolled March 15, 1873; annual capacity, 600,000 gross tons of Bessemer steel ingots. Steel rail mill has 7 heating furnaces, one 36-inch blooming train, one 23-inch rail train, and one Sellers 3-ton hammer; annual capacity, 540,000 gross tons of rails or billets. Wire-rod mill contains one Garrett mill built in 1888 and another added in 1895; 4 heating furnaces; annual capacity, 210,000 gross tons. A third wire-rod mill, arranged to roll either rods, hoops, or cotton-ties, added in 1898; annual capacity, 50,000 gross tons of wire rods or 30,000 gross tons of cotton-ties and hoops. Merchant mill, built in 1895, contains machinery for the production of merchant steel and railroad supplies, including spikes, bolts, nuts, washers, etc.; annual capacity of merchant mill, 40,000 gross tons of merchant products; of factory products, 30,000 tons. Fuel, coal for steam, manufactured gas in the principal departments, and some fuel oil for heating purposes. Total annual capacity: ingots, 600,000 gross tons; rolled products, 840,000 tons; forged products, 30,000 tons. S. B. Sheldon, Acting Superintendent.

Milwaukee Works, Milwaukee, Milwaukee county, Wisconsin. Built in 1868 and 1874; remodeled in 1895-6; 11 heating furnaces, using gas as fuel, and 6 trains of rolls (one 8, two 9, one 12, one 21, and one 22-inch); product, light rails, (12 to 45 pounds per yard,) merchant bar steel, and angle and splice bars; annual capacity, 150,000 gross tons of light rails and steel bars and 30,000 tons of angle and splice bars. Fuel, coal and manufactured gas. George L. Reis, Superintendent.

North Works, Chicago, Cook county, Illinois. Rolling mill and steel departments dismantled.

Union Works, 3179 Ashland ave., Chicago, Cook county, Illinois. Original mill built in 1863 and original Bessemer steel works made first blow on 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, oil. (The equipment described above is idle and partly dismantled and is not likely to be again operated.) Total annual capacity of the 4 rolling mills and steel works: Bessemer steel ingots, 1,760,000 gross tons; open-hearth steel ingots, 240,000 tons; all kinds of rolled and forged products, 2,345,000 tons.

BRIDGE AND STRUCTURAL PLANT—1.

North Works, North Chicago, Illinois. Railroad and highway bridges; also erect iron and steel buildings; annual capacity, 15,000 gross tons. (Formerly operated by the Universal Construction Company.)

CEMENT PLANTS—2.

North Works, North Chicago, Illinois. Built in 1895; product, hydraulic "Steel" cement (Puzzolan) of high quality, manufactured from blast furnace slag; daily capacity, 500 barrels.

South Works, South Chicago, Illinois. Built in 1899-1900; product, "Steel" and "Universal Portland" cement; daily capacity, 1,500 barrels. The "Universal Portland" cement is of the highest quality, is a true Portland, and equals in every way the best foreign and American brands of Portland cement.

WIRE ROD MILL—1.

Joliet Works, Joliet, Ill. Product, wire rods. Annual capacity, 260,000 gross tons.

BOLT, NUT, AND RIVET WORKS—1.

Joliet Works, Joliet, Illinois. Product, steel bolts, nuts, and rivets. Sizes: bolts, from $\frac{1}{2}$ of an inch to 1 inch; nuts, from $\frac{1}{2}$ of an inch to 1 inch; rivets, from $\frac{1}{2}$ of an inch to $1\frac{1}{4}$ inches. Annual capacity, 5,000 gross tons.

SPIKE WORKS—1.

Joliet Works, Joliet, Illinois. Product, standard steel spikes; sizes, $5\frac{1}{2}$ inches by $\frac{1}{8}$ of an inch; annual capacity, 30,000 gross tons.

RAILROADS, IRON-ORE MINES, COAL LANDS, COKE OVENS, AND LIMESTONE QUARRIES.

The Illinois Steel Company owns the entire capital stock of the Chicago, Lake Shore, and Eastern Railroad Company, which operates over 299 miles of track by ownership, lease, or otherwise. It also owns the Cundy Iron Ore Mine, at Quinnesec, Michigan, the Iron Ridge Mine, at Iron Range, Dodge county, Wisconsin, and 4,015 acres of ore lands in Marquette, Dickinson, Iron, and Baraga counties, Michigan, on which is located the Youngstown Mine, near Crystal Falls; also 5,908 acres of mineral lands in Iron and Gogebic counties, Michigan. It also owns 5,986 acres of unmined coking coal

lands, of which 1,471 acres are located in Westmoreland county, Pa., and are in the name of the Southwest Connellsville Coke Company; on these lands there is a plant of 1,233 bee-hive coke ovens. The remaining 4,400 acres are located in Raleigh county, W. Va. This last-named tract has no mines in operation at present. The company also operates limestone quarries near Logansport, Ind., containing in all 400 acres.

THE LORAIN STEEL COMPANY.

The Lorain Steel Company; general offices, Lorain, Ohio. *Officers:* Daniel Coolidge, President; Max M. Suppes, Vice-President and General Manager; P. M. Boyd, Secretary; A. C. Gary, Treasurer; and Joseph H. Craig, Auditor. *Sales Agents:* H. C. Evans, Battery Park Building, New York City; A. S. Littlefield, Monadnock Building, Chicago, Illinois, and Bank of Commerce Building, St. Louis, Missouri; S. P. S. Ellis, Penn Building, Pittsburgh, Pa.; William W. Kingston, Equitable Building, Atlanta, Georgia; and Millard Hunsiker, 29 Great St. Helens, London, E. C., England. *Board of Directors:* Charles M. Schwab, Elbert H. Gary, E. C. Converse, and E. Shearson, of New York City; Daniel Coolidge, Max M. Suppes, P. M. Boyd, A. C. Gary, and Joseph H. Craig, of Lorain, Ohio. The Lorain Steel Company operates the following works:

BLAST FURNACES—2.

Lorain Furnaces, Lorain, Lorain county, Ohio. Two stacks, each 100 x 22; No. 1, built in 1898-9 and blown in July 5, 1899; No. 2, built in 1898-9 and blown in August 23, 1899; eight Cowper-Roberts fire-brick stoves, 100 x 21; fuel, Connellsville coke; ores, Lake Superior and Mesabi; product, Bessemer pig iron; total annual capacity, 400,000 gross tons. Brand, "Lorain." Equipped with one pig-iron casting machine. S. W. Vaughn, Furnace Superintendent.—*Active in 1901.*

Total annual capacity of the 2 furnaces: 400,000 gross tons.

ROLLING MILLS AND STEEL WORKS—2.

Lorain Works, Lorain, Lorain county, Ohio. Built in 1894-5, using rail-mill machinery from the company's works at Johnstown, Pennsylvania; two 38-inch reversible blooming mills, one of which was built in 1899; one 27-inch girder rail mill, with an engine at each end, making practically a double mill; 4 gas heating furnaces; product, blooms, billets, slabs, girder and T rails, and street railroad specialties; annual capacity, 500,000 gross tons. Bessemer steel department contains two 12-gross-ton acid converters; first steel made April 1, 1895; 28 soaking pits; product, Bessemer steel ingots; annual capacity, 550,000 gross tons. Fuel, coal and producer gas. Brand, "Lorain." W. Y. Williams, Superintendent Bessemer department,

and H. C. Ryding, Superintendent rail mill. (Formerly operated by The Johnson Company.)

Johnson Works, Johnstown, Cambria county, Pa. 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 acid open-hearth furnace, using oil gas, and one 7-gross-ton acid open-hearth furnace, using producer gas; annual capacity, 6,500 gross tons of street railroad specialties. Switch and drop-forging works, an electric welding plant, and an iron foundry for making rolls and general castings are connected with the works. Fuel, coal and oil. P. Lavelle, General Manager. (Formerly operated by The Johnson Company.) Total annual capacity of the 2 rolling mills and steel works: Bessemer steel ingots, 550,000 gross tons; rolled products and street railroad specialties, 506,500 tons.

MINNESOTA IRON COMPANY.

The Minnesota Iron Company owns 150,300 acres of iron-ore mining lands in Minnesota and Michigan. It has seven mines, of which five are in operation, namely, Minnesota and Chandler in the Vermilion Range, and Fayal, Auburn, and Genoa, in the Mesabi Range, producing over 3,000,000 gross tons of iron ore annually. It also owns the entire capital stock and \$3,500,000 of the second mortgage bonds of the Duluth and Iron Range Railroad Company, which has 192 miles of track and valuable ore docks on Lake Superior. It also owns the entire capital stock and bonds of the Minnesota Steamship Company, which has 12 steamers and 10 barges, with an annual aggregate ore-carrying capacity of 2,052,000 gross tons. It also owns eleven-twentieths of the capital stock of the Minnesota Dock Company, which operates docks on Lake Erie. *Office:* Duluth, Minnesota. *Officers:* Thomas F. Cole, President and General Manager, Nelson P. Hulst, Vice-President and General Mining Engineer, C. D. Fraser, Secretary, and George D. Swift, Assistant Treasurer, Duluth, Minn.; and Charles E. Scheide, Treasurer, and Thomas Murray, Assistant Treasurer, 71 Broadway, New York. *Board of Directors:* E. H. Gary, E. C. Converse, Percival Roberts, Jr., Charles M. Schwab, Charles P. Coffin, A. H. Viele, W. J. Olcott, Nelson P. Hulst, and Thomas F. Cole.

THE ELGIN, JOLIET, AND EASTERN RAILROAD COMPANY.

The Elgin, Joliet, and Eastern Railroad Company operates 190 miles of main line and branches and 114 miles of spurs and yards, making a total of 304 miles. The company owns 56 locomotives, 2,032 freight cars, and 3 passenger cars.

NEW COKING COAL LANDS.

The Federal Steel Company has acquired 5,296 acres of coking coal lands and 1,344 acres of surface land in Fayette county, Pa., on which three plants of 400 coke ovens each have been erected, in all 1,200 ovens. A new line of railroad, known as the Masontown and New Salem Railroad, about twelve miles long, has been constructed by a company of that name, connecting all of the coking plants on the above property. The Baltimore and Ohio Railroad Company and the Pennsylvania Railroad Company have extended their lines of railroad to connect with the Masontown and New Salem Railroad.

NATIONAL STEEL COMPANY.

Practically all the stock of the National Steel Company is now owned by The United States Steel Corporation.

National Steel Company; general offices, Carnegie Building, Pittsburgh, Pa. *Officers*: W. E. Corey, President; H. P. Bope, First Vice-President and General Manager of Sales; W. W. Blackburn, Second Vice-President and Secretary; W. C. McCausland, Treasurer; James J. Campbell, Assistant Secretary and Auditor; and William R. Conrad, Assistant Treasurer. *Sales Agencies*: Equitable Building, Atlanta, Georgia; No. 125 Milk st., Boston, Massachusetts; No. 451 Main st., Buffalo, New York; Rookery Building, Chicago, Illinois; No. 104 West Fourth street, Cincinnati, Ohio; No. 103 Superior street, Cleveland, Ohio; People's Bank Building, Denver, Colorado; Union Trust Building, Detroit, Michigan; Guaranty Building, Minneapolis, Minn.; Empire Building, New York City; Harrison Building, Philadelphia; No. 721 Olive st., St. Louis, Missouri; and No. 258 Market st., San Francisco, California. *Foreign*: Bell Telephone Building, Montreal, Canada; Apartado No. 924, City of Mexico, Mexico; and Nos. 71-72 King William st., London, England. Capital stock issued, \$27,000,000 of 7 per cent. cumulative preferred and \$32,000,000 of common. Bonded indebtedness assumed, \$3,819,000. The company operates the following works:

BLAST FURNACES—18.

Bellaire Works, Bellaire, Belmont county, Ohio. 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; total annual capacity, 220,000 gross tons. Equipped with one pig-iron casting machine. (Formerly called the Bellaire Furnaces and operated by the Bellaire Steel Company.)—*Active in 1901.*

Columbus Works, Columbus, Franklin county, Ohio. Two stacks: one, 75 x 17½, completed in November, 1873, and rebuilt in 1892, 1895, and 1900, has three Massicks & Crooke stoves, each 65 x 18 (formerly called Franklin Furnace); the other, 80 x 18, built in 1897 and first blown in August 12, 1897, has three Massicks & Crooke stoves, each 75 x 19½, (formerly called Steelton Furnace.) Fuel, Pocahontas and New River coke; ore, Lake Superior; product, Bessemer pig iron; total annual capacity, 190,000 gross tons. (Formerly operated by The King, Gilbert, and Warner Company.)—*Active in 1901.*

Mingo Works, Mingo Junction, Jefferson county, Ohio. Three stacks: No. 1 Furnace, (formerly known as No. 2,) 75 x 17, built in 1872 and rebuilt in 1886; four Gordon-Whitwell-Cowper stoves. No. 2 Furnace, 106½ x 23, built in 1900-1901 and blown in in June, 1901; four Massicks & Crooke stoves, each 85 x 21. No. 3 Furnace, 106½ x 23, built in 1900-1901 and first blown in April 28, 1901; four Massicks & Crooke stoves, each 85 x 21. Fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; total annual capacity, 500,000 gross tons. Equipped with one pig-iron casting machine. (Old No. 1 Furnace, 75 x 17, built in 1871 and rebuilt in 1886, dismantled in 1900.) (Formerly called the Mingo Furnaces and operated by the Aetna-Standard Iron and Steel Company.)—*Active in 1901.*

New Castle Works, New Castle, Lawrence county, Pennsylvania. Four stacks: No. 1 Furnace, (formerly called Rosena and operated by the Oliver and Snyder Steel Company,) one stack, 100 x 20, built in 1872, first put in blast in June, 1873, and rebuilt in 1893; old furnace torn down in 1897 and rebuilt and blown in in the same year; five Massicks & Crooke stoves, four 75 x 20 and one 85 x 21. No. 2 Furnace, (formerly called Neshannock and operated by the Shenango Valley Steel Company,) one stack, 75 x 18½, built in 1872; first put in operation December 1, 1872; remodeled in 1883; four Whitwell stoves, three 60 x 18 and one 65 x 20, and one improved Massicks & Crooke stove, 70 x 20. No. 3 Furnace, (formerly called Shenango and operated by the Shenango Valley Steel Company,) one stack, 75 x 18½; built and blown in in 1872; rebuilt in 1885; four Cowper-Kennedy stoves, three 65 x 18 and one 75 x 20. No. 4 Furnace, (new,) 106½ x 23, built in 1900-1901 and first put in blast in July, 1901; four Massicks & Crooke stoves, each 85 x 21; equipped with a slag casting machine. Fuel, coke; ore, Lake Superior; product, Bessemer pig iron; total annual capacity, 580,000 gross tons. Equipped with pig-iron casting machines. (One of the

old Shenango Furnaces, 80 x 17½, and built in 1872, was dismantled in 1900.)—*Active in 1901.*

Niles Works, Niles, Trumbull county, Ohio. One stack, 76 x 18½; 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 pig iron; annual capacity, 90,000 gross tons. (Formerly called the Thomas Furnace and operated by The Thomas Furnace Company.)—*Active in 1901.*

Ohio Works, Youngstown, Mahoning county, Ohio. Three stacks, each 106½ x 23: No. 1, built in 1899–1900 and blown in February 15, 1900, has four Cowper-Kennedy-Roberts stoves, each 110 x 21; No. 2, built in 1899–1900 and blown in June 7, 1900, has four Cowper-Kennedy-Roberts stoves, each 110 x 21; and No. 3, built in 1900–1901 and blown in March 29, 1901, has four Massicks & Crooke stoves, each 85 x 21. Fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; total annual capacity, 600,000 gross tons. Equipped with two pig-iron casting machines. (Partly built by The Ohio Steel Company and completed by the National Steel Company.)—*Active in 1901.*

Sharon Works, Sharon, Mercer county, Pa. Two alternate stacks, each 75 x 18, one built in 1865 and rebuilt in 1887 and one built in 1866 and enlarged in 1883; one Kennedy and three Whitwell stoves; fuel, coke; ore, Lake Superior; specialty, basic open-hearth pig iron; total annual capacity, 80,000 gross tons. One furnace may be dismantled in 1901. (Formerly operated by the Sharon Iron Company, Limited.)—*Active in 1901.*

Zanesville Works, Zanesville, Muskingum county, Ohio. One stack, 75 x 16, built in 1870–1, blown in September 7, 1871, and rebuilt in 1883; three Whitwell stoves, each 65 x 17, and one Kennedy stove, 70 x 18; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 65,000 gross tons. (Formerly called the Zanesville Furnace and operated by the Ohio Iron Company.)—*Active in 1901.*

Total annual capacity of the 18 furnaces: 2,325,000 gross tons.

ROLLING MILLS AND STEEL WORKS—6.

Bellaire Works, Bellaire, Belmont county, Ohio. Rolling mill built in 1867 and put in operation in February, 1868; remodeled in 1893 and rebuilt in 1895; 3 trains of 24-inch rolls, with five driven roller and chain transfer tables. Bessemer steel works built in 1883–4 and rebuilt in 1897; two 10-gross-ton converters, 3 soaking pits, and one 32-inch blooming mill; first blow made April 28, 1884; annual capacity, 300,000 gross tons of ingots. Product, soft steel blooms, billets, slabs, and sheet and tinplate bars; annual capacity, 250,000 gross

tons. Fuel, coal and producer gas. (Formerly operated by the Belaire Steel Company.)

Columbus Works, Columbus, Franklin county, Ohio. Built in 1894-5 and put in operation May 2, 1895; two 4½-gross-ton Bessemer steel converters with an annual capacity of 200,000 gross tons, 2 soaking pits, 2 heating furnaces, 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, 150,000 gross tons. Fuel, coal and producer gas. (Formerly operated by The King, Gilbert, and Warner Company.)

Mingo Works, Mingo Junction, Jefferson county, Ohio. Built in 1885-6; two 10-gross-ton Bessemer steel converters with an annual capacity of 450,000 gross tons of ingots; first blow made February 8, 1886; two 6-hole soaking pits, one 34-inch direct-coupled blooming mill, and one Kennedy continuous mill; product, blooms, billets, slabs, and sheet and tinplate bars; annual capacity, 400,000 gross tons. Fuel, coal and producer gas. Pig iron is taken by direct metal process from the Mingo Furnaces to the Bessemer converters. (The Mingo Works were formerly called the Junction Works and were operated by the Laughlin and Junction Steel Company. They were consolidated with the works of the Aetna-Standard Iron and Steel Company on July 1, 1897, and were operated by that company until acquired by the National Steel Company.)

New Castle Works, New Castle, Lawrence county, Pa. Two 8-gross-ton Bessemer steel converters built in 1892 and first blow made November 2, 1892; annual capacity, 500,000 gross tons of ingots; one 36-inch blooming mill and four 4-hole soaking pits; one bar mill containing 12 trains of rolls driven by four engines; product, steel billets and 8-inch tinplate and sheet bars; annual capacity, 450,000 gross tons. Fuel, coal and producer gas. Pig iron is taken by direct metal process from the New Castle Furnaces to the Bessemer converters. The Bessemer converters will be increased in 1901 to 10 gross tons, the ingot capacity to 600,000 gross tons, and the rolled capacity to 550,000 tons. (Formerly called the Shenango Valley Steel Works and operated by the Shenango Valley Steel Company.)

Ohio Works, Youngstown, Mahoning county, Ohio. Built in 1893-4; two 10-gross-ton acid Bessemer steel converters; first steel made February 4, 1895; six 4-hole soaking pits, 5 trains of rolls, (one 34-inch blooming, three 24-inch roughing and finishing, and one 14-inch Morgan continuous,) and one 1,500-lb. hammer; first steel rail rolled May 14, 1900; product, sheet and tinplate bars, slabs, billets to 1½ inches square, and T rails; annual capacity, 650,000 gross tons of ingots or 600,000 tons of rolled or forged products. Fuel, coal and producer gas. Pig iron taken by direct metal process from furnaces to Bessemer converters. (Formerly operated by The Ohio Steel Company.)

Sharon Works, Sharon, Mercer county, Pa. Built in 1896-7 and first put in operation in May, 1897; six 30-gross-ton basic open-hearth steel furnaces; first steel made May 24, 1897; annual capacity, 110,000 gross tons of basic open-hearth ingots; three 4-hole soaking pits, one 35-inch blooming mill, and one 3-high 27-inch finishing mill having connected with it a 24-inch bullhead mill; product, blooms, slabs, sheet and tinplate bars, and small billets; annual capacity, 150,000 gross tons. Fuel, coal and producer gas. (Formerly operated by the Buhl Steel Company.)

Total annual capacity of the 6 rolling mills and steel works: Bessemer steel ingots, 2,100,000 gross tons; open-hearth steel ingots, 110,000 tons; rolled and forged products, 2,000,000 tons.

IRON-ORE MINES, COAL LANDS, COKE OVENS, AND LAKE VESSELS.

The National Steel Company owns all the stock of the Winthrop Iron Company and the Chapin Mining Company. It also owns one-fourth of the Biwabik Mine in the Mesabi Range of the Lake Superior iron-ore region.

The company owns the capital stock of the Continental Coke Company, which owns the Revere tract of 1,250 acres of coking coal land, with 600 coke ovens, and the Thompson tract of 717 acres of coking coal land, with 400 coke ovens, near Uniontown, Pa., all in the Connellsville region. It also owns a one-third interest in about 7,000 acres of steam coal lands in the Panhandle region of the Pittsburgh District in Pennsylvania. The company also owns the capital stock of the Standard Connellsville Coke Company, which formerly operated 400 coke ovens at Pleasant Unity, Pennsylvania, but are now operated by the Continental Coke Company.

It also owns the capital stock of the Mutual Transportation Company and the Menominee Transit Company, operating a fleet of 9 ore vessels on the Great Lakes, with an aggregate annual ore-carrying capacity of 564,300 gross tons of iron ore.

NATIONAL TUBE COMPANY.

Practically all the stock of the National Tube Company is now owned by The United States Steel Corporation.

National Tube Company; general offices, Conestoga Building, Pittsburgh; New York office, Havemeyer Building. *Officers at Pittsburgh:* F. J. Hearne, President, in charge of all the affairs of the com-

pany; William B. Schiller, First Vice-President, in charge of manufacturing; William H. Latshaw, Second Vice-President, in charge of mercantile affairs; John D. Culbertson, Third Vice-President, Treasurer, and Secretary, in charge of financial affairs; Taylor Alderdice, Assistant to First Vice-President; Peter Boyd, General Superintendent; Peter Patterson, Consulting Engineer; P. C. Patterson, Mechanical Engineer; J. F. Townsend, Traffic Manager; Edward Worcester, General Sales Agent; George S. Garritt, Assistant General Sales Agent; C. I. O'Connor, General Purchasing Agent; and A. T. Stewart, Auditor. *Officers at New York:* A. S. Matheson, Fourth Vice-President, in charge of foreign affairs, Havemeyer Building; and Sullivan & Cromwell, General Counsel, 45 Wall street. *Managers of Departments:* Allison, Chester, and Morris-Tasker Departments, H. Cheston Vansant, 267 South Fourth street, Philadelphia, Pennsylvania; American Department, James H. Matheson, Middletown, Pa.; Cohoes Department, Henry Aird and John Don, Troy, New York; Continental Department, H. R. Gilbert, Pittsburgh, Pa.; National Department, G. G. Crawford, McKeesport, Pa.; Oil City Department, D. J. Geary, Oil City, Pa.; Pennsylvania and Pittsburgh Departments, William B. Rhodes, Pittsburgh, Pa.; Riverside Department, E. L. Wiles, Manager, and F. H. Crockard, Assistant Manager, Wheeling, West Virginia; Seamless Department, R. C. Stiefel, Manager, Ellwood City, Pa., and J. H. Nicholson, Assistant Manager, Pittsburgh, Pa.; Syracuse Department, George Timmins, Syracuse, New York; and Warren and Youngstown Departments, W. L. Kauffman, Youngstown, Ohio. *Sales Agents:* New York City, Clifton Wharton, Jr., domestic sales agent, and D. B. McClelland, foreign sales agent, Havemeyer Building; Philadelphia, H. Cheston Vansant, 267 South Fourth street; Pittsburgh, A. M. Lally, Conestoga Building; Chicago, H. S. Raymond, Western Union Building; Boston, P. W. French, 95 Milk street; San Francisco, Charles M. Woods, Pacific Coast sales agent, 420 California st.; St. Louis, E. A. Downey, Security Building; Europe, J. W. Downer, 18 Billiter street, London, E. C., England. *Board of Directors:* E. C. Converse, William Nelson Cromwell, John D. Culbertson, F. J. Hearne, William H. Latshaw, A. S. Matheson, William J. Curtis, William B. Schiller, Charles Steele, C. M. Schwab, and E. H. Gary. Capital stock, \$80,000,000, of which \$40,000,000 is 7 per cent. cumulative and \$40,000,000 is common. The company operates the following works:

BLAST FURNACES—4 COMPLETED AND 1 BUILDING.

Monongahela Furnaces, (National Department,) McKeesport, Allegheny county, Pa. Two stacks, built in 1889-90: Furnace A, 90 x 20, blown in December 1, 1890, and rebuilt in 1900; Furnace B, 90 x 20, blown in June 1, 1891, and rebuilt in 1901; seven Cowper-Kennedy stoves,

each 79½ x 21; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; total annual capacity, 275,000 gross tons. W. A. Cornelius, Furnace Superintendent. (Formerly operated by the National Tube Works Company.)—*Active in 1901.*

Riverside Furnace, (Riverside Department,) Benwood, Marshall county, West Virginia. 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, by-product coke, made from Connellsville coal; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 80,000 gross tons. J. C. Percy, Furnace Superintendent. (A new furnace, to be 100 x 21, is being erected by the Tube Steel Company, a corporation controlled by the National Tube Company. It will make Bessemer pig iron, will have an annual capacity of about 175,000 gross tons, and will be ready for blast early in 1902.) (Formerly operated by the Riverside Iron Works.)—*Active in 1901.*

Steubenville Furnace, (Riverside Department,) Steubenville, Jefferson county, Ohio. One stack, 75 x 16, built in 1872 and rebuilt in 1886; three Massicks & Crooke stoves; fuel, by-product coke, made from Connellsville coal; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 75,000 gross tons. William Crockard, Furnace Superintendent. (Formerly operated by the Riverside Iron Works.)—*Active in 1901.*

Total annual capacity of the 4 completed furnaces: 430,000 gross tons; of the building furnace, 175,000 tons.

ROLLING MILLS AND STEEL WORKS—9.

Boston Iron and Steel Works, (National Department,) McKeesport, Allegheny county, Pa. Built in 1891-2; 2 double and 22 single puddling furnaces, 7 heating furnaces, one train of muck rolls, and one 16-inch roughing and one 12-inch finishing mill; product, wrought iron and steel skelp and socket iron; annual capacity, 40,000 gross tons of skelp and 9,000 tons of socket iron. Fuel, coal. W. A. Cornelius, Superintendent. (Formerly operated by the National Tube Works Company.)

Elba Rolling Mills, (Continental Department,) Second ave., Pittsburgh, Allegheny county, Pa. Built in 1862; 30 single puddling furnaces, 4 heating furnaces, and 4 trains of rolls (one muck, and one 8, one 10, and one 18-inch); product, wrought iron and steel skelp, all consumed by the Continental Pipe Mills; annual capacity, 40,000 gross tons. Fuel, bituminous coal and producer gas. John O. Edwards, Superintendent. (Formerly called the Elba Iron Works Department and operated by the Oil Well Supply Company.)

Monongahela Steel Works, (National Department,) McKeesport, Allegheny county, Pa. Built in 1892-3; two 8-gross-ton Bessemer steel converters, four 10-foot cupolas, three 5-hole soaking pits, and one

36-inch 2-high reversing blooming train; first blow made December 14, 1893; product, slabs and billets; annual capacity, 330,000 gross tons of ingots and 300,000 tons of slabs and billets. Fuel, producer gas. W. A. Cornelius, Superintendent. (Formerly operated by the National Tube Works Company.)

National Forge and Iron Works, (National Department,) McKeesport, Allegheny county, Pa. Built in 1882-3 and rebuilt in 1896; 20 charcoal knobbling fires, 2 refinery fires, 2 heating furnaces, 2 steam hammers, and one train of muck rolls; product, charcoal blooms and muck bar; annual capacity, 13,500 gross tons. Fuel, charcoal. W. A. Cornelius, Superintendent. (Formerly operated by the National Tube Works Company.)

National Rolling Mills, (National Department,) McKeesport, Allegheny county, Pa. Built from 1878 to 1893; 6 double and 25 single puddling furnaces, 24 heating furnaces, one train of 2-high slabbing rolls, 2 muck trains, one 82-inch plate mill, and 4 grooved mills (one 13, one 19, and one 22-inch, and one continuous); product, wrought iron and steel skelp; annual capacity, 240,000 gross tons. Fuel, coal and producer gas. W. A. Cornelius, Superintendent. (Formerly operated by the National Tube Works Company.)

Republic Iron Works, (National Department,) Twenty-fifth st., South Side, Pittsburgh, Allegheny county, Pa. Built in 1863; 26 single and 10 double puddling furnaces, 10 heating furnaces, 4 sheet furnaces, one train of muck rolls, 2 grooved mills, (one 14 and one 16-inch,) one 72-inch plate mill, and 8 sheet mills (two 22-inch roughing, and one 20, two 22, one 23, and two 24-inch finishing); product, wrought iron and steel skelp, plates, and sheets; annual capacity, 40,000 gross tons of grooved skelp, 22,500 tons of plates, and 13,500 tons of sheets. Fuel, natural gas and coal. J. W. Keffer, Superintendent. (Formerly operated by the National Tube Works Company.)

Riverside Bar Mill, (Riverside Department,) Wheeling, Ohio county, West Virginia. Built in 1875; 4 coal heating furnaces and 2 trains of rolls (9 and 12-inch); product, steel skelp; annual capacity, 22,500 gross tons. Fuel, coal. (Formerly operated by the Riverside Iron Works.)

Riverside Skelp Mills, (Riverside Department,) Benwood, Marshall county, West Virginia. Built in 1885; 10 regenerative gas heating furnaces and 5 trains of 21-inch grooved rolls; product, steel skelp; annual capacity, 120,500 gross tons. Fuel, producer gas. William Murrins, Superintendent. (Formerly operated by the Riverside Iron Works.)

Riverside Steel Works, (Riverside Department,) Benwood, Marshall county, West Virginia. Built in 1883-4; two 5-gross-ton Bessemer steel converters; first blow made June 11, 1884; two three-hole soaking pits, three 8-foot cupolas, and one 36-inch 2-high reversing

blooming mill; product, steel slabs and billets; annual capacity, 150,000 gross tons of ingots and 135,000 tons of slabs and billets. Fuel, producer gas. Orville Marstellar, Superintendent. (Formerly operated by the Riverside Iron Works.)

Total annual capacity of the 9 rolling mills and steel works: Bessemer steel ingots, 480,000 gross tons; slabs and billets, 435,000 tons; skelp, 503,000 tons; plates and sheets, 36,000 tons; charcoal blooms and muck bar, 13,500 tons; and socket iron, 9,000 tons.

CUT-NAIL FACTORIES—2.

Riverside Nail Factories, (Riverside Department,) Wheeling, Ohio county, West Virginia. Two factories, one built in 1867 and the other in 1875; 224 cut-nail machines; product, steel cut nails; total annual capacity, 550,000 kegs. Fuel, coal. (Formerly operated by the Riverside Iron Works.)

GALVANIZED AND KALAMEINED PIPE WORKS—1.

National Galvanizing Works, (National Department,) Versailles, Allegheny county, Pa. Built in 1895; product, galvanized and kalamained pipe; annual capacity, 54,000 gross tons. H. B. Lynch, Superintendent. (Formerly operated by E. C. Converse.)

WROUGHT IRON AND STEEL PIPE AND TUBE WORKS—14.

Allison Department, Thirty-second and Walnut sts., Philadelphia, Pa. Product, charcoal iron boiler tubes; sizes, from 1½ to 8 inches inclusive; annual capacity, 13,000 gross tons. H. R. Borie, Superintendent. (Formerly operated by The Allison Manufacturing Company.)

American Department, Middletown, Dauphin county, Pa. Product, wrought iron and steel pipe; sizes, from ½ of an inch to 16 inches inclusive; annual capacity, 85,000 gross tons. W. D. Matheson, Superintendent. (Formerly operated by the American Tube and Iron Company.)

Chester Department, South Chester, Delaware county, Pa. Product, wrought iron and steel pipe; sizes, from 1½ to 12 inches inclusive; annual capacity, 50,000 gross tons. H. R. Borie, Superintendent. (Formerly operated by The Chester Pipe and Tube Company.)

Cohoes Department, Cohoes, Albany county, New York. Product, wrought iron and steel pipe; sizes, from ½ of an inch to 2 inches inclusive. Annual capacity, 15,000 gross tons. William Mosley, Superintendent. (Formerly operated by Aird, Don & Curtis.)

Continental Pipe Mills, (Continental Department,) Second avenue, Pittsburgh, Allegheny county, Pa. Product, wrought iron and steel pipe; sizes, from ½ of an inch to 8 inches inclusive. Annual capacity, 40,000 gross tons. Thomas J. Bray, Superintendent. (Formerly operated by the Oil Well Supply Company.)

Morris-Tasker Department, New Castle, New Castle county, Delaware.

Product, wrought iron and steel pipe; sizes, from $\frac{3}{8}$ of an inch to 16 inches inclusive; annual capacity, 60,000 gross tons. H. R. Borie, Superintendent. (Formerly operated by the Delaware Iron Company.)

National Pipe Mills, (National Department,) McKeesport, Allegheny county, Pa. Product, wrought iron and steel pipe and charcoal iron and steel boiler tubes; sizes, from $\frac{1}{2}$ of an inch to 30 inches inclusive; annual capacity, 285,000 gross tons. A. M. Saunders, Superintendent. (Formerly operated by the National Tube Works Company.)

Oil City Department, Oil City, Venango county, Pa. Product, wrought iron and steel pipe; sizes, from $\frac{1}{2}$ of an inch to 12 inches inclusive; annual capacity, 50,000 gross tons. John O'Shea, Superintendent. (Formerly operated by the Oil City Tube Company.)

Pennsylvania Department, Second avenue, Pittsburgh, Allegheny county, Pa. Product, wrought iron and steel pipe; sizes, from $\frac{1}{2}$ of an inch to 30 inches inclusive; annual capacity, 120,000 gross tons. W. J. McNutt, Superintendent. (Formerly operated by the Pennsylvania Tube Works.)

Pittsburgh Department, Second avenue, Pittsburgh, Allegheny county, Pa. Product, wrought iron and steel pipe; sizes, from $\frac{1}{2}$ of an inch to 12 inches inclusive; annual capacity, 36,000 gross tons. W. J. McNutt, Superintendent. (Formerly operated by The Pittsburgh Tube Company.)

Riverside Tube Works, (Riverside Department,) Benwood, Marshall county, West Virginia. Product, wrought iron and steel pipe; sizes, from $\frac{1}{2}$ of an inch to 8 inches inclusive; annual capacity, 95,000 gross tons. F. A. Peterson, Superintendent. (Formerly operated by the Riverside Iron Works.)

Syracuse Department, Syracuse, Onondaga county, New York. Product, wrought iron and steel pipe and charcoal iron and steel boiler tubes; sizes, from $1\frac{1}{2}$ to 7 inches inclusive; annual capacity, 18,000 gross tons. Andrew Telfer, Superintendent. (Formerly operated by the Syracuse Tube Company.)

Warren Department, Warren, Trumbull county, Ohio. Product, wrought iron and steel pipe; sizes, from $\frac{1}{2}$ of an inch to 6 inches inclusive; annual capacity, 25,000 gross tons. (Formerly operated by the Ohio Tube Company.)

Youngstown Department, Youngstown, Mahoning county, Ohio. Product, wrought iron and steel pipe; sizes, from $1\frac{1}{2}$ to 16 inches inclusive; annual capacity, 30,000 gross tons. James Cooper, Superintendent. A coupling and socket department is being added. (Formerly operated by the American Tube and Iron Company.)

Total annual capacity of the 14 wrought iron and steel pipe and tube works: 922,000 gross tons.

SEAMLESS PIPE AND TUBE WORKS—2.

Standard Seamless Tube Works, (Seamless Department,) Ellwood City, Lawrence county, Pa. Product, seamless pipe and tubes. R. T. Brown, Superintendent. (Formerly operated by the Standard Seamless Tube Company.)

United States Seamless Tube Works, (Seamless Department,) McKeesport, Allegheny county, Pa. Product, seamless pipe and tubes. E. F. Hollinger, Superintendent. (Formerly operated by the National Tube Works Company.)

COKE OVENS.

Semet-Solvay By-Product Coke Ovens, Benwood, Marshall county, West Virginia. Number of ovens, 120; product, coke from Connellsville coal; annual capacity, 200,000 net tons. Plant owned by the National Tube Company but operated under lease by the Semet-Solvay Company. W. O. Wood, Superintendent, Benwood, West Virginia.

COAL LANDS, LIMESTONE QUARRIES, AND IRON-ORE MINES.

The National Tube Company owns tracts of coal lands in Pennsylvania, West Virginia, and Ohio. It also owns an interest in limestone quarries in Lawrence county, Pa.; also in iron-ore mines in the Gogebic and Menominee Ranges of the Lake Superior iron-ore region.

AMERICAN STEEL AND WIRE COMPANY OF NEW JERSEY.

Practically all the stock of the American Steel and Wire Company of New Jersey is now owned by The United States Steel Corporation.

American Steel and Wire Company of New Jersey, Rookery Building, Chicago, Illinois. *Officers at Chicago:* J. S. Keefe, First Vice-President; F. L. Watson, Treasurer; A. F. Allen, Assistant Treasurer and Secretary; E. C. Lott, Manager Chicago District; Frank Baackes, General Sales Agent; G. A. Cragin and D. A. Merriman, Assistant Sales Agents; Max Pam, General Counsel. *Officers at Cleveland, Ohio:* Wm. P. Palmer, President; C. A. Vogt, Auditor; A. T. DeForest, Manager, and R. W. Ney and J. H. Early, Assistant Managers, Cleveland District; and A. S. Chisholm, Assistant to President, Western Reserve Building. *Officers at Pittsburgh, Pa.:* C. L. Miller, General Superintendent; J. H. Price, Manager; and S. W. Tener, Assistant Manager, Pittsburgh District, Tradesmens Building. *Officers at New*

York City: T. P. Alder, Assistant Treasurer, and F. E. Patterson, Manager and Assistant Secretary, 71 Broadway, New York City. *Officers at Worcester, Massachusetts:* P. W. Moen, Third Vice-President; F. H. Daniels, Chief Engineer; Charles Ranlet, Manager Worcester District; and H. G. Stoddard, Assistant Manager Worcester District. *Sales Offices and Agents—Domestic:* Chicago, Ill., Rookery Building—F. Baackes, General Sales Agent; G. A. Cragin and D. A. Merriman, Assistant General Sales Agents. New York City, Empire Building—T. H. Taylor, Assistant General Sales Agent. San Francisco, California, 8-10 Pine st.—George H. Ismon, Pacific Coast Sales Agent. Boston, Mass., 166 High st.—W. M. Atwater, Sales Agent. Butte, Montana, 19 West Granite st.—Charles H. Lane, Sales Agent. Cleveland, Ohio, Western Reserve Building—H. T. Pratt, Sales Agent. Denver, Colorado, 809 Seventeenth st.—American Steel and Wire Company of Colorado; E. R. Pool, President. Los Angeles, Cal., 206 North Los Angeles st.—Burton W. Smith, Sales Agent. Philadelphia, Pa., 707 Filbert st.—F. A. Keyes, Sales Agent. Pittsburgh, Pa., Tradesmens Building—J. D. Sutherland, Sales Agent. Portland, Oregon, 231 Pine st.—E. R. Eldredge, Sales Agent. St. Louis, Mo., 1935 Papin st.—O. B. Barrows, Sales Agent. St. Paul, Minn., 518 Endicott Building—E. A. Lycett, Sales Agent. Salt Lake City, Utah, Grant Brothers, Sales Agents. Seattle, Wash., Dexter-Horton Bank Building—O. D. Colvin, Sales Agent. Spokane, Wash., 514 First ave.—M. K. Lott, Sales Agent. *Foreign:* London, England, 29 Great St. Helens, E. C.—A. Holland, Agent. Montreal, Canada, New York Life Building—George A. Childs, Sales Agent. Hamburg, Germany—A. Auerbach, Agent. Constantinople, Turkey—A. Raditi, Agent. Salonica, Turkey—Jacques Fillipucci, Agent. Smyrna, Turkey—Saparte & Naar, Agents. *Board of Directors:* C. M. Schwab, E. H. Gary, William Edenborn, Alfred Clifford, Wm. P. Palmer, Leslie D. Ward, John S. Keefe, F. Baackes, F. H. Daniels, C. L. Miller, and E. C. Lott. Capital stock issued, \$90,000,000, of which \$40,000,000 is 7 per cent. cumulative preferred and \$50,000,000 is common. Bonded indebtedness, \$78,000. The company operates the following works:

BLAST FURNACES—11.

Central Furnaces, Cleveland, Cuyahoga county, Ohio. Three stacks: one, 75 x 20, built in 1881-2 and rebuilt in 1895-6; one McClure and three Whitwell stoves; one, 80 x 20, built in 1887; four fire-brick stoves; and one, 100 x 21, built in 1900-1901 and blown in January 17, 1901; four fire-brick stoves, each 22 x 100. Fuel, coke; ore, Lake Superior; product, No. 1 Bessemer pig iron; total annual capacity, 385,000 gross tons. E. B. Tenney, Superintendent Blast Furnaces, Cleveland District. (Formerly operated by the Cleveland Rolling Mill Company.)—*Active in 1901.*

Crown Point Furnaces, Crown Point, Essex county, New York. 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, coke; product, Bessemer pig iron, produced from Crown Point (or Penfield) and Chateaugay ores, and ferromanganese; total annual capacity, 40,500 gross tons. Brand, "Crown Point." (Formerly operated by the Crown Point Iron Company.)—*Active in 1900.*

Edith Furnace, Allegheny, Allegheny county, Pa. One stack, 97½ x 20, built and blown in in 1898; one Massicks & Crooke and four Kennedy stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 150,000 gross tons. (The old Edith Furnace, 75 x 16½, built in 1882, and abandoned in 1898, is now used as a dust catcher.) Samuel S. Hartranft, Superintendent. (Formerly operated by the Oliver and Snyder Steel Company; later by the Allegheny Furnace Company.)—*Active in 1901.*

Emma Furnace, Cleveland, Cuyahoga county, Ohio. One stack, 72 x 17, built in 1872; remodeled in 1882-3, 1890-1, and 1896; three Ford & Moncur stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 90,000 gross tons. Brand, "Emma." John McCarthy, Furnace Superintendent. (Formerly operated by the Union Rolling Mill Company.)—*Active in 1901.*

Neville Island Furnace, Neville Island, Neville Township, Allegheny county, below Pittsburgh, Pa. One stack, 100 x 21, built in 1900-1901 and blown in July 3, 1901; four Kennedy two-pass stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 165,000 gross tons.—*Active in 1901.*

Newburgh Furnace, Cleveland, Cuyahoga county, Ohio. One stack, 65 x 16, built in 1872 and remodeled in 1886; rebuilt in 1895-6; fuel, coke; ore, Lake Superior; product, No. 1 Bessemer pig iron; annual capacity, 50,000 gross tons. (Formerly operated by the Cleveland Rolling Mill Company.)—*Active in 1901.*

Shoenberger Furnaces, Pittsburgh, Allegheny county, Pa. 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 and basic pig iron; total annual capacity, 150,000 gross tons. Henry Oliver, General Superintendent, and John Carnahan, Furnace Superintendent. (Formerly operated by the Shoenberger Steel Company.)—*Active in 1901.*

Total annual capacity of the 11 furnaces: 1,030,500 gross tons.

ROLLING MILLS AND STEEL WORKS—15.

Allentown Works, Allentown, Lehigh county, Pa. Built in 1889 by the Iowa Barb Wire Company; 2 gas heating furnaces, 4 trains of rolls, (9, 10, 14, and 16-inch,) and 166 wire-nail machines; product, wire

- rods drawn into wire and chiefly used by the company in the manufacture of barbed wire and wire nails; annual capacity, 75,000 gross tons of wire rods and 600,000 kegs of wire nails. Fuel, coal and manufactured gas. Brands, "Iowa Barb Wire," "Consolidated Field Fencing," and "Baker Perfect Barb Wire." A galvanizing plant is connected with the works. W. M. Douglass, Superintendent. (Formerly operated by the American Steel and Wire Company of Illinois.)
- American Works, Cleveland, Cuyahoga county, Ohio. Built in 1886 by the American Wire Company 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 and wire; annual capacity, 125,000 gross tons of rods and 60,000 tons of wire. Fuel, coal. E. Parker, Superintendent. (Formerly operated by the American Steel and Wire Company of Illinois.)
- Anderson Works, Anderson, Madison county, Indiana. Built in 1889 by the American Wire Nail Company; 2 continuous heating furnaces, one rod mill, and 186 wire-nail machines; product, steel wire rods, wire, and wire nails; annual capacity, 75,000 gross tons of rods, 70,000 tons of wire, and 1,000,000 kegs of nails. Fuel, natural gas and coal. C. Gaus, Superintendent. (Formerly operated by the American Steel and Wire Company of Illinois.)
- Beaver Falls Works, Beaver Falls, Beaver county, Pa. Built and put in operation in 1883 by the Hartman Steel Company, Limited, and enlarged by Carnegie, Phipps & Co., Limited; purchased by the Consolidated Steel and Wire Company in 1895 and enlarged in 1895-6; combination rod train run by 3 engines; 2 heating furnaces, 160 wire blocks, and 142 wire-nail machines; product, steel wire rods, plain, galvanized, and coppered market wire, barbed wire, and wire nails; annual capacity, 100,000 gross tons of wire rods and 850,000 kegs of wire nails. Fuel, bituminous coal and producer gas. Galvanizing and fence departments are connected with the works. W. C. Jones, Superintendent. (Formerly operated by the American Steel and Wire Company of Illinois.)
- Braddock Works, Braddock, Allegheny county, Pa. Built in 1891 and put in operation in February, 1892; 3 heating furnaces, 3 trains of rolls, (9, 12, and 16-inch,) and 112 wire-nail machines; product, steel wire rods, wire, and wire nails; annual capacity, 80,000 gross tons of wire rods, 73,500 tons of rolled and drawn products, and 700,000 kegs of wire nails. Fuel, bituminous coal. August Mann, Superintendent. (Formerly operated by the Pittsburgh Wire Company.)
- Consolidated Works, Cleveland, Cuyahoga county, Ohio. Wire-drawing and wire-nail plants built in 1890-1 by the Baackes Wire Nail Company; rod mill added in 1892; 3 heating furnaces, 131 wire-drawing

blocks, 264 wire-nail machines, 56 barbed-wire machines, and one 9, one 12, and one 16-inch train of rolls; product, steel wire rods, wire, wire nails, and American and Ellwood field fencing; annual capacity, 80,000 gross tons of rods, 80,000 tons of wire, and 1,000,000 kegs of nails. Fuel, coal and producer gas. A galvanizing plant is connected with the works. G. W. Jewett, Superintendent. (Formerly operated by the American Steel and Wire Company of Illinois.)

H. P. Works, Cleveland, Cuyahoga county, Ohio. Built in 1880 by the H. P. Nail Company 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 512 wire-nail machines; product, steel wire rods, steel wire, galvanized wire, wire nails, staples, tacks, and rivets; annual capacity, 60,000 gross tons of rods, 90,000 tons of finished products, and 1,500,000 kegs of wire nails. A galvanizing plant is connected with the works; annual capacity, 4,500 gross tons of wire. Fuel, coal for boilers and producer gas for the rod mill. Ernst Boley, Superintendent. (Formerly called the H. P. Nail Works and operated by the American Steel and Wire Company of Illinois.)

Newburgh Steel Works, Newburgh, Cuyahoga county, Ohio. 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, 480,000 gross tons of ingots. Open-hearth steel works built in 1876-8 and rebuilt in 1899-1900; one acid and three basic 50-gross-ton furnaces; annual capacity, 120,000 gross tons of ingots. Blooming mill built in 1881 and remodeled in 1891; 4 soaking pits and 2 trains of rolls (one 2-high 33-inch reversing and one 3-high 23-inch); annual capacity, 420,000 tons of blooms, billets, and slabs. Rail mill built in 1857 and remodeled in 1895; 5 heating furnaces and one train of rolls; annual capacity, 150,000 tons of standard rails, girder rails, beams, channels, etc. Two rod mills; annual capacity, 140,000 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. A foundry, a forge, and a machine shop are also connected with the works. 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. Fuel, coal for steam and manufactured gas for heating. M. McMurray, General Superintendent. (Formerly operated by the Cleveland Rolling Mill Company.)

New Castle Works, New Castle, Lawrence county, Pa. 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,) and 254 wire-nail

machines; product, wire rods, wire, and wire nails; annual capacity, 90,000 gross tons of rods, 75,000 tons of wire, and 1,250,000 kegs of nails. Fuel, coal. Brand, "New Castle." W. C. Stone, Superintendent. (Formerly called the New Castle Wire Nail Works and operated by the Shenango Valley Steel Company.)

Rankin Works, Rankin Station, Allegheny county, Pa. Built in 1885-6 by the Braddock Wire Company; rod mill rebuilt in 1897; 2 heating furnaces, 4 trains of rolls, (two 9, one 12, and one 18-inch,) 166 wire-nail machines, and 80 barbed-wire machines; 4-inch billets rolled directly to No. 5 rods in 18 passes through 4 trains of rolls; product, steel wire rods, plain and galvanized market wire, barbed wire, wire nails, and field fencing; annual capacity, 100,000 gross tons of wire rods and 900,000 kegs of wire nails. Fuel, bituminous coal and manufactured gas. Galvanizing and field fencing plants are connected with the works. W. C. Stone, Superintendent; C. E. Williams, Assistant Superintendent. (Formerly called the Pittsburgh Works and operated by the American Steel and Wire Company of Illinois.)

Shoenberger Works, Fifteenth st. and Penn ave., Pittsburgh, Allegheny county, Pa. Established in 1824; 24 gas producers, 12 heating furnaces, 4 soaking pits, 4 annealing furnaces, 13 trains of rolls, (one 8, two 9, one 16, and one 22-inch bar, one 40 x 24-inch, one 48 x 24-inch, one 60 x 24-inch, and one 72 x 24-inch sheet train, one 34 x 127-inch plate train, 2 blooming mills, and one continuous train,) and 12 horseshoe machines. Open-hearth steel department added in 1879; three 35-gross-ton basic furnaces. Two 7-gross-ton Bessemer converters with modern appliances; first blow made March 17, 1886. Product, basic open-hearth steel plates, sheet steel, skelp steel, iron and steel horse and mule shoes, steel blooms and billets, horseshoe bars, and toe calks; annual capacity, 75,000 gross tons of open-hearth steel ingots, 270,000 tons of Bessemer steel ingots, and 300,000 tons of rolled products. Fuel, natural gas, manufactured gas, and bituminous coal. Henry Oliver, General Superintendent. (Formerly called the Juniata Iron and Steel Works and operated by the Shoenberger Steel Company.)

South Side Works, Eighth and Bingham sts., Pittsburgh, Allegheny county, Pa. Rod mill built in 1884 and first put in operation June 12, 1884; 2 continuous heating furnaces and 4 trains of rolls (two 9, one 12, and one 18-inch); product, wire rods; annual capacity, 90,000 gross tons. Wire department contains machinery for the manufacture of plain and barbed wire and wire nails; number of wire-nail machines, 204; annual capacity, 150,000 gross tons of drawn wire, 31,500 tons of barbed wire and fencing specialties, and 960,000 kegs of wire nails. Fuel, natural gas and coal. Brand, "Oliver." C. Evans, Superintendent. (Formerly operated by the Oliver Wire Company.)

South Works, Worcester, Worcester county, Massachusetts. Rolling mill

built in 1846; 12 heating furnaces, one 34-inch blooming mill, and 5 rod mills; product, billets, iron and steel wire rods, and wire; annual capacity, 135,000 gross tons of rods. Open-hearth steel department contains one 15 and three 20-gross-ton acid furnaces and four 50-gross-ton basic furnaces; first open-hearth steel made September 26, 1885; annual capacity, 170,000 gross tons of ingots. Fuel, coal and manufactured gas. J. O. E. Trotz, Superintendent. (Also called the Quinsigamond Works; formerly operated by the Washburn and Moen Manufacturing Company.)

Twenty-sixth Street Works, Twenty-seventh and Smallman sts., Pittsburgh, Allegheny county, Pa. 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, 185,000 gross tons of ingots and 170,000 tons of billets and slabs. Fuel, natural gas and coal. C. F. Berkenbush, Superintendent. (Formerly operated by the Oliver and Snyder Steel Company.)

Waukegan Works, Waukegan, Lake county, Illinois. Built in 1891; destroyed by fire in 1899 and immediately rebuilt; put in operation in September, 1900; 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, coal and coke. Works also produce all kinds of coarse steel and copper wire, galvanized wire, bale ties, barbed-wire fencing, staples, etc. F. C. Gedge, Superintendent. (Formerly operated by the Washburn and Moen Manufacturing Company.)

Total annual capacity of the 15 rolling mills and steel works: Bessemer steel ingots, 935,000 gross tons; open-hearth steel ingots, 365,000 tons; billets, slabs, etc., 890,000 tons; wire rods and other rolled products, not including billets or slabs, 1,755,000 tons.

WIRE-ROD PLANTS, 13; WIRE-DRAWING PLANTS, 23; AND WIRE-NAIL PLANTS, 16.

Allentown Works, Allentown, Pa. Product, rods, wire, and wire nails. Rods: annual capacity, 75,000 gross tons. Wire: sizes, from No. 00 to No. 20 gauge; annual capacity, 65,000 tons. Nails: number of machines, 166; all sizes; annual capacity, 600,000 kegs. (Formerly operated by the American Steel and Wire Company of Illinois.)

American Works, Cleveland, Ohio. Product, rods and wire. Rods: annual capacity, 125,000 gross tons. Wire: sizes, from ⅜ of an inch down to No. 34 gauge; annual capacity, 60,000 tons. (Formerly operated by the American Steel and Wire Company of Illinois.)

Anderson Works, Anderson, Indiana. Product, rods, wire, and wire nails. Rods: annual capacity, 75,000 gross tons. Wire: sizes, from

No. 000 to No. 21 gauge inclusive; annual capacity, 70,000 tons. Nails: number of machines, 186; all sizes; annual capacity, 1,000,000 kegs. (Formerly operated by the American Steel and Wire Company of Illinois.)

Beaver Falls Works, Beaver Falls, Pa. Product, rods, wire, and wire nails. Rods: annual capacity, 100,000 gross tons. Wire: sizes, from $\frac{3}{8}$ of an inch to No. 20 gauge; annual capacity, 65,000 tons. Nails: number of nail machines, 142; all sizes; annual capacity, 850,000 kegs. (Formerly operated by the American Steel and Wire Company of Illinois.)

Braddock Works, Braddock, Pa. Product, Bessemer and basic open-hearth steel rods, wire, and wire nails. Rods: annual capacity, 80,000 gross tons. Wire: sizes, from $\frac{3}{8}$ of an inch down to $\frac{1}{16}$ of an inch in diameter; annual capacity, 70,000 tons. Nails: number of machines, 112; all sizes; annual capacity, 700,000 kegs. (Formerly operated by the Pittsburgh Wire Company.)

Central Works, Worcester, Massachusetts. Product, bright, coppered, tinned, and annealed wire; sizes, from $\frac{1}{2}$ of an inch to No. 33 gauge; annual capacity, 20,000 gross tons. (Formerly operated by the Worcester Wire Company.)

Consolidated Works, Cleveland, Ohio. Product, rods, wire, and wire nails. Rods: annual capacity, 80,000 gross tons. Wire: sizes, from rod down to No. 19 gauge; annual capacity, 80,000 tons. Nails: number of machines, 264; sizes, from $\frac{3}{8}$ of an inch to 9 inches; annual capacity, 1,000,000 kegs. (Formerly operated by the American Steel and Wire Company of Illinois.)

De Kalb Works, De Kalb, Illinois. Product, wire and wire nails. Wire: sizes, from No. 0 to No. 20 gauge; annual capacity, 75,000 gross tons. Nails: number of machines, 152; standard sizes; annual capacity, 840,000 kegs. (Formerly called the Elwood Works and operated by the American Steel and Wire Company of Illinois.)

Granite City Works, Granite City, Illinois. Product, market wire, annealed and galvanized barbed wire, steel wire nails, hog and cattle wire, etc. Wire: sizes, from No. 0 to No. 14 gauge of steel wire; annual capacity, 24,000 gross tons. Nails: number of machines, 32; sizes, from 3 to 40-penny; annual capacity, 75,000 kegs. (Formerly operated by the Continental Wire Company; later by the Merchants Wire and Nail Company.)

H. P. Works, Cleveland, Ohio. Product, rods, wire, and wire nails. Rods: annual capacity, 60,000 gross tons. Wire: sizes, from 1-inch shafting down to No. 25 gauge; annual capacity, 60,000 tons. Nails: number of machines, 512; all sizes; annual capacity, 1,500,000 kegs. (Formerly called the H. P. Nail Works and operated by the American Steel and Wire Company of Illinois.)

Joliet, Illinois, Bluff Street Works, Joliet, Illinois. Product, bright, annealed, and galvanized wire; sizes, from No. 2 to No. 18 gauge; an-

nual capacity, 40,000 gross tons. (Formerly called the Joliet Works and operated by the Consolidated Barb Wire Company.)

Joliet, Illinois, Meeker Avenue Works, Joliet, Illinois. Product, wire; sizes, from No. 0 to No. 22 gauge; annual capacity, 7,500 gross tons of wire for bale ties, box straps, wire nails, staples, etc. (Formerly operated by The Laidlaw Bale Tie Company.)

Joliet, Illinois, Rockdale Works, near Joliet, Illinois. Product, wire; sizes, from No. 2 to No. 22 gauge inclusive; annual capacity, 65,000 gross tons. (Formerly operated by the American Steel and Wire Company of Illinois.)

Joliet, Illinois, Scott Street Works, Joliet, Illinois. Product, wire and wire nails. Wire: sizes, from No. 00 to No. 22 gauge inclusive; annual capacity, 100,000 gross tons. Nails: number of machines, 266; standard sizes; annual capacity, 1,500,000 kegs. (Formerly called the Joliet Works and operated by the American Steel and Wire Company of Illinois.)

Newburgh Steel Works, Newburgh, Ohio. Product, wire rods; annual capacity, 140,000 gross tons. M. McMurray, General Superintendent. (Formerly operated by the Cleveland Rolling Mill Company.)

Newburgh Wire Works, Newburgh, Ohio. Product, wire, barbed wire, and wire nails. Wire: sizes, from $\frac{3}{8}$ of an inch to No. 33 gauge; annual capacity, 90,000 gross tons. Barbed wire: annual capacity, 18,000 tons. Nails: number of machines, 30; all sizes; annual capacity, 240,000 kegs. M. McMurray, General Superintendent, and C. R. Putnam, Superintendent. (Formerly operated by the Cleveland Rolling Mill Company.)

New Castle Works, New Castle, Pa. Product, rods, wire, and wire nails. Rods: annual capacity, 90,000 gross tons. Wire: sizes, from $\frac{3}{8}$ of an inch to No. 22 gauge; annual capacity, 75,000 tons. Nails: number of machines, 254; sizes, from 2-penny fine to 60-penny common; annual capacity, 1,250,000 kegs. (Formerly called the New Castle Wire Nail Works and operated by the Shenango Valley Steel Company.)

North Works, Worcester, Mass. Product, wire, barbed wire, wire rope, wire nails, insulated wire, galvanized wire, cables, etc. Wire: all sizes down to .003 of an inch in diameter; annual capacity, 100,000 gross tons. Nails: number of machines, 113; all sizes and kinds; annual capacity, 200,000 kegs. E. J. Watson, Superintendent. (Formerly operated by the Washburn and Moen Manufacturing Company.)

Pacific Works, San Francisco, California. Product, street railway and submarine cable, plain, and copper wire, wire rope, and wire nails. Wire: sizes, from $\frac{3}{8}$ of an inch to No. 36 gauge; annual capacity, 15,000 gross tons of plain wire and 7,500 tons of rope and cable. Nails: number of machines, 32; sizes, from 2-penny to 12-inch spikes; annual capacity, 120,000 kegs. (Formerly operated by the Washburn and Moen Manufacturing Company.)

Rankin Works, Rankin Station, Pa. Product, rods, wire, and wire nails.

Rods: annual capacity, 100,000 gross tons. Wire: all sizes; annual capacity, 90,000 tons. Nails: number of machines, 166; all sizes; annual capacity, 900,000 kegs. (Formerly called the Pittsburgh Works and operated by the American Steel and Wire Company of Illinois.)

Salem Works, Salem, Ohio. Product, wire and wire nails. Wire: sizes, from rod down to No. 21 gauge; annual capacity, 36,000 gross tons. Nails: number of machines, 124; sizes, from $\frac{1}{4}$ of an inch to 7 inches; annual capacity, 650,000 kegs. (Formerly operated by the American Steel and Wire Company of Illinois.)

South Side Works, Pittsburgh, Pa. Product, rods, wire, and wire nails. Rods: annual capacity, 90,000 gross tons. Wire: sizes, from $\frac{3}{8}$ of an inch to No. 20 gauge; annual capacity, 150,000 tons. Nails: number of machines, 204; sizes, from $\frac{1}{4}$ of an inch to 9 inches; annual capacity, 960,000 kegs. (Formerly operated by the Oliver Wire Company.)

South Works, Worcester, Massachusetts. Product, rods and wire. Rods: annual capacity, 135,000 gross tons. Wire: sizes, from $\frac{1}{2}$ of an inch to No. 20 gauge; annual capacity, 105,000 tons. (Formerly operated by the Washburn and Moen Manufacturing Company.)

Waukegan Works, Waukegan, Ill. Product, rods and wire. Rods: annual capacity, steel or copper, 100,000 gross tons. Wire: sizes, from $\frac{1}{2}$ of an inch to No. 22 $\frac{1}{2}$ gauge; annual capacity, 100,000 tons. (Formerly operated by the Washburn and Moen Manufacturing Company.)

Total annual capacity: wire rods, 1,250,000 gross tons; wire, 1,562,500 tons; wire nails, 12,385,000 kegs of 100 pounds.

IRON-ORE MINES, COAL LANDS, COKE OVENS, ETC.

The American Steel and Wire Company of New Jersey controls the Sauntry Iron Ore Mine in St. Louis county, Minnesota, the Alpena Mine, adjoining the Sauntry Mine on the north, and the Clark Mine, all in the Mesabi Range; the Atlantic Mine, at Iron Belt, Wisconsin, in the Gogebic Range; the Negaunee Mine, at Negaunee, and the Moore Mine, in Michigan, in the Marquette Range; and the Cuff Mine, in Dickinson county, and the Hill Top Mine, at Crystal Falls, Michigan, in the Menominee Range, all located in the Lake Superior iron-ore region. In addition it owns 1,364 acres of coal lands in Westmoreland county, 8,313 acres in Fayette county, and 2,330 acres in Greene county, Pa. It also owns 1,630 coke ovens in Westmoreland and Fayette counties, Pa., now operated by the American Coke Company, and a one-half interest in 250 additional ovens at Dawson, Fayette county, Pa., operated by the Juniata Coke Company. It also operates limestone quarries at Williamsburg, Pa.

The company also owns 12 steamers, with an aggregate annual ore-carrying capacity of 1,252,100 gross tons. [For a description of these vessels see pages 65-6.]

AMERICAN TIN PLATE COMPANY.

Practically all the stock of the American Tin Plate Company is now owned by
The United States Steel Corporation.

American Tin Plate Company; general offices, Battery Park Building, New York. *Officers*: Daniel G. Reid, President; William T. Graham, First Vice-President; Warner Arms, Second Vice-President; Warner Leeds, Third Vice-President; Frederick S. Wheeler, Treasurer; E. G. Applegate, Secretary; H. B. Wheeler, Assistant Secretary; and William P. Beaver, Auditor. *Engineering Department*: Carnegie Building, Pittsburgh; C. W. Bray, Chief Engineer. *Board of Directors*: Daniel G. Reid, William H. Moore, William B. Leeds, William T. Graham, James H. Moore, James McLean, James B. Dill, Frederick S. Wheeler, Warner Arms, George Greer, Warner Leeds, Cecil A. Robinson, William E. Reis, James A. Matthews, and Richard R. Quay. *Executive Committee*: William B. Leeds, Chairman; Daniel G. Reid, Warner Arms, William T. Graham, and William H. Moore. Capital stock, \$50,000,000, of which \$20,000,000 is 7 per cent. cumulative preferred and \$30,000,000 is common. The company operates the following works:

ROLLING MILLS—28 COMPLETED AND 1 BUILDING.

Unless otherwise stated the annual capacity of the rolling mills named below is given on triple turn.

American Works, Elwood, Madison county, Indiana. Built in 1891-2 and first put in operation in June, 1892; 52 heating furnaces, 9 annealing furnaces, and 26 hot and 20 cold mills; one bar mill, with two stands of 3-high rolls, one stand of bull heads, and 2 continuous heating furnaces; product, black plates for tin and terne plates; annual capacity, double turn, 52,000 gross tons. Fuel, natural gas exclusively. Make tin and terne plates. The hot and cold trains of rolls with which the Montpelier Works of the American Tin Plate Company, at Montpelier, Indiana, were formerly equipped were removed to the American Works in January, 1900. (Formerly called the Elwood Works and operated by The American Tin Plate Company.)

Anderson Works, Anderson, Madison county, Indiana. Built in 1894-5 and put in operation August 1, 1895; 7 double heating furnaces, one large annealing furnace, and 7 hot and 6 cold mills; product, black plates for tinning; annual capacity, 14,000 gross tons. Fuel, natural gas. Make tin and terne plates. (Formerly operated by The National Tin Plate Company.)

Atlanta Works, Atlanta, Hamilton county, Indiana. Built in 1894-5 and put in operation in March, 1895; 6 double heating furnaces, 3 annealing furnaces, and 6 hot and 4 cold mills; product, black plates for tinning and light sheets up to No. 34 gauge and in sizes up to 30 x 96 inches; annual capacity, 12,000 gross tons. Fuel, natural gas. Make tin and terne plates. (Formerly operated by The Atlanta Steel and Tin Plate Company.)

Banfield Works, Irondale, Jefferson county, Ohio. Works, which were originally built by the Pioneer Iron Company in 1868, then consisted of a blast furnace, a rolling mill, a galvanizing plant, and a square mile of coal property; bought and refitted by Wallace, Banfield & Co., who erected two sheet mills in 1884. Present plant contains 4 double heating furnaces, 2 annealing furnaces, and four 24-inch hot and three 24-inch cold mills; product, black plates for tinning; annual capacity, 8,000 gross tons. Fuel, coal. Make tin and terne plates. (Formerly called the Irondale Rolling Mill and operated by Wallace, Banfield & Co.)

Beaver Works, Lisbon, Columbiana county, Ohio. Built in 1894-5 and first put in operation April 10, 1895; 7 sheet and 7 pair furnaces, 4 double annealing furnaces, and seven 24 x 32-inch hot and seven 22 x 34-inch cold mills; product, black plates for tinning; annual capacity, 14,000 gross tons. Fuel, bituminous coal. Make tin and terne plates. (Formerly operated by The Beaver Tin Plate Company.)

Cambridge Works, Cambridge, Guernsey county, Ohio. Built in 1894 and first put in operation January 1, 1895; 6 double heating furnaces, 5 annealing furnaces, and six 24 x 32-inch hot and six 20 x 32-inch cold mills; product, black plates for tinning; annual capacity, 12,000 gross tons. Fuel, bituminous coal. Make tin and terne plates. (Formerly operated by The Morton Tin Plate Company.)

Canonsburg Works, Canonsburg, Washington county, Pa. Built in 1882; 5 double sheet and pair furnaces, 6 annealing furnaces, one hammer, 2 bar mills, (one 2-high and one 3-high,) one sheet mill, 4 black plate mills, and 6 cold mills; product, fine sheet iron and steel for stamping and tinning purposes; annual capacity, 10,000 gross tons. Fuel, natural gas. (Formerly operated by the Canonsburg Iron and Steel Company.)

Chester Works, Chester, Hancock county, West Virginia. Post office address, East Liverpool, Ohio. Built in 1899-1900 by the Chester Rolling Mill Company, and equipped with machinery for the manufacture of sheet steel; acquired by the American Sheet Steel Company in 1900, and purchased by the American Tin Plate Company in 1901. The works are now being equipped with 7 sheet furnaces, 7 pair furnaces, 3 annealing furnaces, one 26 x 52-inch sheet mill, six 26 x 32-inch black plate mills, all hot, and seven cold mills, (one 26 x 52 and six 26 x 32-inch); product, black plates for tin-

ning and large sheets; annual capacity, 12,000 gross tons; fuel, coal. The plant is expected to be ready for operation by November 1, 1901. Will make tin and terne plates.

Crescent Works, Cleveland, Cuyahoga county, Ohio. Built in 1895 and first put in operation June 1, 1895; 6 pair and 6 heating furnaces, 6 annealing furnaces, and six 24 x 32-inch hot and six 20 x 30-inch cold mills; product, black plates for tinning and stamping; annual capacity, 12,000 gross tons. Fuel, coal. Make tin and terne plates. (Formerly operated by The Crescent Sheet and Tin Plate Company.)

Cumberland Works, Cumberland, Allegany county, Maryland. Black plate mill added to rolling mill in 1892 and first black plates made in 1893; 5 sheet and 5 pair furnaces, one annealing furnace, two 24-inch and three 26-inch hot mills, and six 22-inch cold mills; product, black plates for tinning; annual capacity, 8,000 gross tons. Fuel, coal. (Formerly operated by the Cumberland Steel and Tin Plate Company.)

Ellwood City Works, Ellwood City, Lawrence county, Pa. Built in 1892-3 and first put in operation April 1, 1893; 6 double sheet and pair furnaces, one annealing furnace, and six 24-inch hot and six 20-inch cold mills; product, black plates for tinning and cold-rolled steel sheets; annual capacity, 12,000 gross tons. Fuel, coal. Make tin and terne plates. (Formerly called the Ellwood Tin Plate Works and operated by the Ellwood Tin Plate Company.)

Falcon Works, Niles, Trumbull county, Ohio. Built in 1892-3 and first put in operation in April, 1893; 12 sheet and pair furnaces, one annealing furnace, and six 24 x 32-inch hot and eight 22 x 34-inch cold mills; product, black plates for tinning; annual capacity, 12,000 gross tons. Fuel, bituminous coal and slack. Make tin and terne plates. (Formerly operated by the Falcon Tin Plate and Sheet Company.)

Great Western Works, Joliet, Will county, Illinois. Built in 1891-2 and first put in operation May 1, 1892; 4 double sheet and pair furnaces, 2 annealing furnaces, and four 24 x 32-inch hot and four 20 x 32-inch cold mills; product, black plates for tinning; annual capacity, 7,000 gross tons. Fuel, coal. Make tin and terne plates. (Formerly called the Joliet Sheet Mill and operated by the Great Western Tin Plate Company.)

Humbert Works, South Connellsville, Fayette county, Pa. Built in 1896 and first put in operation October 31, 1896; 6 double sheet and pair furnaces, 3 annealing furnaces, and six 24 x 32-inch hot and six 22 x 30-inch cold mills; product, black plates for tinning; annual capacity, 12,000 gross tons. Fuel, coal. Make tin and terne plates. (Formerly called the South Connellsville Plant and operated by the Humbert Tin Plate Company.)

Irondale Works, Middletown, Henry county, Indiana. Built in 1893-4, utilizing machinery from the Irondale Steel and Iron Company's

mill at Anderson, which was destroyed by fire on October 31, 1893; 12 pair and sheet furnaces, one 24 x 40 and five 24 x 32-inch hot mills, and one 20 x 44 and four 20 x 34-inch cold mills; product, black plates for tinning; annual capacity, 10,000 gross tons. Fuel, natural gas. (Formerly operated by The Irondale Steel and Iron Company.)

Johnstown Works, Johnstown, Cambria county, Pa. Built in 1898 and first put in operation in May, 1898; 4 sheet and pair furnaces, one annealing furnace, two 24 x 32-inch hot mills, and three 20 x 36-inch cold mills; product, black plates for tinning; annual capacity, 3,750 gross tons. Fuel, bituminous coal. Make tin and terne plates. (Formerly called the Johnstown Tinplate Works and operated by the Johnstown Tinplate Company.)

La Belle Works, Wheeling, Ohio county, West Virginia. Black plate mill added to rolling mill in 1893 and first black plates made in April, 1894; 10 sheet and 10 pair furnaces, 4 annealing furnaces, and one 24 x 36 and nine 24 x 32-inch hot and ten 22 x 32-inch cold mills; product, black plates for tinning; annual capacity, 20,000 gross tons. Fuel, natural gas. Make tin and terne plates. (Formerly operated by the La Belle Iron Works, which still operate the remainder of the plant.)

Laughlin Works, Martins Ferry, Belmont county, Ohio. Black plate mill added to rolling mill in 1895 and first black plates made in August, 1895; 22 sheet and 22 pair furnaces, 6 annealing furnaces, and twenty-two 26 x 32-inch hot and eighteen 22 x 34-inch cold mills; product, black plates for tinning; annual capacity, 30,000 gross tons. Fuel, coal. Make tin and terne plates. (Formerly operated by the Laughlin Nail Company, which still operates the remainder of the plant.)

Monongahela Works, South Fifteenth st., Pittsburgh, Allegheny county, Pa. Built in 1894-5 and first put in operation February 14, 1895; 14 sheet and 14 pair furnaces, 5 annealing furnaces, and fourteen 24 x 32-inch hot and twelve 20 x 32-inch cold mills; product, black plates for tinning; annual capacity, 24,000 gross tons. Fuel, bituminous coal. Make tin and terne plates. (Formerly operated by the Monongahela Tin Plate Company.)

Morewood Works, Gas City, Grant county, Indiana. Built in 1892-3 and first put in operation in December, 1893; 8 sheet and 8 pair furnaces, 2 annealing furnaces, one bar mill, and 8 hot and 8 pairs of cold mills; product, black plates for tinning; annual capacity, 16,000 gross tons. Fuel, natural gas. Make tin and terne plates. (Formerly called the Gas City Tinplate Works and operated by The Morewood Company.)

Muskegon Works, Muskegon, Muskegon county, Michigan. Black plate mill added to rolling mill in 1899 and first black plates made in

1900; 6 double heating furnaces, 2 annealing furnaces, 6 single pair furnaces, and six 26-inch hot and five 24-inch cold mills. Product, iron and steel black plates for tinning; annual capacity, 12,000 gross tons. Fuel, coal and manufactured gas. Make tin and terne plates. (Formerly called the Muskegon Rolling Mills and operated by the Champion Iron and Steel Company. The American Rolling Mill Company now operates the remainder of the plant.)

National Works, Monessen, Westmoreland county, Pa. Built in 1897-8 and first put in operation in January, 1898; 24 sheet and 24 pair furnaces, 6 annealing furnaces, and twenty-four 24 x 32-inch hot and eighteen 22 x 32-inch cold mills; product, black plates for tinning; annual capacity, 50,000 gross tons. Fuel, coal. Make tin and terne plates. (Formerly operated by the National Tin Plate Company of Pennsylvania.)

New Castle Works, New Castle, Lawrence county, Pa. Built in 1892-3 and first put in operation in October, 1893; 20 pair and 20 sheet furnaces, 7 annealing furnaces, twenty 24 x 32-inch hot and twenty-one 20 x 22-inch cold mills; product, black plates for tinning; annual capacity, 40,000 gross tons. Fuel, bituminous coal. Make tin and terne plates. (Formerly operated by the New Castle Steel and Tin Plate Company, Incorporated.)

Pennsylvania Works, New Kensington, Westmoreland county, Pa. Built in 1894 and first put in operation in 1895; 8 sheet and 8 pair furnaces, 3 annealing furnaces, and six 24 x 32-inch hot and six 22 x 32-inch cold mills; product, black plates for tinning; annual capacity, 12,000 gross tons. Fuel, coal. Make tin and terne plates. (Formerly operated by the Pennsylvania Tin Plate Company.)

Pittsburgh Works, New Kensington, Westmoreland county, Pa. Built in 1894 and first put in operation in December, 1894; 7 sheet, 7 pair, and 4 annealing furnaces, three 24 x 28-inch, one 24 x 36-inch, and two 24 x 32-inch hot mills, and seven 22 x 36-inch cold mills; product, black plates for tinning and soft stamping sheets; annual capacity, 14,000 gross tons. Fuel, bituminous coal. Make tin and terne plates. (Formerly operated by the Pittsburgh Tin Plate Works.)

Reeves Works, Canal Dover, Tuscarawas county, Ohio. Built in 1895; 6 sheet furnaces, 6 pair furnaces, 6 annealing furnaces, and six 24-inch hot and six 24-inch cold mills; product, black plates for tinning and black steel sheets; annual capacity, 12,000 gross tons. Fuel, bituminous coal. Make tin and terne plates. (Formerly operated by The Reeves Iron Company.)

Shenango Works, New Castle, Lawrence county, Pa. Built in 1897-8 and first put in operation in April, 1899; 30 sheet and 30 pair furnaces, 8 annealing furnaces, and thirty 26 x 32-inch hot and thirty 22 x 34-inch cold mills; product, black plates for tinning; annual capacity, 60,000 gross tons. Fuel, coal. Make tin and terne plates.

(Works partly built by the Shenango Valley Steel Company and completed and started by the American Tin Plate Company.)

Star Works, foot of Twelfth st., Pittsburgh, Allegheny county, Pa. Built in 1895 and first put in operation January 6, 1896; 16 sheet and pair furnaces, 5 annealing furnaces, and six 24 x 32-inch hot and nine 22 x 32-inch cold mills; product, black plates for tinning; annual capacity, 16,000 gross tons. Fuel, bituminous coal. Make tin and terne plates. (Formerly operated by the Star Tin Plate Company.)

United States Works, Demmler, (eighth ward, McKeesport,) Allegheny county, Pa. Built in 1873-4; burned and rebuilt in 1883; 11 sheet and 11 pair furnaces, 6 annealing furnaces, and 11 hot and 11 cold mills; product, refined and cold-rolled black sheet iron, Bessemer and open-hearth steel sheets, and black plates for tinning; annual capacity, 18,000 gross tons. Fuel, bituminous coal. Make tin and terne plates. (Formerly operated by the United States Iron and Tin Plate Manufacturing Company.)

Total annual capacity of the 28 completed rolling mills, on triple turn: 522,750 gross tons of black plates or sheets for tinning, stamping, etc.; of the building mill, 12,000 tons.

TINPLATE WORKS—25 COMPLETED AND 1 BUILDING.

Unless otherwise stated the weekly capacity of the tinplate works named below is given in boxes of 100 pounds and on double turn.

American Works, Elwood, Madison county, Indiana. Built in 1891-2 and first tin and terne plates made in July, 1892; 59 sets; weekly capacity, 30,000 base boxes of tin and terne plates of various weights. Fuel, natural gas. Brands: for tinplates, "Hazen," "Premier," "Imperial," and "Peerless" for charcoal, and "Hazen," "Kream," "Kan-ner," "L-Wood," and "Koko" for coke; for terne plates, "L-e-e-d-s," "E-l-w-o-o-d," "I-n-d-i-a-n-a," and "R-e-i-d." The tinning sets formerly in the Montpelier Works of the American Tin Plate Company, at Montpelier, Ind., were removed to the American Works in 1896. (Formerly called the Elwood Works and operated by The American Tin Plate Company.)

Anderson Works, Anderson, Madison county, Indiana. Built in 1894-5 and first tin and terne plates made in August, 1895; 10 sets; weekly capacity, 6,000 boxes of tin or terne plates. Fuel, natural gas. Brands: for tinplates, "Donner," "Irwin," "Matter," and "Eagle" for charcoal and "Anderson" and "National" for coke. (Formerly operated by The National Tin Plate Company.)

Atlanta Works, Atlanta, Hamilton county, Indiana. Built in 1892-3 and first tinplates made in March and first terne plates in April, 1893; 8 sets; weekly capacity, 4,000 boxes. Fuel, natural gas. Brand, "Atlanta" for coke tinplates and for terne plates. (Formerly operated by The Atlanta Steel and Tin Plate Company.)

Banfield Works, Irondale, Jefferson county, Ohio. Tinning plant added to rolling mill in 1891; enlarged in 1892; 10 tinning machines; product, tin and terne plates; weekly capacity, 2,800 boxes of tinplates and 200 boxes of terne plates. Tinned sheets 40 inches wide and 96 inches long are produced at this plant. Fuel, coal. Brands: for tinplates, "B," "A," "AA," and "AAA" for charcoal and "C" and "BC" for coke; for terne plates, Diamond "B," "A," "AA," "AAA," "WB," and "OS." (Formerly called the Irondale Tin and Terne Plate Works and operated by Wallace, Banfield & Co.)

Beaver Works, Lisbon, Columbiana county, Ohio. Built in 1894-5 and first tin and terne plates made in April, 1895; 14 sets; weekly capacity, 6,000 boxes of tin and terne plates. Fuel, bituminous coal. Brands: for tinplates, "Beaver" coke and "Beaver A," "Beaver AA," and "Beaver AAA" charcoal; for terne plates, "Beaver," "Beaver Special," "Beaver Extra," and "Beaver Best." (Formerly operated by The Beaver Tin Plate Company.)

Cambridge Works, Cambridge, Guernsey county, Ohio. Built in 1894 and first tin and terne plates made in March, 1895; 9 sets for tin and terne plates; weekly capacity, 5,000 boxes. Fuel, bituminous coal. Brands: for tinplates, "Guernsey," "Morton," "Regent," and "White Rose" for charcoal and "Cambridge" and "Thistle" for coke; for terne plates, "American Standard," "Cambridge Old Style," "Cambridge New Method," "Leatherwood," "Economy," "North Star," "Neptune," "Paragon," and "Cambridge Redipped." (Formerly called the Morton Tin Plate Works and operated by The Morton Tin Plate Company.)

Chester Works, Chester, Hancock county, West Virginia. Post office address, East Liverpool, Ohio. Adding a tin-dipping plant to a rolling mill, to contain 12 sets, 8 for tinplates and 4 for terne plates; weekly capacity, 4,000 boxes of tinplates and 2,000 boxes of terne plates. Fuel, coal. Plant will probably be completed and in operation by November 1, 1901.

Crescent Works, Cleveland, Cuyahoga county, Ohio. Built in 1894-5 and first tin and terne plates made in January, 1896; 11 sets for tin and terne plates; weekly capacity, 5,400 boxes. Fuel, coal. Brands: for tinplates, "A," "AA," and "AAA" in a crescent for charcoal and "C" in a crescent for coke; for terne plates, "*", "**," and "***" in a crescent. (Formerly operated by The Crescent Sheet and Tin Plate Company.)

Ellwood City Works, Ellwood City, Lawrence county, Pa. Tinning plant added to rolling mill in 1894 and first tin and terne plates made in January, 1895; 16 sets for tin and terne plates; weekly capacity, 5,400 boxes. Fuel, coal. Brands: for tinplates, "Silverine," "Saturn," "Anti-Rust," and "P. O. P." for charcoal and "American" and "American Palm" for coke; for terne plates, "Monogram,"

"N. C. T.," "Charter Oak," "Banner," "Weather Proof," and "MF." Trademark, a red star. (Formerly called the Ellwood Tin Plate Works and operated by the Ellwood Tin Plate Company.)

Falcon Works, Niles, Trumbull county, Ohio. Tinning plant added to rolling mill in 1895 and first tin and terne plates made in March, 1895; 12 sets for tin and terne plates; weekly capacity, 5,400 boxes. Fuel, bituminous coal. Brands: for tinplates, "Tulip," "Crocus," "Hyacinth," "Jonquil," and "Daisy" for charcoal and "Clover" for coke; for terne plates, "Official Seal," "Cornflower," "Sweet Brier," "Holly Wood," "Golden Rod," "Mayflower," "Moonflower," "Starflower," "Sunflower," and "Wildflower." (Formerly operated by the Falcon Tin Plate and Sheet Company.)

Great Western Works, Joliet, Will county, Illinois. Tinning plant added to rolling mill in 1895 and first tin and terne plates made in March, 1895; 8 sets for tin and terne plates; weekly capacity, 3,000 boxes. Fuel, oil. Brands: for tinplates, "Moose" for charcoal and "Elk" for coke; for terne plates, "Duck," "Drake," and "Swan." (Formerly operated by the Great Western Tin Plate Company.)

Humbert Works, South Connellsville, Fayette county, Pa. Built in 1896 and first tinplates made December 4, 1896; 12 sets for tin and terne plates; weekly capacity, 6,000 boxes. Fuel, natural gas. Brand, "Humbert." (Formerly called the South Connellsville Plant and operated by the Humbert Tin Plate Company.)

Johnstown Works, Johnstown, Cambria county, Pa. Built in 1898 and first put in operation in May, 1898; 3 sets for tin and terne plates; weekly capacity, 1,800 boxes. Fuel, bituminous coal. (Formerly called the Johnstown Tinplate Works and operated by the Johnstown Tinplate Company.)

La Belle Works, Wheeling, Ohio county, West Virginia. Tinning plant added to rolling mill in 1895; first tinplates made in July, 1895, and first terne plates in January, 1896; 15 sets for tin and terne plates; weekly capacity, 9,000 boxes. Fuel, natural gas. Brands: for tinplates, "La Belle" for coke and "Woodward A" and "Woodward B" for charcoal; for terne plates, "West Virginia A," "West Virginia B," and "West Virginia Old Style." (Formerly operated by the La Belle Iron Works.)

Laughlin Works, Martins Ferry, Belmont county, Ohio. Tinning plant added to rolling mill in 1895 and enlarged in 1896-7 and in 1900; first tin and terne plates made August 29, 1895; 42 sets for tin and terne plates; weekly capacity, 20,000 boxes. Fuel, coal. Brand, "Laughlin." (Formerly operated by the Laughlin Nail Company.)

Monongahela Works, South Fifteenth st., Pittsburgh, Allegheny county, Pa. Built in 1893; first terne plates made June 1 and first tinplates November 15, 1893; 22 sets for tin and terne plates; weekly capacity, 11,000 boxes. Fuel, coal. Brands: for coke tinplates, "Monon"

and "Oliver (O. H.);" for terne plates, "Iron City," "Soho," "Manchester," and "Sheffield." (Formerly operated by the Monongahela Tin Plate Company.)

Morewood Works, Gas City, Grant county, Indiana. Built in 1893; first terne plates made in June and first tinplates in December, 1893; 18 sets for tin and terne plates; weekly capacity, 6,400 boxes. Fuel, natural gas. 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." (Formerly called the Gas City Tinplate Works and operated by The Morewood Company.)

Muskegon Works, Muskegon, Muskegon county, Michigan. Tinning plant added to rolling mill in 1900 and first tin and terne plates made August 4, 1900; 14 sets for tin and terne plates; weekly capacity, 5,500 boxes. Fuel, manufactured gas. Brand, "American." (Formerly operated by the Champion Iron and Steel Company.)

National Works, Monessen, Westmoreland county, Pa. Built in 1897-8 and first tin and terne plates made in March, 1898; 38 sets for tin and terne plates; weekly capacity, 20,000 boxes. Fuel, coal. (Formerly operated by the National Tin Plate Company of Pennsylvania.)

New Castle Works, New Castle, Lawrence county, Pa. Built in 1892-3 and first tin and terne plates made in November, 1893; 32 sets for tin and terne plates; weekly capacity, 16,000 boxes. Fuel, coal. Brands: for tinplates, "New Castle 'Palm' Coke" and "New Castle Coke" for coke plates; "New Castle Best Palm," "New Castle Palm," "New Castle Charcoal," and "Shenango" for charcoal plates; for terne plates, "New Castle Old Method," "Shenango," and "Juniata." (Formerly operated by the New Castle Steel and Tin Plate Company, Incorporated.)

Pennsylvania Works, New Kensington, Westmoreland county, Pa. Built in 1895 and first tin and terne plates made in April, 1895; 10 sets for tin and terne plates; weekly capacity, 5,000 boxes. Fuel, coal. Brands: for tinplates, "Melvin" and "Range" for charcoal and "B. G." and "Peconic" for coke; for terne plates, "Defender." (Formerly operated by the Pennsylvania Tin Plate Company.)

Pittsburgh Works, New Kensington, Westmoreland county, Pa. Built in 1891-2 and first terne plates made in February and first tinplates in October, 1892; 12 sets for tin and terne plates; weekly capacity, 5,000 boxes. Fuel, bituminous coal. Brands: for tinplates, "Opal" and "Onyx" for charcoal and "Alba," "Alba Extra," and "Lorna" for coke; for terne plates, "Kensington," "Amber," and "P. T. W. Old Fashion." (Formerly operated by the Pittsburgh Tin Plate Works.)

Reeves Works, Canal Dover, Tuscarawas county, Ohio. Built in 1896 and first tin and terne plates made in 1896; 8 sets for tin and terne plates and 4 pots for continuous roofing plates; weekly capacity, 5,000 boxes. Fuel, bituminous coal. Brands: for tinplates, "Althea,"

"Carol," "New Cresta," "Rieka," and "Villette" for charcoal and "Ariel," "Delta," and "S. J. R." for coke; for terne plates, "Barto," "Crown Old Method," "Eminent Old Method," "Mingo," "Pencoyd," "Preble Extra," and "Sanatoga;" for continuous roofing, "Dover," "Dover Extra," and "Dover Old Method." (Formerly operated by The American Tin Plate Machine and Manufacturing Company.)

Shenango Works, New Castle, Lawrence county, Pa. Built in 1897-8 and first tin and terne plates made in July, 1899; 36 sets for tin and terne plates; weekly capacity, 24,000 boxes. Fuel, coal. (Works partly built by the Shenango Valley Steel Company and completed and started by the American Tin Plate Company.)

Star Works, foot of Twelfth st., Pittsburgh, Allegheny county, Pa. Built in 1895; 13 sets for tin and terne plates; weekly capacity, 6,000 boxes. Fuel, natural gas. Brand, "Star" coke tinplates. (Formerly operated by the Star Tin Plate Company.)

United States Works, Demmler, (eighth ward, McKeesport,) Allegheny county, Pa. Original works erected in 1874; first terne plates made in 1874 and first tinplates in 1876; manufacture stopped in 1878 and resumed in 1890; new tin house built on modern plan in 1898; 14 sets for tin and terne plates; weekly capacity, 7,000 boxes. Fuel, natural gas. Brands: for tinplates, "U. S. Bright," "Youghiogheny Bright," and "Versailles Bright" for charcoal and "Mifflin" for coke; for terne plates, "U. S. Monongahela," "U. S. Eagle," "U. S. Redipped," "U. S. Grant," and "Demmler Redipped." (Formerly operated by the United States Iron and Tin Plate Manufacturing Company.)

Total weekly capacity of the 25 completed tin and terne plate works, on double turn: 220,900 boxes of 100 pounds; of the building works, 6,000 boxes.

AMERICAN STEEL HOOP COMPANY.

Practically all the stock of the American Steel Hoop Company is now owned by The United States Steel Corporation.

American Steel Hoop Company; general offices, Carnegie Building, Pittsburgh, Pa. Branch sales offices: Equitable Building, Atlanta, Georgia; No. 125 Milk st., Boston, Massachusetts; No. 451 Main street, Buffalo, New York; Rookery Building, Chicago, Illinois; No. 104 West Fourth st., Cincinnati, Ohio; No. 103 Superior st., Cleveland, Ohio; People's Bank Building, Denver, Colorado; Union Trust Building, Detroit, Michigan; Guaranty Building, Minneapolis, Minn.;

Empire Building, New York City; Harrison Building, Philadelphia; No. 721 Olive st., St. Louis, Missouri; and No. 258 Market st., San Francisco, California. *Foreign*: Bell Telephone Building, Montreal, Canada; Apartado No. 924, City of Mexico, Mexico; and Nos. 71-72 King William st., London, England. *Officers*: W. E. Corey, President; H. P. Bope, First Vice-President and General Manager of Sales; W. W. Blackburn, Second Vice-President and Secretary; W. C. McCausland, Treasurer; James J. Campbell, Assistant Secretary and Auditor; and William R. Conrad, Assistant Treasurer. Capital stock issued, \$33,000,000, of which \$14,000,000 is 7 per cent. preferred and \$19,000,000 is common. The company operates or controls the following works:

BLAST FURNACES—3.

Isabella Furnaces, (operated by The Isabella Furnace Company, Incorporated,) Etna, Allegheny county, Pennsylvania. Three stacks: two built in 1872 and one built in 1890; No. 1, now 75 x 20, to be rebuilt to 20 x 90, and to be equipped with four Kennedy stoves; No. 2, 19 x 90, rebuilt in 1900, has four Kennedy stoves; No. 3, now being rebuilt, to be 20 x 90, and to be equipped with four Kennedy stoves. Fuel, coke; ore, Lake Superior; product, Bessemer, foundry, mill, and basic pig iron; total annual capacity, 500,000 gross tons. Brand, "Isabella." Equipped with one pig-iron casting machine.—*Active in 1901.*

Total annual capacity of the 3 furnaces: 500,000 gross tons.

ROLLING MILLS AND STEEL WORKS—14.

Atlanta Mill, Atlanta, Fulton county, Georgia. Built in 1900 and first put in operation in July, 1900; one heating furnace and one 8-inch train of rolls; product, hoops and cotton-ties; annual capacity, 15,000 gross tons. Fuel, coal. Brand, "Ashco.*" J. P. McCaslin, Superintendent. (Formerly operated by the Southern Manufacturing Company.)

Bridgeport Mill, Bridgeport, Belmont county, Ohio. Built in 1873 and put in operation January 1, 1874; enlarged in 1883 and 1891; 2 regenerative gas heating furnaces and one 16-inch 3-high bar mill; product, steel bars, light T rails, angles, tees, channels, and miscellaneous shapes; annual capacity, 30,000 gross tons. Fuel, natural gas. Brand, "Ashco.*" George W. Bradberry, Superintendent. (Formerly operated by the Aetna-Standard Iron and Steel Company.)

Clark Mill, Thirty-fifth st., A. V. Railway, and Allegheny river, Pittsburgh, Allegheny county, Pa. Built in 1869; 7 heating furnaces and 6 trains of rolls (two 8, one 9, one 10, one 12, and one 20-inch); two 12-gross-ton acid open-hearth steel furnaces added in 1889-90 with an annual capacity of 10,000 gross tons of ingots; product, hoop, band, box, and scroll steel, cotton-ties, steel tire, and skelp;

annual capacity, 60,000 gross tons. Fuel, natural and manufactured gas. Brands, "Delta" for cotton-ties and "*Ashco*" for other products. W. H. Thompson, Superintendent. (Formerly called the Solar Steel Works and operated by the William Clark Sons Company.)

Girard Mill, Girard, Trumbull county, Ohio. 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 iron and steel bars, small steel T rails, angles, channels, tees, and special shapes; special attention given to the manufacture of iron for chains, bolts, nuts, and agricultural implements; annual capacity, 35,000 gross tons. Fuel, manufactured gas for heating furnaces and coal for puddling furnaces. Brand, "*Ashco.*" W. W. Wilson, Superintendent. (Formerly operated by The Union Iron and Steel Company.)

Greenville Mill, Greenville, Mercer county, Pa. Built in 1871; 30 single puddling and 4 heating furnaces and 3 trains of rolls (one 16-inch muck and one 8 and one 10-inch finishing); product, iron and steel bars and skelp; special attention given to cold pressed nut iron; annual capacity, 25,000 gross tons. Brand, "*Ashco.*" Fuel, coal. Thomas R. Smith, Superintendent. (Formerly called the Greenville Rolling Mill and operated by The P. L. Kimberly Company.)

Lower Union Mill, Youngstown, Mahoning county, Ohio. Built in 1863, 1874, and 1890; 10 single and 18 double puddling furnaces, 9 heating furnaces, (4 using producer gas,) and 8 trains of rolls (two muck, and one 7, three 8, one 10, and one 16-inch finishing); product, hoops, bands, horseshoe iron, bar iron, guide iron, shapes, merchant steel bars, and steel cotton-ties; annual capacity, 125,000 gross tons. Fuel, coal and manufactured gas. Brands, "Eagle" for horseshoe iron and "*Ashco*" for other products. M. E. Coombs, Superintendent. (Formerly operated by The Union Iron and Steel Company.)

McCutcheon Mill, 88 Rebecca st., Allegheny, Allegheny county, Pa. Built in 1862; 20 single puddling and 4 heating furnaces and 4 trains of rolls (one muck, and two 8 and one 10-inch finishing); product, hoops, bands, horseshoe bars, and cotton-ties; also strap and T hinges, wrought steel shelf brackets, and wrought steel and iron washers; annual capacity, 40,000 gross tons. Fuel, natural gas and coal. Brands, "Star" for horseshoe bars and "*Ashco*" for other products. F. B. Baugh, Superintendent. (Formerly called the Star Iron and Steel Works and operated by Lindsay & McCutcheon.)

Mingo Mill, Mingo Junction, Jefferson county, Ohio. Formed by the 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 2 gas heating furnaces and one 10-inch continuous Belgian mill;

product, merchant steel bars; annual capacity, 50,000 gross tons. Fuel, manufactured gas. Brand, "**Ashco.**" H. K. Williams, Superintendent. (Formerly called the Junction Works and operated by the Aetna-Standard Iron and Steel Company.)

Monessen Mill, Monessen, Westmoreland county, Pa. Built in 1898-9 and first put in operation March 24, 1899; 2 continuous charging gas heating furnaces and 2 trains of rolls (one 8 and one 10-inch); product, steel hoops, bands, and cotton-ties; annual capacity, 40,000 gross tons. Brand, "**Ashco.**" Fuel, manufactured gas. A. B. Scott, Superintendent. (Formerly operated by the Monessen Steel Company.)

Painter Mill, South Side, Pittsburgh, Allegheny county, Pa. Built in 1834; 9 regenerative gas heating furnaces and 8 trains of rolls (five 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-steel, stone saws, merchant bands, skelp, and hinge steel; annual capacity, 100,000 gross tons. Fuel, natural gas, producer gas, and coal. Brand, "**Ashco.**" T. L. Harper, Superintendent. (Formerly called the Pittsburgh Iron and Steel Works and operated by the J. Painter and Sons Company.)

Pomeroy Mill, Pomeroy, Meigs county, Ohio. Built in 1847; 12 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, and horseshoe bars; annual capacity, 20,000 gross tons. Fuel, coal. Brand, "**Ashco.**" H. A. Zellers, Superintendent. (Formerly operated by The Pomeroy Iron and Steel Company.)

Portage Mill, Duncansville, Blair county, Pa. Built in 1839 and rebuilt in 1882-3; enlarged in 1890 and 1897; 37 single puddling furnaces, 3 coal and 2 gas heating furnaces, and 6 trains of rolls (one 18 and one 20-inch muck, one 15-inch bar, and one 7, one 8, and one 10-inch guide); product, merchant bars; annual capacity, 30,000 gross tons. Fuel, producer gas and coal. Brands, "Portage" and "**Ashco.**" (Formerly operated by the Portage Iron Company, Limited.)

Upper Union Mill, Youngstown, Mahoning county, Ohio. Built in 1871 and burned and rebuilt in 1877; 5 gas heating furnaces, and one 7 and one 8-inch continuous, one 10-inch continuous hoop, and one 12-inch finishing train of rolls; product, bar, hoop, band, hame, box, tongue-cap, and tire steel, angles, special shapes, and cotton-ties; annual capacity, 125,000 gross tons. Fuel, coal and manufactured gas. Brand, "**Ashco.**" M. E. Coombs, Superintendent. (Formerly operated by The Union Iron and Steel Company.)

Warren Mill, Warren, Trumbull county, Ohio. 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, 35,000 gross tons. Fuel, coal. Brand, "Ashco.*" J. M. Bennington, Superintendent. (Formerly operated by The Union Iron and Steel Company.)

Total annual capacity of the 14 rolling mills and steel works: Open-hearth steel ingots, 10,000 gross tons; rolled products, 730,000 tons.

COAL LANDS, IRON-ORE MINES, AND COKE OVENS.

The company owns 530 acres of coal lands in Fayette and Westmoreland counties, Pa., 250 coke ovens at Cokeville, Westmoreland county, Pa., and a one-third interest in the National Mining Company, which owns about 7,000 acres of coal lands located within 15 miles of Pittsburgh. It has also acquired a one-fifth interest in the iron-ore property of the Mahoning Ore and Steel Company, whose mines are located in the Mesabi Range of the Lake Superior iron-ore region. The company also owns a one-half interest in the Union Ore Company, which operates the Union Mine in the Mesabi Range.

THE AMERICAN SHEET STEEL COMPANY.

Practically all the stock of The American Sheet Steel Company is now owned by The United States Steel Corporation.

The American Sheet Steel Company; general offices, Battery Park Building, New York City; branch offices: Vandergrift Building, Pittsburgh; Neave Building, Cincinnati; Land Title Building, Philadelphia; Security Building, St. Louis; Marquette Building, Chicago; Hennen Building, New Orleans; Chamber of Commerce Building, Detroit; Los Angeles, California; Portland, Oregon; Chattanooga, Tennessee; and 1622 Arapaho street, Denver, Colorado. *Officers:* George G. McMurtry, President; Wallace P. Bache, Assistant to the President; J. A. Topping, Vice-President; H. B. Wheeler, Secretary; F. S. Wheeler, Treasurer; J. Warner, Manager Aetna-Standard, Cambridge, Canton, Chartiers, Dennison, Dresden, Falcon, Midland, New Philadelphia, Old Meadow, Piqua, Reeves, Scottdale, and Struthers Works; E. W. Pargny, Manager Apollo, Hyde Park, Kirkpatrick, Saltsburg, and Vandergrift Works; Persifor F. Smith, Manager McKeesport and Wellsville Works. *Sales Manager:* James L. Sharkey, Battery Park Building, New York City. *District Sales Agents:* W. J. Wetstein, Security Building, St. Louis, Missouri; W. E. Stockton, Marquette Building, Chicago, Illinois; S. J. Waterman, Neave Build-

ing, Cincinnati, Ohio; Lee Chamberlain, Los Angeles, California; Hoge & Swift, Portland, Oregon; T. W. Simpers, Land Title Building, Philadelphia, Pa.; S. L. Mitchel, Hennen Building, New Orleans, Louisiana; W. T. Shannon, Chattanooga, Tennessee; F. A. Goodrich & Co., Chamber of Commerce Building, Detroit, Mich.; L. A. Hastings, 1622 Arapaho street, Denver, Colorado; and F. C. Milliken, Vandergrift Building, Pittsburgh. *Board of Directors*: George G. McMurtry, W. T. Graham, William B. Leeds, D. G. Reid, J. A. Topping, Charles M. Schwab, E. H. Gary, J. Warner, Wallace P. Bache, T. M. Day, Jr., and F. S. Wheeler. *Executive Committee*: Charles M. Schwab, George G. McMurtry, Wallace P. Bache, John A. Topping, D. G. Reid, William B. Leeds, and W. T. Graham. Capital stock authorized, \$52,000,000, of which \$26,000,000 is preferred and \$26,000,000 is common. Stock issued, \$24,500,000 of common and \$24,500,000 of preferred: total, \$49,000,000. The company operates the following works:

ROLLING MILLS AND STEEL WORKS—21.

Aetna-Standard Works, Bridgeport, Belmont county, Ohio. Built in 1872 and since enlarged; 4 regenerative gas heating furnaces, 20 pair and 20 sheet furnaces, 24 box annealing furnaces, two 60-inch, three 38-inch, fourteen 26-inch, and three 24-inch hot mills, and four 22-inch cold mills; product, black sheets and painted and formed roofing; annual capacity, triple turn, 88,400 net tons of sheets. Fuel, natural gas and coal. A galvanizing plant, not now in operation, is connected with the works. H. L. Cooke, Division Superintendent. (Formerly called the Aetna Works, the Standard Sheet Mill Works, and the Standard Black Plate Mills, and operated by the Aetna-Standard Iron and Steel Company as three separate works; the three plants have been consolidated and are now known as the Aetna-Standard Works.)

Apollo Works, Apollo, Armstrong county, Pa. Built in 1850 and rebuilt in 1886; 12 heating and 9 annealing furnaces, 1 muck and bar train, one 22-inch and five 24-inch hot sheet mills, and two 24-inch cold mills. Two 20-gross-ton acid open-hearth steel furnaces; first steel made June 15, 1886; annual capacity, 33,000 gross tons of ingots. Product, black sheets for galvanizing; annual capacity, triple turn, 18,000 net tons. Fuel, natural gas exclusively. S. A. Davis, Division Superintendent. (Formerly called the Apollo Rolling Mills and operated by the Apollo Iron and Steel Company.)

Cambridge Works, Cambridge, Guernsey county, Ohio. Built in 1889-90 and put in operation in July, 1890; 3 scrap furnaces, 2 gas and 19 coal heating furnaces, and one 22-inch muck mill, one 24 x 48-inch, three 24 x 33-inch, and three 24 x 38-inch sheet mills, and one 24 x 44-inch, one 24 x 48-inch, and one 24 x 50-inch cold mills; product, sheet bars and sheet iron and sheet steel; annual capacity,

triple turn, 5,000 gross tons of sheet bars and 20,000 net tons of sheet iron and sheet steel. Fuel, producer gas for bar mill and natural gas for sheet mill. Brand for galvanized sheets, "Apollo Cambridge Works." Also operate a galvanizing plant with an annual capacity of 22,000 net tons. H. L. Cooke, Division Superintendent. (Formerly operated by The Cambridge Iron and Steel Company.)

Canton Works, Canton, Stark county, Ohio. Built in 1894 and first put in operation in August, 1894; 5 pair, 5 sheet, and 5 annealing furnaces, two 24 x 36-inch and three 24 x 40-inch hot mills, and two 24 x 44-inch cold mills; product, iron and steel black sheets for stamping and roofing; annual capacity, triple turn, 14,000 net tons. Fuel, natural gas and coal. Adding one 38 x 26-inch hot sheet mill. E. E. Cline, Division Superintendent. (Formerly operated by the Canton Rolling Mill Company.)

Chartiers Works, Carnegie, Allegheny county, Pa. Built in 1883-4 and put in operation August 13, 1884; 4 single puddling furnaces, 11 heating furnaces, one 4-ton hammer, one 20 x 64-inch bar mill, one 22 x 32-inch, one 24 x 38-inch, and one 24 x 48-inch hot sheet mills, and one 24 x 40-inch and one 24 x 50-inch cold mills; product, sheet iron and sheet steel; annual capacity, triple turn, 7,200 net tons. Fuel, natural gas and coal. John Henry, Superintendent. (Formerly operated by The Chartiers Iron and Steel Company, Limited.)

Dennison Works, Dennison, Tuscarawas county, Ohio. Built in 1897 and first put in operation November 10, 1897; 4 heating furnaces, 4 annealing furnaces, two 24 x 40-inch and two 26 x 32-inch hot sheet mills, and one 22 x 44-inch, one 22 x 38-inch, and one 22 x 32-inch cold mills; product, common cold-rolled sheets for stamping and black plates for tinning; annual capacity, triple turn, 11,200 net tons. Fuel, bituminous coal. E. E. Cline, Division Superintendent. (Formerly operated by The Dennison Rolling Mill Company.)

Dresden Works, Dresden, Muskingum county, Ohio. Built and put in operation in 1898; 4 sheet furnaces, 4 pair furnaces, 2 double annealing furnaces, one 24 x 33-inch, one 25 x 48-inch, and two 24 x 38-inch hot sheet mills, and one 25 x 48-inch cold mill; product, iron and steel sheets; annual capacity, triple turn, 11,200 net tons. Fuel, coal. E. E. Cline, Division Superintendent. (Formerly operated by The Dresden Iron and Steel Sheet Company.)

Falcon Works, Niles, Trumbull county, Ohio. Built in 1867; 15 single and 4 double puddling furnaces, 13 heating furnaces, 1 scrap furnace, 11 box annealing furnaces, one 20-inch skelp mill, one 22-inch sheet bar mill, one 22-inch muck mill, one 26-inch and three 24-inch hot sheet mills, four 22-inch cold mills, and one 3-ton hammer; product, muck bar and sheet iron and sheet steel; annual capacity, triple turn, 23,000 gross tons of muck bar and 11,200 net tons of sheet iron and sheet steel. Fuel, bituminous coal and slack. E. E. Cline, Divis-

ion Superintendent, and Joseph Beck, Superintendent. (Formerly called the Falcon Iron and Nail Works and operated by the Falcon Iron and Nail Company.)

Hyde Park Works, Hyde Park, Westmoreland county, Pa. Built in 1895 and first put in operation September 1, 1895; 4 Bailey combination sheet and pair furnaces, one single sheet furnace, one single pair furnace, one billet heating furnace, 7 annealing furnaces, one sheet bar mill, 3 roughing mills, (two 40-inch and one 44-inch,) 5 hot sheet mills, (one 38-inch, three 40-inch, and one 44-inch,) and one 48-inch and one 50-inch cold mills; product, sheet bars and fine grades of soft steel sheets for stamping, japanning, tinning, galvanizing, and armatures, including pickled and cold rolled, open pickled, double annealed and cold rolled, and cold rolled and annealed finishes; annual capacity, triple turn, 10,000 gross tons of sheet bars and 14,000 net tons of sheets. Fuel, natural gas. S. A. Davis, Division Superintendent. (Formerly called the Hyde Park Iron and Steel Works and operated by the Hyde Park Iron and Steel Company.)

Kirkpatrick Works, Leechburg, Armstrong county, Pa. Built in 1872; 18 heating furnaces, nine 24-inch sheet mills, and two 24-inch cold mills; product, steel sheets; annual capacity, triple turn, 24,000 net tons. Fuel, natural gas and coal. S. A. Davis, Division Superintendent. (Formerly called the Leechburg Iron Works and operated by Kirkpatrick & Co., Limited.)

McKeesport Works, McKeesport, Allegheny county, Pa. Built in 1851; 14 forge fires, 8 single puddling furnaces, 2 refinery fires, 18 annealing furnaces, 31 heating furnaces, three 20-inch bar mills, 16 sheet mills, (two 24 x 40, two 24 x 48, six 20 x 40, three 20 x 36, two 24 x 56, and one 24 x 60-inch,) two 24 x 40 and two 20 x 36-inch cold mills, and 8 hammers; open-hearth steel department, built in 1889-90, contains two 15-gross-ton acid open-hearth steel furnaces; product, muck bar and sheet iron and sheet steel, both black and planished; specialty, patent planished sheet iron; annual capacity, triple turn, 18,000 gross tons of ingots, 6,500 gross tons of muck bar, and 33,600 net tons of sheets. Fuel, natural gas, manufactured gas, and coal. Charcoal refinery fires for the manufacture of blooms are connected with the works; 14 knobbling fires; annual capacity of blooms, 8,400 gross tons. Trade-mark, a Russian bear in the talons of an American eagle. S. M. Cooper, Superintendent. (Formerly called the McKeesport Iron Works and operated by the W. Dewees Wood Company.)

Midland Works, Muncie, Delaware county, Indiana. Built in 1892 and first put in operation October 10, 1892; one 30-gross-ton basic and one 30-gross-ton acid open-hearth steel furnace with an annual capacity of 40,000 gross tons of ingots; 6 pair, 6 sheet, and 6 annealing furnaces, 4 soaking pits, one 30-inch reversing blooming mill, one 3-high bar mill, one 26-inch plate mill, six 24-inch sheet mills, and

five 24-inch cold mills; product, ingots, blooms, billets, slabs, sheet and tinplate bars, and stamping and tinning sheets; annual capacity, triple turn, 40,000 gross tons of billets and sheet and tinplate bars and 22,800 net tons of sheets and plates. Fuel, natural gas exclusively. A. Beard, Superintendent. (Formerly operated by the Midland Steel Company.)

New Philadelphia Works, New Philadelphia, Tuscarawas county, Ohio.

Built in 1883; one gas and 7 coal heating furnaces, 2 muck mills, one 48-inch, two 34-inch, and six 38-inch hot sheet mills, and one 44-inch and one 50-inch cold mills; product, common and refined sheet iron and sheet steel; annual capacity, triple turn, 31,200 net tons. Fuel, coal. E. E. Cline, Division Superintendent. (Formerly operated by The New Philadelphia Iron and Steel Company.)

Old Meadow Works, Scottdale, Westmoreland county, Pa. Built and put in operation in 1898; 6 sheet furnaces, 6 pair furnaces, 5 annealing furnaces, 6 sheet mills, (one 26 x 54-inch, one 24 x 44-inch with roughing rolls, and four 24 x 38-inch with roughing rolls, all hot,) and 2 cold mills; product, sheet iron; annual capacity, triple turn, 17,000 net tons. Fuel, natural gas and coal. Robert Skemp, Division Superintendent. (Formerly operated by the Old Meadow Rolling Mill Company.)

Piqua Works, Piqua, Miami county, Ohio. Built in 1889; 6 single puddling furnaces, 2 sheet bar heating furnaces, 4 combined pair and softening furnaces, 5 annealing furnaces, one 23 x 78-inch bar mill, one 24 x 34, one 24 x 36, one 24 x 40, and one 24 x 48-inch hot sheet mills, and one 22 x 42-inch cold sheet mill; product, sheet bars and iron and steel sheets; annual capacity, triple turn, 5,000 gross tons of sheet bars and 12,400 net tons of sheets. Fuel, natural gas and coal. A galvanizing plant, with an annual capacity of 6,500 net tons, is connected with the works. J. H. Frantz, Superintendent. (Formerly operated by The Piqua Rolling Mill Company.)

Reeves Works, Canal Dover, Tuscarawas county, Ohio. Built in 1865-6 and enlarged in 1895; first iron rolled in February, 1866; four 26 x 34, one 26 x 44, one 26 x 60, and four 26 x 38-inch hot sheet mills, and one 24 x 60 and four 24 x 48-inch cold mills; also a complete galvanizing and pickling plant; product, black and galvanized and cold-rolled sheet iron and sheet steel; annual capacity, triple turn, 32,200 net tons of black sheets and 22,000 net tons of galvanized sheets. Fuel, coal. E. E. Cline, Division Superintendent. (Formerly operated by The Reeves Iron Company.)

Saltsburg Works, Saltsburg, Indiana county, Pa. 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 48 and three 38-inch trains of finishing rolls, and two 48-inch trains of cold rolls; product, fine sheet iron; annual capacity, triple turn, 12,000 net tons.

Fuel, natural gas and coal. S. A. Davis, District Superintendent. (Formerly called the Saltsburg Rolling Mills and operated by P. H. Laufman & Co., Limited.)

Scottdale Works, Scottdale, Westmoreland county, Pa. Built in 1873 and remodeled in 1894 and in 1897; 8 sheet and 8 pair heating furnaces, 7 box annealing furnaces, 8 sheet mills, (two 24 x 44, four 22 x 40, and two 22 x 38-inch,) and 3 cold mills (one 22 x 44, one 22 x 40, and one 22 x 38-inch); product, iron and steel sheets; annual capacity, triple turn, 24,000 net tons. Fuel, natural gas, coal, and coke. A galvanizing plant, with an annual capacity of 15,000 net tons, is connected with the works. Robert Skemp, Division Superintendent. (Formerly operated by the Scottdale Iron and Steel Company, Limited.)

Struthers Works, Struthers, Mahoning county, Ohio. Built in 1881-2 and entirely rebuilt in 1895; partly destroyed by fire on August 12, 1899, but immediately rebuilt; 6 pair and 6 sheet furnaces, 8 large box annealing furnaces, and 8 sheet mills (six 26 x 40-inch hot and two 22 x 40-inch cold); product, all sizes of iron and steel sheets; annual capacity, triple turn, 16,800 net tons. Fuel, coal, coke, and slack. Adding one 38 x 26-inch hot sheet mill. Charles S. Thomas, Superintendent. (Formerly operated by The Struthers Iron and Steel Company.)

Vandergrift Steel Works, Vandergrift, Westmoreland county, Pa. Built in 1895-6 and first put in partial operation in October, 1895; 4 four-hole Siemens regenerative gas heating furnaces, one 2-high reversing blooming mill, one continuous bar mill containing 2 groups of 3 pairs of rolls each, twenty-nine double 26-inch sheet mills, ten 24-inch cold mills, and 43 heating furnaces; four 30-gross-ton acid and two 30-gross-ton basic open-hearth steel furnaces; first open-hearth steel made January 11, 1897; product, black and galvanized sheets, acid and basic open-hearth steel ingots, and sheet bars; annual capacity, triple turn, 156,000 gross tons of ingots, 132,650 gross tons of sheet bars, 92,000 net tons of black sheets, and 94,500 net tons of galvanized sheets. Fuel, natural gas, coal, and producer gas. Brand, "Apollo." S. A. Davis, Division Superintendent. (Formerly called the Apollo Steel Works and operated by the Apollo Iron and Steel Company.)

Wellsville Works, Wellsville, Columbiana county, Ohio. Mill built in 1873 to make tinplates; remodeled in 1880; 1 heating furnace, 13 pair and sheet furnaces, and 17 annealing furnaces, one bar mill, 6 roughing mills, six 24-inch hot sheet mills, and one 20, one 22, and seven 24-inch cold mills; product, plate and sheet iron and steel; annual capacity, triple turn, 16,800 net tons. Fuel, natural gas. D. S. Brookman, Superintendent. (Formerly operated by the Wellsville Plate and Sheet Iron Company.)

Total annual capacity of the 21 rolling mills and steel works: Open-hearth ingots, 247,000 gross tons; charcoal blooms, 8,400 gross tons; muck bar, 29,500 gross tons; plain and black sheets, 530,000 net

tons; galvanized sheets, 160,000 net tons; and large and small sheet bars, 192,650 gross tons.

COAL LANDS.

The company owns 2,056 acres of coal lands, located in Armstrong and Westmoreland counties in Pennsylvania and in Tuscarawas and Belmont counties in Ohio.

THE AMERICAN BRIDGE COMPANY.

Practically all the stock of The American Bridge Company is now owned by The United States Steel Corporation.

American Bridge Company, (of New Jersey,) (Manufacturing Company); main office, No. 1 Exchange Place, Jersey City, New Jersey; purchasing office, No. 261 South Fourth st., Philadelphia. *Officers:* Alfred J. Major, President; William H. McCord, Vice-President, in charge of Finance; Joshua A. Hatfield, Vice-President, in charge of Contracting; C. C. Schneider, Vice-President, in charge of Engineering; Paul L. Wolfel, Chief Engineer; James Christie, Mechanical Engineer; C. C. Price, Auditor; William H. Connell, Treasurer; and H. Schoonmaker, Secretary. *Board of Directors:* Alfred J. Major, Percival Roberts, Jr., James Christie, August Ziesing, Paul L. Wolfel, Robert J. Davis, A. L. Schultz, E. A. Muench, Abram S. Hewitt, Charles M. Schwab, and Elbert H. Gary.

American Bridge Company of New York (Selling and Erecting Company); offices in New York State: 100 Broadway and 7 West Twenty-second st., New York City, and Ellicott Square Building, Buffalo, New York. *Officers:* Joshua A. Hatfield, President, C. C. Schneider, Vice-President, William H. Connell, Treasurer, and H. Schoonmaker, Secretary, all at 100 Broadway, New York City; August Ziesing, Vice-President, Chicago; S. P. Mitchell, Chief Engineer, and C. C. Price, Auditor, Pencoysd, Pa. *Board of Directors:* Joshua A. Hatfield, A. J. Major, Percival Roberts, Jr., C. C. Schneider, James A. Huston, August Ziesing, J. P. Kennedy, E. A. Muench, C. W. Bryan, C. M. Schwab, and S. P. Mitchell. *Branch offices in the United States:* Fiske Building, 89 State st., Boston, Massachusetts; 42 Church st., New Haven, Connecticut; 261 South Fourth st., Philadelphia; Continental Trust Building, Baltimore, Maryland; Empire Building, Pittsburgh, Pa.; Chamber of Commerce Building, Cleveland, Ohio; Monadnock Block, Chicago, Illinois; Second st. and Sixth ave., Minneapolis, Minn.; Godchaux Building, New Orleans, Louisiana;

Massachusetts Building, Kansas City, Missouri; Hennessey Building, Butte, Montana; Jackson Block, Denver, Colorado; Dooley Block, Salt Lake City, Utah; 116 West Michigan st., Duluth, Minn.; Crocker Building, San Francisco, California; Bailey Building, Seattle, State of Washington; English-American Building, Atlanta, Georgia; and the Perin Building, Cincinnati, Ohio. *Foreign offices:* Place Viger Hotel, Montreal, Quebec, Canada; 2 Calle de Gante, City of Mexico, Mexico; P. O. Box 334, Guadalajara, Mexico; 110 Cannon st., London, E. C., England; 11 Mercaderes, Havana, Cuba; 20 Loftus st., Sydney, New South Wales; 43 Sakamoto cho, Nihombashi-ku, Tokio, Japan; 69 Shichome, Honcho, Yokohama, Japan; 17 Nichome Nakanoshima, Osaka, Japan; 3 Sanchome Kaigandoxi, Kobe, Japan; 3118 Honcho, Moji, Japan; 3 Oura, Kaigan, Nagasaki, Japan; 12 Mingdong, Seoul, Corea; Japanese Settlement, Chemulpo, Corea; French Settlement, Tientsin, China; 17 Szechuen Road, English Settlement, Shanghai, China; and 6 Ice House st., Praya Central, Hong Kong, China.

Capital stock of American Bridge Company, (of New Jersey,) \$70,000,-000, of which \$35,000,000 is 7 per cent. cumulative preferred and \$35,000,000 is common. Capital stock of American Bridge Company of New York, \$100,000. The American Bridge Company, (of New Jersey,) operates or controls the following works:

ROLLING MILLS AND STEEL WORKS—1.

Pencoyd Iron Works, A. and P. Roberts Company, operators, general office, 261 South Fourth st., Philadelphia. Works in Montgomery county, opposite Manayunk, Pa. Built in 1852; 11 regenerative gas heating furnaces, 3 coal-fired heating 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 one 75-gross-ton and ten 30-gross-ton basic open-hearth furnaces; annual capacity, 230,000 gross tons of ingots. Product, open-hearth steel channel bars from 2 to 15 inches, beams from 3 to 24 inches, deck beams from 5 to 12 inches, tees from 1 to 6 inches, angles from 1 to 8 inches, flats from 1 to 14 inches wide, rounds from $\frac{1}{2}$ inch to 7 inches in diameter, hammered or rolled axles, bar and bridge steel, shafting, and steel blooms; annual capacity, 180,000 gross tons of finished material. Specialties, structural shapes, shafting, and bar and bridge steel. Brand, "Pencoyd." Fuel, bituminous coal.

Bridge and Construction Department contains equipment 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, 65,000 gross tons. Fuel, bituminous coal.

Officers: Charles Major, President, James Christie, Vice-President, and J. W. Davis, Secretary and Treasurer, 261 South Fourth st., Philadel-

phia. For sales offices see list of branch offices of American Bridge Company of New York.

Total annual capacity of the rolling mills and steel works: Open-hearth steel ingots, 230,000 gross tons; finished products, 180,000 tons; of the bridge and construction works, 65,000 gross tons.

BRIDGEBUILDING PLANTS—25.

American Bridge Works, Fortieth st. and Stewart ave., Chicago, Illinois. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 32,500 gross tons. (Formerly operated by the American Bridge Works.)

Berlin Iron Bridge Works, East Berlin, Conn. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 10,800 gross tons. (Formerly operated by The Berlin Iron Bridge Company.)

Buffalo Bridge and Iron Works, Buffalo, New York. Railroad and highway bridges. Annual capacity, 4,000 gross tons. (Formerly operated by the Buffalo Bridge and Iron Works.)

Edge Moor Bridge Works, Edge Moor, Delaware. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 22,500 gross tons. (Formerly operated by the Edge Moor Bridge Works.)

Elmira Bridge Works, Elmira, New York. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 27,000 gross tons. (Formerly operated by the Elmira Bridge Company, Limited.)

Gillette-Herzog Manufacturing Works, 259 First avenue south, Minneapolis, Minnesota. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 10,800 gross tons. (Formerly operated by The Gillette-Herzog Manufacturing Company.)

Groton Bridge and Manufacturing Works, Groton, New York. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 7,200 gross tons. (Formerly operated by the Groton Bridge and Manufacturing Company.)

Hilton Bridge Works, North Albany, New York. Railroad and highway bridges. Annual capacity, 5,400 gross tons. (Formerly operated by the Hilton Bridge Construction Company.)

Horseheads Bridge Works, Horseheads, New York. Highway bridges; have erected a few railroad bridges. Annual capacity, 1,800 gross tons. (Formerly operated by the Horseheads Bridge Company.)

Keystone Bridge Works, Fifty-first st., Pittsburgh. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 32,500 gross tons. (Formerly operated by The Carnegie Steel Company, Limited.)

Lafayette Bridge Works, Lafayette, Indiana. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 2,700 gross tons. (Formerly operated by The Lafayette Bridge Company.)

Lassig Bridge and Iron Works, corner Clybourn and Wrightwood avenues, Lake View, Chicago, Illinois. Railroad bridges only. Also

- erect steel buildings. Annual capacity, 40,500 gross tons. (Formerly operated by the Lassig Bridge and Iron Works.)
- Milwaukee Bridge and Iron Works, Seventeenth st. and St. Paul avenue, Milwaukee, Wisconsin. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 10,800 gross tons. (Formerly operated by The J. G. Wagner Company.)
- New Columbus Bridge Works, Columbus, Ohio. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 3,600 gross tons. (Formerly operated by The New Columbus Bridge Company.)
- Pencoyd Iron Works, (Bridge and Construction Department,) A. and P. Roberts Company, operators, 261 South Fourth st., Philadelphia. Works in Montgomery county, opposite Manayunk, Pa. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 65,000 gross tons.
- Pittsburgh Bridge Works, Thirty-eighth st. and A. V. Ry., Pittsburgh, Pa. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 13,500 gross tons. (Formerly operated by The Pittsburgh Bridge Company.)
- Post & McCord Works, Greenpoint, Long Island, New York. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 21,600 gross tons. (Formerly operated by Post & McCord.)
- Rochester Bridge and Iron Works, Rochester, New York. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 4,500 gross tons. (Formerly operated by the Rochester Bridge and Iron Works.)
- Schultz Bridge Iron Works, McKees Rocks, Pa. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 9,000 gross tons. (Formerly operated by the Schultz Bridge Iron Company.)
- Shiffler Bridge Works, Forty-eighth st. and A. V. Ry., Pittsburgh, Pa. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 36,000 gross tons. (Formerly operated by the Shiffler Bridge Company.)
- Toledo Bridge Works, Toledo, Ohio. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 25,000 gross tons. (Formerly operated by The Toledo Bridge Company.)
- Trenton Iron Works, Trenton, New Jersey. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 27,000 gross tons. (Formerly operated by the New Jersey Steel and Iron Company.)
- Union Bridge Works, Athens, Pa. Railroad bridges only. Annual capacity, 13,500 gross tons. (Formerly operated by the Union Bridge Company.)
- Wrought Iron Bridge Works, South Canton, Ohio. Railroad and highway bridges. Also erect steel buildings. Annual capacity, 5,000 gross tons. (Formerly operated by the Wrought Iron Bridge Company.)
- Youngstown Bridge Works, Youngstown, Ohio. Railroad and highway

bridges. Also erect steel buildings. Annual capacity, 9,000 gross tons. (Formerly operated by The Youngstown Bridge Company.) Total annual capacity of the 25 bridgebuilding plants: 441,200 gross tons.

BOLT, NUT, AND RIVET WORKS—5.

Edge Moor Bridge Works, Edge Moor, Delaware. Product, rivets, principally for their own use in the construction of bridges, buildings, etc. Sizes of rivets, from $\frac{5}{8}$ of an inch to 1 inch. (Formerly operated by the Edge Moor Bridge Works.)

Elmira Bridge Works, Elmira, New York. Product, steel bolts, nuts, and rivets. Sizes: bolts, from $\frac{1}{2}$ of an inch to 4 inches; nuts, 2 inches and larger; rivets, $\frac{1}{2}$ of an inch and larger. (Formerly operated by the Elmira Bridge Company, Limited.)

Lassig Bridge and Iron Works, Chicago, Illinois. Product, steel bolts and rivets. Sizes: bolts from $\frac{5}{8}$ of an inch to 2 inches in diameter; rivets, from $\frac{1}{2}$ of an inch to 1 inch in diameter. (Formerly operated by the Lassig Bridge and Iron Works.)

Pencoyd Iron Works, A. and P. Roberts Company, operators, 261 South Fourth st., Philadelphia. Works in Montgomery county, opposite Manayunk, Pa. Product, steel bolts, upset rods, and eye bars for bridge and structural work; also steel rivets. Sizes; bolts, from $\frac{1}{2}$ of an inch to 7 inches in diameter; rivets, from $\frac{1}{2}$ of an inch to 2 inches in diameter.

Trenton Iron Works, Trenton, New Jersey. Product, steel bolts for their own use in the construction of bridges and buildings; also steel bridge rivets. Sizes of rivets, from $\frac{1}{2}$ of an inch to 1 $\frac{1}{4}$ inches inclusive. (Formerly operated by the New Jersey Steel and Iron Company.)

SHELBY STEEL TUBE COMPANY.

The majority of the stock of the Shelby Steel Tube Company is now owned by The United States Steel Corporation.

Shelby Steel Tube Company; general offices, American Trust Building, Cleveland, Ohio; Western office, The Rookery, Chicago, Illinois; Eastern office, 258 Broadway, New York City; European office and warehouse, 29 Constitution Hill, Birmingham, England. *Officers at Cleveland:* W. S. Miller, President; H. S. Smith, Assistant to the President; J. W. Phillips, Treasurer; H. H. Cockley, Secretary; A. C. Morse, General Superintendent; and J. A. Pannabaker, Purchasing Agent. *Officer at New York:* Frank L. Brown, General Sales Agent.

Officer at Chicago: W. R. Garberson, Assistant General Sales Agent. Capital stock authorized, \$15,000,000, of which \$5,000,000 7 per cent. cumulative preferred and \$8,151,500 common have been issued. The company operates the following works:

ROLLING MILLS—5.

Auburn Works, (Factory O.,) Auburn, Schuylkill county, Pennsylvania. Rolling mill added to bolt and nut works in 1897; first rolled blanks produced in 1897; 2 heating furnaces and 2 trains of rolls; product, blanks for seamless tubes; annual capacity, 3,600 gross tons. Fuel, bituminous coal. (Formerly operated by the Auburn Bolt and Nut Works.)

Ellwood Works, (Factory B.,) Ellwood City, Lawrence county, Pa. Built in 1895 and first put in operation in June of that year; 2 heating furnaces, 1 piercing machine, and two 14½-inch trains of rolls; product, blanks for the manufacture of seamless drawn steel tubes; annual capacity, 6,000 gross tons of blanks and about 12,000,000 feet of seamless drawn tubes. Fuel, coal. (Formerly operated by the Ellwood Weldless Tube Company.)

Greenville Works, (Factory C.,) Greenville, Mercer county, Pa. Built in 1896 and first put in operation in May, 1897; 3 forge fires, 2 heating furnaces, 1 piercing machine, 3 hammers, (two 150-lb. and one 250-lb.,) and 2 hot and 20 cold trains of rolls; product, blanks for the manufacture of seamless drawn steel tubes; annual capacity, 15,000 gross tons of blanks and 6,000,000 feet of seamless drawn tubes. Fuel, bituminous coal and coke. (Formerly operated by the Greenville Tube Company.)

Shelby Works, (Factory A.,) Shelby, Richland county, Ohio. Built in 1890 and first put in operation in July, 1891; 4 Swindell heating furnaces and 9 hot mills (one 10, four 12, and four 20-inch); product, blanks for the manufacture of seamless drawn steel tubes; annual capacity, 12,000 gross tons of blanks and 24,000,000 feet of seamless drawn steel tubes. Fuel, coal and oil. (Formerly operated by the Shelby Steel Tube Company.)

Toledo Works, (Factory D.,) Toledo, Lucas county, Ohio. Built in 1896; first rolled blanks produced in 1900; one heating furnace, one piercing machine, and 4 trains of rolls; product, rolled blanks for the manufacture of seamless drawn steel tubes; annual capacity, 8,000 gross tons. Fuel, gas. (Formerly operated by the American Weldless Steel Tube Company.)

Total annual capacity of the 5 rolling mills: 44,600 gross tons of blanks.

SEAMLESS DRAWN TUBE WORKS—7.

Albany Works, (Factory N.,) Albany, Delaware county, Indiana. Product, cold-drawn seamless steel tubes; sizes, from ¼ of an inch in

diameter to $1\frac{1}{2}$ inches; annual capacity, 5,000,000 feet. (Formerly operated by the Albany Manufacturing Company.)

Auburn Works, (Factory O.,) Auburn, Schuylkill county, Pa. Product, seamless steel tubes; sizes, from $\frac{1}{2}$ of an inch in diameter to 2 inches; annual capacity, 3,000,000 feet. (Formerly operated by the Auburn Bolt and Nut Works.)

Ellwood Works, (Factory B.,) Ellwood City, Lawrence county, Pa. Product, cold-drawn seamless steel tubes; sizes, from $\frac{1}{4}$ of an inch in diameter to $3\frac{1}{2}$ inches; annual capacity, about 12,000,000 feet. (Formerly operated by the Ellwood Weldless Tube Company.)

Greenville Works, (Factory C.,) Greenville, Mercer county, Pa. Product, cold-drawn seamless steel tubes; sizes, from $\frac{1}{2}$ of an inch in diameter to $4\frac{1}{2}$ inches; annual capacity, 6,000,000 feet. (Formerly operated by the Greenville Tube Company.)

Hartford Works, (Factory M.,) Hartford, Hartford county, Connecticut. Product, cold-drawn seamless steel tubes; sizes, 2 inches and under; annual capacity, 10,000,000 feet. (Formerly operated by The Pope Tube Company.)

Shelby Works, (Factory A.,) Shelby, Richland county, Ohio. Product, cold-drawn seamless steel tubes; sizes, from $\frac{1}{2}$ of an inch in diameter to $3\frac{1}{2}$ inches; also square, rectangular, and special sections; annual capacity, 24,000,000 feet. (Formerly operated by the Shelby Steel Tube Company.)

Toledo Works, (Factory D.,) Toledo, Lucas county, Ohio. Product, seamless drawn steel tubes; sizes, from $\frac{1}{2}$ of an inch in diameter to 6 inches; annual capacity, 3,000,000 feet. (Formerly operated by the American Weldless Steel Tube Company.)

Total annual capacity of the 7 seamless drawn tube works: 63,000,000 feet.

LAKE SUPERIOR CONSOLIDATED IRON MINES.

Practically all the stock of the Lake Superior Consolidated Iron Mines is now owned by The United States Steel Corporation.

Lake Superior Consolidated Iron Mines; offices, 71 Broadway, New York City, and Duluth, Minnesota. *Officer at Chicago*: Charles P. Coffin, President. *Officers at New York*: Dwight H. Coble, Vice-President and Assistant Secretary, and Charles E. Scheide, Secretary and Treasurer. *Officers at Duluth*: Joseph B. Cotton, Attorney, and W. J. Olcott, Superintendent of Mines. *Sales Offices and Agents*: Oglebay, Norton & Co. and M. A. Hanna & Co., Cleveland, Ohio; also 71 Broadway, New York City. *Board of Directors*: James Gayley, Dwight H. Coble, Charles P. Coffin, Walter M. Jeffery, and Thomas

F. Cole. Capital stock, \$30,000,000, all common. The company owns the following iron-ore properties, which are included in the list of mines printed on pages 67-8.

IRON-ORE MINES.

The iron-ore properties of the company are all located in the Mesabi Range in the State of Minnesota. The active mines are as follows: Hull, Rust, Burt, Sellers, Pillsbury, Mountain Iron, Missabe Mountain, Ohio, Lone Jack, Minnewas, Stephens, Adams, Aetna, Cloquet, Spruce, Biwabik, Duluth, and Day. In addition the company owns large tracts of explored but unopened iron-ore lands on the Mesabi Range which are held in reserve for future use. The company also owns in fee several thousand acres of unexplored mineral lands in the Mesabi Range, much of which is located in the ore-bearing member.

RAILROADS.

The Lake Superior Consolidated Iron Mines own the entire capital stock of the Duluth, Missabe, and Northern Railway, which operates 220 miles of railroad.

PITTSBURGH STEAMSHIP COMPANY.

Five-sixths of the stock of the Pittsburgh Steamship Company is owned by The Carnegie Company and one-sixth of the stock by The United States Steel Corporation. Into the Pittsburgh Steamship Company have been merged all the steamship companies belonging to the constituent companies of The United States Steel Corporation, and it now operates all the steamships and barges belonging to the constituent companies of The United States Steel Corporation.

Pittsburgh Steamship Company; principal office, Duluth, Minnesota; branch office, Cleveland, Ohio. *Officers*: Daniel M. Clemson, President, Carnegie Building, Pittsburgh; A. B. Wolvin, Vice-President and General Manager, George D. Swift, Assistant Treasurer, and W. M. Jeffery, Auditor, Duluth; James H. Hoyt, Secretary, and Edwin S. Mills, Assistant General Manager, Cleveland; and Charles E. Scheide, Treasurer, 71 Broadway, New York City. *Board of Directors*: Daniel M. Clemson, A. B. Wolvin, Edwin S. Mills, D. G. Kerr, and James H. Hoyt. The company operates the following vessels:

STEAMSHIPS FORMERLY OPERATED BY THE AMERICAN STEEL AND WIRE COMPANY OF NEW JERSEY.

Steamships: Isaac L. Ellwood, James J. Hill, John W. Gates, Wm. Edenborn, Crescent City, Empire City, Queen City, Superior City, Zenith City, W. H. Gilbert, A. B. Wolvin, and Wm. P. Palmer.

Total, 12; annual ore-carrying capacity, based on an average of 19 trips each season, 1,252,100 gross tons.

STEAMSHIPS, WHALEBACKS, AND BARGES FORMERLY OPERATED BY THE BESSEMER STEAMSHIP COMPANY.

Steamships: Chas. R. Van Hise, Douglass Houghton, General O. M. Poe, Geo. Stephenson, James B. Eads, James Watt, John Ericsson, Rob't W. E. Bunsen, Robert Fulton, Sam'l F. B. Morse, Sir Henry Bessemer, Sir Wm. Fairbairn, Sir Wm. Siemens, James B. Neilson, and Henry Cort.

Barges: Alexander L. Holley, Alfred Krupp, Geo. H. Corliss, James Nasmyth, John A. Roebling, John Fritz, John Smeaton, Sidney G. Thomas, Sir I. L. Bell, W. Le B. Jenney, J. Scott Russell, and Sir J. Whitworth.

Whaleback Steamships: Alex. McDougall, A. D. Thomson, Colgate Hoyt, E. B. Bartlett, Frank Rockefeller, James B. Colgate, John B. Trevor, J. L. Colby, Samuel Mather, and Thomas Wilson.

Whaleback Barges: 105, 107, 109, 110, 111, 116, 117, 118, 126, 127, 129, 130, 131, 132, 133, 134, 137, 201, and 202.

Total, 25 steamers and 31 barges; annual ore-carrying capacity, based on an average of 19 trips each season, 4,343,400 gross tons.

STEAMSHIPS AND BARGES FORMERLY OPERATED BY THE MINNESOTA STEAMSHIP COMPANY.

Steamships: Malieto, Manola, Maricopa, Marina, Mariposa, Mariska, Maritana, Maruba, Masaba, Matoa, Maunaloa, and Mataafa.

Barges: Madeira, Magna, Maia, Maida, Malta, Manda, Manila, Marcia, Martha, and Marsala.

Total, 12 steamers and 10 barges; annual ore-carrying capacity, based on an average of 19 trips each season, 2,052,000 gross tons.

STEAMSHIPS AND BARGES ORIGINALLY OPERATED BY THE PITTSBURGH STEAMSHIP COMPANY.

Steamships: Lafayette, Princeton, Cornell, Harvard, Rensselaer, Clarence A. Black, William R. Linn, Griffin, La Salle, Joliet, and Wawatam.

Barges: Bryn Mawr and Carrington.

Total, 11 steamers and 2 barges; annual ore-carrying capacity, based on an average of 19 trips each season, 1,276,800 gross tons.

STEAMSHIPS FORMERLY OPERATED BY THE NATIONAL STEEL COMPANY.

Steamships: Saxon, Grecian, Roman, German, Briton, Coralia, Corsica, Corona, and Cambria.

Total, 9; annual ore-carrying capacity, based on an average of 19 trips each season, 564,300 gross tons.

ESTIMATED ANNUAL ORE-CARRYING CAPACITY OF THE
FOREGOING VESSELS.

The steamships, barges, and whalebacks formerly operated by the Bessemer Steamship Company have an annual ore-carrying capacity of 4,343,400 gross tons, the steamships and barges formerly operated by the Minnesota Steamship Company, 2,052,000 tons, the steamships and barges originally operated by the Pittsburgh Steamship Company, 1,276,800 tons, the steamships formerly operated by the American Steel and Wire Company of New Jersey, 1,252,100 tons, and the steamships formerly operated by the National Steel Company, 564,300 tons: making a grand total of 9,488,600 tons.

SUMMARY OF VESSELS NOW OPERATED BY THE PITTSBURGH
STEAMSHIP COMPANY.

The Pittsburgh Steamship Company has acquired from the Bessemer Steamship Company 15 steamships, 10 whalebacks, and 31 barges; from the Minnesota Steamship Company 12 steamships and 10 barges; from the American Steel and Wire Company of New Jersey 12 steamers; and from the National Steel Company 9 steamers, which, with the 11 steamships and 2 barges originally operated by the Pittsburgh Steamship Company, make a grand total of 112 vessels, of which 69 are steamships and whalebacks and 43 are barges.

LAKE SUPERIOR IRON ORE MINES.

The iron-ore mines named below are owned or controlled by the constituent companies of The United States Steel Corporation.

The iron-ore mines named below are owned or controlled by the constituent companies of The United States Steel Corporation. They are arranged according to ranges. In addition to the mines named the constituent companies of The United States Steel Corporation own several hundred thousand acres of land located in the mineral belts of Michigan and Minnesota.

Mesabi Range: Auburn, Adams, Alpena, Aetna, Alworth, d'Autremont, Burt, Biwabik, Canton, Chisholm, Cloquet, Clark, Culver, Duluth, Day, Elba, Fayal, Forster, Genoa, Great Northern, Great Western, Gross, Hull, Hartley, Humphrey, Lone Jack, Leonidas, Mahoning,

Mountain Iron, Missabe Mountain, Minnewas, McKinley, Norman, Ohio, Pillsbury, Pool, Rust, Rouchleau, Sparta, Spruce, Sauntry, Sellers, Sheridan, Snively, Shaw, Stephens, Union, and Victoria.

Vermilion Range: Chandler, Minnesota, Pioneer, Savoy, Sibley, Southall, Silverman, and Zenith.

Gogebic Range: Atlantic, Aurora, North Aurora, Geneva, Norrie, North Norrie, East Norrie, Pabst, Royal, Tilden, and Vaughn.

Menominee Range: Aragon, Columbia, Chicagon Lake, Chapin, Cundy, Cuff, Dober, Forest, Gibson, Hamilton, Hilltop, Hope, Isabella, Iron River, Mansfield, Keel Ridge, Ludington, Michigan, Mueller, New Ludington, Pewabic, Walpole, and Youngstown.

Marquette Range: Bessie, Blue, Buffalo, Goodrich, Hartford, Hard Ore, Hematite, Moore, Negaunee, Prince of Wales, Section 16, Section 21, Stegmiller, Queen, and Winthrop.

COKE PLANTS IN SOUTHWEST PENNSYLVANIA.

The coke properties named below are owned or controlled by constituent companies of The United States Steel Corporation.

On August 1, 1901, all the coke properties of the Federal Steel Company, in Fayette county, Pennsylvania, were absorbed by the Southwest Connellsville Coke Company, the coke plants of the American Steel and Wire Company of New Jersey by the American Coke Company, and those of the National Steel Company by the Continental Coke Company. After August 1 the H. C. Frick Coke Company will sell the coke produced by the three coke companies named, but the properties owned by the companies will be operated by them respectively. These properties are all located in Southwestern Pennsylvania and are described as follows:

Southwest Connellsville Coke Company, in the Connellsville region, Southwest Nos. 1, 2, 3, and 4, aggregating 1,233 ovens, and in the Masontown district, Buffington, Footdale, and Leckrone, aggregating 1,200 ovens: total, 2,433 ovens.

American Coke Company, in the Connellsville region, Baggaley, 400 ovens, and Dorothy, 230 ovens; in the Masontown district, Edenborn and Lambert, aggregating 1,000 ovens: total, 1,630 ovens.

Continental Coke Company, in the Connellsville region, Continental Nos. 1, 2, and 3, aggregating 1,000 ovens, and Marguerite, also in the Connellsville region, 400 ovens: total, 1,400 ovens.

Office: Pittsburgh, Pa. *Officers*: The officers of each of the three coke

companies mentioned are as follows: Thomas Lynch, President, C. H. Hosler, Secretary, and C. P. Parker, Treasurer, Pittsburgh; and O. W. Kennedy, General Superintendent, Scottdale, Pa. *Board of Directors*: Thomas Lynch, E. H. Gary, C. M. Schwab, O. W. Kennedy, E. J. Buffington, J. H. Price, and J. M. B. Reis.

REPUBLIC IRON AND STEEL COMPANY.

Republic Iron and Steel Company; general offices, Stock Exchange Building, Chicago, Illinois. *Officers*: Alexis W. Thompson, President; G. Watson French, Chairman of Executive Committee; Archibald W. Houston, William E. Taylor, John F. Taylor, and William Barret Ridgely, Vice-Presidents; John F. Taylor, Treasurer; Y. B. Haagsma, Secretary and General Auditor; George A. Baird, General Sales Agent; and H. R. Moore, Traffic Manager. The district offices of the company are located as follows: *Southern District*—Office, Birmingham, Alabama; W. H. Hassinger, District Manager, and D. M. Forker, District Treasurer. *Valley District*—Office, Youngstown, Ohio; Thomas Parrock, Superintendent Brown Bonnell and Mahoning Valley Works. *Northern Ohio District*—Office, Massillon, Ohio; J. C. Corns, District Manager. *Ohio River District*—Office, Cincinnati, Ohio;, District Manager. *Valley Furnaces*—Office, Youngstown, Ohio;, Manager. *Mines*—Office, Negaunee, Michigan; Alexander Maitland, General Manager. *Sales Agents*—C. A. Maydwell, 308 Market st., San Francisco, California; Fred J. Rowlands, Butte City, Montana; E. M. Miller, Salt Lake City, Utah; A. V. Boswell, Joplin, Mo.; B. S. Adams, Mermod-Jaccard Building, Broadway and Locust st., St. Louis, Mo.; E. W. Parker, Manhattan Life Building, 66 Broadway, New York City; L. A. Burrell, Northwest corner Elm and Second sts., Cincinnati, Ohio; C. T. Johnston and B. F. Harper, Western Reserve Building, Cleveland, Ohio; George M. Kenyon, 109 Endicott Arcade, St. Paul, Minn.; W. S. Johnston, 910 Ellicott Square, Buffalo, N. Y.; and L. C. Frazer, Birmingham, Alabama. *Board of Directors*: August Belmont, G. Watson French, Archibald W. Houston, W. H. Hassinger, Peter L. Kimberly, Edwin N. Ohl, William Nelson Page, Harry Rubens, William Barret Ridgely, Grant B. Schley, George R. Sheldon, William E. Taylor, John F. Taylor, Alexis W. Thompson, and Randolph S. Warner. *Executive Committee*: G. Watson French, Chairman; Alexis W. Thompson, John F. Taylor, Harry Rubens, and William E. Taylor. Capital stock, \$55,000,000, of which \$25,000,000 is 7 per cent. preferred and \$30,000,000 is common. The company operates or controls the following works:

BLAST FURNACES—6 COMPLETED AND 1 BUILDING.

Atlantic Furnace, (operated by the Atlantic Iron and Steel Company,) New Castle, Lawrence county, Pa. One stack, 75 x 17, originally built in 1868; rebuilt in 1886; four Whitwell stoves, each 65 x 18, added in 1889; fuel, coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 95,000 gross tons. Brand, "Atlantic." (Formerly called Etna Furnace.) George L. Pearson, Furnace Superintendent. (One stack, 75 x 16, built in 1868, dismantled in 1899.)—*Active in 1901.*

Hall Furnace, Sharon, Mercer county, Pa. One stack, 60 x 14, built in 1845; rebuilt in 1882 and 1891; five iron pipe stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer, mill, and foundry pig iron; annual capacity, 45,000 gross tons. Brand, "Hall." G. B. LeVan, Furnace Superintendent. (Formerly called the Sharon Furnace and operated by the Sharon Iron Company, Limited.)—*Active in 1901.*

Hannah Furnace, Youngstown, Mahoning county, Ohio. One stack, 75 x 16, first put in blast June 14, 1880; rebuilt in 1888 and remodeled in 1900; two Cowper-Kennedy and three Massicks & Crooke stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer and mill pig iron; annual capacity, 95,000 gross tons. Brand, "Hannah." Bert Deetrick, Furnace Superintendent. (Formerly operated by The Mahoning Valley Iron Company.)—*Active in 1901.*

Haselton Furnace, Youngstown, Mahoning county, Ohio. Furnace at Haselton, now a part of Youngstown. One stack, 76 x 16½, built in 1867 and rebuilt in 1880, 1892, 1896, and 1900; four Cowper-Kennedy stoves; fuel, coke; ore, Lake Superior; product, Bessemer and foundry pig iron; annual capacity, 95,000 gross tons. Brand, "Haselton." Charles Hart, Furnace Superintendent. (Formerly called the Haselton Iron Works and operated by The Andrews Brothers Company.)—*Active in 1901.*

Pioneer Furnaces, (operated by the Pioneer Mining and Manufacturing Company,) Thomas, Jefferson county, Alabama. Two completed stacks, each 75 x 16½, and one building stack: 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, 125,000 gross tons. Brand, "Pioneer." The building stack is to be 85 x 18½ feet and will be completed about December, 1901; it will have four Massicks & Crooke stoves and an annual capacity of about 90,000 gross tons. Frank Keyser, Furnace Superintendent. Selling agents, M. A. Hanna & Co., Cleveland, Ohio.—*Active in 1901.*

Total annual capacity of the 6 completed furnaces: 455,000 gross tons; of the building furnace, 90,000 tons.

ROLLING MILLS AND STEEL WORKS—27.

Alabama Works, Gate City, Jefferson county, Alabama. 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, angles from 1 to 2½ inches, and light channels; annual capacity, 24,000 gross tons. Fuel, coal in puddling furnaces and manufactured gas in heating furnaces. (Formerly operated by the Alabama Rolling Mill Company.)

Alexandria Works, Alexandria, Madison county, Indiana. 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, Illinois; put in operation in July, 1895; 9 single and 5 double puddling furnaces, 8 forge fires, 6 bar heating furnaces, 5 regenerative gas heating furnaces, and 5 trains of rolls (one 20-inch muck, one 21-inch bar, and one 8, one 9, and one 12-inch guide); product, muck bar, bar iron and steel, railroad splices, and small rails; annual capacity, 40,000 gross tons. Fuel, natural gas in all departments. (Formerly operated by the Union Steel Company. The two 5-gross-ton Bessemer steel converters and the 32-inch blooming mill formerly in these works have been removed to the Brown Bonnell Works, at Youngstown, Ohio.)

Andrews Works, Youngstown, Mahoning county, Ohio. Built at Niles, Trumbull county, in 1872 and removed to Haselton, a suburb of Youngstown, in 1880-1; 16 double puddling furnaces, 2 scrap furnaces, 6 heating furnaces, and 4 trains of rolls (one 8, one 10, one 16, and one 22-inch); product, bar, rod, skelp, and band iron and steel; annual capacity, 45,000 gross tons. Fuel, coal and slack. Brand, "Haselton." (Formerly called the Haselton Iron Works and operated by The Andrews Brothers Company.)

Atlantic Works, (operated by the Atlantic Iron and Steel Company,) New Castle, Lawrence county, Pa. Consolidation, in November, 1874, of the Etna Iron Company and the Onondaga Iron and Nail Company; 3 double puddling furnaces, 25 single puddling furnaces, 5 heating furnaces, and 4 trains of rolls (8, 16, 2-high 18, and 3-high 18-inch); product, merchant bar iron and skelp iron; annual capacity, 18,000 gross tons. Fuel, coal and slack. (Nail factory, containing 55 cut-nail machines, abandoned and dismantled in 1899.) A. W. Thompson, President; John F. Taylor, Vice-President and Treasurer; Fred A. Davis, Assistant Treasurer; Edwin N. Ohl, Secretary and General Manager.

Birmingham Rolling Mills, (operated by the Birmingham Rolling Mill Company,) Birmingham, Jefferson county, Alabama. 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 gas furnace, 7 gas, 4 box annealing, 2 pair, and 4 sheet heating and annealing furnaces, and 10 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, all hot, and one cold sheet train.) Open-hearth steel department, containing two Siemens 30-gross-ton basic furnaces, built in 1897; first steel made July 22, 1897; annual capacity, 30,000 gross tons of ingots. Product, iron and open-hearth steel bars, plates, sheets, angles, round-edge tire, small T rails, fish-plates, etc.; annual capacity, 70,000 gross tons. Fuel, coal and producer gas. James G. Caldwell, President; D. M. Forker, Secretary and Treasurer; W. H. Hassinger, District Manager; J. D. Dwyer, Superintendent.

Brown Bonnell Works, Youngstown, Mahoning county, Ohio. Built in 1846; 41 double puddling furnaces, 7 gas and 6 coal heating furnaces, 2 annealing furnaces, 4 spike and 2 washer machines, and 10 trains of rolls (three 20-inch muck, and two 8, two 10, one 12, one 18, and one 20-inch finishing); product, bars, beams, channels, angles, universal mill plates, angle splices, railroad and boat spikes, links and pins, washers, and plates; annual capacity, 135,000 gross tons. A guide and a hoop mill may be added to these works. Bessemer steel department added in 1900, utilizing the Bessemer converters and the 32-inch blooming mill formerly in the Alexandria Works, at Alexandria, Indiana, and the Bessemer converters formerly in the Springfield Works, at Springfield, Illinois, which were removed to these works, entirely rebuilt, and the equipment largely increased; plant now has two 6-gross-ton converters; first steel made in September, 1900; annual capacity, 350,000 gross tons of ingots and 325,000 tons of blooms; a continuous billet mill is being added to the 32-inch blooming mill and will be completed in 1901. A mill for the manufacture of small billets, to be completed in 1901, is also being added. Fuel, coal and producer gas. Brand, "Brown Bonnell." (Formerly operated by The Brown Bonnell Iron Company.)

Central Works, Brazil, Clay county, Indiana. Built in 1882-3 and first put in operation January 12, 1883; 9 double puddling furnaces, one gas and 9 coal heating furnaces, 4 spike machines, 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 turnbuckles; annual capacity, 12,000 gross tons of rolled iron, 3,000 gross tons of forged iron, 7,000 gross tons of spikes, and 300,000 turnbuckles. Fuel, producer gas. Brand, "Central." A factory for the manufacture of bolts, nuts, and rivets is connected with the works. (Formerly operated by The Central Iron and Steel Company.)

Cleveland Works, Cleveland, Cuyahoga county, Ohio. Built in 1852;

4 single puddling furnaces, 8 scrap furnaces, 5 heating furnaces, 2 regenerative gas heating furnaces, 4 trains of rolls, (8, 9, and 18-inch,) and 4 hammers; product, locomotive and car axles, iron and steel forgings, iron shafting up to 20-inch round, and merchant bar iron; annual capacity, 30,000 gross tons of rolled and 7,000 tons of forged products. Fuel, bituminous coal and manufactured gas. (Formerly called the Lake Erie Iron Works and operated by the Lake Erie Iron Company.)

Corns Works, Massillon, Stark county, Ohio. Built in 1873 and put in operation January 4, 1875; 4 single puddling furnaces, 4 scrap furnaces, one regenerative gas heating furnace, and 2 trains of rolls (one 9 and one 18-inch); product, best common and refined bar iron; specialties, shapes to pattern and iron for agricultural implements; annual capacity, 9,000 gross tons. Fuel, bituminous coal and manufactured gas. (Formerly called the Massillon Rolling Mill and operated by The Corns Iron and Steel Company.)

Eagle Works, Ironton, Lawrence county, Ohio. Built in 1852 and enlarged several times since; 16 single puddling furnaces, 3 double puddling furnaces, 3 gas furnaces for bar and guide mills, one scrap furnace, and 3 trains of rolls (one 18-inch muck, one 3-high 16-inch bar, and one 9-inch guide); product, bars and 8 to 16-lb. rails; annual capacity, 25,000 gross tons. Fuel, natural gas. (Formerly called the Ironton Rolling Mill and operated by The Eagle Iron and Steel Company.)

Indiana Works, Muncie, Delaware county, Indiana. Built in 1892, utilizing machinery from the Lancaster Iron Company's rolling mill at Lancaster, Ohio; first put in operation in July, 1892; one double and 14 single puddling furnaces, 6 scrap furnaces, 1 regenerative scrapping furnace, 5 regenerative 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, 50,000 gross tons of finished products. Fuel, natural gas. (Formerly operated by The Indiana Iron Company.)

Inland Works, East Chicago, Lake county, Indiana. Built in 1889 and first put in operation September 15, 1889; 15 double and 4 single puddling furnaces, 7 heating furnaces, one piling furnace, and 6 trains of rolls (one 18 and one 22-inch muck, and one 8, one 9, one 10, and one 18-inch finishing); product, bar iron and steel; annual capacity, 70,000 gross tons. Fuel, coal. (Formerly operated by the Inland Iron and Forge Company.)

Mahoning Valley Works, Youngstown, Mahoning county, Ohio. Built in 1871; 25 double puddling furnaces, 4 busheling furnaces, 7 coal and 5 gas heating furnaces, 55 cut-nail machines with an annual capacity of 120,000 kegs, two 20-inch muck trains, and 7 trains of

finishing rolls (one 7, one 9, one 12, one 16, two 18, and one 24-inch); product, merchant bar iron, angles, and tank and plate iron; annual capacity, 65,000 gross tons. A plant for the manufacture of "Acme" polished shafting, which was entirely rebuilt and enlarged in 1900, is connected with these works; daily capacity, 25 gross tons. Fuel, bituminous coal. Brands, "M. V. I." for shafting, "I. X. L." for horseshoe bars, "B. Q." for bridge iron, and "M. S. B." for stay-bolt iron. (Formerly operated by The Mahoning Valley Iron Company.)

Marion Works, Marion, Grant county, Indiana. Built in 1893 and put in operation in September, 1893; 2 regenerative gas heating furnaces and one 10-inch train of rolls; product, rods, squares, flats, ovals, and hoop and band iron and steel; annual capacity, 18,000 gross tons. Fuel, natural gas. (Formerly operated by The Marion Steel and Iron Company, Incorporated.)

Minnesota Iron Works, (operated by the Minnesota Iron and Steel Company,) Columbia Heights, Anoka county, Minnesota. Built in 1894-5; 4 gas heating furnaces and 3 trains of rolls (9 and 12-inch guide and one 18-inch bar.) Steel department added in 1898 and first steel made in January, 1899; one 22-gross-ton and two 15-gross-ton basic open-hearth steel furnaces with an annual capacity of 30,000 gross tons of ingots. Product, bar iron and basic open-hearth steel bars and shapes; annual capacity, 25,000 gross tons. Fuel, producer gas. The open-hearth steel department is equipped with improved Wellman charging machines and other modern labor saving devices. R. S. Warner, President; G. D. Wick, Vice-President; William Barret Ridgely, Secretary; and J. F. Taylor, Treasurer. (Formerly called the Minneapolis Rolling Mills.)

Mitchell-Tranter Works, Covington, Kenton county, Kentucky. Built in 1873; 10 puddling, 3 scrap, and 5 heating furnaces, two 5-ton steam hammers, and one 18-inch muck mill, one 8 and one 10-inch guide mill, one 20-inch bar mill, and one 26-inch plate mill; one 7-gross-ton Siemens acid open-hearth steel furnace, built in 1879, with an annual capacity of 4,500 gross tons of ingots; product, plate, channel, angle, and merchant iron, and boiler plate and plow steel; annual capacity, single turn, 15,500 gross tons. Fuel, coal. Brand, "Crown" horseshoe bar and refined iron. (Formerly operated by Mitchell, Tranter & Co.)

Muncie Works, Muncie, Delaware county, Indiana. Built in 1893 and first put in operation in April, 1894; 6 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, band and bar iron; annual capacity, 20,000 gross tons. Fuel, natural gas exclusively. (Formerly operated by The Muncie Iron and Steel Company.)

New Albany Works, New Albany, Floyd county, Indiana. Forge built in 1869; rolling mill added in October, 1887; 12 coal heating furnaces, 3 forge fires, 3 trains of rolls, (10, 18, and 21-inch,) and 6 hammers; product, car axles, shafting, forgings, and bar and structural iron; annual capacity, 9,000 gross tons of axles, 1,500 tons of forgings, and 30,000 tons of bars. Fuel, coal. (Formerly operated by the Indiana Forge and Rolling Mill Company.)

Sharon Works, Sharon, Mercer county, Pa. Built in 1850; 8 single puddling furnaces, 13 double puddling furnaces, 12 heating furnaces, and 5 trains of rolls (one 8-inch guide, one 12, one 16, and one 18-inch bar, and one 24-inch plate); product, bar, band, hoop, tank, and light T rails; annual capacity, 30,000 gross tons. Fuel, coal and producer gas. (Formerly operated by the Sharon Iron Company, Limited.)

Springfield Works, Springfield, Sangamon county, Illinois. Open-hearth steel works built in 1879; two 20-gross-ton Siemens-Pernot acid furnaces and one Pernot furnace for dephosphorizing pig metal; first steel ingot made February 9, 1880; annual capacity, 18,000 gross tons. Bar mills contain 13 Siemens heating furnaces and one 9 and one 12-inch Belgian mill, one 12-inch mill, one 18-inch mill, and one 23-inch mill 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 mill contains one 31-inch train with rolls 112 inches in length; product, steel plates of all sizes; annual capacity, 18,000 gross tons. Fuel, Siemens producer gas in all heating furnaces. (Two 5-gross-ton Bessemer steel converters removed to the Brown Bonnell Works, at Youngstown, Ohio, in 1900. Entire plant formerly operated by The Springfield Iron Company.)

Sylvan Works, Moline, Rock Island county, Illinois. Built in 1894 and first put in operation in December, 1894; 5 gas heating furnaces, 2 coal heating furnaces, 2 forge fires, and one 8-inch, one 12-inch, one 16-inch, and one 18-inch mill; (the 16-inch mill is an auxiliary to the 12-inch, and is used for roughing billets to be rolled on the 12-inch mill); product, merchant bar and refined iron, soft and hard steel, and iron and steel agricultural shapes; annual capacity, 40,000 gross tons. Brand, "S." Fuel, producer gas. (One 5-gross-ton basic open-hearth steel furnace, built in 1898, dismantled in 1900. Formerly operated by the Sylvan Steel Company.)

Terre Haute Works, Terre Haute, Vigo county, Indiana. 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, 28,000 gross tons. Fuel, block coal and manufactured gas. Brands, "Terre Haute" and "Vigo." Works also contain 64 cut-nail machines, which are idle. (Formerly operated by the Terre Haute Iron and Steel Company.)

Toledo Works, East Toledo, Lucas county, Ohio. Built in 1883-4, burned April 10, 1887, and rebuilt in 1887-8; one single and 3 double puddling furnaces, 5 heating furnaces, 6 scrap furnaces, 4 trains of rolls, (one 8, one 10, and two 18-inch,) and one 5-ton hammer; product, extra quality assorted iron and steel merchant bar, band, and shafting; annual capacity, 30,000 gross tons. Fuel, coal. (Formerly called the Maumee Rolling Mill and operated by The Toledo Rolling Mill Company.)

Tudor Works, East St. Louis, St. Clair county, Illinois. First put in operation in January, 1873; two double puddling furnaces, 9 single busheling furnaces, 11 heating furnaces, 6 trains of rolls, and 10 automatic and 8 hand spike machines; product, railroad splices, T rails, bar iron, bolts and nuts, and spikes; annual capacity, 55,000 gross tons. Fuel, bituminous coal and producer gas. (Formerly operated by the Tudor Iron Works.)

Wabash Works, Terre Haute, Vigo county, Indiana. Completed in 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, 22,500 gross tons. Fuel, block coal. Brands, "Wabash," "Maud S.," and "Vigo." (Formerly operated by the Wabash Iron Company.)

Westerman Works, Marion, Grant county, Indiana. Built in 1890-1 with machinery from the abandoned Prospect Mill at Cleveland, Ohio; 4 heating furnaces and 2 trains of rolls (one 9 and one 15-inch); product, bar iron; annual capacity, 10,000 gross tons. Fuel, natural gas. Brand, "Westerman." (Formerly operated by the Westerman-Stewart Iron Company.)

Wetherald Works, Frankton, Madison county, Indiana. Built in 1893, utilizing machinery from the abandoned Wetherald Rolling Mill, at Findlay, Ohio; first put in operation in January, 1894; 6 single scrap furnaces, 3 regenerative gas heating furnaces, and 3 trains of rolls (8, 10, and 18-inch); product, bar and band iron; annual capacity, 18,000 gross tons. Fuel, natural gas. (Formerly called the Wetherald Rolling Mill and operated by the Wetherald Rolling Mill Company.)

Total annual capacity of the 27 rolling mills and steel works: Bessemer steel ingots, 350,000 gross tons; open-hearth steel ingots, 82,500 tons; Bessemer steel blooms and billets, 325,000 tons; rolled and forged products, 1,043,500 tons; spikes, 15,000 tons; cut nails, 120,000 kegs; polished shafting, 7,500 tons; and turnbuckles, 300,000.

BOLT, NUT, RIVET, AND SPIKE WORKS—4.

Brown Bonnell Works, Youngstown, Ohio. Product, railroad and boat spikes. (Formerly operated by The Brown Bonnell Iron Company.)

Central Works, Brazil, Indiana. Product, iron and steel bolts, nuts, and rivets. Sizes: bolts, from $\frac{1}{2}$ of an inch to 2 inches; nuts, from $\frac{1}{2}$ of an inch to 2 inches; rivets, from $\frac{1}{2}$ of an inch to 1 inch. Also make Acheson's patent railroad spikes. (Formerly operated by the Central Iron and Steel Company.)

Indiana Works, Muncie, Indiana. Product, iron and steel bolts, nuts, and rivets. Sizes: bolts, usual sizes for carriages, machinery, plows, coaches, etc.; nuts, usual sizes and all kinds; rivets, all kinds, from $\frac{1}{4}$ of an inch to 2 inches. (Formerly operated by the Indiana Iron Company.)

Tudor Works, East St. Louis, Illinois. Product, iron and steel bolts and nuts. Sizes: bolts, nothing smaller than $\frac{3}{4}$ of an inch; nuts, from $\frac{1}{4}$ of an inch to 2 inches. Also make railroad spikes. (Formerly operated by the Tudor Iron Works.)

CAR-AXLE WORKS—3.

Central Works, Brazil, Clay county, Indiana. Product, iron and steel passenger, freight, locomotive, and engine truck axles; annual capacity, 12,000 axles. (Formerly operated by the Central Iron and Steel Company.)

Cleveland Works, Cleveland, Ohio. Product, locomotive, truck, and M. C. B. car axles; annual capacity, 30,000 axles. (Formerly operated by the Lake Erie Iron Company.)

New Albany Works, New Albany, Indiana. Product, all kinds of car axles; annual capacity, 18,000 axles. (Formerly operated by the Indiana Forge and Rolling Mill Company.)

Total annual capacity of the 3 works: 60,000 axles.

IRON-ORE MINES.

The company operates the Cambria and Lillie iron-ore mines at Negaunee, Michigan, in the Marquette Range of the Lake Superior iron-ore region, and the Franklin, Victoria, Bessemer, and Pettit mines, at Virginia, Minnesota, in the Mesabi Range of the same region. It also owns an interest in the Mesabi iron-ore mines of the Mahoning Ore and Steel Company and a one-half interest in the property of the Union Ore Company in the Mesabi Range.

COKE OVENS AND COAL LANDS.

It also operates 80 coke ovens and owns about 550 acres of coking coal lands in the Connellsville region of Pennsylvania. The company also has in operation 910 coke ovens at the Pioneer Furnaces, at Thomas, Alabama.

BARNUM RICHARDSON COMPANY.

Barnum Richardson Company; general offices, Lime Rock, Litchfield county, Connecticut; branch office, East Canaan, Connecticut. *Officers:* M. B. Richardson, President and Treasurer; C. W. Barnum, Vice-President; and R. N. Barnum, Secretary. *Board of Directors:* M. B. Richardson, C. W. Barnum, R. N. Barnum, W. M. Barnum, M. B. Richardson, Jr., George W. Cowdrey, and James L. Richardson. Capital stock, \$200,000, all common. The company operates the following works:

BLAST FURNACES—4 CHARCOAL STACKS.

Canaan Furnaces, East Canaan, Litchfield county, Connecticut. 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; warm blast; steam and water power; fuel, charcoal; ore, Salisbury brown hematite; product, pig iron for car-wheels, malleable castings, ordnance, and machinery, known as "Salisbury" iron; total annual capacity, 10,000 gross tons. (No. 2 Furnace abandoned. Formerly operated by the Barnum Richardson Company.)—*Active in 1901.*

Lime Rock Furnace, Lime Rock, Litchfield county, Connecticut. Established in 1734; first incorporated in 1828; incorporated by the Lime Rock Iron Company in 1863; present furnace, one stack, 32 x 9, built in 1864; warm blast; water-power; open top; fuel, charcoal; ore, Salisbury brown hematite; product, pig iron for car-wheels, malleable castings, ordnance, and machinery known as "Salisbury" iron; annual capacity, 5,000 gross tons. (Formerly operated by the Lime Rock Iron Company.)—*Active in 1897.*

Sharon Valley Furnace, Sharon Valley, Litchfield county, Connecticut. One stack, 31 x 9½; very old; rebuilt in 1863; warm blast; water-power; open top; fuel, charcoal; ore, Salisbury brown hematite; product, Salisbury car-wheel pig iron; annual capacity, 5,000 gross tons. (Formerly operated by the Sharon Valley Iron Company.)—*Active in 1897.*

Total annual capacity of the 4 furnaces: 20,000 gross tons.

LIMESTONE QUARRIES AND IRON-ORE MINES.

The company owns and operates limestone quarries at East Canaan and at Lime Rock, Connecticut.

It also owns and operates the Old Hill iron-ore mine at Ore Hill, Salisbury, Connecticut. In addition it operates the Davis Mine, also at Salisbury, Connecticut.

THE TROY STEEL COMPANY.

The Troy Steel Company; general offices, Troy, New York; branch office, 56 Pine st., New York City. *Officers:* Frank S. Witherbee, President and Receiver; George A. Bell, Vice-President; and Lysander B. Danforth, Secretary and Treasurer. *Board of Directors:* Frank S. Witherbee, Henry H. Rogers, William Kemp, Junius S. Morgan, George A. Bell, C. W. Tillinghast, and Lysander B. Danforth. Capital stock, \$2,500,000, all of which is common. The company operates or controls the following works:

BLAST FURNACES—3.

Troy Furnaces, on Breaker Island, Albany county, opposite Troy, New York. Three stacks, each 80 x 18, built in 1886-7; twelve Whitwell stoves; fuel, anthracite coal and coke; ores, magnetic from Essex and Columbia counties; product, basic-Bessemer pig iron; total annual capacity, 160,000 gross tons. (Formerly operated by the Troy Steel and Iron Company.)—*Active in 1897. Idle.*

Total annual capacity of the 3 furnaces: 160,000 gross tons.

ROLLING MILLS AND STEEL WORKS—3.

Albany Iron Works, Troy, Rensselaer county, New York. Leased and operated by the Continuous Rail Joint Company, of Newark, N. J.; lease will not expire until May 1, 1910. (Formerly operated by the Troy Steel and Iron Company.)—*For a description of these works see Part II., Rolling Mills and Steel Works in New York.*

Bessemer Steel Works, on Breaker Island, Albany county, New York. Built at Troy, Rensselaer county, in 1864 and removed to Breaker Island (opposite Troy) and enlarged in 1896; first blow made at Troy on February 15, 1865; first blow made at Breaker Island on September 11, 1896; three 15-gross-ton basic-Bessemer converters, 4 cupolas, 4 spiegel cupolas, two 5-hole Hainsworth pit furnaces, and 24 soaking pits; annual capacity, 200,000 gross tons of ingots. Rolling mill connected with the steel works contains one 2-high 35-inch reversing blooming mill, with 42 x 60-inch reversing engines, and one 3-high 21-inch billet mill; product, billets, blooms, slabs, and skelp; annual capacity of rolled material, 200,000 tons. Fuel, bituminous coal. (Formerly operated by the Troy Steel and Iron Company.)—*Idle.*

Rensselaer Iron Works, Troy, Rensselaer county, New York. Established in 1846; merchant mill built in 1866 and 1867; new merchant mill built in 1877 and 1878; 18 heating furnaces and 4 trains of rolls; product, steel shapes and sheets and merchant steel of all kinds; annual capacity, 25,000 gross tons. Brands of steel, "XX

Gun," "XX Special Dead Soft," "XX Gun Barrel," and a variety of other special grades. Fuel, bituminous coal. (Formerly operated by the Troy Steel and Iron Company.)—*Idle*.

Total annual capacity of the 3 rolling mills and steel works, including the Albany Iron Works: Bessemer steel ingots, 200,000 gross tons; rolled products, 275,000 tons.

THE THOMAS IRON COMPANY.

The Thomas Iron Company; general offices, Easton, Pa.; branch offices, Hokendauqua, Alburtis, Island Park, and Hellertown, Pa., and Richard Mine, Port Oram, New Jersey. *Officers*: B. F. Fackenthal, Jr., President and General Manager, W. H. Hulick, Vice-President, and James W. Weaver, Secretary and Treasurer, Easton, Pa.; David H. Thomas, General Superintendent, Hokendauqua, Pa. *Sales Agents*: W. R. Thomas, 95 Liberty st., New York, and Philip E. Wright, 703 Stephen Girard Building, Philadelphia. Sales are also made at the main office of the company at Easton. *Board of Directors*: Samuel Thomas, W. H. Hulick, W. P. Hardenbergh, B. F. Fackenthal, Jr., Fred R. Drake, Joseph S. Rodenbough, and J. Samuel Krause. Capital stock, \$2,500,000, all of which is common. There is no bonded indebtedness. The company operates the following works:

BLAST FURNACES—10.

Thomas Iron Works: 10 stacks, all located in Lehigh and Northampton counties, Pennsylvania.

Hokendauqua Furnaces, Hokendauqua, Lehigh county, Pa. Five stacks: No. 1, 80 x 17, built in 1855 and rebuilt in 1894; No. 3, 80 x 17, built in 1863 and rebuilt in 1899; No. 4, 65 x 17, built in 1863; Nos. 5 and 6, each 60 x 17, built in 1873; No. 5 abandoned in 1897 but revived in 1899; Nos. 1, 3, and 6 have Taws & Hartman regenerative stoves; the others have iron pipe stoves; fuel, mixed anthracite coal and coke. David H. Thomas, General Superintendent.—*Active in 1901*.

Keystone Furnace, (Island Park,) Easton, Northampton county, Pa. One stack, No. 9, 65 x 16, first put in blast April 17, 1876; Siemens-Cowper-Cochrane regenerative stoves; fuel, mixed anthracite coal and coke. Fletcher H. Knight, Superintendent.—*Active in 1900*.

Lock Ridge Furnaces, Alburtis, Lehigh county, Pa. Two stacks: No. 7, 60 x 14, built in 1867; No. 8, 60 x 16, built in 1869; No. 7 has iron pipe stoves and No. 8 has Durham iron pipe stoves; fuel, anthracite coal. Daniel Davis, Superintendent.—*Active in 1901*.

Saucon Furnaces, Hellertown, Northampton county, Pa. Two stacks: No. 10, 75 x 16, put in blast March 25, 1868, and rebuilt in 1894; No. 11, 60 x 16, put in blast May 25, 1870; Durham iron pipe stoves; fuel, mixed anthracite coal and coke. These furnaces are equipped with one Hartman pig-iron casting machine. Horace Boyd, Superintendent.—*Active in 1901.*

Ores, foreign, Lake Superior, local brown hematite, and New Jersey magnetite; product, foundry, forge, basic open-hearth, and Bessemer pig iron. Brand, "Thomas."

Total annual capacity of the 10 furnaces: 240,000 gross tons.

RAILROADS AND LIMESTONE QUARRIES.

The Thomas Iron Company owns the entire capital stock of the Iron-
ton Railroad Company and of the Saucon Valley Railroad Company; also one-third of the capital stock of the Mount Hope Mineral Railroad Company, in New Jersey, and two-fifths of the capital stock of the Catasauqua and Fogelsville Railroad Company.

It also owns and operates the following limestone quarries: the Saeger Quarry, on line of the Iron-
ton Railroad; the Ruth Quarry, on line of the Catasauqua and Fogelsville Railroad; the Clark Quarry, at Island Park, and the Biery Quarry, at Hokendauqua, on the Lehigh Valley Railroad. In addition it leases and operates the Eberhart Quarry, at Catasauqua; the Lobach Quarry, on line of the Iron-
ton Railroad; the Heller Quarry, at Hellertown; and the Spring Creek Quarry, at Albur-
tis.

IRON-ORE MINES.

The company also owns the Richard iron-ore mine, at Port Oram, New Jersey; the Wawayanda Mines, near Warwick, New York; and fourteen other iron-ore properties in Lehigh and Berks counties, Pennsylvania.

BETHLEHEM STEEL COMPANY.

Bethlehem Steel Company; general offices, South Bethlehem, Northampton county, Pa. *Officers:* Edward M. McIlvain, President; A. E. Borie, Vice-President; H. S. Snyder, Secretary; A. N. Cleaver, Treasurer; Archibald Johnston, General Superintendent; and William M. Tobias, Purchasing Agent. *Selling Agents:* H. F. J. Porter, 100 Broadway, New York City; W. H. Mitchell, 421 Chestnut street, Philadelphia; E. Nelson, 1433 Marquette Building, Chicago; Walter Miller, Perry-Payne Building, Cleveland; S. E. Freeman, 930 North Main st., St. Louis; J. P. Larkin, 430 Endicott Building, St. Paul, Minnesota;

and the Abner Doble Company, San Francisco, California. *Board of Directors:* Robert P. Linderman, E. T. Stotesbury, Edward M. McIlvain, Archibald Johnston, George F. Baer, J. P. Ord, and Charles MacVeagh. Capital stock, \$15,000,000, all of which is common. The company operates the following works:

BLAST FURNACES—4.

Bethlehem Furnaces, South Bethlehem, Northampton county, Pa. Four stacks: 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; twelve Siemens-Cowper-Cochrane stoves. Fuel, anthracite coal and Connellsville coke; product, Bessemer, basic, low-phosphorus, and foundry pig iron made from local and foreign hematite and magnetic ores; total annual capacity, 200,000 gross tons. Furnaces are equipped with one Davies pig-iron casting machine. Foundations for Furnace No. 8 laid in 1892; work suspended. (No. 1 Furnace, 61 x 15½, built and blown in in 1863, abandoned in 1895, and No. 7 Furnace, (Bingen,) 65 x 16, built in 1870, abandoned in 1897. Formerly operated by The Bethlehem Iron Company.)—*Active in 1901.*

Total annual capacity of the 4 furnaces: 200,000 gross tons.

ROLLING MILLS AND STEEL WORKS—1.

Bethlehem Rolling Mills and Steel Works, South Bethlehem, Northampton county, Pa. Established in 1860. Iron mills started in 1863; Bessemer steel works started in 1873; 7 double puddling furnaces, 17 heating furnaces, (4 ordinary reverberatory and 13 bituminous coal and fuel oil,) 6 trains of rolls, (12, 22, 25, 28, 32, and 48-inch,) and 4 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 and 4 spiegel cupolas. 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. This department also contains a general machine shop and an iron foundry. Fuel, bituminous coal, oil, and manufactured gas. (Formerly operated by The Bethlehem Iron Company.)

Open Hearth Steel Department. Eight open-hearth steel furnaces (two 40-gross-ton basic and one 10, one 20, and four 40-gross-ton acid) and one preheater; first steel melted August 11, 1888; an ingot weighing 104 gross tons has been cast; annual capacity of ingots, about 85,000 gross tons. Fuel, manufactured gas. (Formerly operated by The Bethlehem Iron Company.)

Forge and Armor Plate Department. Connected with the open-hearth steel furnaces is a plant for the fluid compression of steel, (press taking an 18-foot ingot,) a forging plant containing 3 hydraulic forging presses, (one 2,000, one 5,000, and one 14,000-tons' pressure,) 1 hammer with a falling weight of 125 gross tons, 8 hammers for making small forgings, and one 7,000-ton bending press; also 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. These plants contain 51 heating furnaces, which are supplied with gas by 85 gas producers, and an illuminating gas plant. A crucible steel plant, containing 2 hammers and 2 furnaces, is also connected with this department. Also a blacksmith shop containing 7 hammers, ranging from 1,100 pounds to 3 tons, and one 6-ton hammer with 2 heating furnaces; also 2 machine shops, (one for general work, rough-machining and finishing forgings, and for heavy ordnance, and one for trimming and machining armor plates,) and a steel foundry. Product, steel forgings and castings of all descriptions and of the largest dimensions and weight, marine and stationary engine cranks, (forged solid or built-up,) shafting, (forged solid or hollow,) gun carriages, heavy ordnance of all calibres, and forged armor plates, including conning towers, shields, etc.; also all grades of steel billets. 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. Fuel, manufactured gas. (Formerly operated by The Bethlehem Iron Company.)

Total annual capacity of the rolling mills and steel works: Bessemer steel ingots, 250,000 gross tons; open-hearth steel ingots, 85,000 tons; rolled products, 260,000 tons; finished armor plate, 5,000 tons; heavy steel shafting, steel forgings, and iron and steel castings are also produced in large quantities.

IRON-ORE MINES AND LIMESTONE QUARRY.

The Bethlehem Steel Company controls a one-half interest in The Juragua Iron Company, Limited, which operates extensive iron-ore mines near Santiago, in the Island of Cuba. It also operates the Troxell limestone quarry, on the Catasauqua and Fogelsville Railroad, near Catasauqua, Pennsylvania.

PROVING GROUND.

At Redington, Pa., on the Lehigh Valley Railroad, is a proving ground for armor plates and ordnance, a complete establishment for these purposes having been established there by The Bethlehem Iron Company several years ago.

EMPIRE STEEL AND IRON COMPANY.

Empire Steel and Iron Company; general offices, Catasauqua, Pa. *Officers*: Leonard Peckitt, President; F. M. Davis, Vice-President; W. L. Sims, General Manager and Treasurer; J. M. Fitzgerald, Secretary; J. S. Stillman, Auditor; and W. A. Major, Purchasing Agent. *Selling Agents*: Rogers, Brown & Co., New York, Cincinnati, Cleveland, Buffalo, Pittsburgh, and Chicago; Rogers, Brown & Warner, Philadelphia. *Board of Directors*: E. R. Chapman, Archer Brown, W. E. Scarlett, W. L. Sims, F. M. Davis, E. K. Summerwell, F. M. Jeffery, Leonard Peckitt, and W. E. Davis. *Executive Committee*: Archer Brown, Chairman, E. R. Chapman, and W. L. Sims. Authorized capital, \$5,000,000, divided as follows: \$2,500,000 of preferred 6 per cent. cumulative and \$2,500,000 of common. No bonds have been issued by the company. In December, 1900, \$2,368,100 of preferred and \$2,281,400 of common stock had been issued. The company operates or controls the following works.

BLAST FURNACES—12 COMPLETED AND 1 PROJECTED.

- Cherokee Furnace, Greensboro, Guilford county, North Carolina. One stack, 70 x 16½, built in 1892; iron shell on cast iron columns; first blown in April 25, 1899; two Ford & Moncur stoves; fuel, Pocahontas coke; ores, local magnetite and limonite from the company's mines; product, foundry and forge pig iron; annual capacity, 35,000 gross tons. Brand, "Cherokee." S. Norton, General Superintendent. (Formerly called the Carolina Furnace and owned by The Greensboro Furnace Company.)—*Active in 1899.*
- Crane Furnaces, Crane Iron Works, Catasauqua, Lehigh county, Pa. Four stacks: two 75 x 17 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, basic open-hearth, and Bessemer pig iron; total annual capacity, 135,000 gross tons. Brands, "Crane" and "Crane L. P." Leonard Peckitt, President; J. M. Fitzgerald, Secretary; James M. Hodge, Treasurer; Howard Knauss, Superintendent. (Operated by the Crane Iron Works.)—*Active in 1901.*
- Gem Furnace, Shenandoah, Page county, Virginia. 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, found-

ry and forge pig iron; annual capacity, 36,000 gross tons. Brand, "Shenandoah." S. Norton, General Superintendent. (Formerly operated by the Shenandoah Furnace Company.)—*Active in 1900.*

Henry Clay Furnaces, Reading, Berks county, Pa. 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, foundry and gray forge pig iron; total annual capacity, 36,000 gross tons. Brand, "Henry Clay." W. B. Foote, Superintendent. (Formerly operated by Eckert & Brother.)—*Active in 1901.*

Macungie Furnace, Macungie, Lehigh county, Pa. One stack, 56 x 16, completed in 1874 and blown in September 14, 1874; old pattern Kent stoves; fuel, anthracite coal and coke; ores, Lake Superior and native hematite; product, Bessemer, foundry, and forge pig iron; annual capacity, 20,000 gross tons. Brand, "Macungie." W. H. Clymer, Superintendent. (Formerly operated by the Macungie Iron Company.)—*Active in 1901.*

Oxford Furnace, Oxford, Warren county, New Jersey. One stack, 63 x 17½, built in 1871; remodeled in 1900; two Kent and one Durham iron pipe ovens; fuel, anthracite coal; ore, magnetic mined near the works; product, Bessemer, foundry, and forge pig iron; annual capacity, 36,000 gross tons. Brand, "Oxford." R. L. Ahles, Division Superintendent. (Formerly called the Oxford Iron Works.) A new furnace may be erected.—*Active in 1901.*

Topton Furnace, Topton, Berks county, Pa. 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; ores, Lake Superior and native hematite; product, foundry and forge pig iron; annual capacity, 30,000 gross tons. Brand, "Topton." W. H. Clymer, Superintendent. (Formerly operated by Isaac Eckert & Co.)—*Active in 1901.*

Victoria Furnace, Goshen, Rockbridge county, Virginia. One stack, 75 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. Brand, "Victoria." J. H. Ferguson, Superintendent. (Formerly called Rockbridge Furnace and operated by the Victoria Furnace Company.)—*Active in 1901.*

Total annual capacity of the 12 furnaces: 378,000 gross tons.

IRON-ORE AND COAL LANDS, COKE OVENS, AND RAILROAD LINES.

The company owns at Oxford, New Jersey, about 2,500 acres of iron-ore lands and controls the mineral rights for several thousand additional acres. It has also purchased the iron-ore property of the Mount

Hope Mining Company, in New Jersey, containing in all about 1,500 acres of land; also 31,000 acres of iron-ore lands in Page county, Virginia, comprising the Massanutton tract. The company also owns and operates the Huddleston Mine, in the Potts Valley, Virginia, with a daily shipping capacity of 600 tons of brown iron ore. This mine is connected with the Chesapeake and Ohio Railway by a narrow-gauge railroad, which is also owned by the company. Other iron-ore mines owned by the company are located at Ore Hill, near Greensboro, North Carolina, and at Wheatfield, near Reading, Pa. The company also owns and operates the Mount Hope Mineral Railroad, $4\frac{1}{8}$ miles long, which connects the Mount Hope iron-ore mines with the Central Railroad of New Jersey and the Delaware, Lackawanna, and Western Railroad at Port Oram, New Jersey; the Victoria and Western Railway, 12 miles long, Goshen, Va., to Rockbridge Alum Springs, Va.; Potts Valley Railroad, 5 miles long, McDowell, Va., to Huddleston, Va.; Lehigh and Oxford Railroad, 3 miles long, Butzville, N. J., to Queen Mines, N. J.; and the Virginia Northern Railroad, $3\frac{1}{2}$ miles long, Shenandoah, Va., to Massanutton, Va. It also owns a controlling interest in the Victoria Coal and Coke Company, which conducts large coal and coke operations at Caperton and Sunnyside, in West Virginia.

THE LACKAWANNA IRON AND STEEL COMPANY.

The Lackawanna Iron and Steel Company; general offices, Scranton, Lackawanna county, Pa.; New York office, 100 Broadway. *Officers at New York:* Walter Scranton, President; Moses Taylor, Vice-President; J. P. Higginson, Secretary and Treasurer; and F. F. Graham, Assistant Treasurer. *Officers at Scranton:* Henry Wehrum, General Manager; Arja Williams, Assistant Secretary; and William F. Kiesel, Cashier. *Board of Directors:* Walter Scranton, William E. Dodge, Warren Delano, Jr., D. C. Blair, J. J. Albright, Cornelius Vanderbilt, Moses Taylor Pyne, Edmund Hayes, Moses Taylor, Arthur Scranton, Henry Wehrum, Stephen S. Palmer, Austin B. Blair, B. H. Buckingham, and Arja Williams. Authorized capital stock, \$25,000,000; issued, \$20,000,000, all common. The company operates the following works:

BLAST FURNACES—7.

Bird Coleman Furnaces, (leased,) Cornwall, Lebanon county, Pa. Two stacks: 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; Whitwell stoves; fuel, coke; ore, Cornwall; product, principally Bessemer pig iron; total annual capacity, 80,000 gross tons. Brand, "Lackawanna." H. B. Cox, Superintendent, and Patrick Eagan, Assistant Superintendent. (Owned by the Cornwall Iron Company, Limited.)—*Active in 1901.*

Colebrook Furnaces, (owned,) Lebanon, Lebanon county, Pa. Two stacks: No. 1, 81½ x 18, built in 1881, remodeled in 1887, and rebuilt in 1895; No. 2, 85 x 18, completed in November, 1882; Lackawanna stoves; fuel, coke; ore, Cornwall; product, principally Bessemer pig iron; total annual capacity, 125,000 gross tons. Brand, "Lackawanna." H. B. Cox, Superintendent, and Patrick Eagan, Assistant Superintendent.—*Active in 1901.*

Franklin Furnace, (owned,) Franklin Furnace P. O., Sussex county, New Jersey. One stack, 67 x 16½, completed in October, 1873, and blown in January 1, 1874; abandoned in 1898 and revived in 1899; fuel, anthracite coal and coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 55,000 gross tons. S. P. Tomkins, Superintendent. (Formerly owned by the Franklin Iron Company.)—*Active in 1900.*

Lackawanna Furnace, (owned,) Scranton, Lackawanna county, Pa. One stack, No. 3, 75 x 16½, originally built in 1852; changed to No. 4 in 1874 and to No. 3 in 1901; four Durham iron stoves; fuel, anthracite coal and coke; ores, Cornwall and Lake Superior; product, Bessemer pig iron; annual capacity, 60,800 gross tons. Brand, "Lackawanna." (Three stacks, Nos. 1, 2, and 4, dismantled.) A. H. Lee, Superintendent of Furnaces.—*Active in 1901.*

North Cornwall Furnace, (leased,) Cornwall, Lebanon county, Pa. One stack, 80 x 18, built in 1872 and rebuilt in 1890; Whitwell stoves; fuel, coke; ore, Cornwall; product, principally Bessemer pig iron; annual capacity, 45,000 gross tons. Brand, "Lackawanna." H. B. Cox, Superintendent, and Patrick Eagan, Assistant Superintendent.—*Active in 1901.*

Total annual capacity of the 7 furnaces: 365,800 gross tons.

ROLLING MILLS AND STEEL WORKS—2.

North Works, (owned,) Scranton, Lackawanna county, Pa. Commenced in 1840; 33 heating furnaces, 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, 250,000 gross tons of steel rails, blooms, billets, angle bars, and merchant bars. Bessemer steel plant added in 1875; three 7-gross-ton converters and 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, 280,000 gross tons of ingots. Fuel, anthracite culm under boilers. Brand, "Lackawanna." (Formerly operated by the Lackawanna Iron and Coal Company.)

South Works, (owned,) Scranton, Lackawanna county, Pa. Built in 1881-3; two 9-gross-ton Bessemer steel converters and 9 pig-melting and 3 spiegel-melting cupolas; first blow made March 29, 1883, and first steel rail rolled May 4, 1883; eight 6-ingot soaking pits, 3 trains of 32-inch rolls, and 2 blooming trains, one pass each; product, steel rails; annual capacity, 425,000 gross tons of ingots and 380,000 tons of rails. Ingots are cast in moulds on cars. Fuel, anthracite culm under boilers. Brand, "Lackawanna." (Formerly operated by the Scranton Steel Company.)

Total annual capacity of the 2 rolling mills and steel works: Bessemer steel ingots, 705,000 gross tons; steel rails, blooms, billets, etc., 630,000 tons.

NEW PLANT NEAR BUFFALO, NEW YORK.

The Lackawanna Iron and Steel Company is now engaged in erecting on the lake shore at West Seneca, Erie county, New York, a short distance below Buffalo, an extensive blast furnace, rolling mill, and steel plant, which it expects to have completed in 1902. When completed this plant will produce iron and steel in all the forms now produced at Scranton and elsewhere and also additional products. The company has secured about 1,500 acres of land along the lake front at and beyond Stony Point, starting from the line of the city limits of Buffalo. The tract includes a large frontage on the new harbor formed by the very extensive breakwater now being completed by the United States Government. Through a connecting road now being built by an affiliated interest of the Lackawanna Iron and Steel Company direct connection is secured with 26 railroads entering the city of Buffalo. Supplies of raw material will be drawn from sources heretofore controlled by the company and from new sources recently acquired by it, including several thousand acres of excellent coking coal in Indiana and Cambria counties, Pennsylvania. It is the intention of the company to haul the coal from this section to Lebanon, Pennsylvania, and also to its new plant below Buffalo, where it will be coked for the use of its blast furnaces.

THE PHENIX IRON COMPANY.

The Phoenix Iron Company; general offices, 410 Walnut street, Philadelphia; branch offices, 49 William street, New York City; 153 Milk street, Boston; and Rookery Building, Chicago. *Officers at Philadelphia:* David Reeves, President, George Gerry White, Secretary, and George C. Carson, Jr., Treasurer. *Officers at Phoenixville, Pa.:* William

H. Reeves, General Superintendent, and Frank P. Norris, Manager. *Sales Offices*: Sales are made at the general offices and at all branch offices. *Board of Directors*: David Reeves, William H. Reeves, Edward T. Stotesbury, George C. Thomas, and John Lowber Welsh. Capital stock, \$1,500,000, of which \$800,000 is 7 per cent. cumulative preferred and \$700,000 is common. The company operates the following works:

ROLLING MILLS AND STEEL WORKS—1.

Phoenix Iron Works, Phoenixville, Chester county, Pa. Original works built in 1808. New mill built in 1873; 16 Siemens heating furnaces, one Siemens and 19 Phoenix gas producers, and 5 trains of rolls, (one 9, one 13, two 22, and one 24-inch.) The 24-inch train of rolls is driven by a pair of Mackintosh & Hemphill 28 x 48-inch reversing engines of the latest design; all material is put in and drawn from the furnaces by Wellman-Seaver Engineering Company's patent electric charging machine and transfer buggy; also handled at rolls by electrically driven tables designed by the Wellman-Seaver Engineering Company. Product, open-hearth steel bars, beams, channels, angles, tees, miscellaneous structural shapes, and steel castings; total annual capacity, 100,000 gross tons. Fuel, bituminous coal.

Steel works, built in 1888-9, and enlarged in 1899, contain two 30 and two 40-gross-ton acid and two 30 and two 40-gross-ton basic open-hearth steel furnaces with an annual capacity of 125,000 gross tons of ingots; furnaces charged by two Wellman-Seaver Engineering Company's patent electric charging machines; also 14 Siemens and 2 Duff gas producers; also one 36-inch blooming mill, driven by a pair of Mackintosh & Hemphill 33 x 48-inch reversing engines; also three 4-hole soaking pits. First steel made in February, 1889. Fuel, bituminous coal.

Total annual capacity of the rolling mills and steel works: Open-hearth steel ingots, 125,000 gross tons; rolled products and steel castings, 100,000 tons.

FOUNDRY DEPARTMENT.

Phoenix Foundry, Phoenixville, Pa. Product, all kinds of heavy iron and steel castings; annual capacity, 6,000 gross tons of iron and 2,500 tons of steel castings.

BRIDGEBUILDING WORKS.

Phoenix Bridge Works, Phoenixville, Pa. Product, railroad and highway bridges; also erect iron and steel buildings. Annual capacity, 50,000 gross tons. An eye bar plant, making bars from 3 inches to 16 inches inclusive in width, is connected with the works. A hydraulic testing machine with a capacity of 2,000,000 pounds is also connected with this department.

BOLT, NUT, AND RIVET WORKS.

Phoenix Iron Works, Phoenixville, Pa. Product, bolts, nuts, and rivets, all consumed by the company; sizes, from $\frac{1}{2}$ of an inch to $1\frac{1}{2}$ inches inclusive.

IRON-ORE LANDS AND LIMESTONE QUARRIES.

The company owns iron-ore mines in Chester, Montgomery, Berks, and Lancaster counties, Pa.; also limestone quarries at Port Kennedy, Pa.

GLASGOW IRON COMPANY.

Glasgow Iron Company; general offices, Pottstown, Montgomery county, Pa.; branch office, Harrison Building, Philadelphia; sales offices, 88 Washington street, New York City, and 272 Franklin street, Boston, Massachusetts. *Officers*: Comly B. Shoemaker, President; Harry W. Prizer, Secretary; Oliver E. Shuler, Treasurer; and James P. Roe, General Superintendent. The company leases or operates the following works:

BLAST FURNACES—1 LEASED.

Anvil Furnace, (leased,) Pottstown, Montgomery county, Pa. One stack, 80 x 17, built in 1867 and blown in in December, 1867; remodeled in 1889; three fire-brick stoves, 76 $\frac{1}{4}$ x 19; fuel, anthracite coal and coke; ores, magnetic and hematite; product, special pig iron; annual capacity, 50,000 gross tons. Brand, "Anvil." (Owned by the Pottstown Iron Company.)—*Idle since 1893.*

Annual capacity: 50,000 gross tons.

ROLLING MILLS AND STEEL WORKS—1 OWNED AND 1 LEASED.

Glasgow Iron and Steel Works, ninth ward, Pottstown, Montgomery county, Pa. Puddle mill built in 1874; 8 double puddling furnaces and one train of muck rolls; rotary squeezer; steam and water power; annual capacity, 10,000 gross tons. 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; 2 large gas heating furnaces; one train of rolls; rotary shears; annual capacity, 12,000 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. Fuel, manufactured gas and bituminous coal.

Pottstown Iron Works, (leased,) Pottstown, Montgomery county, Pa. Built in 1863 and enlarged in 1867; 22 double puddling furnaces, 13 Siemens heating furnaces, 95 cut-nail machines, one hammer, and 8 trains of rolls (18-inch muck, 21-inch muck, 23-inch muck, 23-inch nail plate, 60-inch plate, 65-inch plate, 112-inch plate, and a universal mill on which can be rolled plates up to 36 inches in width); product, muck bar, cut nails, and boiler, ship, bridge, and tank plate; annual capacity, 35,000 gross tons of muck bar, 127,000 tons of plates, and 250,000 kegs of cut nails. Fuel, coal and manufactured gas. A Roe mechanical puddling machine is being erected. Steel works, built in 1885-6, contain three 10-gross-ton basic-Bessemer steel converters and a 36-inch blooming mill; first blow made July 1, 1886; also one 12-gross-ton Siemens basic open-hearth steel furnace, built in 1885-6; steel plant idle and may be dismantled. (Owned by the Pottstown Iron Company.)

Total annual capacity of the 2 rolling mills and steel works: Rolled iron and steel, 196,000 gross tons; cut nails, 250,000 kegs.

AMERICAN IRON AND STEEL MANUFACTURING COMPANY.

American Iron and Steel Manufacturing Company; general offices, Lebanon, Pa. *Officers:* J. H. Sternbergh, President and General Manager, Reading, Pa.; Arthur Brock, Vice-President, H. M. M. Richards, Treasurer, and Charles M. Hallman, Secretary, Lebanon, Pa. *Board of Directors:* Arthur Brock, Horace Brock, Thomas Evans, Charles M. Hallman, H. H. Light, James Lord, and H. M. M. Richards, of Lebanon, Pa.; J. H. Sternbergh, Herbert M. Sternbergh, and Charles W. Wilhelm, of Reading, Pa.; and William H. Wallace, of New York City. Capital stock, \$20,000,000, of which \$3,000,000 is 5 per cent. preferred and \$17,000,000 is common. The par value of the preferred stock is \$50 per share, fully paid, and the par value of the common stock is \$50 per share, upon which \$5 per share has been paid. The company operates the following works:

ROLLING MILLS—4.

Central Works, Lebanon, Lebanon county, Pa. First put in operation in January, 1883; burned and rebuilt in 1886; 9 double puddling furnaces, one gas and 6 coal heating furnaces, and 5 trains of rolls

(one 20-inch puddle, and one 8, one 10, one 12, and one 16-inch finishing); product, merchant bar iron and steel, car forgings, bolts, nuts, washers, turnbuckles, etc.; annual capacity, 50,000 gross tons. Fuel, manufactured gas and bituminous coal. (Formerly operated by the Pennsylvania Bolt and Nut Company.)

East Works, Lebanon, Lebanon county, Pa. Built in 1891, destroyed by fire in 1893, and rebuilt and put in operation the same year; 12 double puddling furnaces, 4 heating furnaces, and 3 trains of rolls (20-inch muck and 10 and 18-inch finishing); product, muck bar and merchant bar iron; annual capacity, 24,000 gross tons of refined bar iron. Fuel, bituminous coal. (Formerly operated by the East Lebanon Iron Company.)

Reading Works, Reading, Berks county, Pa. Rolling mill department established in 1870 and enlarged in 1880, 1886, and 1896; 6 heating furnaces and 3 trains of rolls (one tandem 18 and 10-inch train, one tandem 12 and 9-inch train, and one single 10-inch train); product, refined merchant bar and bolt iron; annual capacity, 35,000 to 40,000 gross tons. Fuel, bituminous coal. (Formerly called the Reading Bolt and Nut Works, (not incorporated,) and operated by J. H. Sternbergh & Son.)

West Works, Lebanon, Lebanon county, Pa. Built in 1882-3; 11 double puddling furnaces, 4 heating furnaces, and 3 trains of rolls (one 20-inch puddle, one tandem 12 and 8-inch finishing, and one 12-inch finishing); product, muck bar and refined iron; annual capacity, 15,000 gross tons of refined bar iron. Fuel, bituminous coal. (Formerly operated by the Lebanon Iron Company.)

Total annual capacity of the 4 rolling mills: 129,000 gross tons of finished rolled and forged products.

BOLT, NUT, AND RIVET WORKS—3.

Central Works, Lebanon, Pa. Product, bolts, nuts, washers, turnbuckles, car forgings, etc. (Formerly operated by the Pennsylvania Bolt and Nut Company.)

North Reading Works, Reading, Pa. Established in 1891. Product, all sizes and kinds of iron and steel bolts and nuts. (Formerly operated by the National Bolt, Nut, and Rivet Works.)

Reading Works, Reading, Pa. Established in 1865 and enlarged in 1872, 1880, and 1886; destroyed by fire February 6, 1891, and rebuilt on a larger scale in the same year; again enlarged in 1895 and in 1896; product, every variety of bolts, nuts, washers, lag screws, turnbuckles, boiler and structural rivets, cap and set screws, railway track bolts, rods, punched plates, straps, and forgings for cars, bridges, buildings, etc. Fuel, petroleum. (Formerly called the Reading Bolt and Nut Works, (not incorporated,) and operated by J. H. Sternbergh & Son.)

GALVANIZING WORKS.

The company operates a galvanizing plant at Lebanon which is connected with its Central Works, and which is equipped for galvanizing bolts, nuts, washers, turnbuckles, lag screws, rods, plates, straps, etc.

KEG FACTORY.

A new keg factory was recently completed to take the place of the old factory, which will be torn down.

TRADE MARKS.

For bolts and screws, the letter "A" stamped on heads; for highest grade of boiler rivets, the letter "S" stamped on heads; for standard grade of boiler rivets, the letter "S" in a ring stamped on heads.

READING IRON COMPANY.

Reading Iron Company; general offices, Baer Building, Reading, Pa.
Officers: George F. Baer, President; F. C. Smink, Vice-President and General Manager; George Schuhmann, General Superintendent; George B. Harris, Treasurer; and George W. Delany, Secretary.
Board of Directors: Joseph S. Harris, J. Lowber Welsh, George F. Baer, F. C. Smink, and Samuel R. Seyfert. Capital stock, \$1,000,000, all of which is common. The company operates the following works:

BLAST FURNACES—2.

Crumwold Furnace Department, Emaus, Lehigh county, Pa. 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; ores, New York and New Jersey magnetic and Lake Superior; product, foundry and forge pig iron; annual capacity, 45,000 gross tons. (Formerly called Emaus Furnace.) Destroyed by fire in July, 1901; now being rebuilt. Albert Broden, Superintendent.—*Active in 1901.*

Keystone Furnace Department, Reading, Berks county, Pa. One stack, 80 x 17, built in 1898-9 and first blown in May 1, 1899; four Mas-sicks & Crooke stoves, 75 x 19½; fuel, anthracite coal and coke; ores, Lake Superior, local hematite, and New Jersey magnetic; product, foundry and forge pig iron; annual capacity, 100,000 gross tons. Al-

bert Broden, Superintendent. (Keystone Furnace, 65 x 14½, built in 1873 and remodeled in 1886, abandoned.)—*Active in 1901.*
Total annual capacity of the 2 furnaces: 145,000 gross tons.

ROLLING MILLS—4.

Montour Rolling Mills Department, Danville, Montour county, Pa. Built in 1845 and remodeled in 1895; 21 double puddling furnaces, 12 heating furnaces, and 5 trains of rolls (one 12, one 16, and three 20-inch); product, iron and steel rails, bar iron, angle iron, iron and steel angle and plain splice bars, and grooved skelp iron; annual capacity, 60,000 gross tons. Fuel, anthracite and bituminous coal. David Thomas, Superintendent. Partly destroyed by fire in the spring of 1901; now being rebuilt.

Ninth Street Mills Department, Reading, Berks county, Pa. Built in 1868 and remodeled in 1889; 14 double puddling furnaces, 4 heating furnaces, and 2 trains of rolls (one 14-inch finishing and one 23-inch puddle, with 2 squeezers); product, skelp, socket, and bar iron; annual capacity, 25,000 gross tons. Fuel, bituminous coal. Adding a universal skelp mill with 4 gas heating furnaces, one 3-high 22-inch universal roughing train, and one 3-high 23-inch finishing train; product, to be skelp iron; estimated annual capacity, 35,000 gross tons. W. H. Lutz, Superintendent. (Formerly called the Reading Rolling Mill.)

Oley Street Mills Department, Reading, Berks county, Pa. Built in 1896-7; 12 double puddling furnaces, 2 scrap furnaces, 4 gas heating furnaces, and 2 trains of 3-high rolls (one 20-inch puddle and one 23-inch skelp); product, skelp iron; annual capacity, 35,000 gross tons. Fuel, bituminous coal. Howard H. Geiger, Superintendent.

Sheet Mill Department, Reading, Berks county, Pa. Built in 1863; 10 double puddling furnaces, 4 heating furnaces, and 3 trains of rolls; product, sheared skelp and plate iron; annual capacity, 25,000 gross tons. Fuel, bituminous coal. Thomas H. Desmond, Superintendent. Total annual capacity of the 4 rolling mills, including the building universal mill: 180,000 gross tons of finished rolled products.

TUBE DEPARTMENT.

Tube Works Department, Reading, Berks county, Pa. Built in 1856; 10 mills; product, wrought-iron pipe, boiler tubes, oil-well tubing and casing, trolley poles, and other tubular goods; sizes of pipe, from ½ of an inch to 12 inches; annual capacity, 100,000 gross tons. W. B. Williams, Superintendent.

FOUNDRY DEPARTMENT.

Scott Foundry Department, Reading, Berks county, Pa. Built in 1854. Product, all classes of rolling-mill and blast-furnace machinery, large

castings, cotton compressors, sugar mills, and all other general machinery; annual capacity, 6,000 gross tons. Jesse I. Boyer, Superintendent.

FORGE DEPARTMENT.

Steam Forge Department, Reading, Berks county, Pa. Built in 1850 and abandoned in 1901; new forge completed in 1901; one 15-ton, one 6-ton, one 5-ton, one 3-ton, and several smaller steam hammers. Product, all classes of marine, engine, and general forgings; annual capacity, 10,000 gross tons. G. F. Dale, Superintendent.

IRON-ORE MINES, COAL LANDS, AND LIMESTONE QUARRIES.

The Reading Iron Company owns the Canada, West Point, Pratt, and Ladue iron-ore mines, all located in Putnam county, New York. It also operates the Spring Quarry, in Spring township, Berks county, Pa. It also owns 7,538 acres of coal lands located at Mostollar, Somerset county, Pa., which are now in operation and are producing daily about 300 tons of bituminous coal.

LUKENS IRON AND STEEL COMPANY.

Lukens Iron and Steel Company; general offices, Coatesville, Chester county, Pa.; branch offices, Fidelity Building, Philadelphia; 29 Broadway, New York City; 8 Oliver st., Boston; Continental Trust Building, Baltimore; and 626-30 South Peters st., New Orleans. *Officers*: A. F. Huston, President; Charles L. Huston, Vice-President; Joseph Humpton, Secretary and Treasurer. *Selling Agents*: A. M. Castle & Co., Chicago; J. F. Corlett, Cleveland; Charles Neblett, Cincinnati; and Thomas Robertson & Co., Montreal, Canada. *Board of Directors*: A. F. Huston, Charles L. Huston, Benjamin Miller, Joseph Humpton, H. B. Spackman, and Howard Taggart. The company operates the following works:

ROLLING MILLS AND STEEL WORKS—1.

Lukens Iron and Steel Works, Coatesville, Chester county, Pa. Established in 1810. Puddle mill contains 6 double puddling furnaces, 1 rotary squeezer, and 1 train of muck rolls. This mill is operated by steam power. It occupies the site of the first mill which rolled boiler plates in the United States.

Three plate mills: one 3-high 48-inch universal mill, with four horizontal gas heating furnaces, electric charging and drawing crane, electric shears, etc.; plates 80 feet long, 42 inches wide, and $\frac{1}{4}$ of an

inch thick have been rolled on this mill; also plates over 100 feet long; steam, electric, hydraulic, and pneumatic power; product, all kinds of universal plates; annual capacity, 75,000 gross tons. Also one 84-inch train, with four reverberatory heating furnaces, and one 134-inch train, with 3 gas heating furnaces, (the latter having hearths 27 feet by 7 feet,) and one 3-hole gas pit furnace; both mills are equipped with shearing appliances and plate straightening machines, the latter arranged to straighten the plates after leaving the mill rolls and while red hot; product, all kinds of acid and basic open-hearth steel boiler, ship, bridge, and tank plates; also machine-flanged boiler heads and patent hydraulic-pressed boiler braces; annual capacity of the two mills, 100,000 gross tons of plates. Total annual capacity of the three plate mills, rolling direct from ingots, 175,000 gross tons.

Two open-hearth steel plants: Plant No. 1 contains two 40-gross-ton acid furnaces and four 40-gross-ton basic furnaces; first steel made early in 1892. Plant No. 2 contains six 50-gross-ton basic furnaces; first steel made April 7, 1900. Total annual capacity, 300,000 gross tons of basic and 50,000 tons of acid ingots. The plants are equipped with hydraulic and electric cranes, gas producers, and other necessary appliances.

Fuel, manufactured gas and bituminous coal.

Adding a large slabbing mill, which when completed will increase the capacity of the works about 100 per cent.

Also adding a 3-high plate mill, with rolls 38 x 140 inches, to be equipped with electric cranes, straightening rolls, 3 large shears, 2 continuous heating furnaces 9 feet wide by 40 feet long, one large pit furnace, etc.; annual capacity, 100,000 gross tons.

Total annual capacity of the rolling mills and steel works, including the building plate mill: Open-hearth steel ingots, 350,000 gross tons; rolled products, 275,000 tons.

AMERICAN STEEL CASTING COMPANY.

American Steel Casting Company; general offices, Thurlow Station, Chester, Delaware county, Pa. *Sales Offices:* Chester, Chicago, and Pittsburgh. *Officers:* Daniel Eagan, President; John A. Middleton, Vice-President; J. H. D. Eagan, Treasurer; R. C. Foster, Secretary; and S. A. Watson, General Sales Agent. *Board of Directors:* Daniel Eagan, John A. Middleton, Robert Wetherill, N. H. Larzelere, C. I. Travelli, A. C. Wall, and Frank H. Buhl. *Executive Committee:* Daniel

Eagan, John A. Middleton, and C. I. Travelli. Capital stock, \$4,200,000, of which \$2,750,000 is common and \$1,450,000 is preferred. The company operates the following works:

OPEN-HEARTH STEEL CASTING PLANTS—5.

Alliance Works, Alliance, Stark county, Ohio. Built in 1883 and since enlarged; four 15-gross-ton acid open-hearth steel furnaces; product, open-hearth steel castings; annual capacity, 36,000 gross tons. Fuel, coal. (Formerly operated by The Solid Steel Company.)

Norristown Works, Earnest Station, Norristown, Montgomery county, Pa. Built in 1890-91 and first steel made September 3, 1891; two 15-gross-ton acid open-hearth steel furnaces; product, open-hearth steel castings of every description; annual capacity, 5,400 gross tons. Fuel, manufactured gas. (Formerly operated by the Norristown Steel Company.)

Sharon Works, Sharon, Mercer county, Pa. Built in 1887 and first steel made August 26, 1887; one 20 and two 25-gross-ton acid open-hearth steel furnaces; product, open-hearth steel castings of all kinds; annual capacity, 36,000 gross tons. Fuel, producer gas. Plant damaged by fire in January, 1901; now being repaired; capacity will be considerably increased. (Formerly operated by the Sharon Steel Casting Company.)

Syracuse Works, Geddes, Onondaga county, New York. Built in 1886; open-hearth steel plant added in 1890 and enlarged in 1891; first castings made in November, 1890; burned in 1892 and rebuilt and enlarged in the same year; two 10-gross-ton Siemens acid furnaces; product, open-hearth steel castings; annual capacity, 3,000 gross tons. Fuel, manufactured gas. (Formerly operated by the Syracuse Steel Foundry Company.)

ThurLOW Works, ThurLOW, (post-office address, Chester,) Delaware county, Pa. Built in 1883-4 and first put in operation in March, 1884; enlarged in 1890 and 1893; two 12-gross-ton and two 20-gross-ton acid open-hearth steel furnaces; product, open-hearth steel castings; annual capacity, 36,000 gross tons. Fuel, coal. (Formerly operated by the Standard Steel Casting Company.)

Total annual capacity of the 5 plants: 116,400 gross tons of steel castings.

SUSQUEHANNA IRON AND STEEL COMPANY.

Susquehanna Iron and Steel Company; general offices, Columbia, Pa. Philadelphia office, Girard Building. *Officers:* Charles A. Porter, President; R. Y. Filbert, Secretary and Treasurer; and J. W. Steacy, Gen-

eral Manager. *Board of Directors:* Dr. L. S. Filbert, Charles A. Porter, H. F. Bruner, John Q. Denney, J. W. Steacy, W. S. Kimball, R. J. Houston, Percy M. Chandler, and Henry Clay. Capital stock, \$1,500,000, all preferred. The company operates the following works:

BLAST FURNACES—2.

Aurora Furnace, Wrightsville, York county, Pa. 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, native, from York, Lancaster, and Lebanon counties; product, neutral forge and foundry pig iron; annual capacity, 30,000 gross tons. Brand, "Aurora." (Formerly operated by the Steacy and Denney Company.)—*Active in 1901.*

Vesta Furnace, Vesta, Lancaster county, Pa. 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." (Formerly operated by the Columbia Rolling Mill Company.)—*Active in 1900.*

Total annual capacity of the 2 furnaces: 55,000 gross tons.

ROLLING MILLS—5.

Columbia Mill, Columbia, Lancaster county, Pa. Built in 1854 and remodeled and enlarged in 1885; 12 double puddling furnaces, 4 heating furnaces, and 4 trains of rolls; product, skelp and tube iron; annual capacity, 20,000 gross tons. Fuel, bituminous coal. Brand, "Columbia." (Formerly operated by the Columbia Rolling Mill Company.)

East End Mill, Columbia, Lancaster county, Pa. Built in 1893-4 and first put in operation in September, 1894; 3 heating furnaces, 2 double puddling furnaces, 1 rotary squeezer, and 2 trains of rolls (one 12 and one 18-inch); product, merchant bar iron and steel; annual capacity, 8,000 gross tons. Fuel, bituminous coal. Brand, "East End." (Formerly operated by the Janson Iron Company.)

Susquehanna Mill, Columbia, Lancaster county, Pa. 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, 10,000 gross tons. Fuel, bituminous coal. Brand, "Susquehanna." (Formerly called the Susquehanna Iron Works and operated by the Susquehanna Iron Company.)

Union Street Mill, Columbia, Lancaster county, Pa. 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, sock-

et iron, oval iron, etc.; annual capacity, 15,000 gross tons. Fuel, coal. Brand, "Union Street." (Formerly operated by the Columbia Iron Company.)

York Mill, York, York county, Pa. Built in 1869; 8 double puddling furnaces, 4 heating furnaces, 3 trains of rolls, (one 18, one 22, and one 26-inch,) and 2 hammers; product, plate and skelp iron; annual capacity, 10,000 gross tons. Fuel, bituminous coal. Brand, "York." (Formerly called the York Rolling Mill and operated by the Steacy and Denney Company.)

Total annual capacity of the 5 rolling mills: 63,000 gross tons of finished rolled products.

PENNSYLVANIA STEEL COMPANY OF NEW JERSEY.

Pennsylvania Steel Company of New Jersey; offices, Girard Building, Philadelphia. *Officers*: Edgar C. Felton, President; Frederick W. Wood, Vice-President; Edmund N. Smith, Treasurer; and Frank Tenney, Assistant to President and Secretary. *Directors*: Luther S. Bent, Arthur Brock, John Cassels, Evans R. Dick, George H. B. Martin, Edgar C. Felton, Francis I. Gowen, Frank W. Hunnewell, Effingham B. Morris, Edward T. Stotesbury, William D. Winsor, George Wood, and John Lowber Welsh. *Executive Committee*: Effingham B. Morris, Chairman; Edgar C. Felton, John Lowber Welsh, Luther S. Bent, and Edward T. Stotesbury.

The Pennsylvania Steel Company of New Jersey was incorporated at Trenton, New Jersey, on April 29, 1901, with an authorized capital stock of \$50,000,000. The capital stock is divided into 250,000 shares of common and 250,000 shares of preferred stock. The preferred stock is non-cumulative and is to bear 7 per cent. interest.

The company owns practically all the stock of The Pennsylvania Steel Company, whose works are at Steelton and Harrisburg, Pennsylvania, and all the stock of the Maryland Steel Company, whose works are at Sparrows Point, Maryland.

It also owns one-half the stock of The Juragua Iron Company, Limited, and all the stock of the Spanish-American Iron Company, which companies operate extensive iron-ore mines in the Province of Santiago in the Island of Cuba.

It also owns stock in the Cuban Steel Ore Company, which has recently commenced to ship iron ore from its mines in the Province of Santiago.

THE PENNSYLVANIA STEEL COMPANY.

Practically all the stock of The Pennsylvania Steel Company is owned by the Pennsylvania Steel Company of New Jersey.

The Pennsylvania Steel Company; general offices, 312-19 Girard Building, Broad and Chestnut streets, Philadelphia; branch offices, Empire Building, 71 Broadway, New York City; 70 Kilby street, Boston; Equitable Building, Baltimore; 413 Western Union Building, Chicago; and 110 Cannon st., London, E. C., England. *Officers at Philadelphia*: Edgar C. Felton, President; Frank Tenney, Assistant to President and Secretary; Edmund N. Smith, Treasurer; and H. F. Martin, General Sales Agent. *Officers at Steelton*: H. H. Campbell, Superintendent and General Manager, and John W. Dougherty, Assistant Superintendent. *Sales Agents*: Richard Peters, Jr., Philadelphia; S. W. Baldwin, New York City; Charles S. Clark, Boston; R. C. Hoffman & Co., Baltimore; the Q. & C. Company, Western Union Building, Chicago; J. G. Miller, Security Building, St. Louis; G. W. Gibbs Company, 33-39 Fremont st., San Francisco; and Sanders & Co., 110 Cannon st., London, E. C., England. Capital stock, \$6,500,000, of which \$1,500,000 is 7 per cent. non-cumulative preferred and \$5,000,000 is common. The company operates the following works:

BLAST FURNACES—7.

Lebanon Furnaces, Lebanon, Lebanon county, Pa. Two stacks: No. 1, 80 x 18, built in 1845 and rebuilt in 1868 and in 1885; No. 3, 100 x 20, built in 1872-3 and put in blast in August, 1873; rebuilt in 1900; four Massicks & Crooke and four patent 3-pass Cowper stoves; fuel, anthracite coal and coke; ore, Cornwall; product, Bessemer pig iron; total annual capacity, 130,000 gross tons. Equipped with one pig-iron casting machine. (No. 2 stack, built in 1847, dismantled. Formerly operated by B. D. and E. R. Coleman, Managers.)—*Active in 1901.*

Lochiel Furnace, Harrisburg, Dauphin county, Pa. One stack, 65 x 14, built in 1872, first put in blast in April, 1873, and remodeled in 1886; two Whitwell stoves; fuel, anthracite coal and coke; ores, foreign and domestic hematite and magnetite; product, Bessemer and low-phosphorus pig iron and spiegeleisen; annual capacity, 40,000 gross tons. Otto C. Burkhardt, Superintendent of Furnace. (Formerly owned by the Lochiel Furnace Company.)—*Active in 1901.*

Steelton Furnaces, Steelton, Dauphin county, Pa. Four stacks: No. 1, 60 x 14, built in 1872-3, put in blast in October, 1873, and remodeled in 1883; two Whitwell stoves. No. 2, 80 x 20, built in 1874-6, put

in blast in June, 1876, and remodeled in 1877; four Whitwell stoves. Nos. 3 and 4, each 70 x 18; No. 3 first put in blast in February, 1884, and No. 4 first put in blast in April, 1884; each has four Whitwell stoves. Fuel, anthracite coal and coke mixed; ores, foreign and domestic hematite and magnetite; product, Bessemer, low-phosphorus, and basic pig iron and spiegeleisen; total annual capacity, 260,000 gross tons. Equipped with one pig-iron casting machine. Otto C. Burkhardt, Superintendent of Furnaces.—*Active in 1901.*

Total annual capacity of the 7 furnaces: 430,000 gross tons.

ROLLING MILLS AND STEEL WORKS—1.

Pennsylvania Steel Works, Steelton, Dauphin county, Pa. Bessemer steel works built in 1865-7; three 10-gross-ton converters; first blow made in June, 1867; annual capacity, 300,000 gross tons of ingots; product, 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 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 3 hammers (one 1, one 4, and one 12-ton.)

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, six 50-ton furnaces added in 1893, and two 40-ton furnaces added in 1900; both acid and basic open-hearth steel are produced; plant now contains four 20 and six 50-gross-ton basic furnaces and two 6 and two 40-gross-ton acid furnaces; total annual capacity, 200,000 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. Fuel, used in all departments, producer gas and coal.

A steel foundry, to contain 2 acid open-hearth steel furnaces, (one 10 and one 20-gross-ton,) with an estimated annual capacity of 18,000 gross tons, is being added to the works.

Total annual capacity of the rolling mills and steel works: Bessemer steel ingots, 300,000 gross tons; open-hearth steel ingots, 200,000 tons; steel castings, 18,000 tons; steel rails, 180,000 tons; steel billets and slabs, 200,000 tons; other finished rolled products, 100,000 tons.

BRIDGEBUILDING WORKS.

Bridge and Construction Department, Steelton, Pa. Product, railroad and highway bridges; also erects iron and steel buildings; annual capacity, from 25,000 to 30,000 tons.

BOLT AND RIVET WORKS.

Bolt and Rivet Department, Steelton, Pa. Product, bolts and rivets for the use of the company only.

IRON-ORE MINES AND RAILROADS.

The company has also purchased the holdings in the Cornwall iron-ore banks and associated interests of the heirs of G. Dawson Coleman, of Mrs. Annie C. Rogers, and of some members of the Grubb family. The company has also acquired the interests in the Cornwall and Lebanon Railroad represented by these parties. This road is 21.66 miles long.

LIMESTONE QUARRY.

The Pennsylvania Steel Company owns and operates an extensive limestone quarry near Steelton, Pennsylvania.

MARYLAND STEEL COMPANY.

All the stock of the Maryland Steel Company is owned by the Pennsylvania Steel Company of New Jersey.

Maryland Steel Company; general offices, Sparrows Point, Maryland, and Girard Building, Philadelphia. *Officer at Sparrows Point*: F. W. Wood, President. *Officers at Philadelphia*: E. N. Smith, Secretary and Treasurer, and H. F. Martin, General Sales Agent. *Sales Offices*: Girard Building, Philadelphia; Empire Building, New York City; and 70 Kilby street, Boston. The company operates the following works:

BLAST FURNACES—4.

Maryland Steel Company, Sparrows Point, Baltimore county, Maryland. Four stacks: Furnaces A, B, C, and D, each 85 x 20; commenced building in August, 1887, and completed in 1889, 1890, and 1891. First blasts: A, October 23, 1889; B, March 11, 1890; C, October 3, 1891; and D, April 15, 1893. Each stack is equipped with four Whitwell stoves; fuel, coke from West Virginia, the mountain district of Pennsylvania, and Connellsville, Pa.; ores, hematite from Cuba, Spain, Africa, and Newfoundland; product, Bessemer pig iron and spiegeleisen; total annual capacity, 358,000 gross tons. Furnaces

are equipped with one double Heyl & Patterson pig-iron casting machine. F. P. Bassett, Furnace Superintendent.—*Active in 1901.*
Total annual capacity of the 4 furnaces: 358,000 gross tons.

ROLLING MILLS AND STEEL WORKS—1.

Maryland Steel Company, Sparrows Point, Baltimore county, Maryland. 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, 400,000 gross tons of ingots and 300,000 tons of billets and rails. Fuel, bituminous coal and petroleum. Brand, "Maryland."

Total annual capacity of the rolling mills and steel works: Bessemer steel ingots, 400,000 gross tons; rolled products, 300,000 tons.

SHIPBUILDING WORKS.

Maryland Steel Company, (Marine Department,) Sparrows Point, Maryland. Product, all kinds of steam and sailing vessels and barges; plant is equipped for the construction of vessels of the largest size, both hulls and machinery, and with launching ways, machine shops, foundry, etc., sufficient to provide for, equip, and finish at one time seven large ocean freight steamers.

COKE OVENS.

The Maryland Steel Company will build at Sparrows Point 200 coke ovens of the Otto-Hoffman type, with a daily capacity of 1,000 tons.

CAMBRIA STEEL COMPANY.

Cambria Steel Company; general offices, Harrison Building, southwest corner Fifteenth and Market streets, Philadelphia. *Officers at Philadelphia:* Powell Stackhouse, President; John W. Townsend, First Vice-President; J. Lowber Welsh, Second Vice-President; William S. Robinson, Secretary and Treasurer; and A. P. Robinson, Assistant Secretary and Assistant Treasurer. *Officers at Johnstown:* Charles S. Price, General Manager, and H. S. Endsley, Solicitor and General Agent. *Sales Offices:* New York City, H. L. Waterman, 71 Broadway; Chicago, C. J. Ellis, 209 Western Union Building; Toledo, Ohio, for rails, W. E. C. Coxe, 316 The Nasby; Cincinnati, Ohio, J. L. Adams,

Union Trust Building; Cleveland, for structural and merchant steel, The Bourne-Fuller Company, Perry-Payne Building; Atlanta, Georgia, F. I. Stone & Co., Southern Agents, Austell Building; St. Louis, for rails, E. H. Linley Supply Company, 714 North Second st.; for structural and merchant steel, H. P. Hubbell, Chemical Building; Pittsburgh, Pa., William McLain, 818 Park Building; Boston, Mass., for structural steel, H. W. Hayes & Co., 70 Kilby st.; and Baltimore, Maryland, Jameson, McKenzie & Evans, 310 North st. *Board of Directors:* Effingham B. Morris, Edward T. Stotesbury, J. Lowber Welsh, Leonard C. Hanna, Frank J. Firth, Theodore N. Ely, George F. Baer, John W. Townsend, and Powell Stackhouse. Capital stock: \$50,000,000; par value, \$50 per share; issued and full paid, 900,000 shares, aggregating \$45,000,000. The company operates the following works:

BLAST FURNACES—6.

Cambria Furnaces, Johnstown, Cambria county, Pa. Six stacks: Nos. 1, 2, 3, and 4 were built in 1853 and 1854; No. 1, 76 x 20, was rebuilt in 1883, 1895, and 1899; No. 2, 98 x 21, was rebuilt in 1883, 1891, 1896, and 1901; No. 3, 95½ x 20½, was rebuilt in 1886, 1894, and 1900; No. 4, 76 x 18, was rebuilt in 1886 and 1892; No. 5, 96 x 21, was built in 1873-6, blown in December 22, 1876, and rebuilt in 1890 and 1896-7; No. 6, 76 x 20½, was first blown in July 20, 1879, and rebuilt in 1893, 1896, and 1900. The furnaces are equipped with twenty-three Whitwell stoves. Fuel, Connellsville and Otto-Hoffman coke; ores, Menominee and Mesabi hematite and native and foreign manganiferous; product, Bessemer and basic open-hearth pig iron and spiegeleisen and ferromanganese; total annual capacity, 650,000 gross tons. Equipped with two pig-iron casting machines. (Formerly operated by the Cambria Iron Company.)—*Active in 1901.*
Total annual capacity of the 6 furnaces: 650,000 gross tons.

ROLLING MILLS AND STEEL WORKS—1.

Cambria Rolling Mills and Steel Works, Johnstown, Cambria county, Pa. 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, built in 1878-9, now contain two 20-gross-ton furnaces, (one acid and one basic,) one built in 1895 and one in 1896, and two 20-gross-ton basic Wellman furnaces built in 1897; annual capacity, 11,000 gross tons of acid ingots and 34,000 tons of basic ingots. Blooming mill contains 7 pit-hole heating furnaces, one 2-high 48-inch blooming mill, one set; one 2-high 40-inch blooming mill, one set; and one 3-high 30-inch billet, slab, and beam mill, four sets.

Rolling mills contain 9 Siemens furnaces, 26 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; one 22-inch 2-high puddle mill, two sets; and one 22-inch 2-high plate mill, two 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 9-inch mill, nine sets; one 8-inch mill, five 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. Also a cold-drawing plant, with full equipment of furnaces, shears, hammers, and special machinery.

Franklin open-hearth steel department, built in 1900-1901; six 50-gross-ton stationary furnaces (5 basic and one acid); first open-hearth steel made April 20, 1901; one 2-high 40-inch blooming mill, one set; annual capacity, 150,000 gross tons of basic ingots and 30,000 gross tons of acid ingots. Adding one 2-high 34-inch slabbing mill, one set.

Fuel used in all departments, coal and producer gas. (Formerly operated by the Cambria Iron Company.)

Total annual capacity of the rolling mills and steel works: Bessemer steel ingots, 600,000 gross tons; open-hearth steel ingots, 225,000 tons; finished steel, 300,000 gross tons of steel rails and 325,000 tons of structural shapes and merchant steel for tire, spring, toe-calk, machinery, plow steel, finger bars, harrow discs, rake teeth, etc.

CAR-AXLE WORKS.

Cambria Steel Company, Harrison Building, Philadelphia. Works at Johnstown, Pa. Product, open-hearth steel axles, annealed and tempered by the Coffin process; annual capacity, 45,000 axles.

BOLT, NUT, AND RIVET WORKS.

Cambria Steel Company, Harrison Building, Philadelphia. Works at Johnstown, Pa. Product, all sizes of iron and steel bolts, nuts, and rivets.

COAL LANDS, IRON-ORE MINES, COKE OVENS, LIMESTONE QUARRIES, ETC., ETC.

The Cambria Steel Company operates extensive coal mines in Cambria county, near Johnstown, Pennsylvania. It also operates 160 Otto-Hoffman coke ovens at Johnstown and 920 bee-hive ovens in Fayette county, Pennsylvania.

In addition the company operates works at Johnstown, Pa., for the manufacture of pitch and tarred and asphalt roofing felts. This plant is known as the North West Department.

It also owns all the stock of the Penn Iron Mining Company, oper-

ating iron-ore mines on the Menominee Range in Michigan, and one-half the stock of the Mahoning Ore and Steel Company, which operates the Mahoning Mine, on the Mesabi Range, in Minnesota.

The company also owns all the stock of the Manufacturers' Water Company, at Johnstown, Pa.

It also owns controlling interests in the Juniata Limestone Company, Limited, and the Naginey Quarry Company, Limited, both operating extensive limestone quarries in Pennsylvania.

JONES & LAUGHLINS, LIMITED.

Jones & Laughlins, Limited; general offices, Third avenue and Ross street, Pittsburgh, Pa.; branch house, Lake and Canal sts., Chicago, Illinois. *Officers*: B. F. Jones, Jr., Chairman; Willis L. King, Vice-Chairman; Irwin B. Laughlin, Treasurer; William C. Moreland, Secretary; William Larimer Jones, General Manager; and Thomas K. Laughlin, Assistant Treasurer, all at Pittsburgh. *Sales Agents*: George C. Beals, Erie County Savings Bank, Buffalo, N. Y.; G. P. Bullard & Co., 8 Oliver st., Boston, Mass.; George Kinsey, Union Trust Building, Cincinnati, Ohio; H. F. Holloway, St. Paul Building, New York City; Otis, Bonnell & Co., Cuyahoga Building, Cleveland, Ohio; Waycott-Andrews Supply Company, Washington ave. and Second st., St. Louis, Mo.; John B. Newkirk & Co., Harrison Building, Philadelphia, Pa.; and F. A. Goodrich & Co., Chamber of Commerce Building, Detroit, Mich. *Board of Managers*: B. F. Jones, Jr., Willis L. King, Irwin B. Laughlin, William C. Moreland, William Larimer Jones, James B. Laughlin, Roland Gerry, and Thomas O'C. Jones. *Advisory Board*: B. F. Jones, Henry A. Laughlin, George M. Laughlin, James Laughlin, Jr., and B. F. Jones, Jr. Capital stock, \$20,000,000. The company operates the following works:

BLAST FURNACES—5.

Eliza Furnaces, Pittsburgh, Allegheny county, Pa. Four stacks, all 100 x 22: No. 1, (formerly called No. 4,) built in 1888-9 and blown in in May, 1889; enlarged in 1893, partly dismantled in 1900, and enlarged and remodeled in 1901. No. 2, built in 1898-9 and blown in in September, 1899. No. 3, built in 1900 and blown in in January, 1901. No. 4, built in 1899-1900 and blown in in May, 1900. Twelve Siemens-Cowper stoves; fuel, coke; ore, Lake Superior; product, Bessemer pig iron; total annual capacity, 790,000 gross tons. Brand, "Eliza." Equipped with three pig-iron casting machines. Eugene L.

Messler, Furnace Superintendent. (Old No. 2 stack, 75 x 15, built in 1861, dismantled in 1898, and old No. 3 stack, 80 x 20, built in 1886-7, dismantled in 1900. Formerly operated by Laughlin & Co., Limited.)—*Active in 1901.*

Soho Furnace, Pittsburgh, Allegheny county, Pa. One stack, 80 x 19, built in 1872 and first put in blast November 22, 1872; remodeled in 1888; four improved Cowper stoves; fuel, coke; ore, Lake Superior; product, basic open-hearth and Bessemer pig iron; annual capacity, 100,000 gross tons. Brand, "Soho." A. M. Young, Furnace Superintendent. (Formerly operated by Laughlin & Co., Limited.)—*Active in 1901.*

Total annual capacity of the 5 stacks, 890,000 gross tons.

ROLLING MILLS AND STEEL WORKS—2.

American Iron and Steel Works, Pittsburgh, Allegheny county, Pa. Works in the Twenty-fourth and Twenty-fifth wards, South Side. Built in 1852; 26 heating furnaces, 21 trains of rolls, and 3 hammers. Bessemer steel works built in 1886; two 10-gross-ton converters; first blow made August 19, 1886; annual capacity, 600,000 gross tons of ingots. Open-hearth steel department added in 1895 and enlarged in 1896; one 25-gross-ton acid and six 40-gross-ton basic furnaces; first steel made September 28, 1895; annual capacity, 150,000 tons of ingots. Product, steel bars, rails, plates, sheets, structural shapes, steel billets, wire rods, railroad splice bars and bolts, boat and railroad spikes, machine and bridge bolts, chains, railroad coupling links and pins, forgings, steel castings, cold-rolled shafting, finger bars, couplings, hangers, pillow blocks, and pulleys; annual capacity, 700,000 gross tons of steel billets and blooms and 625,000 tons of finished material. Adding one 40-inch blooming mill. Connected with the works are three foundries, (two iron and one steel,) a chain factory, a bolt factory, and machine shops. Fuel, coal, natural gas, and producer gas. Brand, "American." (Works operated for many years by Jones & Laughlins, Limited.)

Soho Department, Second avenue, near Brady street, Pittsburgh, Allegheny county, Pa. Built in 1859; 1 single and 2 double heating furnaces, 3 annealing furnaces, 2 Siemens regenerative furnaces, 10 Siemens regenerative pit furnaces, 3 trains of rolls, (including a train capable of rolling plates 12 inches thick, 7 feet wide, and 15 tons in weight,) and one hammer. Steel department contains two 15-gross-ton acid open-hearth steel furnaces; first steel made November 29, 1883; annual capacity, 25,000 gross tons of ingots. Product, steel plates; annual capacity, 100,000 gross tons. Fuel, coal and natural gas. (Formerly called the Soho Iron and Steel Works and operated by Laughlin & Co., Limited.)

Total annual capacity of the 2 rolling mills and steel works: Bessemer

steel ingots, 600,000 gross tons; open-hearth ingots, 175,000 tons; steel billets and blooms, 700,000 tons; finished rolled material, including wire rods, 725,000 tons.

SPIKE, RIVET, AND BOLT FACTORY.

Product: steel structural and tank rivets, made from either Bessemer or basic open-hearth steel, with button head, counter-sunk, cone, or steeple head, various lengths, and from $\frac{1}{2}$ of an inch to 1 inch in diameter; also special low-phosphorus basic open-hearth steel boiler rivets; also all sizes of standard railroad and pit railroad spikes, and all sizes of boat, barge, and dock spikes; also round and square drift bolts; annual capacity, 8,000 gross tons.

WIRE-ROD MILL.

A rod mill was completed and put in operation in May, 1901; product, wire rods; estimated annual capacity, 100,000 gross tons.

STRUCTURAL MATERIAL FITTING SHOPS.

These shops are provided with special machines for fabricating all kinds of structural material, especially for "steel skeleton buildings." Floor framing and steel columns can be turned out rapidly. Annual capacity, 24,000 gross tons.

CHAIN FACTORY.

Product: iron and steel chains of the following grades: proof coil, B. B., B. B. B., and dredge chains; close and stud-link cable chains, railroad brake chains, switch and safety chains, agricultural chains, and conveyor, log, and binding chains; annual capacity, 10,000 gross tons.

FOUNDRIES—TWO IRON AND ONE STEEL.

Product: iron and steel castings; annual capacity, 17,500 gross tons of iron and 2,500 tons of steel castings. The castings in the two iron foundries are confined almost exclusively to large pulleys, sheaves, balance wheels, couplings, hangers, etc., which are finished in the machine shops.

COLD ROLLING AND SHAFTING DEPARTMENT.

Product: line shafting for general power transmission; also pump and piston rods, engine slides, cold-rolled angles, and special sections, together with finger bars for agricultural machine makers; annual capacity, 50,000 gross tons.

FORGE SHOP.

Product: forgings for large shafts, either straight, bossed, or with solid flanges; also housing screws, piston rods, connecting rods, etc., all made of steel; annual capacity, 3,000 gross tons.

MACHINE SHOPS.

The 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. They are designed for getting out expeditiously and in large quantities power transmission machinery of all kinds, including couplings, hangers, pillow blocks, pulleys, sheaves, balance wheels, belt tighteners, guide pulleys, binder frames, and other special devices.

IRON-ORE MINES, COAL LANDS, COKE OVENS, AND LIMESTONE QUARRIES.

The company owns in fee and leases a number of large iron-ore properties in the Mesabi and Marquette Ranges of the Lake Superior region. In addition it has several long-time contracts for iron ore in the same ranges.

The company also owns all the capital stock of the Vesta Coal Company, which owns about 6,000 acres of land in Washington county, Pa., in the fourth pool of the Monongahela river, and about 100 acres of coal land in Fayette county, Pa.

It also owns 141 completed coke ovens in Fayette county, Pa., and 840 coke ovens at Pittsburgh. In addition it is building 246 coke ovens at Pittsburgh, Pa.

The company also owns the capital stock of the Blair Limestone Company, Limited, which operates extensive limestone quarries near Hollidaysburg, Pa.

CRUCIBLE STEEL COMPANY OF AMERICA.

Crucible Steel Company of America; general offices, Empire Building, Pittsburgh. *Officers*: C. H. Halcomb, President; Benjamin Atha, First Vice-President; Robert E. Jennings, Second Vice-President; James H. Park, Third Vice-President; Charles E. Clapp, Fourth Vice-President; Reuben Miller, Treasurer; Julius Bieler, Assistant Treasurer; and Frank B. Smith, Secretary. *Directors*: James H. Park, Herbert DuPuy, Reuben Miller, C. H. Halcomb, Benjamin Atha, Robert E. Jennings, Charles E. Clapp, J. M. May, G. Bruce Harton, Frank B. Smith, L. D. York, William H. Singer, H. H. Dickey, A. W. Mellon, and Alexander Thomas. *Executive Committee*: Reuben Miller, Chairman; C. H. Halcomb, Charles E. Clapp, James H. Park, Robert E. Jennings, Benjamin Atha, and Herbert DuPuy. Capital stock, \$50,000,000, of which \$25,000,000 is 7 per cent. cumulative preferred and \$25,000,000 is common. The company operates or controls the following works:

ROLLING MILLS AND STEEL WORKS—13.

Unless otherwise stated the annual capacity of the rolling mills and steel works named below is given on double turn.

Aliquippa Steel Works, Aliquippa, Beaver county, Pa. Built in 1892 and first put in operation October 1, 1892; 8 heating furnaces, 2 welding furnaces, 3 trains of rolls, (two 18-inch and one 26-inch,) and 4 hammers (one 700-lb., one 1,500-lb., one 6-ton, and one 3,000-lb. welding); one 15-gross-ton acid open-hearth steel furnace with an annual capacity of 6,000 gross tons of ingots; 3 crucible steel-melting furnaces (one 24, one 36, and one 48-pot) with an annual capacity of 7,500 gross tons of ingots; product, special qualities of plate and sheet steel; annual capacity, 12,000 gross tons of finished products. Fuel, bituminous coal, producer gas, and natural gas. Brand, "Aliquippa." (Formerly operated by the Aliquippa Steel Company.)

Atha Steel Company, Harrison, Hudson county, New Jersey. Built in 1888-9 and put in operation in April, 1889; one 30 and two 48-pot crucible steel-melting furnaces with an annual capacity of 10,000 gross tons of ingots; 24 heating furnaces, 6 trains of rolls, (one 8, two 9, one 10, one 12, and one 16-inch,) and 19 steam hammers; product, tool, die, spring, and cutlery steel, all grades of merchant bar, wire rods in coils, and forgings; total annual capacity of rolled products, 25,000 gross tons; of forged products, 6,000 tons. Fuel, coal. (Formerly called the Harrison Works and operated by The Benjamin Atha and Illingworth Company.)

Beaver Falls Steel Works, Beaver Falls, Beaver county, Pa. 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. Fuel, coal and producer gas. Brand, "Beaver." (Formerly operated by the Beaver Falls Steel Works.)

Black Diamond Steel Works, (operated by the Park Steel Company,) Pittsburgh, Allegheny county, Pa. Built in 1862; 33 puddling furnaces, 60 heating furnaces, and 2 pipe annealing furnaces; two 24, one 30, two 42, and seven 48-pot crucible steel-melting furnaces with an annual capacity of 34,500 gross tons of ingots; eight 50-gross-ton converting or cementing furnaces with an annual capacity of 3,500 gross tons; two 18 and three 30-gross-ton acid open-hearth steel furnaces with an annual capacity of 65,000 gross tons of ingots, and one 50 and two 30-gross-ton basic open-hearth steel furnaces with an annual capacity of 36,000 tons of ingots; 21 trains of rolls, (one 9-inch, three 10-inch, one 12-inch, two 14-inch, one 16-inch, two 18-inch, one 21-inch, one 30-inch blooming, one 18-inch muck, three

20-inch sheet, one 20-inch cogging and plow slab, one 26-inch saw plate, one 32-inch boiler plate, one 24-inch hot rolling copper, and one 16-inch cold rolling copper,) and 34 hammers, (one 5-ton finishing, one 55-cwt. finishing, one 20-cwt. finishing, six 15-cwt. welding, three 15-cwt. welding, not set up, two 15-cwt. finishing, six 1,250-lb. finishing, seven 700-lb. finishing, three spring-pointing, two blister-breaking, one blacksmith, and one 400-lb. finishing, not set up.) Product, hammered and rolled crucible and open-hearth steel of every description; annual capacity, 128,000 gross tons of finished rolled and 7,600 tons of forged products. Fuel, coal and natural gas. A boiler-head flanging shop, a rake-tooth department, and a crucible factory are connected with the works. The company also operates the Lake Superior Copper Mills, which are equipped with hot rolling and cold rolling mills; annual capacity of finished copper products, 2,000 tons. (Formerly operated by Park, Brother & Co., Limited.)

Burgess Steel and Iron Works, Portsmouth, Scioto county, Ohio. Built in 1871, destroyed by fire in June, 1898, rebuilt in 1898-9, and put in operation in April, 1899; 9 gas heating furnaces, 2 annealing furnaces, one pair furnace, 6 trains of rolls, (one 8, one 12, and two 18-inch, one 20 x 48-inch, and one 24 x 65-inch,) and one 4-ton hammer. Four 30-gross-ton Swindell open-hearth steel furnaces (two acid and two basic) with an annual capacity of 60,000 gross tons of ingots. Product, plates, bars, and plow steel; annual capacity, 40,000 gross tons. Fuel, bituminous coal. (Formerly operated by the Burgess Steel and Iron Works.)

Crescent Steel Works, Forty-ninth to Fifty-first sts., Pittsburgh, Allegheny county, Pa. Built in 1865; 18 puddling furnaces, 39 heating furnaces, 7 annealing furnaces, 14 trains of rolls, (one 8, two 9, one 12, two 14, two 16, and one 18-inch hot and one 6 and four 10-inch cold,) 21 hammers, and 5 electric cranes. One 60-pot, two 36-pot, and two 24-pot crucible steel-melting furnaces with an annual capacity of 12,000 gross tons of ingots. Two 15-gross-ton special open-hearth steel furnaces with an annual capacity of 15,000 gross tons of ingots. Product, hammered and rolled bar steel, and cast, spring, and edge-tool steel; specialty, fine steel; annual capacity, 27,000 gross tons of rolled and hammered products. Adding one 6-ton steam hammer. A drill-rod shop and a wire factory are connected with the works. Fuel, bituminous coal, coke, and natural gas and producer gas. Brand, "Crescent." (Formerly operated by the Crescent Steel Company.)

Cumberland Steel and Tin Plate Works, Cumberland, Allegany county, Maryland. Built in 1873-4, rebuilt in 1884, and enlarged in 1889 and 1892; 3 forge fires, 5 heating furnaces, 5 hammers, (one 600-lb., one 1,000-lb., one 1,500-lb., one 2,500-lb., and one 10,000-lb.,) and one 26-inch roughing and one 3-high 18-inch bar mill; one 28-inch plow mill, with one 28-inch roughing, one 28-inch pinion, one 28-inch

edging, and two 26-inch finishing stands; product, all kinds of rolled and hammered tool, machinery, tire, and agricultural steel, shapes, forgings, rake teeth, crow-bars, claw-bars, etc.; annual capacity, 12,000 gross tons of rolled steel and 1,200 tons of forgings. 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. One 15-gross-ton acid open-hearth steel furnace; first steel made in 1899; annual capacity, 9,000 gross tons of ingots. A shop fully equipped for the manufacture of projectiles, crank shafts, and general machine work is connected with the works. Fuel, bituminous coal. (Formerly operated by the Cumberland Steel and Tin Plate Company.)

Howe, Brown & Co. Works, Penn ave. and Seventeenth st., Pittsburgh, Allegheny county, Pa. 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 with an annual capacity of 10,000 gross tons of ingots, 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. The open-hearth steel department has one 15-gross-ton acid furnace, built in 1886, and one 20-gross-ton acid furnace, built in 1890, with an annual capacity of 20,000 gross tons of ingots; product, spring, plow, and machinery steel, and plates for boilers, hulls of vessels, etc.; annual capacity, 7,200 gross tons of plates, 3,600 gross tons of machinery steel, 1,800 gross tons of plow steel, and 1,800 gross tons of spring steel. Fuel, coal, natural gas, and manufactured gas. Brand, "Howe." (Formerly operated by Howe, Brown & Co., Limited.)

La Belle Steel Works, Ridge ave. and Rebecca st., Allegheny, Allegheny county, Pa. Built in 1863; 19 forge fires, 28 heating furnaces, 11 Swindell gas producers, one 36-pot and two 42-pot crucible steel-melting furnaces, 15 hammers, 6 trains of rolls, (one 9, one 10, one 14, one 16, one 20, and one 24-inch,) and two 15-gross-ton acid open-hearth steel furnaces, one built in 1886 and one built in 1887; product, high-grade merchant steel of every description; also finished harrow disks, horse hay-rake teeth, springs, and vehicle axles of iron or steel; annual capacity, 15,000 gross tons of open-hearth steel ingots, 9,000 tons of crucible steel ingots, and 23,000 tons of finished products. Fuel, coal, natural gas, and manufactured gas. Brand, "La Belle." (Formerly operated by the La Belle Steel Company.)

Pittsburgh Steel Works, McKees Rocks, Allegheny county, Pa., on the 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 (60-lb. to 7-ton); two 33-pot crucible steel-melting furnaces with an annual capacity of 4,000 gross tons of ingots; first crucible steel made April 11, 1883; one 20-gross-ton acid open-hearth steel furnace completed in June, 1886, with an annual capacity of 9,000 gross tons of ingots; 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, forgings, and coil springs of all shapes and kinds; annual capacity, single turn, 6,000 gross tons of rolled and 1,500 tons of forged products. Fuel, natural gas and bituminous coal. Brands, "Keystone" for tool steel and "Diamond" for soft-centre agricultural steel. A department for the manufacture of black-smiths', miners', and other tools is connected with the works. (Formerly operated by Anderson, DuPuy & Co.)

Sanderson Brothers Steel Works, Syracuse, Onondaga county, New York. Established in 1876; 14 heating furnaces, 4 annealing furnaces, 10 hammers, 4 trains of rolls, (one 16-inch sheet, and one 9, one 10, and one 12-inch finishing,) and four 24 and four 12-pot Siemens crucible steel-melting furnaces with an annual capacity of 10,000 gross tons of ingots; product, hammered and rolled crucible steel of every description, shear steel, and sheet steel; specialty, the finest quality of tool steel; annual capacity, 7,000 gross tons. Fuel, coal. Brand, "Sanderson Bros. & Co." (Formerly operated by the Sanderson Brothers Steel Company.)

Singer, Nimick & Co. Works, in the thirty-fourth ward, Pittsburgh, Allegheny county, Pa. Built in 1848; 6 single puddling furnaces, 8 converting furnaces, 14 steam hammers, one train of muck rolls, 3 trains of bar rolls, 4 trains of sheet and plate rolls, (one 18, one 20, one 22, and one 28-inch,) one cold-rolling mill, one band mill, and one cold-drawing mill; crucible steel works have an annual capacity of 13,200 gross tons of ingots; also operate an axle factory and a harrow disc and rolling colter factory; product, tool, saw, sheet, plate, and agricultural steel; also carriage axles and cold-rolled steel; total annual capacity of rolled and forged products, 14,800 gross tons. Fuel, natural gas, manufactured gas, and coal. One idle 10-gross-ton acid open-hearth steel furnace. (Formerly operated by Singer, Nimick & Co., Incorporated.)

West Bergen Steel Works, (operated by The Spaulding and Jennings Company,) Jersey City, Hudson county, New Jersey. Telegraph address, West Bergen. Built in 1880; 20 heating furnaces, 11 annealing furnaces, 8 trains of rolls, (5 hot and 3 cold,) cold-drawing plant with several blocks and one large draw bench, 7 hammers, one 48-

pot gas and twenty-four 4-pot crucible steel-melting holes; product, crucible cast steel, bright drawn steel, and flat cold-rolled steel; also rerolls nickel steel and Bessemer and open-hearth steel billets; annual capacity, single turn, 5,200 gross tons of crucible ingots, 8,000 tons of rolled products, and 2,000 tons of forged products. Fuel, coal. Brand for tool steel, the letter "J" in a diamond.

Total annual capacity of the 13 rolling mills and steel works: Open-hearth steel ingots, 235,000 gross tons; crucible and cemented steel ingots, 122,900 tons; and finished rolled and forged iron and steel products, 350,500 tons. The company can also produce annually about 2,000 tons of finished copper products.

ST. CLAIR FURNACE COMPANY.

The St. Clair Furnace Company is erecting three modern blast furnaces at Clairton, in Allegheny county, Pa., on the Monongahela river, about 20 miles above Pittsburgh. The furnaces will probably be 90 x 20, will each be equipped with four Massicks & Crooke hot-blast stoves, will use coke for fuel, and will each have a daily capacity of about 500 tons of Bessemer and low-phosphorus pig iron. Ground for the furnaces was broken in June, 1901; they will probably be ready for blast in the summer of 1902.

Office: Empire Building, Pittsburgh. *Officers:* C. H. Halcomb, President; James H. Park, Vice-President; John A. Sutton, Secretary; Reuben Miller, Treasurer; and G. G. Thorp, General Superintendent. *Directors:* C. H. Halcomb, James H. Park, Reuben Miller, Robert E. Jennings, and H. N. Babcock. Nearly all the stock of the St. Clair Furnace Company is owned by the Crucible Steel Company of America.

ST. CLAIR STEEL COMPANY.

The St. Clair Steel Company commenced the erection in May, 1901, of a plant at Clairton, in Allegheny county, Pa., on the Monongahela river, about 20 miles above Pittsburgh. It will contain twelve 50-gross-ton open-hearth steel furnaces, a blooming mill, and the necessary finishing trains of rolls; estimated annual capacity, 300,000 to 350,000 gross tons of acid and basic ingots. Works will probably be completed in the spring of 1902.

Office: Empire Building, Pittsburgh. *Officers:* C. H. Halcomb, President; James H. Park, Vice-President; John A. Sutton, Secretary; Reuben Miller, Treasurer; and G. G. Thorp, General Superintendent. *Directors:* C. H. Halcomb, James H. Park, Reuben Miller, Benjamin Atha, and H. N. Babcock. Nearly all the stock of the St. Clair Steel Company is owned by the Crucible Steel Company of America.

STANDARD CHAIN COMPANY.

Standard Chain Company; general offices, First National Bank Building, Pittsburgh, Pa. *Officers*: John C. Schmidt, President, Pittsburgh; A. S. White, Vice-President, New York; J. T. Davis, General Manager, Robert Garland, Secretary and General Sales Agent, and Robert Rigney, Treasurer, Pittsburgh; Franz Krein, Assistant General Manager, Western District, St. Marys, Ohio. *Board of Directors*: John C. Schmidt, James T. Davis, Robert Garland, Chas. H. Hayden, Franz Krein, Eli Attwood, Peter Wertz, A. S. White, Robert Rigney, Charles A. Painter, F. F. Culver, Henry W. Oliver, and Oscar L. Gubleman. *Executive Committee*: John C. Schmidt, A. S. White, Chas. H. Hayden, James T. Davis, and Robert Garland. Capital stock, \$3,000,000, of which \$1,500,000 is preferred and \$1,500,000 is common. The company operates or controls the following works:

ROLLING MILLS—1.

Columbus Iron Works, Columbus, Franklin county, Ohio. 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, 25,000 gross tons. Fuel, coal, producer gas, and oil gas. R. R. Turner, Superintendent. (Formerly operated by The P. Hayden Saddlery Hardware Company.)

Annual capacity: 25,000 gross tons of rolled products.

CHAIN WORKS—9.

Carlisle Chain Works, Gettysburg Junction, Pa. Product, coil, cable, and other chains; also trace and fancy chains, sizes, from $\frac{1}{2}$ of an inch to $1\frac{1}{4}$ inches. (Formerly operated by Bower & Mallery.)

Krein Chain Works, Marion, Indiana. Product, oil-welded, proof-tested coil, log, boom, dredge, and other chains; sizes, from $\frac{1}{4}$ of an inch to $1\frac{3}{4}$ inches. (Formerly operated by The Franz Krein Chain Company; later by the Franz Krein Manufacturing Company.)

Krein Chain Works, St. Marys, Ohio. Product, coil, trace, and fancy chains; also German coil chains; sizes, from $\frac{1}{2}$ of an inch to 1 inch. (Formerly operated by the Franz Krein Chain Company.)

Lebanon Chain Works, Lebanon, Pa. Product, hand-made iron cable, crane, dredging, and other chains; sizes, from $\frac{1}{2}$ of an inch to 4 inches. (Operated as the Lebanon Chain Works.)

Nes Chain Works, York, Pa. Product, all kinds of welded chains;

sizes, from No. 10 Stubb's wire gauge to 1-inch cable. (Formerly operated by the Nes Chain Manufacturing Company.)

P. Hayden Saddlery Hardware Company's Chain Works Department, Columbus, Ohio. Product, coil, trace, stud, and other chains; sizes, from $\frac{1}{8}$ of an inch to $2\frac{1}{2}$ inches. (Formerly operated by The P. Hayden Saddlery Hardware Company.)

South Harrisburg Chain Works, South Harrisburg, Pa. Plant located at Riverton. Product, coil, trace, and other chains; sizes, from $\frac{1}{8}$ of an inch to $1\frac{1}{2}$ inches. (Formerly operated by the South Harrisburg Chain Works Company.)

Standard Chain Company, Braddock, Pa. Product, coil, cable, wagon, conveyor, hand-made, and shackle chains; sizes, from $\frac{1}{8}$ of an inch to $2\frac{1}{2}$ inches. (Formerly operated by the Baker Chain and Wagon Iron Manufacturing Company, of Allegheny, Pa.)

The chain department and good will of the American Steel and Wire Company of Illinois, formerly operated as the H. P. Nail Works, at Cleveland, Ohio, and the Garland Chain Works, formerly operated by the Garland Chain Company, at Rankin Station, Pa., are now consolidated at the Standard Chain Company's plant at Braddock, Pa.

York Chain Works, York, Pa. Product, coil, cable, trace, and other chains; sizes, from No. 8 wire to 1-inch cable. (Formerly operated by John C. Schmidt & Co.)

PRESSED STEEL CAR COMPANY.

Pressed Steel Car Company; general offices, Tradesmens Building, Pittsburgh, Pa. Branch offices, New York, Chicago, and Philadelphia. *Officer at Philadelphia:* C. T. Schoen, Chairman of Board of Directors. *Officers at Pittsburgh:* F. N. Hoffstot, President; W. H. Schoen, First Vice-President; J. W. Friend, Second Vice-President; A. R. Fraser, Secretary and Treasurer; C. E. Postlethwaite, Assistant Secretary; H. J. Gearhart, Auditor; and J. M. Hansen, Chief Engineer. *Officers at Allegheny:* G. E. Macklin, General Manager, and E. E. Forgeus, Purchasing Agent. *Sales Agents:* J. B. Brady, General Sales Agent, 71 Broadway, New York, and W. O. Jacquette, District Manager, Fisher Building, Chicago; Foreign Sales Agent, Transportation Development Company, F. H. Rapley, Resident Engineer, 6 Clements Lane, Lombard st., London, E. C., England. *Board of Directors:* C. T. Schoen, Philadelphia; E. Hawley, New York; W. H. Schoen, E. A. Schoen, F. N. Hoffstot, H. W. Oliver, A. R. Fraser, and J. W. Friend, Pittsburgh; and A. H. Larkin, Jersey City, N. J. Capital stock, \$25,000,000, of which \$12,500,000 is 7 per cent. non-cumulative preferred and \$12,500,000 is common. The company operates the following plants:

PLANTS—4.

Joliet Plant, Joliet, Illinois. Product, steel freight-car trucks, engine-tender trucks, freight-car bolsters, centre plates, etc. (Formerly operated by the Fox Pressed Steel Equipment Company.)

McCandless Avenue Plant, Pittsburgh, Pa. Product, steel freight-car trucks, engine-tender trucks, freight-car bolsters, centre plates, etc. (Formerly operated by the Fox Pressed Steel Equipment Company.)

McKees Rocks Plant, McKees Rocks, Pa. Product, steel and wooden freight cars, trucks, etc. (Built by the Pressed Steel Car Company.)

Wood's Run Plant, Allegheny, Pa. Product, steel freight cars, trucks, etc. (Formerly operated by the Schoen Pressed Steel Company.)

Total annual capacity of the 4 plants: Steel and wooden cars, 35,000; truck frames, 120,000; bolsters, 250,000; centre plates, 18,150.

THE SHARON STEEL COMPANY.

The Sharon Steel Company; general offices, Sharon, Pa. *Officers:* George W. Darr, President; John Stevenson, Jr., Vice-President and General Manager; V. M. Delamater, Secretary; David Adams, Treasurer; N. McConnell, General Superintendent; and J. P. Whitla, Sales Agent. *Board of Directors:* George W. Darr, John Stevenson, Jr., F. H. Buhl, William Flinn, George H. Flinn, N. McConnell, J. P. Whitla, David Adams, and John Fahnlane. Capital stock, \$5,000,000. The company operates the following works:

BLAST FURNACES—1 COMPLETED AND 1 PROJECTED.

Sharon (The) Steel Company, Sharon, Mercer county, Pa. One stack, 100 x 22, built in 1900-1901 and blown in in September, 1901; four Kennedy-Cowper stoves, 22 x 100; fuel, coke; ore, Lake Superior; product, basic pig iron; annual capacity, 200,000 gross tons. An additional furnace is projected.

Annual capacity: 200,000 gross tons.

ROLLING MILLS AND STEEL WORKS—1.

Sharon (The) Steel Company, Sharon, Mercer county, Pa. Built in 1900-1901 and first put in operation in May, 1901; 4 continuous heating furnaces, 4 soaking pits, 5 trains of rolls, (one blooming, 2 bar, and 2 rod,) 200 wire-drawing blocks, and 200 wire-nail machines. Eight 50-gross-ton basic open-hearth steel furnaces with an annual capacity of 300,000 gross tons of ingots; first steel made April 30, 1901; five additional 50-gross-ton furnaces are being built. Product, open-hearth

steel billets, tinplate bars, sheet bars, slabs, blooms, skelp, wire rods, wire, and wire nails; annual capacity, 300,000 gross tons of rolled products, 75,000 tons of wire, and 1,000,000 kegs of wire nails. Fuel, producer gas and coal.

Total annual capacity of the rolling mills and steel works: Open-hearth steel ingots, 300,000 gross tons; rolled products, 300,000 tons; wire, 75,000 tons; and wire nails, 1,000,000 kegs.

WIRE-ROD MILL.

The wire-rod mill contains two trains of rolls, and has an annual capacity of 125,000 gross tons of rods.

WIRE-DRAWING PLANT.

The wire-drawing plant contains 200 wire-drawing blocks; sizes of wire drawn, from $\frac{1}{2}$ of an inch to No. 22 gauge; product, plain wire, barbed wire, galvanized staples, etc.; annual capacity, 75,000 gross tons of wire.

WIRE-NAIL PLANT.

The wire-nail plant is equipped with 200 wire-nail machines, produces all sizes of nails, and has an annual capacity of 1,000,000 kegs. Additional machines will be added.

WROUGHT-PIPE PLANT.

A plant for the manufacture of wrought pipe is now being erected. Steel pipe only will be made at first, although iron pipe may be made later on. The annual capacity of this department will be 120,000 gross tons. The plant will probably be completed and in operation in February, 1902.

GALVANIZING AND SOCKET DEPARTMENTS.

Galvanizing and socket departments will be connected with the wrought-pipe plant.

THE BUFFALO UNION FURNACE COMPANY.

The Buffalo Union Furnace Company; general offices, Buffalo, New York; branch office, Cleveland, Ohio. *Officers:* D. R. Hanna, President; F. B. Baird, Vice-President; C. A. Collins, Secretary; C. C. Bolton, Treasurer; F. B. Richards, General Manager; and F. E. Bachman, General Superintendent. *Selling Agents:* M. A. Hanna & Co., Cleveland, Ohio. *Board of Directors:* D. R. Hanna, F. B. Baird, C. C. Bolton, F. B. Richards, H. J. Pierce, H. P. Bissell, and C. A. Col-

lins. *Executive Committee*: D. R. Hanna, C. C. Bolton, and F. B. Richards. Capital stock, \$1,200,000, of which \$200,000 is 7 per cent. cumulative preferred and \$1,000,000 is common. The company operates the following works:

BLAST FURNACES—1 CHARCOAL AND 2 COKE STACKS.

- A Furnace, Buffalo, Erie county, New York. One stack, 80 x 18, built in 1892 and first blown in February 25, 1893; one 2-pass Kennedy and three Cowper-Kennedy stoves; fuel, Walston or Connellsville coke; ore, Lake Superior hematite; product, foundry, Bessemer, basic, and malleable pig iron; annual capacity, 80,000 gross tons. Brand, "Buffalo." (Formerly called the Buffalo Furnace and operated by the Buffalo Furnace Company.)—*Active in 1901.*
- B Furnace, Buffalo, Erie county, New York. One stack, 76 x 17, built in 1897-8 and first blown in August 12, 1899; four 75 x 20 Hartman stoves; fuel, Walston or Connellsville coke; ore, Lake Superior; product, foundry, Bessemer, basic, and malleable pig iron; annual capacity, 80,000 gross tons. Brand, "Buffalo." (Formerly called the Union Iron Works.)—*Active in 1901.*
- C Furnace, Buffalo, Erie county, New York. One stack, 60 x 15, built in 1899-1900 and blown in June 18, 1901; three hot-blast stoves; fuel, charcoal; ore, Lake Superior; product, car-wheel, malleable, and low-phosphorus pig iron; annual capacity, 40,000 gross tons. Brand, "Buffalo charcoal."—*Active in 1901.*
- Total annual capacity of the 3 furnaces: 160,000 gross tons of coke pig iron and 40,000 tons of charcoal pig iron.

WHEELING STEEL AND IRON COMPANY.

Wheeling Steel and Iron Company; general offices, Wheeling, Ohio county, West Virginia. *Officers*: C. R. Hubbard, President; Frank W. Bowers, Secretary; W. H. Higgins, Assistant Secretary and Treasurer; and H. G. Tinker, General Sales Agent. The company operates the following works:

BLAST FURNACES—3.

- Belmont Furnace, Wheeling, Ohio county, West Virginia. One stack, 70 x 16, built in 1874 and blown in September 4, 1875; remodeled in 1893; three Gordon fire-brick stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 75,000 gross tons. Brand, "Belmont."—*Active in 1901.*
- Martins Ferry Furnace, Martins Ferry, Belmont county, Ohio. One

stack, 60 x 14, built in 1866; three iron stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 40,000 gross tons. Brand, "Martins Ferry."—*Active in 1901.*

Top Mill Furnace, Wheeling, Ohio county, West Virginia. One stack, 80 x 18, built in 1873-4 and blown in October 3, 1878; remodeled in 1888 and rebuilt in 1894; three Massicks & Crooke stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 100,000 gross tons. Brand, "Top Mill."—*Active in 1901.*
Total annual capacity of the 3 furnaces: 215,000 gross tons.

ROLLING MILLS AND STEEL WORKS—4.

Belmont Works, Wheeling, Ohio county, West Virginia. Built in 1849; 3 regenerative gas heating furnaces, 2 continuous and 3 direct heating furnaces, 4 forge fires, 3 trains of rolls, and 50 cut-nail machines; product, grooved skelp and nails, made from soft steel slabs; annual capacity, 120,000 gross tons of skelp and 120,000 kegs of cut nails. Fuel, bituminous coal and natural gas. Brand, "Belmont." (Formerly operated by the Belmont Nail Company.)

Benwood Works, Benwood, Marshall county, West Virginia. Built in 1852, burned in 1876, and rebuilt in 1876-7; 30 single puddling furnaces, 3 gas heating furnaces, and 2 trains of rolls (one muck and one 3-high skelp); product, muck bar and iron and steel skelp; annual capacity, 21,000 gross tons of muck bar and 45,000 tons of skelp. Fuel, bituminous coal. (Formerly called the Benwood Iron Works. Cut-nail factory, containing 130 machines, dismantled.)

Top Mill, Wheeling, Ohio county, West Virginia. 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, 8,000 gross tons of sheets and 300,000 kegs of nails and spikes. Fuel, bituminous coal and natural gas. Brand, "Top Mill." (Formerly operated by the Wheeling Iron and Nail Company.)

Wheeling Steel Works, Benwood, Marshall county, West Virginia. Bessemer steel works built in 1885-6; first blow made August 12, 1886; two 6-gross-ton Bessemer converters with an annual capacity of 190,000 gross tons of ingots; 2 soaking pits and one 2-high 36-inch blooming mill; product, steel nail slabs, billets, and blooms; annual capacity, 180,000 gross tons of slabs, billets, and blooms. Fuel, coal and natural gas. Brand, "W. S. W."

Total annual capacity of the 4 rolling mills and steel works: Bessemer steel ingots, 190,000 gross tons; slabs, billets, and blooms, 180,000 tons; skelp and sheets, 173,000 tons; muck bar, 21,000 tons; and cut nails, 420,000 kegs.

TUBE MILL—1 BUILDING.

The company is erecting a mill at Benwood for the manufacture of iron and steel tubes; sizes to be made, from $\frac{1}{4}$ of an inch to 16 inches; estimated annual capacity, 75,000 gross tons. Expects to have the works completed in the latter part of 1901.

LIMESTONE QUARRIES AND COAL LANDS.

The Wheeling Steel and Iron Company owns a one-third interest in the Bessemer Limestone Company, of Youngstown, Ohio. It also owns 500 acres of coal lands near Benwood and Wheeling, in West Virginia.

THE AMERICAN SHIP BUILDING COMPANY.

The American Ship Building Company; general offices, 120 Viaduct, Cleveland, Ohio. *Officer at Chicago*: W. L. Brown, President, Rookery Building. *Officers at Cleveland*: Robert L. Ireland, Vice-President; James C. Wallace, General Manager; and R. C. Wetmore, Secretary and Treasurer. *Board of Directors*: W. L. Brown, H. H. Porter, Jr., Robert Wallace, James C. Wallace, H. M. Hanna, L. C. Hanna, Robert L. Ireland, Luther Allen, L. M. Bowers, J. A. McGean, A. B. Wolvin, Andrew M. Joys, A. McVittie, William C. McMillan, and W. T. Coleman Carpenter. *Executive Committee*: W. L. Brown, A. McVittie, James C. Wallace, Robert L. Ireland, Luther Allen, L. M. Bowers, and A. B. Wolvin. Authorized capital stock, \$30,000,000; stock issued, \$15,500,000, of which \$7,900,000 is non-cumulative 7 per cent. preferred and \$7,600,000 is common. The company owns or controls the following yards:

SHIPBUILDING YARDS AND DRY DOCKS—10 ESTABLISHMENTS.

American Steel Barge Works, (owned and operated by the Superior Ship Building Company,) West Superior, Wisconsin. Building yards, dry docks, and repair shops. Product, all kinds of vessels. (Formerly operated by the American Steel Barge Company.)
Buffalo Dry Docks, (owned and operated by the Buffalo Dry Dock Company,) Buffalo, New York. One shipbuilding plant and four dry docks and repair shops. Product, steel and wooden vessels; marine repairing of all kinds. (Two dry docks were formerly operated by the Buffalo Dry Dock Company, and a shipbuilding yard and two dry docks were formerly operated by The Union Dry Dock Company.)
Chicago Yards, (owned and operated by the Chicago Ship Building Company,) South Chicago, Illinois. Building yards, dry docks, and repair shops. Product, all kinds of vessels.

- Detroit Yards, (owned and operated by the Detroit Ship Building Company,) Detroit, Michigan. Dry docks and repair shops. Product, steel and wooden lake vessels and steamers. (Formerly operated by the Detroit Dry Dock Company and Dry Dock Engine Works.)
- Globe Yards, (owned and operated by The American Ship Building Company,) West Centre and Spruce sts., Cleveland, Ohio. Building yards and repair shops. Product, passenger and freight steamships, barges, yachts, tugs, light-house tenders, revenue cutters, etc. (Formerly operated by The Globe Iron Works Company.)
- Lorain Yards, (owned and operated by The American Ship Building Company,) Lorain, Ohio. Building yards, dry docks, and repair shops. Product, all kinds of lake vessels and steamers. (Formerly operated by The Cleveland Ship Building Company.)
- Milwaukee Dry Dock Yards, (owned and operated by the Milwaukee Dry Dock Company,) Milwaukee, Wis. Dry docks and repair shops.
- Ship Owners' Dry Docks, (owned and operated by the American Ship Building Company,) Cleveland, Ohio. Dry dock and repair shops. (Formerly operated by the Ship Owners' Dry Dock Company.)
- Wheeler's Ship Yard, (owned and operated by the West Bay City Ship Building Company,) West Bay City, Michigan. Building yards and repair shops. Product, all kinds of metallic vessels. (Formerly operated by F. W. Wheeler & Co.)
- Wyandotte Yards, (owned and operated by the Detroit Ship Building Company,) Wyandotte, Michigan. Building yards and repair shops. Product, steel and wooden lake vessels and steamers. (Formerly operated by the Detroit Dry Dock Company and Dry Dock Engine Works.)
-

THE COLORADO FUEL AND IRON COMPANY.

The Colorado Fuel and Iron Company; general offices, Boston Building, Denver, Colorado; branch office, Empire Building, New York City. *Sales Offices:* Denver, Col.; El Paso, Texas; Los Angeles and San Francisco, Cal.; and Salt Lake City, Utah. *Officers at Denver:* John C. Osgood, Chairman of the Board of Directors; J. A. Kebler, President; A. C. Cass, 1st Vice-President; Dennis Sullivan, 2d Vice-President; John L. Jerome, Treasurer; A. D. Moss, Assistant Treasurer; D. C. Beaman, General Counsel and Secretary; Cass E. Herrington, General Attorney, Land Department; Fred Herrington, General Attorney, Operating Department; S. I. Heyn, Assistant Secretary; J. F. Welborn, General Sales Agent; John T. Kebler, General Manager of Fuel Department; C. S. Robinson, General Manager of Iron De-

partment; J. A. Writer, Auditor; and S. G. Pierson, Purchasing Agent. *Officers at New York:* J. E. Heimerdinger, 3d Vice-President, and C. E. Phelps, Assistant Secretary and Assistant Treasurer. *Board of Directors:* John C. Osgood, of Redstone, Colorado; Dennis Sullivan, James B. Grant, W. H. James, J. A. Kebler, A. C. Cass, John L. Jerome, and D. C. Beaman, all of Denver, Colorado; James A. Blair and J. E. Heimerdinger, of New York City; and John J. Mitchell, John W. Gates, and John Lambert, of Chicago, Illinois. Capital stock authorized, \$40,000,000. A meeting of the stockholders of the company on July 13, 1901, authorized an issue of \$15,000,000 of convertible 5 per cent. debenture bonds, of which \$10,000,000 will be immediately issued. The company operates or controls the following works:

BLAST FURNACES—3 COMPLETED, 2 BUILDING, AND 2 PROJECTED.

Minnequa Furnaces, Pueblo, Pueblo county, Colorado. Three completed stacks and two building: Furnace C, 75 x 17, built in 1880-1, blown in September 7, 1881, and rebuilt and modernized in 1893; Furnace B, 75 x 17½, built in 1890-1 and remodeled, capacity increased, and new stove added in 1901; and Furnace A, 95 x 21, built in 1900-1 and blown in September 4, 1901; thirteen Siemens-Cowper-Cochrane stoves; fuel, coke, produced at the company's ovens at Sopris and El Moro; ores, limonite, hematite, and magnetite from the company's mines in Colorado, Wyoming, and New Mexico; product, Bessemer, foundry, Scotch, and mill pig iron, and spiegeleisen; total annual capacity, 306,000 gross tons. Building two furnaces, D and E, to be 95 x 21, and to be ready for blast in 1902; total annual capacity, 292,000 tons. (One furnace, 75 x 17, built in 1887, dismantled in 1899.) Two additional furnaces, 95 x 21, may be added.—*Active in 1901.*

Total annual capacity of the 3 completed furnaces: 306,000 gross tons; of the 2 building furnaces, 292,000 tons.

ROLLING MILLS AND STEEL WORKS—2.

Minnequa Rolling Mills and Steel Works, Pueblo, Pueblo county, Colorado. Built in 1881-2 and extensive improvements made in the years 1889, 1891, and 1893; Bessemer converting department made its first blow April 11, 1882; two 5-gross-ton converters with an annual capacity of 250,000 gross tons of ingots; 3 pig iron and 2 spiegel melting cupolas, 4 gas-fired soaking pits, 2 Siemens bloom-heating furnaces, 6 scrap heating furnaces, one 2-high 36-inch reversing blooming train, one 3-high 28-inch roughing train, one 3-high 26-inch finishing train, one 30 x 78-inch plate train, 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, tank plate, structural shapes, railroad spikes, and

nuts and bolts; annual capacity, 200,000 gross tons of steel rails, 30,000 tons of tank plate, 50,000 tons of structural shapes, 50,000 tons of bar iron and steel, mine rails, and angle bars, and 120,000 kegs of railroad spikes, bolts, nuts, and rivets. Also operate a cast-iron pipe foundry with an annual capacity of 18,000 gross tons. Fuel, coal and producer gas. Rail mill remodeled and plate and structural mill added in 1897. New Bessemer steel converting department now being built, to be completed in the spring of 1902 and to embrace two 15-gross-ton converters with an annual capacity of 600,000 gross tons of ingots. Also making additions to rail mill, which, when completed, will increase the rail capacity to 500,000 tons. Also building works for the manufacture of open-hearth steel, black plates, tinplates, hoops, cotton-ties, wire rods, wire, wire nails, galvanized wire, etc. J. B. McKennan, General Superintendent, and R. H. Lee, Assistant General Superintendent.

Laramie Rolling Mills, (operated by The Laramie Iron and Steel Company,) Laramie, Albany county, Wyoming. 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 4 spike machines; 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, 30,000 gross tons of rolled products, 1,000 tons of forged products, and 90,000 kegs of bolts, nuts, and spikes, (200 pounds to the keg.) Fuel, coal. C. S. Robinson, President, D. C. Beaman, Vice-President, and J. L. Jerome, Secretary and Treasurer, Denver, Colorado; and A. E. Jupp, Superintendent, Laramie. The heating furnaces are being rebuilt and modernized. (The stock of the Laramie Iron and Steel Company is owned by the Colorado Fuel and Iron Company.)

Total annual capacity of the 2 rolling mills and steel works: Bessemer steel ingots, 250,000 gross tons; steel rails, 200,000 tons; tank plate, 30,000 tons; structural shapes, 50,000 tons; other rolled and forged products, 81,000 tons; and railroad spikes, bolts, and nuts, 210,000 kegs.

BOLT, NUT, RIVET, AND SPIKE WORKS—2.

Minnequa Works, Pueblo, Pueblo county, Colorado. Product, iron and steel bolts, nuts, and rivets. Sizes and kinds: machine bolts, from $\frac{1}{4}$ of an inch to 1 inch, and all sizes for bridge work and pipe bands; nuts, square and hexagon, from $\frac{1}{2}$ of an inch to $1\frac{1}{2}$ inches, all standards; rivets, from $\frac{1}{2}$ of an inch to $1\frac{1}{2}$ inches, with button, cone, or countersunk heads. Also produce railroad spikes. Annual capacity, included in the general description of these works, 120,000 kegs of bolts, spikes, nuts, etc.

Laramie Works, (operated by The Laramie Iron and Steel Company,) Laramie, Wyoming. Product, iron bolts and nuts. Sizes: bolts, from

$\frac{1}{2}$ of an inch to 1 inch in diameter; nuts, square and hexagon, to fit bolts from $\frac{1}{2}$ of an inch to 1 inch in diameter. Also produce railroad spikes. Annual capacity, included in the general description of these works, 90,000 kegs of bolts, nuts, and spikes.

Total annual capacity of the 2 works: 210,000 kegs of bolts, nuts, rivets, and spikes.

IRON, BRASS, AND STEEL CASTINGS.

Minnequa Works, Pueblo, Colorado. Product, iron and brass castings; annual capacity, 15,000 gross tons of iron and 100 tons of brass castings. Also produce Bessemer steel castings.

CAST-IRON PIPE WORKS.

Minnequa Works, Pueblo, Colorado. Product, cast-iron gas and water pipe; sizes, from 3 to 20 inches; daily melting capacity, 60 gross tons.

RAILROADS AND IRON-ORE MINES.

The Colorado Fuel and Iron Company owns the Crystal River Railroad, which operates 21 miles of standard and 12 miles of narrow-gauge track in Garfield and Pitkin counties, Colorado, connecting with the Denver and Rio Grande Railroad at Carbondale, Colorado; it also owns the Colorado and Wyoming Railway, which operates 16 miles of standard-gauge track in Laramie county, Wyoming, connecting with the Colorado and Southern Railway at Hartville Junction, Wyoming. It is also building 21 miles of railroad to the new coal fields in Las Animas county, Colorado. This road will connect with the Atchison, Topeka, and Santa Fé Railway at Jansen, Colorado, and with the Denver and Rio Grande Railroad and the Colorado and Southern Railway at Sopris, Colorado.

The company also owns and operates iron-ore mines at Orient, Colorado, Sunrise, Wyoming, and Fierro, New Mexico; also other iron-ore properties in Colorado, New Mexico, Utah, and California.

COAL LANDS, COKE OVENS, AND LIMESTONE QUARRIES.

It also owns approximately 300,000 acres of coal lands at Sopris, Engle, Berwind, Rouse, Walsen, Robinson, Pictou, Starkville, Coal Creek, Fremont, Rockvale, Brookside, Crested Butte, Anthracite, Floresta, Gulch, Sunlight, Placita, Coalbasin, Tabasco, Primero, and other points in Colorado, and at Los Cerrillos, Gallup, Catalpa, and Weaver in New Mexico.

In addition it owns and operates 1,214 coke ovens at Sopris, Starkville, El Moro, Crested Butte, Cardiff, and Redstone, all in Colorado, and at Waldo in New Mexico. Nine hundred new coke ovens are now being built.

The company also operates large limestone quarries at Lime, Colorado.

VIRGINIA IRON, COAL, AND COKE COMPANY.

Virginia Iron, Coal, and Coke Company; general offices, Bristol, Tennessee. *Officers at Bristol*: Archer A. Phlegar, Receiver; G. B. Schley, President; James L. Brass, General Manager; W. R. Wills, Secretary and Treasurer; D. Davies, Auditor; F. M. Eaton, Sales Agent; and John Warwick, Purchasing Agent. *Officers at New York*: Henry K. McHarg, Receiver and Vice-President, 40 Wall street, and C. L. E. De Gaugue, Assistant Secretary, 80 Broadway. *Selling Agents*: For coke pig iron—Crocker Brothers, New York; N. S. Bartlett & Co., Boston, Mass.; the Domhoff and Joyce Company, Cincinnati, Ohio; and Hickman, Williams & Co., Chicago, Ill., and Louisville, Kentucky. For charcoal pig iron—R. C. Hoffman & Co., Baltimore, Md. *Board of Directors*: George L. Carter, H. K. McHarg, George A. Crocker, Charles B. Squire, Grant B. Schley, E. J. Berwind, and W. B. Dickerman. *Executive Committee*: Grant B. Schley, E. J. Berwind, and Charles B. Squire. Capital stock authorized, \$10,000,000; outstanding, \$8,425,000. Bonded debt outstanding, \$8,425,000 of first mortgage 5 per cent. fifty year gold bonds. The company operates the following works:

BLAST FURNACES—1 CHARCOAL AND 12 COKE STACKS.

Bristol Furnace, Bristol, Tenn. Furnace built on the Virginia side of the State line, in Washington county. One stack, 75 x 18, built in 1890-1; first iron made October 24, 1891; one 2-pass and three Whitwell stoves; fuel, Tom's Creek and Stonega coke; ores, Ducktown and Doe Mountain brown; product, foundry and forge pig iron; annual capacity, 60,000 gross tons. Brand, "Bristol." Joseph Duane, Superintendent. (Formerly operated by the Bristol Furnace Company; later by the Home Iron Company.)—*Active in 1901.*

Buena Vista Furnace, Buena Vista, Rockbridge county, Virginia. One stack, 70 x 16½, built in 1889-90 and blown in December 12, 1890; three Whitwell stoves; fuel, Pocahontas coke; ore, Oriskany; product, foundry and chill-cast basic pig iron; annual capacity, 54,000 gross tons. Brand, "Buena Vista." P. Johnson, Superintendent. (Formerly operated by the Alleghany Iron Company.)—*Active in 1901.*

Carnegie Furnace, Johnson City, Washington county, Tennessee. One stack, 74½ x 17½, partly erected by the Carnegie Iron Company; work suspended in 1892; stack completed in 1898 by the Carnegie Furnace Company and blown in January 2, 1899; three Whitwell stoves, each 65 x 18; fuel, Looney Creek or Stonega coke; ore, Cranberry; product, low-phosphorus and Bessemer pig iron; annual ca-

capacity, 43,000 gross tons. Brand, "Carnegie." J. W. Cure, Superintendent. (Formerly operated by the Carnegie Furnace Company.)—*Active in 1900.*

Crozer Furnaces, Roanoke, Roanoke county, Virginia. Two stacks: No. 1 Furnace, 70 x 17½, built in 1882-3 and first put in operation May 29, 1883; four 18 x 60 two-pass stoves; No. 2 Furnace, 70 x 16½, built in 1889 and blown in October 19, 1889; three 18 x 60 four-pass and one 18 x 60 two-pass Whitwell stoves; fuel, Tom's Creek and Pocahontas coke; ore, local hematite; product, foundry and forge pig iron; total annual capacity, 96,000 gross tons. Brand, "Crozer." James Duane, Superintendent. (Formerly operated by the Crozer Iron Company.)—*Active in 1901.*

Dora Furnace, Pulaski City, Pulaski county, Virginia. One stack, 75 x 18, built in 1891-2 and blown in in May, 1892; one 18 x 75 two-pass stove and three Whitwell stoves; fuel, Tom's Creek coke; ores, limonite and hematite from Cripple Creek; product, foundry and forge pig iron; annual capacity, 60,000 gross tons. Brand, "Dora." James Duane, Superintendent. (Formerly operated by the Dora Furnace Company.)—*Active in 1901.*

Embreville Furnace, Embreville, Washington county, Tennessee. One stack, 80 x 17½, built in 1891 and blown in in 1892; three Cowper-Kennedy stoves, each 75 x 20; fuel, Looney Creek and Stonega coke; ore, local brown hematite; product, malleable and high manganese foundry pig iron; annual capacity, 45,000 gross tons. Brand, "Embreville." (Formerly operated by The Embreville Iron Company, Limited.)—*Active in 1900.*

Graham Furnace, Graham, Tazewell county, Virginia. One stack, 70 x 16½, built in 1890 and blown in December 12, 1891; three Whitwell stoves; fuel, Pocahontas coke; ore, local hematite; product, foundry pig iron; annual capacity, 36,000 gross tons. Brand, "Graham." (Formerly operated by the Graham Furnace Company.)—*Idle since 1892.*

Max Meadows Furnace, Max Meadows, Wythe county, Virginia. One stack, 75 x 20, built in 1890-1; first blown in November 19, 1895; rebuilt in 1899; one 20 x 70 two-pass and three 20 x 60 four-pass Whitwell stoves; fuel, Pocahontas coke; ores, limonite and hematite from Cripple Creek; product, foundry pig iron; annual capacity, 60,000 gross tons. Brand, "Max Meadows." James Duane, Superintendent. (Formerly owned by the Max Meadows Iron Company.)—*Active in 1896.*

Radford-Crane Furnace, Radford, Montgomery county, Virginia. One stack, 75 x 18, begun in 1890 and completed in 1892; first blown in in December, 1899; four Whitwell stoves; fuel, Tom's Creek and Pocahontas coke; ore, Virginia hematite; product, foundry pig iron; annual capacity, 60,000 gross tons. Brand, "Radford." James Duane, Superintendent. (Formerly owned by the Radford-Crane Iron Company.)—*Active in 1901.*

Reed Island Furnace, Reed Island, Pulaski county, Virginia. Furnace in Pulaski county, on Reed Island branch of the Norfolk and Western Railway. One stack, 39 x 11, put in blast April 28, 1881; cold blast; water-power; open top; fuel, charcoal; ore, local hematite; product, cold-blast charcoal pig iron; annual capacity, 2,250 gross tons. Brand, "Reed Island." W. R. Tipton, Superintendent. (Formerly operated by the Reed Island Iron Company.)—*Active in 1901.*

Watts Furnaces, Middlesborough, Bell county, Kentucky. Two stacks, one, 74½ x 16½, and one, 74½ 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 and Ducktown ore from Polk county, Tenn.; product, foundry and forge pig iron; total annual capacity, 110,000 gross tons. Brand, "Watts." J. F. Skelding, Superintendent. (Formerly operated by The Watts Steel and Iron Syndicate, Limited.)—*Active in 1901.*

Total annual capacity of the 13 stacks: 624,000 gross tons of coke pig iron and 2,250 tons of charcoal pig iron.

ROLLING MILLS AND STEEL WORKS—2.

Crescent Horse Shoe and Iron Works, Max Meadows, Wythe county, Virginia. Built in 1892 and first put in operation November 8, 1892; 16 puddling furnaces, 3 heating furnaces, 3 spike machines, 5 bending machines, 5 pressing machines, 22 punching machines, 2 grubbers, and 2 trains of rolls (one 18-inch and one 9-inch); product, merchant bar iron, horse and mule shoes, and railroad and boat spikes; annual capacity, 21,000 gross tons. Fuel, Tom's Creek coal. Brand, "Crescent." Selling agent, F. M. Eaton, Bristol, Tennessee. (Formerly operated by the Consolidated Coal, Iron, and Land Company.)

Watts Works, Middlesborough, Bell county, Kentucky. Built in 1890-3; seven 25-gross-ton basic open-hearth steel furnaces (4 completed and 3 partly completed) with an annual capacity of 96,000 gross tons of ingots; two 4-hole soaking pits and one 32-inch reversing blooming mill; product, billets, blooms, and slabs; annual capacity, 75,000 gross tons. Fuel, manufactured gas. Brand, "Watts." Selling agent, F. M. Eaton, Bristol, Tennessee. (Formerly operated by The Watts Steel and Iron Syndicate, Limited.)

Total annual capacity of the 2 rolling mills and steel works: Open-hearth steel ingots, 96,000 gross tons; rolled products, 96,000 tons.

CARBUILDING WORKS—3.

Dora Car Shops, Pulaski, Pulaski county, Virginia. Product, wooden coal and iron-ore cars; annual capacity, 2,500. A foundry and a machine shop are connected with these works.

Tom's Creek Car Shops, Tom's Creek, Wise county, Virginia. Product, wooden 4-wheel coal cars; annual capacity, 2,500.

Virginia and Southwestern Railway Car Shops, Bristol, Sullivan county, Tennessee. Repair and build over locomotives, cars, etc., in use by the Virginia and Southwestern Railway Company; also occasionally build new cars for the company's use. The Virginia Iron, Coal, and Coke Company owns all the first mortgage bonds and all the capital stock of the Virginia and Southern Railway Company.

Total annual capacity: about 5,000 cars.

CAR-WHEEL WORKS.

Dora Foundry, Pulaski, Pulaski county, Virginia. Product, self-oiling tram car wheels; annual capacity, 25,000 wheels. (Formerly operated by the Dora Foundry, Car Wheel, and Machine Company.)

IRON FOUNDRIES AND MACHINE SHOPS.

The Virginia Iron, Coal, and Coke Company operates a foundry and a machine shop at Middlesborough, Kentucky, and at Pulaski, Virginia. It also formerly operated a foundry and a machine shop at Embreville, Tennessee, both of which were destroyed by fire in 1900 and have not been rebuilt.

CAST-IRON PIPE WORKS.

Radford Pipe Works, Radford, Montgomery county, Virginia. Product, cast-iron gas and water pipe. Leased to and operated by the Glamorgan Pipe and Foundry Company, of Lynchburg, Virginia. (Formerly operated by the Radford Pipe and Foundry Company.)

IRON-ORE MINES AND LIMESTONE QUARRIES.

The company owns or operates under lease the following iron-ore mines: The Crozer Mines, Grubb Mines, Crozer Specular Mines, Grubb Specular Mines, and Dewey Specular Mines, at Blue Ridge Springs, Va.; the Black Rock Mines, at Cotopaxi, Va.; the Mary Creek Mines, at Vesuvius, Va.; the Wood Specular Mines, at Buchanan, Va.; the Rorer Mines, at Roanoke, Va.; the Interior Mines, at Interior, Va.; the Tiptop Mines, at Tiptop, Va.; the Betty Baker Mines, at Sylvatus, Va.; the Spring Hill Mines, at Patterson Junction, Va.; the Crawford Mines, the Reed Island Mines, and the Rich Hill Mines, at Reed Island, Va.; the Barren Spring Mines, at Barren Springs, Va.; the Fosters Falls Mines, the Hematite Mines, the Sanders Mines, the Posey Mines, the Cedar Run Mines, and the Indian Camp Mines, at Fosters Falls, Va.; the Ivanhoe Mines, at Ivanhoe, Va.; the Locust Hill Mines, at Max Meadows, Va.; the Cambria Mines, at Cambria, Tenn.; the Isabella Mines, at Isabella, Tenn.; the Tomotla Mines, at Tomotla, N. C.; the Embreville Mines, at Em-

breville, Tenn.; the Taylor Mines, at Carter, Tenn.; the Doe Mountain Mines, at Vaughtsville, Tenn.; the Cross Mines, at Cumberland Gap, Tenn.; the Watts Mines, at Arthur, Tenn.; the Irondale Mines, at Big Stone Gap, Va.; the Harvey Mines, at Jasper, Va.; and the Truro Mines, at Ben Hur, Va.

It also owns or operates under lease the following limestone quarries: The Five Oaks Quarry, at Five Oaks, Va.; the Buchanan & Sexton Quarries, at Buchanan, Va.; the Gate City Quarry, at Gate City, Va.; the Carr Quarry, at Arthur, Tenn.; the Embreville Quarry, at Embreville, Tenn.; and the Ardway Quarry, at Barren Springs, Va.

COKE OVENS, COAL LANDS, AND RAILROADS.

The company has 350 completed coke ovens and 400 building coke ovens at Tom's Creek, Virginia. It is also building 150 coke ovens at Looney Creek, Virginia.

It also owns about 150,000 acres of coal lands, including the Looney Creek coal mines, in Wise county, Virginia, formerly operated by the Virginia, Tennessee, and Carolina Steel and Iron Company.

In addition the company owns all the first mortgage bonds and all the stock of the Virginia and Southwestern Railway Company, which extends from Big Stone Gap via Bristol to Elizabethton, and connects at Bristol with the Norfolk and Western Railway and the Southern system of railways. It has 92 miles of railroad in operation and it is now building 43 miles of railroad up Stony Creek to the Doe Mountain and Doe Valley iron-ore lands. A portion of this line was put in operation in December, 1900.

TENNESSEE COAL, IRON, AND RAILROAD COMPANY.

Tennessee Coal, Iron, and Railroad Company; general offices, Birmingham, Alabama; New York office, 100 Broadway. *Officers:* Don H. Bacon, Chairman, Frank S. Witherbee, First Vice-President, F. A. Lapham, General Sales Agent, and L. T. Beecher, Secretary and Treasurer, New York City; N. Baxter, Jr., President, Charles McCrery, Second Vice-President, James Belden, Assistant to Chairman, and J. R. Vail, Auditor, Birmingham, Alabama; J. L. Gaines, Assistant General Manager, Tennessee Divisions, South Pittsburg, Tennessee. *Board of Directors:* Don H. Bacon, Chairman; James T. Woodward, Albert B. Boardman, Benjamin F. Tracy, Elverton R. Chap-

man, Fred H. Benedict, Frank S. Witherbee, Oliver H. Payne, Cord Meyer, William Barbour, James Henry Smith, and Henry S. Manning, all of New York; N. Baxter, Jr., of Nashville, Tennessee; and Charles McCrery and Walker Percy, of Birmingham, Alabama. *Executive Committee*: Don H. Bacon, Chairman; James T. Woodward, Albert B. Boardman, Elverton R. Chapman, Cord Meyer, William Barbour, James Henry Smith, Fred H. Benedict, and Frank S. Witherbee. *Domestic Selling Agents*: For steel, pig iron, and rolling mill products—F. A. Lapham, General Sales Agent, 100 Broadway, New York, and J. H. Mohns, Birmingham, Alabama; for coal and coke—A. H. Carpenter, Birmingham, Alabama. *Brands*: For steel—"Ensley Basic Open Hearth;" for pig iron—"Ensley," "Bessemer," "DeBardeleben," "Oxmoor," "Eureka," "Alice," "Sheffield," and "South Pittsburg;" (kinds of pig iron made—foundry, forge, mill, basic open-hearth, Thomas, ferromanganese, and spiegeleisen;) for coal—"Pratt," "Blocton," "Cahaba," "Blue Creek," "Gamble," "Henry-Ellen," "Whitwell," and "Sewanee;" for coke—"Pratt," "Blue Creek," "Bessemer," "Jasper," "Whitwell," "Tracy City," and "Bi-Product." Capital stock, \$23,000,000, all of which is common. *Transfer Agents*: Central Trust Company, New York City. The company operates the following works:

BLAST FURNACES—20.

Alice Furnaces, Birmingham, Jefferson county, Alabama. 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. Fuel, Pratt coke made in the company's ovens; ores, red and brown from the company's mines; product, basic and foundry pig iron; total annual capacity, 105,000 gross tons. Brand, "Alice." J. W. Shook, Superintendent. (Operated for several years by the Tennessee Coal, Iron, and Railroad Company.)—*Active in 1901.*

Bessemer Furnaces, Bessemer, Jefferson county, Alabama. Five stacks: Nos. 1 and 2, each 75 x 17, built in 1886-7; No. 1 put in blast in 1888 and No. 2 in 1889; eight Whitwell stoves. Nos. 3 and 4, each 75 x 17, built in 1889-90, and No. 3 rebuilt in 1900; eight Whitwell stoves. No. 5, or Little Belle, 60 x 12, built in 1889-90; three Whitwell stoves. Fuel, Pratt and Blue Creek coke made in the company's ovens; ores, red and brown from the company's mines; product, foundry, forge, and basic pig iron and spiegeleisen and ferromanganese; total annual capacity, 288,000 gross tons. Brand, "DeBardeleben." John Dowling, Superintendent. (Operated for several years by the Tennessee Coal, Iron, and Railroad Company.)—*Active in 1901.*

Ensley Furnaces, Ensley, Jefferson county, Alabama. Five stacks, four

80 x 20, built in 1887, 1888, and 1889, and one, 80 x 18, built in 1899-1900; No. 1 blown in March 19, 1889, No. 2, December 1, 1888, No. 3, June 5, 1888, No. 4, April 9, 1888, and No. 5, October 12, 1900; four Gordon-Whitwell-Cowper stoves to each furnace; fuel, Pratt coke from the company's ovens and Semet-Solvay coke from ovens at Ensley; ores, red and brown from the company's mines; product, foundry, forge, and basic pig iron; total annual capacity, 315,000 gross tons. Brand, "Ensley." One Uehling pig-iron casting machine. J. J. Shannon, Superintendent. (Operated for several years by the Tennessee Coal, Iron, and Railroad Company.)—*Active in 1901.*

Oxmoor Furnaces, Oxmoor, Jefferson county, Alabama. 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; again rebuilt in 1899; seven Whitwell stoves; fuel, Pratt and Blue Creek coke made in the company's ovens; ores, red and brown from the company's mines; product, foundry and forge pig iron; total annual capacity, 122,500 gross tons. Brand, "Eureka." John Dowling, Superintendent. (Formerly called Eureka Furnaces. Operated for several years by the Tennessee Coal, Iron, and Railroad Company.)—*Active in 1901.*

Sheffield Furnaces, Sheffield, Colbert county, Alabama. Three stacks, each 75 x 18, built in 1887-8: No. 1 blown in in September, 1888, No. 2 blown in in October, 1889, and No. 3 blown in in April, 1896; No. 1 rebuilt in 1891 and 1900, No. 2 rebuilt in 1891, and Nos. 2 and 3 remodeled in 1897; nine Whitwell-Cowper stoves; fuel, Pratt and Jasper coke made in company's ovens; ores, Alabama and Tennessee brown hematite obtained partly from company's mines; product, foundry pig iron; total annual capacity, 210,000 gross tons. Brand, "Sheffield." J. S. Colyar, Superintendent. (Formerly operated by the Sheffield Coal, Iron, and Steel Company.)—*Active in 1901.*

South Pittsburg Furnaces, South Pittsburg, Marion county, Tennessee. 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; fuel, coke made in the ovens of the company at Tracy City, Whitwell, and Victoria; ores, brown hematite from Georgia and hard red fossiliferous from the mines of the company; product, foundry and forge pig iron; total annual capacity, 210,000 gross tons. Brand, "South Pittsburg." B. F. Wilson, Jr., Superintendent. The Sewanee Furnace, at Sewanee, Tenn., formerly operated by the Tennessee Coal, Iron, and Railroad Company, was dismantled in 1899 and a part of its machinery used in equipping the new No. 5 furnace of the company at Ensley, Alabama. (Operated for several years by the Tennessee Coal, Iron, and Railroad Company.)—*Active in 1901.*

Total annual capacity of the 20 furnaces: 1,250,500 gross tons.

ROLLING MILLS AND STEEL WORKS—3.

Bessemer Rolling Mills, Bessemer, Jefferson county, Alabama. Built in 1887-8 and put in operation in September, 1888; 24 single puddling furnaces, 6 heating furnaces, 3 annealing 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 9 Siemens gas producers; product, bar, guide, plate, and sheet iron; annual capacity, 60,000 gross tons. Fuel, coal and manufactured gas. Additional heating furnaces are being added to the bar and plate mills, and plate, angle, and rail straighteners are being installed. R. H. Pritchard, Superintendent. (Formerly operated by The Bessemer Rolling Mills.)

Steel Casting Department, Ensley, Jefferson county, Alabama. Built in 1900; one 20-gross-ton basic open-hearth steel furnace; first steel made August 31, 1900; product, car couplers, gears, rolls, engine parts, and other steel castings; annual capacity, 12,000 gross tons. John McConnell, General Superintendent. (Works owned by the Alabama Steel and Shipbuilding Company and operated under lease by the Tennessee Coal, Iron, and Railroad Company.)

Steel Works Division, Ensley, Jefferson county, Alabama. Built in 1898-9; first heat poured November 30, 1899; ten 50-gross-ton basic open-hearth tilting furnaces with an annual capacity of 300,000 gross tons of ingots; 2 reheating gas furnaces and one 44-inch blooming mill; product, blooms, billets, and slabs. Fuel, producer gas and coke. Building one 27-inch rail train, to be completed about November 1, 1901, and to be equipped for the production of either steel rails, splice bars, small billets, sheet bars, I beams, channels, or angles; estimated annual capacity, from 150,000 to 300,000 gross tons of rails or billets. Also adding 4 soaking pits. John McConnell, General Superintendent. (Works owned by the Alabama Steel and Shipbuilding Company and operated under lease by the Tennessee Coal, Iron, and Railroad Company.)

Total annual capacity of the 3 rolling mills and steel works: Open-hearth steel ingots, 300,000 gross tons; steel castings, 12,000 tons; rails or billets, from 150,000 to 300,000 tons; other finished rolled products, 60,000 tons.

COAL MINES, COKE OVENS, IRON-ORE MINES, LIMESTONE AND DOLOMITE QUARRIES, ETC.

In addition to the blast furnaces, rolling mills, and steel works enumerated the company owns and operates the following properties:

Thirty coal mines, with a total annual capacity of 5,700,000 tons of coal, located at or near Pratt City, Ensley, Wylam, Stockton, Blossburg, Adger, Johns, Sumter, Blocton, Helena, Gurnee, Henry-Ellen, and Gamble, all in Alabama, and Whitwell and Tracy City, Tennessee.

Sixteen coking plants, with 3,732 bee-hive coke ovens, having a total annual capacity of 1,800,000 tons of coke, located at Pratt City, Ensley, Wylam, Bessemer, Johns, Blocton, and Jasper, all in Alabama, and at Whitwell, Victoria, and Tracy City, in Tennessee.

Twenty-nine iron-ore mines, with a total annual capacity of 2,640,000 tons of red and brown hematite ores, located at or near Green Springs, Spaulding, Ishkooda, Smythe, Redding, Readers, Leogusta, Sparks' Gap, Compton, Champion, Goethite, McMath, Martaban, Standiford, and Russellville, all in Alabama, and at Inman, in Tennessee.

Extensive limestone and dolomite quarries at Dolcito, Vann, and Bessemer, in Alabama, and at South Pittsburg, in Tennessee, with a total annual capacity of 500,000 tons of stone.

The company owns in Alabama and Tennessee 303,598 acres of coal lands, 38,395 acres of iron-ore lands, 58,428 acres of undeveloped mineral lands, and 28,227 acres of miscellaneous timber and other lands, making a grand total of 428,648 acres.

SLOSS SHEFFIELD STEEL AND IRON COMPANY.

Sloss Sheffield Steel and Iron Company; principal office, Jersey City, N. J.; operating office, Birmingham, Alabama. *Officers at Birmingham:* E. O. Hopkins, President; E. W. Rucker, Vice-President; J. W. McQueen, Secretary and Treasurer; and C. H. Schoolar, Auditor. *Selling Agents:* Hugh W. Adams, 15 Beekman st., New York, and 53 State st., Boston; John J. Wagoner, 1525 Monadnock Block, Chicago; J. K. Dimmick & Co., 1051-1053 Drexel Building, Philadelphia, 610-611 Empire Building, Pittsburgh, and 401 Ellicott Square, Buffalo, New York; Robert Field, 20 Hayden Building, Columbus, Ohio, and covering St. Louis territory; Joseph R. Lehmer, 1212 Farnam street, Omaha, Nebraska; Edwin Haas, Atlanta, Georgia; F. J. Fuller, Nashville, Tennessee; F. S. Walshe, 325 Carondelet street, New Orleans, Louisiana; C. L. Baum, 1542-44 Wazee st., Denver, Colorado (traveling throughout the Northwest); W. H. Palmer, 409 Manhattan Building, St. Paul, Minnesota; Zimmerman, Wells & Co., Portland, Oregon; Hardy Greenwood, San Antonio, Texas; Estey & Co., St. John, New Brunswick, Canada; Hasam & Moreno, City of Mexico, La Calle de las Damas 5, Mexico; and Wm. Jacks & Co., 23 Royal Exchange Square, Glasgow, Scotland. *Board of Directors:* Archer Brown, W. H. Goadby, A. H. Larkin, J. C. Maben, Richard Mortimer, Walter G. Oakman, George Parsons, John A. Rutherford,

William E. Strong, Moses Taylor, and R. B. Van Cortlandt, of New York; Joseph Bryan and Frederick W. Scott, of Richmond, Va.; and E. O. Hopkins and E. W. Rucker, of Birmingham, Alabama. *Executive Committee*: Walter G. Oakman, Chairman; J. C. Maben, Joseph Bryan, E. O. Hopkins, and R. B. Van Cortlandt. *Registrar*: Guaranty Trust Company, New York City. *Transfer Agents*: Central Trust Company, New York City. Capital stock, \$20,000,000, of which \$10,000,000 is 7 per cent. non-cumulative preferred and \$10,000,000 is common; \$6,700,000 of preferred and \$7,500,000 of common stock have been issued for the present requirements of the company and the balance will be reserved for future use. The bonded indebtedness, attached as a lien only on the property of the Sloss Iron and Steel Company, consists of \$2,000,000 of 6 per cent. and \$2,000,000 of 4½ per cent. bonds, of which \$1,835,000 is outstanding and the balance is in the treasury. The company operates or controls the following works:

BLAST FURNACES—7.

Hattie Ensley Furnace, Sheffield, Colbert county, Alabama. One stack, 75 x 17, built in 1887 and blown in December 31, 1887; remodeled in 1900; four Whitwell stoves; fuel, coke; ore, local brown hematite; product, foundry pig iron; annual capacity, 70,000 gross tons. Brand, "Sheffield." (Formerly operated by the Colbert Furnace Company.)—*Active in 1901.*

Lady Ensley Furnace, Sheffield, Colbert county, Alabama. (Operated by the North Alabama Furnace Company, two-thirds of the stock of which is owned by the Sloss Sheffield Steel and Iron Company.) One stack, 75 x 17, built in 1887-9 and first blown in April 25, 1889; remodeled in 1900-1901; four Whitwell stoves; fuel, coke; ore, local brown hematite; product, foundry and mill pig iron; annual capacity, 70,000 gross tons. Brand, "Lady Ensley." (Formerly operated by the Lady Ensley Furnace Company.)—*Active in 1901.*

Philadelphia Furnace, Florence, Lauderdale county, Alabama. One stack, 75 x 17, commenced by the W. B. Wood Furnace Company in 1887 and completed by the Florence Cotton and Iron Company in 1890-1; remodeled in 1900; four Whitwell stoves, each 70 x 20; fuel, coke; ore, brown hematite from the company's mines in Russellville, Franklin county, Alabama; product, foundry pig iron; annual capacity, 70,000 gross tons. Brand, "Florence." (Formerly operated by the Florence Cotton and Iron Company.)—*Active in 1901.*

Sloss Furnaces, Birmingham, Jefferson county, Alabama. Four stacks: No. 1, 82½ x 18, built in 1881-2, put in blast April 12, 1882, and rebuilt in 1895; No. 2, 73 x 18, built in 1882; No. 3, 73 x 17, built in 1887-8 and blown in in October, 1888; No. 4, 73 x 17, built in 1887-9 and blown in in February, 1889; five Whitwell, eight Gordon-Whit-

well-Cowper, and three two-pass 18 x 70 and two new four-pass 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 the furnaces; product, foundry and mill pig iron; total annual capacity, 225,000 gross tons. Brand, "Sloss." (Formerly operated by the Sloss Iron and Steel Company.)—*Active in 1901.* Total annual capacity of the 7 furnaces: 435,000 gross tons.

IRON-ORE MINES, COAL LANDS, COKE OVENS, AND LIMESTONE QUARRIES.

With the four blast furnaces of the Sloss Iron and Steel Company the Sloss Sheffield Steel and Iron Company acquired 1,100 coke ovens, 30,000 acres of iron-ore lands, 21,000 acres of coal lands, and extensive limestone quarries; 175 coke ovens have since been added.

The company owns two-thirds of the stock of the North Alabama Furnace Company, of Sheffield, Alabama.

It also owns all the stock of the Lady Ensley Coal, Iron, and Railroad Company, the property owned by the latter company consisting of 14,000 acres of coal lands, 13,000 acres of brown iron-ore lands, and 300 coke ovens.

It has also 25,000 acres of coal lands located on the line of the Southern Railway, south of Jasper, Alabama.

It also owns developed brown iron-ore lands and a limestone quarry near Russellville, Alabama.

The Sloss Sheffield Steel and Iron Company is now mining 6,000 tons of coal per day. It has opened mines in the new Walker county coal fields, and as soon as railroad facilities are completed it will be able to ship about 1,500 tons of coal per day additional. It also has a capacity of 375,000 net tons of coke per year.

ALABAMA CONSOLIDATED COAL AND IRON COMPANY.

Alabama Consolidated Coal and Iron Company; general offices, Birmingham, Alabama. *Officers:* T. G. Bush, President; John E. Searles, Vice-President; Charles T. Westcott, Secretary and Treasurer; and G. M. Bowers, Auditor. *Board of Directors:* Abram S. Hewitt, 17 Burling Slip, John E. Searles, 27 William st., and Samuel Thomas, 80 Broadway, New York; J. W. Middendorf, Summerfield Baldwin, W. C. Seddon, Douglass H. Gordon, and Richard H. Edmonds, Bal-

timore, Md.; and T. G. Bush, Birmingham, Ala. *Selling Agents:* Matthew Addy & Co., St. Louis, Cincinnati, Pittsburgh, New York, and Philadelphia. Capital stock, \$5,000,000, of which \$2,500,000 is 7 per cent. cumulative preferred and \$2,500,000 is common. The company operates the following works:

BLAST FURNACES—4.

Clifton Furnaces, Ironaton, Talladega county, Alabama. Two stacks: No. 1, 70 x 17½, built to use charcoal in 1884 and blown in on that fuel on April 16, 1885; changed to coke in 1895; rebuilt in 1896-7; four Whitwell-Cowper stoves. No. 2, 60 x 15, built in 1889-90 to use charcoal and blown in on that fuel in 1891; changed to coke in 1900; three Whitwell-Cowper stoves. Fuel, Alabama coke; ore, local brown hematite; product, foundry pig iron; total annual capacity, 80,000 gross tons. Brand, "Clifton." (Formerly operated by the Clifton Iron Company.)—*Active in 1901.*

Gadsden-Alabama Furnace, Gadsden, Etowah county, Alabama. One stack, 72 x 18, built in 1887-8 and first blown in October 14, 1888; four Whitwell stoves; fuel, coke; ores, local red and brown hematite; product, foundry pig iron; annual capacity, 50,000 gross tons. Brand, "Etowah." (Formerly operated by the Etowah Furnace Company, lessee.)—*Active in 1901.*

Mary Pratt Furnace, Birmingham, Jefferson county, Alabama. One stack, 65 x 14, built in 1882 and first put in blast in April, 1883; rebuilt in 1889 and overhauled in 1900; three Whitwell stoves; fuel, coke; ores, local brown and red fossiliferous; product, foundry pig iron; annual capacity, 30,000 gross tons. Brand, "Mary Pratt." (Formerly operated by the Mary Pratt Furnace Company.)—*Idle for several years but may blow in in 1901.*

Total annual capacity of the 4 furnaces: 160,000 gross tons.

IRON-ORE LANDS, COAL LANDS, LIMESTONE QUARRIES, AND COKE OVENS.

The company has acquired the Gate City property, near Birmingham, Alabama, comprising about 1,800 acres of land. This property contains large deposits of red fossiliferous iron ore, as well as deposits of limestone, dolomite, building stone, sand, etc.

It has also acquired the Standard Coal Company's property, in Tuscaloosa county, Alabama, which contains 32,211 acres of coal and timber land. It is estimated that from 18,000 to 24,000 acres of this land contain workable seams of coal. About 14,000 acres of the property are covered with yellow pine timber. There are now 375 completed coke ovens on the property and 60 additional ovens are in course of erection.

The company acquired with the Clifton Furnaces about 2,500 acres of

mineral lands and 33,292 acres of other lands, of which from 10,000 to 12,000 acres are well timbered.

With the Gadsden-Alabama Furnace it acquired about 730 acres of red ore and other lands.

With the Mary Pratt Furnace it acquired about 33 acres of land.

In addition to the above the company has acquired about 1,200 acres of land near Gadsden, Alabama, containing deposits of red iron ore. It has also acquired a large additional acreage of brown iron-ore property available for its furnaces at Ironaton, Gadsden, and Birmingham.

At Hematite, Georgia, it has acquired 1,700 acres of brown iron-ore lands. These mines are equipped with ore washers.

The company has also purchased tracts of coal lands at Brookwood, Alabama, and in the vicinity of Birmingham.

It has recently purchased valuable red iron-ore properties near Attalla and Gadsden, the latter property being within one mile of the Gadsden-Alabama Furnace and the former property within five miles. On both properties there are developed mines with a capacity at present of from 250 to 300 tons of iron ore per day.

ALABAMA AND GEORGIA IRON COMPANY.

Alabama and Georgia Iron Company; main office, 71 Broadway, New York City. *Officers*: F. M. Davis, President, New York; Noah H. Swayne, Second Vice-President and Treasurer; and M. O. Guiss, Secretary, Cedartown, Georgia. *Board of Directors*: F. M. Davis, Noah H. Swayne, Eugene Zimmerman, D. B. Meacham, Archer Brown, F. M. Jeffery, and Phillips Isham. *Selling Agents*: Rogers, Brown & Co., Cincinnati, Cleveland, Buffalo, Boston, New York, Pittsburgh, St. Louis, Chicago, and Birmingham; Rogers, Brown & Warner, Philadelphia. Capital stock, \$1,300,000, of which \$650,000 is preferred and \$650,000 is common. The company operates the following works:

BLAST FURNACES—1.

Cherokee Iron Works, Cedartown, Polk county, Georgia. 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; changed to charcoal again in May, 1900; cast-iron stoves; fuel, charcoal; ore, brown hematite mined near the works; product, high-grade car-wheel pig iron; annual capacity, 18,000 gross tons. Brand, "Cherokee." (Formerly operated by the Cherokee Iron Company.)—*Active in 1901.* Annual capacity, 18,000 gross tons.

IRON-ORE LANDS, ETC.

The company has acquired all the mineral lands formerly owned by the Augusta Mining and Investment Company, consisting of over 3,000 acres, on which are located large deposits of iron ore. It has also acquired all the iron-ore property formerly owned by the Cherokee Iron Company. Among the iron-ore mines now being operated are the "Grady," the "Reed," and the "Wood." The company is now adding steam shovels, ore washers, etc., to its mining equipment.

UNITED STATES CAST IRON PIPE AND FOUNDRY COMPANY.

United States Cast Iron Pipe and Foundry Company; executive and financial offices, 80 Broadway, New York; general sales offices, 638 Rookery Building and 217 La Salle st., Chicago. *Officers*: Samuel Thomas, President; George B. Hayes, First Vice-President; A. F. Callahan, Second Vice-President; B. F. Haughton, Secretary and Treasurer; and E. C. Fuller, Assistant to First Vice-President. *Selling Agents*: A. F. Callahan, Second Vice-President, in general charge. A. J. Goodhue, Western Sales Manager, and W. L. Davis and A. E. Goodhue, Contracting Agents, 638 Rookery Building, Chicago, Illinois; E. C. Humphreys, Contracting Agent, Cincinnati, Ohio; W. M. Wells, Contracting Agent, St. Paul, Minnesota; C. W. Gray, Southern Sales Manager, and W. H. Flint, Contracting Agent, First National Bank Building, Chattanooga, Tenn.; James Daniels, Contracting Agent, St. Louis, Mo.; P. G. Roeder, Contracting Agent, Apartado No. 2-125, City of Mexico; L. R. Lemoine, Eastern Sales Manager, and J. M. Holmes and W. M. Stewart, Contracting Agents, Land Title Building, Philadelphia; Nathaniel Miles, Contracting Agent, 80 Broadway, New York City; Ralph M. Overholt, Contracting Agent, Pittsburgh, Pa.; Clark W. Harrison, Foreign Sales Manager, 72 Fenchurch street, London, E. C., England; and Howard Egleston, Contracting Agent, Obispo 36, Havana, Cuba. *Board of Directors*: Samuel Thomas, Colgate Hoyt, Anthony N. Brady, A. C. Overholt, B. F. Overholt, A. H. McNeal, George B. Hayes, C. E. Burke, E. C. Fuller, George J. Long, A. F. Callahan, John R. Walsh, and A. H. Hinkle. *Executive Committee*: Samuel Thomas, Anthony N. Brady, Colgate Hoyt, E. R. Thomas, and A. H. Hinkle. Capital stock, \$30,000,000, of which \$12,500,000 is 7 per cent. non-cumulative preferred and \$12,500,000 is common; \$2,500,000 each of common and preferred stock is unissued. The company operates or controls the following works:

BLAST FURNACES—1.

Charlotte Furnace, Scottdale, Westmoreland county, Pa. One coke stack. Leased to Corrigan, McKinney & Co., of Cleveland, Ohio. (Formerly owned by the National Foundry and Pipe Works, Limited.)—*Active in 1901. For a description of this furnace see Part II, Blast Furnaces in Western Pennsylvania.*

ROLLING MILLS AND STEEL WORKS—1.

West Superior Branch, West Superior, Douglas county, Wisconsin. 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, producer gas and coal. (Formerly called the West Superior Iron and Steel Works and owned by the Wisconsin Steel Company.)—*Idle and for sale or lease.*

Total annual capacity of the rolling mills and steel works: 90,000 gross tons of Bessemer steel ingots and 81,000 tons of rolled material.

CAST-IRON GAS AND WATER PIPE AND FITTINGS WORKS—15.

Addyston Branch, Addyston, Ohio. Product, cast-iron gas and water pipe; sizes, from 3 to 72 inches; daily melting capacity, 350 gross tons. Also equipped for the production of all kinds of heavy castings, flanged pipe and general flanged work, flexible joint pipe, and outfits for chemical works. (Formerly operated by The Addyston Pipe and Steel Company.)

Anniston Branch, Anniston, Alabama. Product, cast-iron gas and water pipe; sizes, from 3 to 60 inches; daily melting capacity, 350 gross tons. (Formerly operated by The Southern Pipe Company and the American Pipe and Foundry Company.)

Bessemer Branch, Bessemer, Alabama. Product, cast-iron gas and water pipe; sizes, from 3 to 72 inches inclusive; daily melting capacity, 300 gross tons. Also equipped for general foundry work, especially the manufacture of sugar-house castings. (Formerly operated by the Howard-Harrison Iron Company and the American Pipe and Foundry Company.)

Bridgeport Branch, Bridgeport, Alabama. Product, cast-iron gas and water pipe; sizes, from 14 to 36 inches inclusive; daily melting capacity, 160 gross tons. (Formerly operated by the Chattanooga Foundry and Pipe Works and the American Pipe and Foundry Company.)

Buffalo Branch, Buffalo, New York. Product, cast-iron gas and water pipe; sizes, from 3 to 48 inches; daily melting capacity, 150 gross tons. Also equipped for general foundry work, especially the manufacture of heavy castings. (Formerly operated by the Buffalo Cast Iron Pipe Company.)

Burlington Branch, Burlington, New Jersey. Product, cast-iron gas and water pipe; 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 gross tons. (Formerly operated by The McNeal Pipe and Foundry Company.)

Chattanooga Branch, Chattanooga, Tennessee. Product, cast-iron gas and water pipe; sizes, from 3 to 12 inches inclusive; daily melting capacity, 250 gross tons. Also equipped for the production of flanged pipe and flanged work in general. Connected with this Branch is a separate and distinct plant engaged in the production of cast-iron fittings for water and gas pipe, with a daily melting capacity of 20 gross tons. (Formerly operated by the Chattanooga Foundry and Pipe Works and the American Pipe and Foundry Company.)

Cleveland Branch, Cleveland, Ohio. Product, cast-iron gas and water pipe; sizes, from 3 to 60 inches; daily melting capacity, 300 gross tons. (Formerly operated by the Lake Shore Foundry.)

Columbus Branch, Columbus, Ohio. Product, cast-iron gas and water pipe; sizes, from 3 to 42 inches inclusive; daily melting capacity, 175 gross tons. Equipped for the production of railroad castings and general foundry work. (Formerly operated by The Ohio Pipe Company.)

Louisville Branch, Louisville, Kentucky. Product, cast-iron gas and water pipe; sizes, from 3 to 60 inches inclusive; daily melting capacity, 250 gross tons. Also equipped for the production of flanged pipe and fittings and general foundry work. (Formerly operated by Dennis Long & Company.)

Newport Branch, Newport, Kentucky. Product, cast-iron gas and water pipe; sizes, from 3 to 72 inches; daily melting capacity, 250 gross tons. Also equipped for the production of loam castings, flanged pipe and fittings, and general foundry work. (Formerly operated by The Addyston Pipe and Steel Company.)

Scottdale Branch, Scottdale, Pa. Product, cast-iron gas and water pipe; sizes, from 3 to 48 inches inclusive; daily melting capacity, 300 gross tons. Also equipped for the production of flanged pipe and fittings and general foundry work. (Formerly operated by the National Foundry and Pipe Works, Limited.)

South Pittsburg Branch, South Pittsburg, Tennessee. Product, cast-iron gas and water pipe; sizes, from 3 to 16 inches inclusive; daily melting capacity, 100 gross tons. (Formerly operated by the South Pittsburg Pipe Works and the American Pipe and Foundry Company.)

West Superior Branch, West Superior, Wisconsin. Product, cast-iron gas, water, sewer, and culvert pipe; sizes, from 8 to 60 inches; daily melting capacity, 60 gross tons. Also equipped for the production of general castings, but especially engine and other large castings. (Formerly operated by the Wisconsin Steel Company.)

Total daily melting capacity of the 15 works: 3,215 gross tons of cast-iron gas and water pipe, fittings, etc.

CENTRAL FOUNDRY COMPANY.

Central Foundry Company; general offices, 116 Nassau street, New York City. *Officers:* John Reid, President; George F. Ross, First Vice-President; Gerard Schumacher, Second Vice-President; Winthrop L. Rogers, Secretary and Treasurer; and Robert K. Story, Assistant Manager. Keithley & Hammer, Managers Southern Pacific Coast Territory, 421 Market street, San Francisco, California; Bowles & Strow, Managers Northern Pacific Coast Territory, 209 Stark street, Portland, Oregon; C. C. Todd, Manager Chicago Warehouse, 87-93 North May street, Chicago, Illinois. *Board of Directors:* John Reid, George F. Crane, George D. Hallock, Charles Smithers, Charles B. Alexander, George F. Ross, Gerard Schumacher, Winthrop L. Rogers, Joseph Lodge, Charles R. Schmidt, A. L. Swett, and Robert A. Regester. *Executive Committee:* John Reid, Charles B. Alexander, Charles Smithers, George F. Ross, and Gerard Schumacher. Capital stock, \$14,000,000 of common and preferred, divided into \$7,000,000 of preferred 7 per cent. and \$7,000,000 of common. The company operates the following works:

CAST-IRON SOIL AND PLUMBERS' PIPE AND FITTINGS WORKS—9.

Anniston Plant, Anniston, Ala. Product, cast-iron soil and plumbers' pipe, fittings, stop boxes, etc.; sizes, from 2 to 12 inches; daily melting capacity, 100 gross tons. E. P. Cooper, Manager. (Formerly called the Hercules Foundry and operated by Edmund L. Tyler & Co.)

Baltimore Plant, Baltimore, Maryland. Works at Dundalk Station, about 3 miles from Sparrows Point and 6 miles from Baltimore. Product, cast-iron soil and plumbers' pipe, fittings, all kinds of gray-iron castings, a full line of plumbers' cast-iron goods, etc.; sizes of pipe and fittings, from 2 to 15 inches inclusive; daily melting capacity, 200 gross tons. C. R. Schmidt, Manager, P. O. Box 300, Baltimore, Md. (Formerly called the Phoenix Iron Works and operated by the Henry McShane Manufacturing Company.)

Bessemer Plant, Bessemer, Alabama. Product, cast-iron soil and plumbers' pipe, fittings, stop boxes, etc.; sizes, from 2 to 12 inches inclusive; daily melting capacity, 100 gross tons. R. Campbell, Acting Manager, and J. G. Rahe, Assistant Manager. (Formerly operated by the Alabama Pipe Company.)

H., B., & W. Plant, Gadsden, Ala. Product, cast-iron soil and plumb-

- ers' pipe and fittings; sizes of pipe and fittings, from 2 to 12 inches; also makes stop boxes, etc.; daily melting capacity, 60 gross tons. This plant is not active, being held in reserve. (Formerly operated by the Hoffmann, Billings, and Weller Manufacturing Company.)
- Medina Plant, Medina, New York. Product, cast-iron soil and plumbers' pipe; sizes, from 2 to 8 inches; daily melting capacity, 75 gross tons. F. J. Sieber, Manager. (Formerly operated by The A. L. Swett Iron Works.)
- Monitor Plant, Newark, New Jersey. Product, cast-iron soil and plumbers' pipe and fittings; sizes of pipe and fittings, from 2 to 15 inches; also produces all kinds of light and gray-iron castings and a full line of plumbers' cast-iron goods; daily melting capacity, 60 gross tons. C. F. Manser, Manager. (Formerly operated by the Monitor Iron Works.)
- Phoenix Plant, Lansdale, Pa. Product, cast-iron soil and plumbers' pipe and fittings; sizes of pipe and fittings, from 2 to 8 inches; also produces stop and valve boxes and a full line of plumbers' iron goods; daily melting capacity, about 50 gross tons. This plant is not active but is being held in reserve. (Formerly operated by the Phoenix Foundry and Manufacturing Company.)
- Shuster Plant, South Pittsburg, Tennessee. Product, cast-iron soil and plumbers' pipe and fittings; sizes of pipe and fittings, from 2 to 12 inches; also makes stop boxes and plumbers' cast-iron goods; daily melting capacity, 40 gross tons. W. J. Lodge, Manager. (Formerly operated by the Shuster Foundry.)
- Vincennes Plant, Vincennes, Indiana. Product, cast-iron soil and plumbers' pipe and fittings; sizes of pipe and fittings, from 2 to 12 inches; also makes a full line of stop and valve boxes and plumbers' iron goods; daily melting capacity, 100 gross tons. P. G. Rahe, Manager. (Formerly operated by The Bell-Armistead Manufacturing Company and later by the Bell Manufacturing Company.)
- Total daily melting capacity of the 7 active works: 675 gross tons; of the 2 idle works, 110 tons.

SOUTHERN CAR AND FOUNDRY COMPANY.

Southern Car and Foundry Company; general offices, Birmingham, Alabama; branch offices, Lenoir City and Memphis, Tennessee, and Gadsden and Anniston, Alabama. *Officers:* J. M. Elliott, Jr., President; George E. Eikes, Vice-President; C. L. E. De Gaugue, Secretary; and W. G. Brockway, Treasurer. *Board of Directors:* E. R. Chapman, E. J. Sanford, C. M. McGhee, George E. Eikes, and J. M. Elli-

ott, Jr. *Executive Committee*: E. R. Chapman, E. J. Sanford, and J. M. Elliott, Jr. Capital stock, \$3,500,000, of which \$1,750,000 is preferred and \$1,750,000 is common. The company operates the following works:

ROLLING MILLS—1.

Anniston Works, Anniston, Calhoun county, Alabama. Leased. Built in 1884 and enlarged in 1888-9 and 1893; 1 single and 6 double puddling furnaces, 6 heating furnaces, 2 scrap furnaces, 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, iron and steel car axles and merchant bar iron; annual capacity, 9,000 gross tons of forged and 30,000 tons of rolled products. Fuel, coal. (Formerly operated and now owned by The Illinois Car and Equipment Company.)

Total annual capacity of the rolling mills: 30,000 gross tons of rolled and 9,000 tons of forged products.

CARBUILDING WORKS—4 COMPLETED AND 1 BUILDING.

Anniston Works, Anniston, Alabama. Leased. Product, wooden cars only; annual capacity, 12,000 freight cars. (Formerly operated and now owned by The Illinois Car and Equipment Company.)

Birmingham Works, Birmingham, Alabama. Building a plant at Ensley, Alabama, for the manufacture of steel cars; estimated annual capacity, 4,000. Company expects to have plant completed and in operation in November, 1901.

Gadsden Works, Gadsden, Ala. Product, wooden freight cars; annual capacity, 3,600. (Formerly operated by The Elliott Car Company.)

Lenoir Works, Lenoir City, Tennessee. Product, all kinds of wooden freight, mine, logging, and cane cars; annual capacity, 3,000 standard freight cars. (Formerly operated by The Lenoir Car Company.)

Memphis Works, Memphis, Tennessee. Works at Binghampton, a suburb of Memphis. Product, freight, caboose, tank, logging, and other cars; annual capacity, 4,500. (Formerly called the Memphis Car and Foundry Works.)

Total annual capacity of the 4 completed and building plants: 27,100 cars.

CAR-WHEEL WORKS.

Memphis Works, Memphis, Tennessee. Works at Binghampton, a suburb of Memphis. Product, freight and passenger car wheels; annual capacity, 65,000. (Formerly called the Memphis Car and Foundry Works.)

CAR-AXLE WORKS.

Anniston Works, Anniston, Ala. Leased. Product, iron and steel car and locomotive axles; daily capacity, 120 axles. (Formerly operated and now owned by The Illinois Car and Equipment Company.)

AMERICAN CAR AND FOUNDRY COMPANY.

American Car and Foundry Company; general offices, Lincoln Trust Building, St. Louis, Mo.; Eastern offices, Empire Building, 71 Broadway, New York City. *Officers at St. Louis:* William McMillan, Chairman of Executive Committee; W. K. Bixby, Vice-Chairman of Executive Committee; W. J. McBride, First Vice-President and General Manager; F. F. Webber, Secretary; S. S. DeLano, Treasurer; and J. M. Buick, Auditor. *Officers at New York:* Frederick H. Eaton, President, and C. P. Coleman, Second Vice-President. *District Managers:* Berwick, Pa., W. F. Lowry; Buffalo and Depew, N. Y., Robert S. Cox, Prudential Building, Buffalo; Chicago, Illinois, E. F. Carry, Fisher Building; Huntington, West Virginia, E. Ensign; Jeffersonville, Indiana, J. D. Ingram; Milton, Pa., C. L. Rogers; St. Charles, Missouri, J. G. Lawler; Terre Haute and Indianapolis, Indiana, Lewis J. Cox; Detroit, Michigan, George Hargreaves; Madison, Illinois, and St. Louis, Missouri, Frederick F. Bixby, Lincoln Trust Building, St. Louis, Missouri. *Board of Directors:* William McMillan, W. K. Bixby, Frederick H. Eaton, J. B. Haggin, George Hargreaves, F. E. Canda, E. F. Carry, J. L. Smyser, Lewis J. Cox, George H. Russel, C. R. Woodin, W. J. McBride, S. S. DeLano, W. M. Hager, Gerald Hoyt, W. H. Woodin, and James M. Buick. *Executive Committee:* William McMillan, W. K. Bixby, and Frederick H. Eaton. *Registrar:* Central Trust Company, New York City. *Transfer Agent:* Guaranty Trust Company, New York. Capital stock, \$60,000,000, of which \$30,000,000 is 7 per cent. non-cumulative preferred and \$30,000,000 is common. The company operates the following works:

ROLLING MILLS—2.

Jackson and Woodin Works, Berwick, Columbia county, Pa. Built in 1872; 10 double puddling furnaces, 7 heating furnaces, and 4 trains of rolls (one 9, one 12, and two 18-inch); product, merchant bar iron; annual capacity, 35,000 gross tons. Fuel, bituminous coal. Brand, "Berwick." Also build cars and manufacture car wheels, forgings, and cast-iron gas and water pipe. James H. Catteral, Superintendent. (Formerly operated by The Jackson and Woodin Manufacturing Company.)

Michigan-Peninsular Works, Detroit, Wayne county, Michigan. Forge originally built in 1870 and rolling mill in 1877; destroyed by fire in November, 1892, and immediately rebuilt; 10 heating furnaces, 4 busheling furnaces, 5 hammers, and 3 trains of rolls (12, 16, and 20-inch); product, bar iron, car axles, links and pins, and miscellaneous

forgings; annual capacity, 38,000 gross tons of bar iron and 45,000 car axles. Fuel, coal. A foundry for the manufacture of cast-iron gas and water pipe, two foundries for manufacturing car and other iron castings, two foundries for making car wheels, and large car-building shops are connected with these works. S. D. Leonard, Superintendent. (Formerly operated by the Michigan-Peninsular Car Company.)

Total annual capacity of the 2 rolling mills: 73,000 gross tons of rolled products and 45,000 car axles.

CAST-IRON PIPE WORKS—2.

Jackson and Woodin Works, Berwick, Pa. Product, cast-iron gas and water pipe and gray iron castings; sizes of pipe, from 3 to 16 inches; daily melting capacity, 50 gross tons. (Formerly operated by The Jackson and Woodin Manufacturing Company.)

Michigan-Peninsular Works, West Detroit, Michigan. Product, cast-iron gas and water pipe and gray iron castings; sizes of pipe, from 4 to 42 inches; daily melting capacity, 40 gross tons. (Formerly operated by the Michigan-Peninsular Car Company.)

Total daily melting capacity of the 2 works: 90 gross tons.

IRON AND STEEL CAR-AXLE WORKS—3.

Ensign Works, Huntington, West Virginia. Product, hammered car axles from wrought scrap iron; annual capacity, 20,000 axles. (Formerly operated by The Ensign Manufacturing Company.)

Jackson and Woodin Works, Berwick, Pa. Product, straight-rolled iron and steel car axles; annual capacity, 10,000 axles. (Formerly operated by The Jackson and Woodin Manufacturing Company.)

Michigan-Peninsular Works, Detroit, Michigan. Product, iron and steel car axles; annual capacity, 45,000 axles. (Formerly operated by the Michigan-Peninsular Car Company.)

Total annual capacity of the 3 works: 75,000 car axles.

13 CAR-WHEEL WORKS AND 13 IRON AND 3 BRASS FOUNDRIES.

Ensign Works, Huntington, West Virginia. Product, patent contracting cast-iron chilled car wheels; annual capacity, 90,000 wheels. Also solid and patent self-oiling mine and logging wheels; annual capacity, 12,000 wheels. Also produce brass castings; also gray iron castings. (Formerly operated by The Ensign Manufacturing Company.)

Indianapolis Works, West Indianapolis, Indiana. Product, all kinds of railroad car wheels; annual capacity, 60,000 wheels. Also produce gray iron castings. (Formerly operated by the Indiana Car and Foundry Company.)

- Jackson and Woodin Works, Berwick, Pennsylvania. Product, freight and mine car wheels; annual capacity, 100,000 chilled freight and 55,000 mine car wheels. Also produce gray iron castings. (Formerly operated by The Jackson and Woodin Manufacturing Company.)
- Madison Car Works, Madison, Illinois. Product, chilled cast-iron wheels for passenger, freight, engine, logging, mine, motor, and other cars; annual capacity, 150,000 wheels. Also produce gray iron and malleable castings for cars. (Formerly operated by the Missouri Car and Foundry Company.)
- Michigan-Peninsular Works, Detroit, Michigan. Two car-wheel plants. Product, chilled cast-iron car wheels; total annual capacity, 210,000 wheels. Also operate two gray-iron casting plants. (Formerly operated by the Michigan-Peninsular Car Company.)
- Milton Car Works, Milton, Pa. Product, gray iron castings. (Formerly operated by Murray, Dougal & Co., Limited.)
- Missouri Car and Foundry Works, St. Louis, Mo. Product, chilled cast-iron wheels for locomotive, passenger, freight, motor, mine, ore, logging, truck, and cable cars; annual capacity, 200,000 wheels. Also produce gray iron castings. (Formerly operated by the Missouri Car and Foundry Company.)
- Niagara Car Wheel Works, Buffalo, New York. Product, chilled cast-iron wheels for steam, electric, and street cars; annual capacity, 100,000 wheels. (Formerly operated by the Niagara Car Wheel Company.)
- Ohio Falls Works, Jeffersonville, Indiana. Product, all kinds of cast-iron car wheels; annual capacity, 75,000 wheels. Also produce gray iron and brass castings. (Formerly operated by The Ohio Falls Car Manufacturing Company.)
- St. Charles Works, St. Charles, Missouri. Product, chilled cast-iron car wheels; annual capacity, 86,000 wheels. Also produce gray iron, malleable iron, and brass castings for cars. (Formerly operated by the St. Charles Car Company.)
- Terre Haute Works, Terre Haute, Indiana. Product, Barr contracting chilled cast-iron freight and street car wheels; annual capacity, 75,000 wheels. Also produce gray iron castings. (Formerly operated by the Terre Haute Car and Manufacturing Company.)
- Union Works, Depew, New York. Product, chilled cast-iron car wheels; annual capacity, 100,000 wheels. Also produce gray iron castings. (Formerly operated by The Union Car Company.)
- Wells and French Works, Paulina and Blue Island avenues, Chicago, Illinois. Product, all kinds of chilled cast-iron car wheels; annual capacity, 130,000 wheels. Also produce gray iron castings. (Formerly operated by The Wells and French Company.)
- Total annual capacity of the 13 car-wheel works: 1,443,000 wheels.

CARBUILDING WORKS—15.

- Buffalo Car Works, Buffalo, New York. Product, all kinds of wooden freight cars; annual capacity, 5,000 cars. (Formerly operated by the Buffalo Car Manufacturing Company.)
- Ensign Works, Huntington, West Virginia. Product, freight cars; annual capacity, 6,000 cars. (Formerly operated by The Ensign Manufacturing Company.)
- Indianapolis Works, West Indianapolis, Indiana. Product, all kinds of freight cars; annual capacity, 4,500 cars. (Formerly operated by the Indiana Car and Foundry Company.)
- Jackson and Sharp Works, Wilmington, Delaware. Product, all kinds of sleeping, parlor, express, mail, baggage, electric, street, and cable cars; build cars with steel underframes. Sectional work for export a specialty. Also build and repair wooden vessels, car floats, lighters, etc., and operate a marine railway. Also manufacture and erect all kinds of architectural wood work, making a specialty of fine residences and office buildings. (Formerly operated by the Jackson and Sharp Company.)
- Jackson and Woodin Works, Berwick, Pa. Product, freight, mine, and construction cars; annual capacity, 6,000 cars. (Formerly operated by The Jackson and Woodin Manufacturing Company.)
- Madison Car Works, Madison, Illinois. Product, iron, steel, and wooden freight, caboose, horse, beer, refrigerator, ore, dump, construction, show, hay, furniture, tank, clay, sand, stock, logging, mining, cane, and other cars; annual capacity, 12,000 cars. (Formerly operated by the Missouri Car and Foundry Company.)
- Michigan-Peninsular Works, Detroit, Michigan. Product, all kinds of freight and refrigerator cars; annual capacity, 30,000 cars. (Formerly operated by the Michigan-Peninsular Car Company.) Building shops for the manufacture of structural and pressed steel cars, to be completed in October, 1901, and to have a daily capacity of 30 cars.
- Milton Car Works, Milton, Pa. Product, all kinds of freight cars; annual capacity, 4,500 cars. (Formerly operated by Murray, Dougal & Co., Limited.)
- Minerva Car Works, Minerva, Ohio. Product, iron, steel, and wooden freight cars. (Formerly operated by Pennock Brothers.) Closed indefinitely.
- Missouri Car and Foundry Works, St. Louis, Missouri. Product, iron, steel, and wooden freight, fruit, flat, box, circus, furniture, coal, hay, beer, caboose, stock, refrigerator, mine, ore, tank, logging, dump, horse, and other cars; annual capacity, 15,000 cars. (Formerly operated by the Missouri Car and Foundry Company.)
- Ohio Falls Works, Jeffersonville, Indiana. Product, freight, passenger, parlor, sleeping, and other cars; annual capacity, 6,000 freight and

- 300 passenger cars. (Formerly operated by The Ohio Falls Car Manufacturing Company.)
- St. Charles Works, St. Charles, Missouri. Product, iron, steel, and wooden passenger and freight cars of every description; annual capacity, 7,000 freight and 300 passenger cars. (Formerly operated by the St. Charles Car Company.)
- Terre Haute Works, Terre Haute, Indiana. Product, all kinds of freight cars; annual capacity, 9,000 cars. (Formerly operated by the Terre Haute Car and Manufacturing Company.)
- Union Works, Depew, New York. Product, wooden freight cars of all kinds; annual capacity, 10,000 cars. (Formerly operated by The Union Car Company.)
- Wells and French Works, Chicago, Illinois. Product, wooden inter-urban street, freight, and refrigerator cars; annual capacity, 12,000 freight and 1,000 street cars. (Formerly operated by The Wells and French Company.)
- Total annual capacity of the 15 carbuilding works: over 600 passenger and 128,000 freight, street, and other cars. Will make structural and pressed steel cars.

MALLEABLE IRON WORKS—2.

- Madison Car Works, Madison, Illinois. Eight annealing furnaces. Product, malleable castings for cars; daily capacity, 10 gross tons. (Formerly operated by the Missouri Car and Foundry Company.)
- St. Charles Works, St. Charles, Missouri. Product, malleable castings for cars; number of annealing furnaces, 10; daily capacity, 10 gross tons. (Formerly operated by the St. Charles Car Company.)
- Total daily capacity of the 2 works: 20 gross tons.

NATIONAL ENAMELING AND STAMPING COMPANY.

National Enameling and Stamping Company; executive offices, 81-83 Fulton st., New York. Salesrooms and warehouses: New York, 78-80 and 77-79 Beekman st.; Chicago, cor. Canal and Fulton sts.; St. Louis, Cass ave.; Milwaukee, St. Paul ave.; and Baltimore, 109 Hanover st. *Officers:* F. G. Niedringhaus, President, New York; Ferdinand A. W. Kieckhefer, First Vice-President, Milwaukee, Wis.; Frederick Haberman, Second Vice-President, New York; James E. Ingram, Treasurer, William H. Matthai, Secretary, and George W. Knapp, Director General, Baltimore, Md.; A. M. Steinhardt, Assistant Secretary and Assistant Treasurer, New York City. *Board of Directors:*

F. G. Niedringhaus, George W. Niedringhaus, Thomas K. Niedringhaus, James E. Ingram, William H. Matthai, George W. Knapp, F. Haberman, A. M. Steinhardt, Louis Haberman, Ferdinand A. W. Kieckhefer, Louis Bartling, H. August Luedke, and Charles N. King. *Executive Committee:* F. G. Niedringhaus, F. Haberman, F. A. W. Kieckhefer, William H. Matthai, and Thomas K. Niedringhaus. Capital stock, \$30,000,000, of which \$10,000,000 is 7 per cent. cumulative preferred and \$20,000,000 is common. Of the total capitalization \$1,603,400 of the preferred and \$4,558,200 of the common stock will remain in the treasury for the present. The company operates the following works:

ROLLING MILLS AND STEEL WORKS—2.

Granite City Rolling Mills, Granite City, Madison county, Ill. Built in 1895 and enlarged in 1899-1900; company declines to give a detailed description of the equipment of these works for the Directory; product, basic open-hearth steel ingots, billets, tinplate and sheet bars, and black plates or sheets for stamping, enameling, or tin and terne plates. Fuel, bituminous coal and producer gas. (Formerly operated by the Granite City Steel Company.)

St. Louis Rolling Mills, Second and Destrehan sts., St. Louis, Missouri. Built in 1879 and enlarged in 1900; company declines to give a detailed description of the equipment of these works for the Directory; product, stamping sheet iron for "granite iron ware," galvanizing sheets, and black plates for tin and terne plates. Fuel, coal. Brand, "Juniata" for galvanized sheets and "Granite Mills Soft Steel" for merchant grades. (Formerly called the Granite Iron Rolling Mills and operated by the St. Louis Stamping Company.)

TINPLATE WORKS—2.

Baltimore Branch, 109-13 Hanover st., Baltimore, Maryland. Works, Ohio avenue, and Light, Winder, and Byrd sts. Built in 1892 and first tinplates made in April, 1892; 5 sets; weekly capacity, 950 boxes of tinplates of 108 pounds. Fuel, coal. (Formerly operated by Matthai, Ingram & Co.)

St. Louis Tinplate Works, Second and Destrehan sts., St. Louis, Missouri. Tinning plant added to rolling mill in 1890; first tinplates made in November, 1890, and first terne plates in March, 1891; 14 sets; weekly capacity, 4,800 boxes of tin and terne plates of 108 pounds. Fuel, coal. Brands: for tinplates, "Granite" and "St. Louis" for charcoal and "Steel Coke" for coke; for terne plates, "Acme Old Method," "Alta," "Ex. Fine," and "S. L. S. Old Process." (Formerly called the Granite Iron Rolling Mills and operated by the St. Louis Stamping Company; later by the St. Louis Tinplate Company.)

Total weekly capacity of the 2 tinplate works: 5,750 boxes.

STAMPING AND ENAMELING WORKS—9.

Baltimore Branches, Baltimore, Maryland. Two plants: Matthai, Ingram & Co. Branch; office, 109-13 Hanover st., Baltimore; works, Ohio avenue, and Light, Winder, and Byrd streets; product, enameled, japanned, pieced, and stamped ware, etc.; (formerly operated by Matthai, Ingram & Co.) Keen and Hagerty Branch, 1610 Baltimore street, Baltimore; works, Ostend, Race, Clement, and Creek streets; product, enameled, galvanized, tinned, and japanned stamped ware; (formerly operated by the Keen and Hagerty Manufacturing Company.)

Bellaire Branch, Bellaire, Ohio. Product, enameled ware. (Formerly operated by the Stewart Enamel Company.)

Berlin Branch, Berlin, Long Island, New York. Product, enameled ware, galvanized iron ware, etc. (Formerly operated by the Haberman Manufacturing Company.)

Brooklyn Branches, office, 78-80 Beekman st., New York City. Two plants, one owned and one leased: Brooklyn A Branch, (owned,) 103-119 North Third st., Brooklyn; product, plain, japanned, and stamped tin ware and galvanized ware; (formerly operated by the American Stamping Company.) Brooklyn H Branch, (leased,) Metropolitan ave., Brooklyn; product, plain, japanned, and stamped tin ware; (formerly operated by the Haberman Manufacturing Company.)

Granite City Branch, Granite City, Illinois. Product, enameled, tinned, and stamped ware, etc. (Formerly operated by the St. Louis Stamping Company.)

Milwaukee Branch, St. Paul avenue, between Ninth and Eleventh sts., Milwaukee, Wisconsin. Product, enameled, tinned, japanned, brass, copper, and galvanized ware. (Formerly called the Milwaukee Stamping Works and operated by the Kieckhefer Brothers Company.)

Portland Branch, Portland, Connecticut. Product, enameled iron ware. (Formerly operated by The Eastern Tinware Company and the American Stamping Company.)

THE IRON AND STEEL WORKS

OF

THE UNITED STATES.

PART II—BY STATES AND DISTRICTS.

In Part II is embodied a description of all blast furnaces, rolling mills and steel works, and forges and bloomaries in the United States that are not described in Part I and that are now active or likely to be active at some future time. The descriptions in Part II are arranged by States and districts as in previous editions of the Directory, but with this difference, that all the iron and steel enterprises in each State and district are grouped together. Heretofore all the furnaces in the country were classified by States and districts under a general head, all the rolling mills and steel works under another head, and all the forges and bloomaries under still another head—each division being arranged by States and districts. By the present arrangement all enterprises of this character in any State or district that are not embraced in Part I and are owned by one firm or company are described in close connection in Part II, which also includes a list of all furnaces, rolling mills, and steel works that are described in Part I.

MAINE.

ROLLING MILLS—1.

Portland Rolling Mill, Portland Iron and Steel Company, Ligonias, South Portland, Cumberland county. Built in 1866; destroyed by fire on October 2, 1899, and rebuilt in 1900; 5 double puddling furnaces, 4 heating furnaces, and 3 trains of rolls (one 10-inch guide, one 18-inch bar, and one 18-inch muck); product, merchant bar iron, angle and shaped iron, bolt iron, rolled iron shafting, and punched iron for flumes, racks, and builders' use; annual capacity, 24,000 gross tons. Fuel, bituminous coal. Brands, "Refined" and "Special." Charles T. Means, President; William S. McGowan, Jr., Treasurer.

Number of rolling mills in Maine: 1. There are no active blast furnaces in Maine.

MASSACHUSETTS.

CHARCOAL FURNACES—3.

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; fuel, charcoal; 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.; C. W. Barnum, Secretary, Lime Rock, Conn.; R. A. Burget, Treasurer and General Manager, Richmond Furnace.—*Cheshire Furnace was last active in 1898; Van Deusenville Furnace was last active in 1896 and is not likely to again make pig iron; Richmond Furnace was active in 1901.*

Number of furnaces in Massachusetts: 3 charcoal stacks.

ROLLING MILLS AND STEEL WORKS—9.

Bridgewater Foundry, Machine, and Rolling Mill Company, Bridgewater, Plymouth county. Built in 1785 and 1874 and rebuilt in 1900; 10 heating furnaces, 1 air and 2 cupola furnaces, 5 trains of rolls, and 10 cut-nail machines; steam and water power; product, Bessemer and open-hearth bands, hoops, and tack plate; also chilled and sand rolls and all kinds of gray iron castings; annual capacity, 25,000 gross tons of rolled products and 5,400 kegs of cut nails. Fuel, coal. William H. Hart, President and Treasurer, L. H. Pease, Secretary, and E. Allen Moore, General Superintendent, New Britain, Conn.; John M. Stetson, Manager, Bridgewater, Mass. (Formerly operated by the Bridgewater Iron Company.) Owned by the Stanley Works, New Britain, Connecticut.

Danvers Iron Works, Sylvester & Co., 70 Kilby 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, and railroad and ship spikes; annual capacity, 4,500 gross tons. Fuel, soft coal. Brand, "Danvers."

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 20-inch); steam and water power; product, merchant bar iron, hot machine-

straightened shafting iron, track bolts, building rods, bolts, hangers, wagon axles, and steam and street railroad supplies; annual capacity, single turn, 15,000 gross tons. Fuel, coal and oil. Brands of bar iron, "Kinsley Best" and "Best Refined." A forge is connected with the works for the production of wagon axles, etc.; also a foundry and a machine shop. Oliver Ames, President; Oakes Ames, Treasurer and General Manager. Sales made by the company.

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 of rolled products and 140,000 kegs of cut nails. Fuel, bituminous coal. Brand, "Mount Hope Iron Works." Job M. Leonard, Treasurer; Henry B. Leonard, Agent. Selling agents, F. M. Trafton, 220 Congress street, Boston, Massachusetts; William L. Bowers, 134 South Water street, Providence, Rhode Island.

South Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Worcester, Worcester county, Massachusetts.—*For description of works see pages 34-5.*

Thomson-Houston Electric Company, Steel Foundry Department, 42 Centre st., Lynn, Essex county. (Operating for the General Electric Company; general office, Schenectady, New York.) W. C. Fish, Manager Lynn Works. Three 15-gross-ton acid open-hearth steel furnaces, two erected in 1892 and one in 1898; first steel made March 4, 1893; product, steel castings; annual capacity, 9,000 gross tons. Fuel, manufactured gas. C. A. Coffin, President; Eugene Griffin, J. P. Ord, and E. W. Rice, Jr., Vice-Presidents; M. F. Westover, Secretary; Henry W. Darling, 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-gross-ton converter and first made steel in December, 1887; one 20-gross-ton basic open-hearth steel furnace, with gas 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. Fuel, coal and manufactured gas. Brands, "Percha plates" and "Percha nails." Horace P. Tobey, Treasurer. Goods sold at the factory and at the company's store at 76 Pearl st., Boston.

United States Navy Yard, Charlestown, Suffolk county. Mill built in 1868; 16 forge fires, 13 chain fires, 5 heating furnaces, and 2 trains of rolls (one 10 and one 18-inch); product, bars for chain, cable, and

anchor iron, etc., for government use; annual capacity, single turn, 1,000 gross tons. Fuel, manufactured gas.

United States Steel Company, Everett, Middlesex county. One 24-pot crucible steel melting furnace; first steel made in September, 1899; annual capacity, 400 gross tons; two 15-gross-ton acid open-hearth steel furnaces built in 1900; first steel made December 20, 1900; annual capacity, 5,000 gross tons. Product, steel castings from $\frac{1}{4}$ of a pound to 60,000 pounds. Specialty, "Jupiter Steel Castings." Fuel, manufactured gas and coal. H. B. Whall, President; E. M. Low, Vice-President; H. R. Bradstreet, Secretary; Charles S. Miller, Treasurer; Eugene Edwards, General Manager.

Number of rolling mills and steel works in Massachusetts: 9. Of these 1 has a Clapp-Griffiths steel plant, 4 make open-hearth steel, and 1 makes crucible steel.

RHODE ISLAND.

ROLLING MILLS AND STEEL WORKS—2 COMPLETED AND 1 BUILDING.

Rhode Island Horse Shoe Works, Rhode Island Perkins Horse Shoe Company, Providence. Works at Valley Falls, Providence county, 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. Fuel, bituminous coal. Brands, "Perkins' United States Standard Horse and Mule Shoes," "Perkins' Tips," "Perkins' XL Steel Shoes," "Perkins' Toe-weight Shoe," "Perkins' 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.

Wales (John) Wire Company, Auburn, Providence county. Building works to contain one continuous heating furnace, 3 trains of rolls, (one 10, one 16, and one 26-inch,) 400 wire-drawing blocks, 42 wire-nail machines, and two 30-gross-ton basic open-hearth steel furnaces with an estimated annual capacity of 17,000 gross tons of ingots; product, to be rods, wire, and wire nails; estimated annual capacity, 25,000 tons of rods, 22,500 tons of wire, and 175,000 kegs of wire nails. Fuel, coal and gas. George R. Wales, President and General Manager; P. A. Rand, Secretary; Thomas MacBriar, Treasurer. Works will probably be ready for operation by January 1, 1902.

Washburn Wire Company, Phillipsdale, Providence county. Built in 1901 and first put in operation in May, 1901; 3 heating furnaces, 3 trains of rolls, (one 16, one 20, and one 24-inch,) and two 15-gross-ton

Wellman tilting open-hearth steel furnaces (one acid and one basic) with a total annual capacity of 16,000 gross tons of ingots (8,500 tons of acid and 7,500 tons of basic); first steel made August 17, 1901; product, flat and round rods; annual capacity, 20,000 gross tons of rolled products. Fuel, bituminous coal. Charles G. Washburn, President; Eugene F. Phillips, Vice-President; William L. Benedict, Treasurer; John D. Curtis, General Manager.

Number of rolling mills and steel works in Rhode Island: 2 completed and 1 building. Of these 1 has an open-hearth steel plant and 1 open-hearth steel plant is being built.

There are no active blast furnaces in Rhode Island.

CONNECTICUT.

CHARCOAL FURNACES—4.

Canaan Furnaces, Barnum Richardson Company, Lime Rock. Furnaces at East Canaan, Litchfield county. Two stacks; fuel, charcoal.—*For description of furnaces see page 78.*

Lime Rock Furnace, Barnum Richardson Company, Lime Rock, Litchfield county. One stack; fuel, charcoal.—*For description of furnace see page 78.*

Sharon Valley Furnace, Barnum Richardson Company, Lime Rock. Furnace at Sharon Valley, Litchfield county. One stack; fuel, charcoal.—*For description of furnace see page 78.*

Number of charcoal furnaces in Connecticut: 4 stacks.

ROLLING MILLS AND STEEL WORKS—7 COMPLETED AND 1 REBUILDING.

Aetna Nut Company, Southington, Hartford county. Built in 1872-3; 1 single puddling furnace, 1 scrap and 3 busheling furnaces, 3 heating furnaces, and 3 trains of rolls (one 8, one 10, and one 18-inch); product, merchant iron, machine-forged and hot-pressed nuts, washers, wrought butts, and hinges; annual capacity, 10,000 gross tons. Fuel, coal. H. H. Clark, President; Benjamin S. Porter, Secretary and Treasurer; S. D. Neal, General Manager.

Collins (The) Company, Collinsville, Hartford county. Established in 1826; 2 scrap and 4 heating furnaces, one 12-inch and one 18-inch train of rolls, 2 hammers, two 20-gross-ton steel cementing furnaces, four 2-pot crucible steel-melting holes, and one 24-pot Siemens gas steel-melting furnace; steam and water power; product, bar iron and cast steel all consumed in the production of "Collins" edge tools, steel plows, etc.; annual capacity of finished iron, single turn, 2,250 gross tons; of steel ingots, 600 tons. Fuel, manufactured gas. Edward H. Sears, President; Meigs H. Whaples, Secretary and Treasurer; William Hill, Agent. Treasurer's and transfer office, Hartford.

- Driggs-Seabury Gun and Ammunition Company, 25 Broad st., New York City. Works at Derby, New Haven county, Connecticut. One 2-gross-ton side-blow acid Tropenas steel furnace built in 1898 and first blow made in May, 1898; product, steel castings; annual capacity, 2,500 gross tons. Fuel, coke. Charles H. Williams, President and Treasurer; J. B. M. Grosvenor, Vice-President and Secretary.
- Farist (The) Steel Company, Bridgeport, Fairfield county. Built in 1868; enlarged since; 9 heating furnaces, 3 trains of rolls, (10, 12, and 16-inch,) 6 hammers, and one 24-pot Siemens gas crucible steel-melting furnace; product, crucible steel, rolled and hammered; also rerolls and hammers open-hearth and Bessemer steel; annual capacity, single turn, 1,800 gross tons of crucible ingots, 9,000 tons of rolled products, and 500 tons of forged products. Fuel, manufactured gas and coal. A spring shop for the manufacture of spiral springs and elliptic railroad springs added in 1883; enlarged in 1900. Brand, "The Farist Steel Co." Joel Farist, President; George Windsor, Secretary and Treasurer. Selling agents, John S. Brewer, Chicago, Illinois; Green & Dutro, St. Louis, Missouri.
- Malleable Iron Fittings Company, Branford, New Haven county. One 20-gross-ton acid open-hearth steel furnace built in 1896 and first steel made in that year; product, steel castings for machinery, bicycle, and gun work; annual capacity, 3,000 gross tons. Fuel, manufactured gas. Malleable iron castings are also produced. A. C. Walworth, President; L. J. Nichols, Secretary; A. E. Hammer, Treasurer and Manager; V. T. Hammer, Superintendent.
- National (The) Wire Corporation, New Haven, New Haven county. Built in 1899-1900 and first put in operation March 10, 1900; equipped for the production of wire rods, wire, and wire nails; works entirely destroyed by fire February 3, 1901; now being rebuilt; expect to be completed and in operation in April, 1902; will contain 2 continuous billet heating furnaces, 2 mufflers with 20 annealing pots, 1 rod mill with five trains of rolls, 75 wire-nail machines, and a large number of wire-drawing blocks; product, wire rods, wire, and wire nails; annual capacity, 90,000 gross tons of rods, 30,000 tons of wire, not including the quantity consumed in manufacturing nails, and 300,000 kegs of wire nails. Fuel, coal, petroleum, and coke. E. B. Webster, Managing Director and Treasurer; E. R. Hastings, President; W. H. Seaver, Secretary and Selling Agent; W. E. Hitchcock, Manager.
- New Haven Rolling Mill, New Haven Iron and Steel Company, New Haven, New Haven county. Completed in August, 1871; 8 puddling and 5 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 special shapes; annual capacity, 20,000 gross tons. Fuel, coal. Brand, "N. H." Add-

ing one 16-inch breakdown train, one 10-inch finishing train, and 3 heating furnaces; additions will increase annual capacity about 10,000 gross tons. C. C. Kauffman, President; Clarence Kennedy Crossan, Secretary and Treasurer; J. E. Schall, General Manager; John Male, Superintendent.

Wilmot and Hobbs (The) 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. Fuel, manufactured gas. Brand, "Swedoh." Also operates a cold-rolling department with an annual capacity of 15,000 gross tons. F. A. Wilmot, President and Treasurer; Albert N. Stanton, Vice-President; C. D. S. Miller, Second Vice-President; A. J. Middlebrook, Assistant Treasurer; R. F. Lewis, Superintendent of Manufacture. Selling agent, George Damerel, 253 Broadway, New York City.

Number of rolling mills and steel works in Connecticut: 7 completed and 1 rebuilding. Of these 1 makes Tropenas steel, 1 makes open-hearth steel, 2 make crucible steel, and 1 makes blister steel.

NEW YORK.

COKE AND MIXED ANTHRACITE AND COKE FURNACES—16 COMPLETED AND 2 BUILDING.

Buffalo (The) Union Furnace Company, Buffalo, Erie county. Two stacks: A Furnace, formerly called the Buffalo Furnace; B Furnace, formerly called the Union Iron Works. Fuel, Walston or Connells-ville coke.—*For description of furnaces see page 119.*

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.—*Active in 1900. See Rolling Mills in this State.*

Cedar Point Furnace, Witherbee, Sherman & Co., Incorporated, 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." F. S. Witherbee, President; G. D. Sherman, Vice-President; W. C. Witherbee, Treasurer; L. W. Francis, Secretary. Sales made by the company.—*Active in 1896.*

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, adapted for stove plates and 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.—*Active in 1900.*

Crown Point Furnaces, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Furnaces at Crown Point, Essex county, New York. Two stacks; fuel, coke.—*For description of furnaces see page 31.*

Franklin Furnace, Franklin Iron Manufacturing Company, Franklin Iron Works P. O., Oneida county. One stack, 70 x 15, built in 1871 and remodeled in 1883; idle for several years; operations resumed in 1899; fuel, anthracite coal and coke; ore, fossiliferous red hematite from Clinton, New York; product, foundry pig iron; annual capacity, 30,000 gross tons. Brand, "Franklin." A. E. Hedstrom, President, Buffalo, N. Y.; C. H. Smythe, Secretary, Clinton, N. Y.; W. A. Holden, Treasurer, Syracuse, N. Y.—*Active in 1900.*

Lackawanna (The) Iron and Steel Company, Scranton, Lackawanna county, Pa. Building two coke furnaces at West Seneca, Erie county, New York.—*For description of plant see page 88.*

Niagara Furnaces, Tonawanda Iron and Steel Company, North Tonawanda, Niagara county. Two stacks: Furnace A, 76 x 17½, built in 1873 and rebuilt in 1890-1; Furnace B, 80 x 18, built in 1895 and blown in November 5, 1896; 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. Brands, "Niagara" and "Tonawanda Scotch." William A. Rogers, President; Archer Brown, Vice-President; William M. Mills, Treasurer; W. T. Shepard, Secretary; W. B. Kerr, Superintendent. Selling agents, Rogers, Brown & Co., Buffalo, New York, Boston, Cincinnati, Cleveland, St. Louis, Chicago, and Pittsburgh; Rogers, Brown & Warner, Philadelphia.—*Active in 1901.*

Poughkeepsie Iron Company, A. E. Tower, Agent and Treasurer, 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, Lake Superior hematite, Dutchess county brown hematite, and Port Henry magnetic; product, foundry and forge pig iron; total annual capacity, 75,000 gross tons. Brand, "Poughkeepsie." A. E. Tower, President, Treasurer, and Agent; H. N. Brinsmade, Secretary. Selling agents, Crocker Brothers, 99 John st., New York.—*Active in 1901.*

Troy Furnaces, The Troy Steel Company, Troy. Furnaces on Breaker Island, Albany county, opposite Troy. Three stacks; fuel, anthracite coal and coke.—*For description of furnaces see page 79.*

Number of coke and mixed anthracite and coke furnaces in New York: 16 completed and 2 building stacks.

CHARCOAL FURNACES—3.

C Furnace, The Buffalo Union Furnace Company, Buffalo, Erie county. One stack; fuel, charcoal.—*For description of furnace see page 119.*

Salisbury Carbonate Iron Company, Millerton, Dutchess county. Two stacks, both leased. Chatham Furnace, at Chatham, Columbia county; one stack, 32 x 9, built in 1873 and blown in in July, 1873; warm blast, open top; (formerly called the Beckley Iron Works; leased from the Union Steel and Chain Company, 71 Broadway, New York.) Copake Iron Works, Copake Iron Works P. O., Columbia county; one stack, 32 x 9, built in 1872; cold and warm blast; open top; iron stoves; (leased from the Estate of Frederick Miles, deceased.) Ores, roasted carbonate from Ameniam, New York, and Kelley, Ameniam, and Shaker hematites; product, pig iron for gun castings, gun carriages, car-wheels, chilled rolls, and malleable castings; specialties, pig iron for gun castings, with a tensile strength of from 30,000 to 40,000 pounds, and iron for car-wheels; total annual capacity, 10,000 gross tons. Brands, "Salisbury" and "Carbonate." J. A. Moore, President and Treasurer, Millerton, N. Y.; L. Mallory, Vice-President, Chatham, N. Y.; B. C. Morehouse, Secretary, Chapinville, Conn. Sales made by the company.—*Active in 1901.*

Number of charcoal furnaces in New York: 3 stacks.

Total number of furnaces in New York: 19 completed stacks and 2 stacks building.

ROLLING MILLS AND STEEL WORKS—24 COMPLETED AND 1 BUILDING.

Albany Iron Works, Continuous Rail Joint Company of America, lessee, Newark, New Jersey. Works at Troy, Rensselaer county, New York. Established in 1819; 6 heating furnaces, 3 trains of rolls, (one 9, one 14, and one 20-inch,) 4 steam and 2 trip hammers, and 2 bolt, 8 rivet, and 2 nut machines; product, bars, patented type continuous rail joints, and finger bars; annual capacity, 50,000 gross tons. Fuel, coal. Robert Gray, Jr., President, Fernando C. Runyon, Secretary, Frederick T. Fearey, Treasurer, L. F. Braine, General Manager, and B. G. Braine, Engineer, Newark, N. J.; William J. Bradley, Superintendent, Troy. (Owned by the Troy Steel Company.)—*See page 79.*

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. Fuel, coal. Brand, "Auburn."

Buffalo Steel Company, Tonawanda, Erie county. Chicago office, 1227 Marquette Building. Built in 1900 and put in operation in August, 1900; 2 Lauth heating furnaces and two 14-inch trains of rolls; product, Bessemer steel bars, angles, channels, tees, and special shapes

- for agricultural implements and other purposes; bedstead angles a specialty; annual capacity, 50,000 gross tons. Fuel, coal and coke. L. E. Block, President; P. D. Block, 1st Vice-President; G. H. Jones, 2d Vice-President; J. H. Porter, Secretary; J. G. Joseph, Treasurer.
- Buffalo Steel Foundry, Pratt and Letchworth Company, Buffalo, Erie county.** Two acid open-hearth steel furnaces (one 7-gross-ton and one 9-gross-ton); product, steel castings; annual capacity, 6,000 gross tons. Fuel, producer gas. Malleable iron castings are also produced. O. P. Letchworth, President; W. C. Houck, Secretary; Josiah Letchworth, Treasurer; J. C. Bradley, Superintendent.
- Burden Iron Works, The Burden Iron Company, Troy, Rensselaer county.** Founded in 1813; 35 double and 10 single puddling furnaces, 12 heating furnaces, and 11 trains of rolls (six 9-inch, one 14-inch, and four 20-inch); product, bar and other merchant iron, horse-shoes, and boiler rivets; annual capacity, 45,000 gross tons. Fuel, bituminous coal. Brands of merchant iron, "H. B. & S." and "Burden Best." James A. Burden, President; James A. Burden, Jr., Vice-President; John L. Arts, General Manager; Nicholas J. Gable, Secretary.—*See Furnaces in this State.*
- 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, 5 hammers, nine 6-pot crucible steel-melting holes, and 2 trains of rolls (one 12 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; also crucible chrome steel castings; annual capacity, 3,500 gross tons. Fuel, manufactured gas. Brand, "Chrome." Ferdinand E. Canda, President; Charles J. Canda, Vice-President; F. Mora Canda, Secretary; Thomas I. Jones, Treasurer.
- Cohoes Rolling Mill, Cohoes Rolling Mill Company, Cortland and Canvass sts., Cohoes, Albany county.** Built in 1854; burned and rebuilt in 1883; 9 double puddling furnaces, 4 coal and 4 gas heating furnaces, and 4 trains of rolls (one 10, one 16, and two 21-inch); water-power; product, skelp and refined bar iron; specialties, high-grade iron for edge tools, butts, hinges, and boiler flues; annual capacity, 30,000 gross tons. Fuel, coal and producer gas. George H. Page, President; Samuel T. Page, Vice-President and Treasurer; Albert W. Powers, Secretary. (Formerly operated by Morrison, Colwell & Page.)
- Eckel Brothers Steel Company, Syracuse, Onondaga county.** Built in 1899 and first put in operation in that year; 2 Sweet heating furnaces and one 13-inch train of rolls; product, Bessemer and high-carbon merchant steel; annual capacity, single turn, 8,000 gross tons. Fuel, bituminous coal. Peter Eckel, President; Philip Eckel, Vice-President; Francis H. Nye, Jr., Secretary and Treasurer.

Elmira Steel Works, 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; 1 scrap furnace, 3 busheling furnaces, 6 single and 3 double puddling furnaces, 1 hammer, and one 3-high muck train of rolls. Bar mill erected in 1864; 6 coal heating furnaces and 4 trains of rolls, (one 3-high 9-inch, one 3-high 12-inch, one 2-high 18-inch, and one 3-high 22-inch.) Universal mill, built in 1884 to roll plates from 6 to 30 inches wide and of any thickness, has 2 gas heating furnaces. Annual capacity, 60,000 gross tons of bar, angle, and band iron, and steel plates. Two 20-gross-ton basic open-hearth steel furnaces added in 1896; annual capacity, 40,000 gross tons of ingots. Fuel, manufactured gas and coal. Brand, "Elmira." Address all communications to H. H. Ginsburg, Chairman, Bullitt Building, Philadelphia. (Formerly called the Elmira Rolling Mills.)

Johnson (Isaac G.) & Co., Spuyten Duyvil, New York City. Crucible steel plant erected in 1880; four 5-pot crucible steel-melting holes; annual capacity, 180 gross tons of crucible steel castings. Open-hearth steel plant erected in 1882; one 10 and two 8-gross-ton acid furnaces; annual capacity, single turn, 5,800 gross tons of open-hearth steel castings. Fuel, coal.

Lackawanna (The) Iron and Steel Company, Buffalo, Erie county. Building an extensive rolling mill and steel plant at West Seneca, Erie county, New York.—*For description of old works see pages 86-8.*

Manhattan Rolling Mill, Incorporated, 362 Avenue A., New York City. Built in 1892 and first put in operation September 1, 1892; 2 heating furnaces and 2 trains of rolls (one 10 and one 18-inch); product, horseshoe iron and horseshoes; annual capacity, single turn, 2,500 gross tons of horseshoe iron and horseshoes. Fuel, bituminous coal. Brand for horseshoe iron, a horseshoe inclosing the letters "J. L." John Leonard, President; Michael Blake, Vice-President; Frank D. Cadmus, Secretary; Frank X. Sadlier, Treasurer. (Formerly called the New York City Rolling Mill. Owned by John F. Hanley, 520 East Twenty-third st., New York City.)

New York Steel and Wire Company, 69 South street, New York City. Works at Astoria, Queens county. Built in 1900 and first steel made August 1, 1900; two 30-gross-ton basic open-hearth steel furnaces with an annual capacity of 45,000 gross tons; 1 blooming mill and 1 wire-rod mill; product, billets and wire rods; annual capacity, 40,000 gross tons of billets and 35,000 tons of wire rods. Fuel, producer gas. Two additional 30-gross-ton basic open-hearth steel furnaces may be erected. James M. Waterbury, President; J. M. Waterbury, Jr., Secretary; A. V. H. Ellis, Treasurer; J. B. Nau, Manager. Selling agents, B. Nicoll & Co., 59-61 Wall st., New York City.

Onondaga Steel Works, Sweet's Steel Company, Syracuse, Onondaga county. Built in 1863 and enlarged several times; 9 heating furnaces,

- 3 hammers, (from 200 to 2,000 lbs. each,) and 4 trains of rolls (two 9 and two 12-inch); use Sweet's patent gas furnaces, burning semi-bituminous coal; manipulate old Bessemer steel rails and locomotive tires. One 12-gross-ton basic open-hearth steel furnace, erected in 1899-1900, and first steel made in April, 1900; annual capacity, 10,000 gross tons of ingots. Product, bar steel, steel crow-bars, tire and spring steel, and steel for various other purposes; annual capacity, 18,000 gross tons. Special products, "Sweet's Excelsior" tire steel, "Sweet's" steel crow-bars, "Sweet's" toe-calks, and "Favorite" toe-calk steel. Fuel, manufactured gas. Wm. A. Sweet, President; H. L. Stevens, Secretary; C. H. Knapp, Treasurer; J. W. Maxwell, Superintendent. (Formerly operated by Sweet's Manufacturing Company.)
- Osborne (D. M.) & Co., Auburn, Cayuga county. Built in 1881; 5 heating furnaces, 3 trains of rolls, (one 8 and two 10-inch,) and 1 hammer; use scrap iron and steel billets; product, merchant bars of all sizes and shapes, part of which is used by the firm in the manufacture of agricultural machinery; annual capacity, 12,500 gross tons of rolled products and 6,000 tons of forged products. Fuel, bituminous coal. Contemplate erecting two 15-gross-ton basic open-hearth steel furnaces. T. M. Osborne, President; J. H. Osborne, Secretary; Edwin D. Metcalf, Treasurer and General Manager; C. F. Baldwin, Assistant Treasurer.
- Phoenix Horse Shoe Company, Poughkeepsie, Dutchess county. Built in 1873; 1 single puddling furnace, 2 gas and 22 coal heating furnaces, and 6 trains of rolls (four 9 and two 18-inch); specialty, horseshoes; annual capacity, 13,000 gross tons. Fuel, coal and manufactured gas. Brand, "Phoenix." Elisha H. Miller, President; James D. Keith, Secretary and Treasurer.—*See Rolling Mills and Steel Works 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, and 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. Fuel, coal. Jim Stevens, President; S. B. Stevens, Vice-President; Charles W. Lee, Secretary and Treasurer.
- Sanderson Brothers Steel Works, Crucible Steel Company of America, Empire Building, Pittsburgh, Pa. Works at Syracuse, Onondaga county, New York.—*For description of works see page 113.*
- Standard Rolling Mill, M. J. Dempsey, Fortieth st. and Eleventh ave., New York City. Built in 1891; 3 coal heating furnaces and 2 trains of rolls (10 and 18-inch); product, merchant bar, angle, and horseshoe iron; annual capacity, 6,000 gross tons. Fuel, manufactured gas. Brand, "Standard." William S. Dempsey, Superintendent.

Syracuse Works, American Steel Casting Company, Thurlow Station, Chester, Pa. Works at Geddes, Onondaga county, New York.—*For description of works see page 97.*

Troy (The) Steel Company, Troy, Rensselaer county. Three works, one of which is leased to the Continuous Rail Joint Company of America.—*For description of works see pages 79, 80, and 161.*

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. Fuel, coal.

Wickwire Brothers, Cortland, Cortland county. Built in 1900-1 and first put in operation on February 1, 1901; 1 heating furnace, 1 double wire-rod train, a large number of wire-drawing blocks, and 50 wire-nail machines; product, wire rods, wire, and wire nails; annual capacity, 40,000 gross tons of wire rods, 15,000 tons of wire, and 120,000 kegs of wire nails. Fuel, coal. Also manufacture wire cloth, wire goods, etc. Chester F. Wickwire, President; E. Stilson, Secretary; Theo. H. Wickwire, Treasurer.

Wurster (F. W.) & Co., 375-93 Kent ave., Brooklyn, Kings county. Built in 1890 and put in operation in 1891; 3 heating furnaces and 2 trains of rolls (one 10 and one 18-inch); product, merchant bar iron; annual capacity, 12,000 gross tons. Fuel, coal. Brand, "F. W. W. & Co." F. W. Wurster, Manager.

Number of rolling mills and steel works in New York: 24 completed and 1 building. Of these 1 makes Bessemer steel and 1 Bessemer steel plant is being built, 6 make open-hearth steel and 1 open-hearth steel plant is projected, and 3 make crucible steel.

IRON-ORE FORGES—1.

Standish Iron Works, Chateaugay Ore and Iron Company, Plattsburgh, Clinton county. Works at Standish, Clinton county. Built in 1895; 18 fires and 3 hammers; steam power; product, charcoal blooms for general purposes and charcoal billets for crucible-steel melting stock of high grade, both made from Chateaugay ore; annual capacity, 6,000 gross tons. Smith M. Weed, President; Frank E. Smith, Vice-President; Talbot Olyphant, Secretary and Treasurer; J. N. Stower, General Manager. Number of iron-ore forges in New York: 1.

NEW JERSEY.

COKE, MIXED ANTHRACITE AND COKE, AND ANTHRACITE FURNACES—11 COMPLETED, 1 BUILDING, AND 1 PROJECTED.

Andover Iron Works, Andover Iron Company, Phillipsburg, Warren county. One stack, No. 1, 75 x 16, built in 1848 and rebuilt in 1886; 4 Siemens-Cowper-Cochrane stoves; fuel, anthracite coal and coke;

ores, magnetite from the company's mines, local limonite, and Lake Superior red hematite; product, foundry, basic open-hearth, and forge pig iron; annual capacity, 40,000 gross tons. Brand, "Andover." H. M. Howe, President, Joseph Wharton, Vice-President, and L. B. Allison, Secretary and Treasurer, 240 South Third st., Philadelphia; S. B. Patterson, Superintendent, Phillipsburg. Furnace may be rebuilt in 1902 and size changed to 90 x 18 and annual capacity increased to 75,000 tons. All the stock of the Andover Iron Company was bought in the spring of 1901 by Joseph Wharton. The organization of the company remains.—*Active in 1900.*

Franklin Furnace, (owned,) The Lackawanna Iron and Steel Company, Buffalo, Erie county, New York. Furnace at Franklin Furnace P. O., Sussex county, New Jersey. One stack; fuel, anthracite coal and coke.—*For description of furnace see page 87.*

Hackettstown Furnace, Carteret Steel Company, 150 Broadway, New York City. Furnace at Hackettstown, Warren county, New Jersey. One stack, 60 x 15, built in 1874-5 and put in blast in 1875; idle for several years; revived and rebuilt in 1899; Kent stoves; fuel, coke; ores, principally New Jersey magnetic and concentrates; product, miscellaneous grades of pig iron; annual capacity, 35,000 gross tons. C. J. Luther, Superintendent. (Formerly called Warren Furnace).—*Active in 1900. See Rolling Mills and Steel Works in this State.*

Musconetcong Furnace, Musconetcong Iron Works, Stanhope, Sussex county. One stack, No. 2, 80 x 18, built in 1871 and rebuilt in 1900; 3 stoves (one Kent, one double Durham, and one single Durham); fuel, anthracite coal and coke; ores, New Jersey magnetite, Lake Superior, Cuban, and foreign; product, foundry, mill, Bessemer, and low-phosphorus pig iron; annual capacity, 35,000 gross tons. F. P. Howe, President, and John J. Kirk, Treasurer, 225 Drexel Building, Philadelphia; John S. Kennedy, Manager, Stanhope, N. J. Selling agents, Crocker Brothers, 99 John st., New York. (One stack, No. 1, 70 x 17, built in 1841, abandoned. A. Pardee & Co., owners, Drexel Building, Philadelphia).—*Active in 1901.*

New Jersey (The) Zinc Company, 11 Broadway, New York. Three stacks, two located at Newark, Essex county, and one in Hudson county. Newark Furnaces: A, 31 x 8, built in 1885 to take the place of two stacks built in 1855 and 1863; and B, 50 x 12, built in 1883 to take the place of a stack built in 1871; Furnace B rebuilt in 1896. Hudson County Furnace: 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 and coke; product, spiegeleisen from zinc residuum; total annual capacity, 25,000 gross tons. S. S. Palmer, President, W. P. Hardenbergh, Vice-President, and A. P. Cobb, Secretary, 11 Broadway, New York; D. A. Van Ingen, Superintendent, Newark, N. J. All sales made by the company.—*Active in 1901.*

Oxford Furnace, Empire Steel and Iron Company, Catasauqua, Pa. Furnace at Oxford, Warren county, New Jersey. One stack; fuel, anthracite coal. A new furnace may be erected.—*For description of furnace see page 85.*

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, $\frac{2}{3}$ anthracite coal and $\frac{1}{3}$ 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." John S. Fackenthal, General Manager, Riegelsville, Pa.—*Active in 1900. See Durham Iron Works (Blast Furnaces) in the Lehigh Valley, Pennsylvania.*

Wharton Furnaces, Port Oram, Morris county. Two completed stacks and one building: No. 1, 75 x 17, built in 1868, first blown in in 1869, remodeled in 1889, and old stack replaced by new steel shell stack in 1892; No. 2, 100 x 21, built in 1900-1 and first blown in August 15, 1901; four regenerative hot-blast stoves; fuel, anthracite coal and coke; ores, Hibernia (New Jersey) magnetic and Lake Superior hematite; product, neutral foundry, forge, and basic open-hearth pig iron; total annual capacity, 180,000 gross tons. Brand, "Wharton." No. 3, building, to be 100 x 21, and to have four stoves, each 100 x 21. (No. 1 formerly called Port Oram Furnace.) Equipped with one Uehling pig-iron casting machine. Joseph Wharton, Proprietor, Philadelphia; Edward Kelly, Manager, Port Oram. Selling agents, B. Nicoll & Co., 59-61 Wall st., New York City.—*Active in 1901.*

Number of coke, mixed anthracite and coke, and anthracite furnaces in New Jersey: 11 completed, 1 building, and 1 projected. No charcoal stacks.

ROLLING MILLS AND STEEL WORKS—22 COMPLETED AND 1 BUILDING.

American Horse Shoe Company, Phillipsburg, Warren county. Built in 1865; 6 heating furnaces and 3 trains of rolls (two 9-inch guide and one 18-inch bar); product, a superior grade of horseshoe bars; specialty, horseshoes; annual capacity, 7,000 gross tons. Fuel, coal. Brand, "American." Charles H. Holton, President; Philip S. Dyer, Secretary and Treasurer. (Formerly called the Delaware Rolling Mill.) American Sheet Iron Works, American Sheet Iron Company, Phillipsburg, Warren county. Built in 1867; enlarged in 1870, 1873, 1882, and 1892; 1 double puddling furnace, 2 heating furnaces, 3 sheet-finishing furnaces, 1 pair furnace, 3 annealing furnaces, one 22-inch muck mill, one 22-inch bar mill, two 22 x 44-inch sheet mills, and one 22 x 30-inch black-plate mill, all hot, two 22 x 26-inch cold mills, 1 rotary squeezer, and 1 hammer; product, best qualities of sheet iron and sheet steel for stamping and enameling and black

plates for tinning; annual capacity, triple turn, 2,400 gross tons of sheets and 1,500 tons of black plates. Fuel, anthracite and bituminous coal. Brand, for sheets only, "American R. G. Cleaned." Walter C. Harris, President; George Danby, Secretary and Treasurer; Mark Danby, Superintendent. Selling agents, L. & R. Wister & Co., Bullitt Building, Philadelphia.

Atha (Benjamin) & Co., Newark, Essex county. Began operations in 1864; 2 open-hearth steel furnaces (one 15-gross-ton acid and one 20-gross-ton basic); product, steel castings; annual capacity, 12,000 gross tons. Fuel, coal. Benjamin Atha, President; Abram C. Denman, Secretary; Herbert B. Atha, Treasurer. (Formerly called the Newark Steel Works and operated by the Benjamin Atha and Illingworth Company. The trains of rolls and crucible steel furnaces with which this plant was formerly equipped have been dismantled.)

Atha Steel Company, Harrison, Hudson county, New Jersey. Controlled by the Crucible Steel Company of America, Empire Building, Pittsburgh, Pa.—*For description of works see page 110.*

Boonton Iron Works, Boonton Iron and Steel Company, lessee, Boonton, Morris county. Built originally in 1825 and enlarged since; 9 double puddling furnaces, 3 heating furnaces, and 3 trains of rolls (one 9, one 16, and one 18-inch); product, bar iron and angles; annual capacity, 13,500 gross tons. Fuel, bituminous coal. Brand, "Boonton." Charles Brock, President; R. A. Anthony, Vice-President; F. A. Anthony, Secretary; A. P. Smith, Treasurer. (Cut-nail department dismantled. Owned by the Estate of J. Couper Lord; Benjamin Nicoll, Secretary, 68 Wall st., New York.)

Carteret Steel Company, 150 Broadway, New York City. Works at Carteret, Middlesex county. Built in 1896; one 5-gross-ton basic open-hearth steel furnace, erected for experimental purposes; product, half-ton ingots. Fuel, coal. Henry A. Jones, President; J. C. Davis, Secretary and Treasurer.—*See Hackettstown Furnace in this State.*

Cumberland Nail and Iron Works, Bridgeton, Cumberland county. 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 3,200 gross tons of gas tubes. Fuel, bituminous coal and oil. Brand, "Cumberland." (Owned by Frank M. Riley, Trustee for the Bondholders of the Cumberland Nail and Iron Company, Bridgeton, N. J. The tube department is now known as the Cumberland Pipe Works, and is operated under lease by John M. Reeves & Co., Drexel Building, Philadelphia.)

Dover Iron Works, The Dover Iron Company of New Jersey, Dover, Morris county. Built about 1770 and rebuilt several times; 1 single and 4 double puddling furnaces, 2 heating furnaces, and 3 trains of rolls (10, 18, and 20-inch); steam and water power; product, bar

- iron, boiler rivets, socket bolts, and brace jaws; annual capacity, 5,500 gross tons. Fuel, bituminous coal. Brand for merchant bars, "Dover;" brand for rivets, "D." This company also manufactures "Ulster" iron for C. R. Mulligan, 139 Greenwich st., New York. Mahlon Pitney, President; H. W. Crabbe, Secretary and Treasurer.
- Graphite Metal Company, 15 Cortlandt st., New York City. Works at Garwood, Union county, New Jersey. Buildings erected in 1898; steel plant installed in 1901; three special furnaces; first steel made in February, 1901; product, graphitic steel castings with a tensile strength of from 35,000 to 70,000 pounds; graphitic steel can be forged, welded, or tempered; annual capacity, 2,000 gross tons. Fuel, coal and coke and chlorine, hydrogen, and nitrogen gases. William B. Smith, President; Thomas J. Fambro, Secretary; James P. Powers, Treasurer; Walter E. Smith, Superintendent.
- Heller Brothers Company, Newark, Essex county. Crucible steel works, built in 1882; 30 two-pot crucible steel-melting furnaces; annual capacity, double turn, 2,000 gross tons of ingots; 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 rasps, files, and other tools; annual capacity, single turn, 1,000 gross tons of rolled products. Fuel, bituminous coal and gas. Elias G. Heller, President; Paul E. Heller, Vice-President; Arnaud G. Heller, Secretary and Treasurer; George E. Heller, Manager Rasp and File Works; John J. Heller, Assistant Manager Rasp and File Works; Ernest A. Geoffroy, Manager Steel Works. (Formerly called the Heller & Brothers Steel Works.)
- Janson Steel and Iron Company, Oxford, Warren county. Built in 1866 and rebuilt in 1900; 16 puddling furnaces, 4 heating furnaces, 3 trains of rolls, (one 12 and two 22-inch,) and 2 spike machines; product, bar iron and steel; annual capacity, 20,000 gross tons. Fuel, bituminous coal. Joseph Janson, President; Val. Janson, Secretary and Treasurer; Frank Janson, Manager. (Formerly called the Oxford Iron and Nail Works. The cut-nail machines formerly in this plant have been dismantled; the spike machines are idle.)
- 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. Fuel, producer gas.
- Ludlum (The) Steel and Spring Company, Pompton, Passaic county. Built in 1863; 4 heating furnaces, 2 trains of rolls, (one 9 and one 18-inch,) and 2 hammers; 48 crucible steel-melting pots with an annual capacity of 1,800 gross tons of ingots; product, crucible cast steel and railway car springs; annual capacity, 1,600 gross tons of rolled and 200 tons of forged products. Fuel, coal. Brand, "Pomp-

ton." H. A. Peckham, President; James W. Cox, Jr., Vice-President; William E. Ludlum, Secretary and Treasurer. (Formerly operated by the Pompton Steel and Iron Company.)

Oliphant Steel and Iron Company, Trenton, Mercer county. Built in 1900 and first steel made in November, 1900; one 6-gross-ton acid open-hearth steel furnace; product, steel castings; annual capacity, 2,000 gross tons. Fuel, oil. Hughes Oliphant, President; Richard C. Oliphant, Vice-President; Robert N. Oliphant, Secretary; Sidney M. Oliphant, Treasurer.—*Idle and for sale.*

Pardee (The C.) Works, Incorporated, Perth Amboy, Middlesex county. Built in 1900 and put in operation December 1, 1900; 1 heating furnace and one 12-inch train of rolls; product, steel merchant bars; annual capacity, 8,000 gross tons. Fuel, bituminous coal. Ario Pardee, President; Samuel B. Morgan, Vice-President, Treasurer, and General Manager; Charles F. Eilert, Secretary.

Passaic Rolling Mills and Bridge Works, The Passaic Rolling Mill Company, Paterson, Passaic county. New York office, 45 Broadway; Boston office, 31 State st. Built in 1867 and incorporated in 1869; 8 double puddling furnaces, (4 coal and 4 gas,) 9 gas heating furnaces, and 6 trains of rolls, (one puddle, one 9, one 18, one 23, and one 28-inch, and one 30-inch universal.) Steel department, added in 1889-90 and enlarged in 1894, contains five 25-gross-ton open-hearth furnaces, (two acid and three basic,) 2 reheating furnaces, blooming mill, shears, and other hydraulic machinery. Annual capacity, 15,000 gross tons of acid and 25,000 tons of basic ingots. Product, structural material, including beams, channels, angles, tees, universal mill plates, and merchant bars; annual capacity, 100,000 gross tons of rolled products. The plant includes a bridge-building department, with modern outfit, including steel eye-bar plant; annual capacity of bridge shops, 12,000 gross tons. Fuel, manufactured gas. Brand, "Passaic." W. O. Fayerweather, President and Treasurer; A. C. Fairchild, Vice-President; J. B. Cooke, Secretary; John K. Cooke, General Manager; George H. Blakely, Chief Engineer.

Rockaway (The) Iron and Steel Company, Rockaway, Morris county. Built in 1900-1 and first put in operation in May, 1901; 5 busheling furnaces, 2 heating furnaces, and 3 trains of rolls (one 10, one 12, and one 18-inch); product, merchant bars; annual capacity, 10,000 gross tons. Fuel, bituminous coal. Brand, "Rockaway." John Barker, President; William M. Smith, Vice-President; A. K. Barker, Treasurer.

Roebbling's (John A.) Sons Company, Trenton, Mercer county. Established in 1852; rolling mill rebuilt in 1873 and in 1887; now used only for rolling wire rods; it is a modified Garrett mill and has 3 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, a copper wire, and insulated

wire and cable department. Annual capacity for iron, steel, and copper wire, 65,000 gross tons; of rolling mill, 45,000 gross tons of wire rods. Fuel, manufactured gas and coal. Charles G. Roebling, President; Washington A. Roebling, Vice-President; Ferdinand W. Roebling, Secretary and Treasurer. Branch stores, 117 Liberty st., New York City; 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, 4 heating furnaces, one 2-high 18-inch train of muck rolls, and 1 large steam helve hammer; product, muck and scrap bar for car and locomotive axles; also car and locomotive axles and shafts and similar forgings from steel blooms; annual capacity of axles and shafts, 7,000 gross tons. Steel department, for making Hadfield steel, with special furnaces added in 1892 and first steel made in September, 1892; product, Hadfield's manganese, chrome, and other steel castings, including armor-piercing projectiles of large and medium calibre. Fuel, coal and coke. Lewis H. Taylor, President; T. F. Budlong, Secretary and Treasurer; Walter Gaston, General Manager.

Tremley Point Plant, American McKenna Process Company, Milwaukee, Wisconsin. Building works at Tremley Point, Union county, New Jersey, to be equipped with 3 heating furnaces and 3 trains of rolls (one 12 and two 30-inch) for renewing old steel rails; works will probably be completed and ready for operation in January, 1902; annual capacity, 180,000 gross tons. Fuel, coal. Howard Morris, President, Milwaukee, Wisconsin; D. H. Lentz, General Superintendent, Joliet, Illinois.—*See Rolling Mills and Steel Works in Illinois (Joliet Plant) and Kansas, (Kansas City Plant.)*

Trenton (The) Iron Company, Trenton, Mercer county. New York office, Cooper, Hewitt & Co., 17 Burling Slip. Built in 1845; 3 heating furnaces, one 3-ton hammer, one 12-inch train of rolls, and 1 wire-rod mill, consisting of two 12 and two 10-inch trains; wire works contain 500 blocks; operates several trains of cold rolls for rolling round wire into flat wire; 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 rod capacity, 18,000 gross tons. Fuel, coal and producer gas. Abram S. Hewitt, President, and Peter Cooper Hewitt, Treasurer, New York; William Hewitt, Vice-President, E. Hanson, Secretary, and Charles E. Hewitt, Managing Director, Trenton. Selling agents, Cooper, Hewitt & Co., 17 Burling Slip, New York.

Uniform Steel Company, 320 Broadway, New York City. Works at Belleville, Essex county. Built in 1901 and first steel made May 20,

1901; twelve 4-pot coal-fired crucible steel-melting furnaces; capacity of each pot, 100 pounds; product, tools, dies, and high-grade machine castings; annual capacity, 3,150 gross tons. Fuel, coal. Michael F. Burns, President; S. M. Schatzkin, Secretary, Treasurer, and Manager; A. E. Williamson, Selling Agent.

West Bergen Steel Works, operated by The Spaulding and Jennings Company, Jersey City, Hudson county. Controlled by the Crucible Steel Company of America, Empire Building, Pittsburgh, Pa.—*For description of works see pages 113-4.*

Number of rolling mills and steel works in New Jersey: 22 completed and 1 building. Of these 4 make open-hearth steel, 5 make crucible steel, and 2 make special steel.

PENNSYLVANIA.

PHILADELPHIA COUNTY.

Embraces Rolling Mills and Steel Works in Philadelphia and Philadelphia County.

ROLLING MILLS AND STEEL WORKS—9.

Davis Brothers Rolling Mill, Davis Brothers, Twenty-ninth and Bristol streets, Philadelphia. Built in 1900 and first put in operation in June, 1900; 1 forge fire, 1 heating furnace, two 10-inch trains of rolls, and 6 spike machines; product, rods, rounds, and squares, consumed in the manufacture of railroad, ship, bridge, boat, and wharf spikes; annual capacity, 5,000 gross tons of rolled products and 4,500 gross tons of spikes. Fuel, anthracite and bituminous coal. Charles Gibbons Davis, Manager and Owner. Selling agent, Cleveland Foote, 47 Broadway, New York. (Works at Canal st. near Germantown ave., built in 1874, destroyed by fire in October, 1899, and not rebuilt.)

Fair Hill Rolling Mill, Gaulbert & Caskey, York and American sts., Philadelphia. Built in 1855; 4 single puddling furnaces, 4 heating furnaces, and 3 trains of rolls (two 9 and one 10-inch); product, merchant bar iron; annual capacity, 12,200 gross tons. Fuel, bituminous coal. 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 crucible 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. Fuel, coal.

Hughes & Patterson, Richmond st. and Susquehanna ave., Philadelphia. Two works in Philadelphia: Delaware Rolling Mill, at Richmond st. and Susquehanna ave., 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. Fuel, bituminous coal. Brands, "H. & P. Best," "H. & P. Best-best," and "H. & P. Stay-bolt." Officers of Hughes & Patterson, Incorporated: R. J. Hughes, President and Secretary; Walter Hatfield, Vice-President and Treasurer.—See *Tinplate Works in Pennsylvania*, (*Philadelphia Iron and Tinplate Works*.)

Keystone Saw, Tool, Steel, and File Works, Henry Disston & Sons, (incorporated,) Tacony, Philadelphia. Address all communications to P. O. Box 1537, Philadelphia. Branch offices: Boston, Mass.; Cincinnati, Ohio; Chicago, Ill.; Louisville, Ky.; New Orleans, La.; and San Francisco, Cal. Manufacture of saws started in 1840 and steel in 1854; one 30-gross-ton steel cementing furnace, one 30 and three 24-pot crucible steel-melting furnaces; first rolling mill built in 1866; 2 forge fires, 6 trains of rolls, (one 9-inch rod, one 18-inch bar and band, two 16 and one 20-inch sheet, and one 28-inch plate,) 1 gas and 16 coal heating and annealing furnaces, and 2 hammers (one 1,100-lb. and one 2½-ton); one 9-gross-ton basic open-hearth steel furnace added in 1900 and first steel made October 3, 1900; product, principally saw steel of every description, engravers' plates, and sheet steel for all other purposes; annual capacity, 7,000 gross tons of crucible ingots, 3,000 tons of open-hearth ingots, and 5,380 tons of rolled products. The product of the 18-inch train for band saws and the 9-inch guide mill is bar and band steel of all kinds; annual bar and band and rod-rolling capacity, 15,000 gross tons. The steel works were originally built in Philadelphia and were removed to Tacony in 1879, 1881, 1883, and 1884. Fuel, coal and manufactured gas. Brand, "Disston." William Disston, President; Henry Disston, Vice-President; Jacob S. Disston, Treasurer; Robert J. Johnson, Assistant Treasurer; Samuel Disston, Secretary and General Manager.

Midvale (The) Steel Company, Nicetown, Philadelphia. This company declines to give a description of its works for publication in the Directory. It manufactures crucible and open-hearth steel ingots and castings, and also produces hammered car axles, steel gun forgings, and other forms of rolled and forged finished steel products.

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, 4 trains of rolls, (two 12, one 16, and one 18-inch,) and 1 hammer; product, 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,

10,000 gross tons of rolled products. Fuel, bituminous coal. Brand for springs, "W. & H. Rowland." Edward Rowland, President; Edward K. Rowland, Vice-President; Charles Rowland, Treasurer; E. Burrows Rowland, Secretary. (Crucible steel plant, containing 16 two-pot crucible steel-melting furnaces, abandoned.)

Wharton, Jr., (William) & Co., Incorporated, Station "D," Twenty-fifth st. and Washington ave., Philadelphia. One 2-gross-ton Tropenas steel converter, built in 1901 and first blow made in June, 1901; product, steel castings, chiefly consumed by the company in its switch works; annual capacity, 2,000 gross tons. Fuel, coke. William Wharton, Jr., President; Victor Angerer, Vice-President; Richard Ashhurst, Secretary and Treasurer; L. Koppenhoefer, Assistant Secretary; William Selfridge, Assistant Treasurer.

Number of rolling mills and steel works in Philadelphia county: 9.

Of these 2 make open-hearth steel, 3 make crucible steel, 1 makes blister steel, and 1 makes Tropenas steel.

There are no blast furnaces in Philadelphia or in Philadelphia county.

LEHIGH VALLEY.

Embraces Blast Furnaces, Rolling Mills, and Steel Works located in Northampton, Lehigh, Carbon, and Bucks Counties.

ANTHRACITE AND MIXED ANTHRACITE AND COKE FURNACES—29.

Allentown Iron Works, lessees, Allentown, Lehigh county. Philadelphia office, 106-8 South Fourth 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, Pennsylvania magnetic, Lake Superior, and local hematite; product, foundry and low-phosphorus pig iron; total annual capacity, 60,000 gross tons. Brand, "Allentown." J. Mitchell Clark, President; W. S. Pilling, Vice-President; J. A. Rawlins, Treasurer; Edward T. Clymer, Manager. Selling agents, John W. Quincy & Co., 100 William st., New York City; Pilling & Crane, Girard Building, Philadelphia. (Four stacks, built in 1846 and later years, abandoned. Owned by the Allentown Iron Company.)—*Active in 1901.*

Allentown (The) Rolling Mills, 229 Drexel Building, Philadelphia. Works at Allentown, Lehigh county. 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, foundry and gray forge pig iron; total annual capacity, 24,000 gross tons. Brand, "A. R. Mills."—*Active in 1901. See Rolling Mills and Steel Works in this Valley.*

Bethlehem Furnaces, Bethlehem Steel Company, South Bethlehem, Northampton county. Four stacks; fuel, anthracite coal and coke. —*For description of furnaces see page 82.*

Carbon Iron Works, Carbon Iron and Steel Company, Limited, Mauch Chunk. Works at Parryville, Carbon county. One stack, 66 x 15, built in 1869 and blown in in 1870; rebuilt in 1894-5 and in 1898; three 18 x 65 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. M. S. Kemmerer, Chairman, and H. A. Butler, Secretary and Treasurer, Mauch Chunk; S. S. Freeman, Superintendent, Parryville. Sales made by the company.—*Active in 1901.*

Crane Furnaces, Crane Iron Works, Catasauqua, Lehigh county. Four stacks; fuel, anthracite coal and coke. Controlled by the Empire Steel and Iron Company, Catasauqua.—*For description of furnaces see page 84.*

Crumwold Furnace Department, Reading Iron Company, Reading. Furnace at Emaus, Lehigh county. One stack; fuel, anthracite coal and coke.—*For description of furnace see page 93.*

Durham Iron Works, Cooper & Hewitt, Riegelsville, Bucks county. New York office, 17 Burling Slip. One stack, 75 x 18, built in 1874 and first blown in in February, 1876; six Cooper-Durham iron stoves; fuel, anthracite coal and Connellsville coke; ores, foreign, Lake Superior, local hematite, and New Jersey magnetic; product, foundry, forge, basic open-hearth, and Bessemer pig iron; iron actually made in one calendar year, 38,525 gross tons. Brand, "Durham." John S. Fackenthal, General Superintendent. John Jameson and A. F. Baker are organizing a company to purchase and operate the works.—*Active in 1901. See Pequest Furnace in New Jersey.*

Lehigh Steel and Iron Company, Allentown, Lehigh county. Two stacks: No. 1, 65 x 16, completed July 22, 1869, and rebuilt in 1886; No. 2, 60 x 15, completed October 21, 1872, and rebuilt in 1888; closed tops and fronts; fuel, anthracite coal and coke; ores, Lehigh county and Lake Superior hematite and New Jersey magnetic; specialty, high-grade foundry pig iron; total annual capacity, 57,000 gross tons. Brand, "Lehigh." W. H. Ainey, President; F. J. Remmel, Secretary.—*Active in 1900.*

Macungie Furnace, Empire Steel and Iron Company, Catasauqua. Furnace at Macungie, Lehigh county. One stack; fuel, anthracite coal and coke.—*For description of furnace see page 85.*

New Jersey Zinc Company, (of Pennsylvania,) South Bethlehem, Northampton county. One stack, 35 x 9, first put in blast in February, 1882; two Durham stoves; fuel, anthracite coal and coke; product, spiegeleisen from zinc residuum; annual capacity, 5,400 gross tons. S. S. Palmer, President; A. P. Cobb, Secretary. Sole selling agents, The New Jersey Zinc Company, 11 Broadway, New York

City. (Formerly operated by the Lehigh Zinc and Iron Company.)
—Active in 1901.

Thomas Iron Works, The Thomas Iron Company, Easton. Ten stacks, all located in Lehigh and Northampton counties; fuel, anthracite coal alone and anthracite coal and coke mixed.—*For description of furnaces see pages 80-1.*

Number of anthracite and mixed anthracite and coke furnaces in the Lehigh Valley: 29 stacks.

ROLLING MILLS AND STEEL WORKS—11.

Allentown (The) Rolling Mills, 229 Drexel Building, Philadelphia. Works at Allentown, Lehigh county. 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. Brand, "A. R. M." Fuel, coal and oil. H. M. Howe, President, 229 Drexel Building, Philadelphia; H. W. Allison, Secretary, Treasurer, and General Manager, Allentown. (Glen Iron Works, first put in operation in 1870, dismantled in 1899.)—*See Furnaces in this Valley.*

Allentown Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Allentown, Lehigh county, Pa.—*For description of works see pages 31-2.*

Bethlehem Rolling Mills and Steel Works, Bethlehem Steel Company, South Bethlehem, Northampton county.—*For description of works see pages 82-3.*

Bristol Rolling Mill, Consolidated Iron and Steel Company, Bristol, Bucks county. Philadelphia office, Bullitt Building. Built in 1875-6; 2 double and 2 single puddling furnaces, 5 heating furnaces, and 3 trains of rolls (one 18-inch 3-high muck, with coffee mill squeezer, and one 8 and one 12-inch finishing); product, bar, band, hoop, and scroll iron, and cotton-ties; annual capacity, 12,000 gross tons of finished iron. Fuel, bituminous coal. Brand, "Bristol." Herbert K. Adams, President; Andrew G. Curtin, Jr., Secretary and General Manager; Conrad S. Grove, Treasurer. Selling agents, L. & R. Wister & Co., Bullitt Building, Philadelphia.

Bryden Horse Shoe Works, Bryden Horse Shoe Company, Catasauqua, Lehigh county. Organized in 1882. 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 11 heating furnaces, 10 benders, 10 presses, two 1,200-lb. hammers, and trimming, clipping, punching, and cleaning machinery. Product, "Boss," "Bryden," and "Banner" forged iron and open-hearth steel horse and mule shoes, also steel and aluminum racing and trotting plates; annual capacity, single

turn, 6,000 gross tons. Fuel, bituminous coal. Oliver Williams, President and Treasurer; George E. Holton, Vice-President; T. F. Frederick, Secretary; Jacob Roberts, Superintendent.

Catasauqua Rolling Mill, Catasauqua Rolling Mill Company, Bullitt Building, Philadelphia. Works at Catasauqua, Lehigh county. Two coal heating furnaces and one 10-inch train of rolls; product, bar iron and skelp; annual capacity, 12,000 gross tons. Fuel, bituminous coal. Brand, "Catasauqua." (Formerly called Mill C and operated by the Catasauqua Manufacturing Company.)

Catasauqua Steel Works, George Johnson, Catasauqua. Works at West Catasauqua, Lehigh county. Built in 1877 and first put in operation in that year; 1 heating furnace, 2 annealing furnaces, one 12-inch train of hot rolls, and 5 stands of 9-inch cold rolls; product, strip steel from one to seven inches wide; annual capacity, 1,750 gross tons of hot-rolled and 1,000 tons of cold-rolled strips. Fuel, coal.

Easton Sheet Iron Works, Theodore Oliver, Easton, Northampton county. Started February 1, 1872; 1 single and 1 double puddling furnace, 1 heating furnace, 1 anthracite coal sheet furnace, 1 bituminous coal annealing furnace, and 1 train of 22-inch rolls; product, steel and refined sheets; annual capacity, 1,000 gross tons. Fuel, anthracite and bituminous coal. Brand, "Oliver."

Fullerton Rolling Mill, Fullerton Rolling Mill Company, Bullitt Building, Philadelphia. Works at Fullerton, Lehigh county. Two double and 10 single puddling furnaces, 4 coal heating furnaces, and 3 trains of rolls (one 9, one 15, and one 21-inch); product, bar iron and skelp; annual capacity, 18,000 gross tons. Fuel, bituminous and anthracite coal. Brand, "Fullerton." (Formerly called Mill B and operated by the Catasauqua Manufacturing Company.)

Slatington Rolling Mill, Slatington Rolling Mill Company, Slatington, Lehigh county. Built in 1890; 6 single puddling furnaces, 1 busheling furnace, 2 heating furnaces, and 3 trains of rolls (10, 16, and 20-inch); product, high-grade bar iron made from a special puddled mixture and by a patented process; annual capacity, 7,500 gross tons. Fuel, bituminous coal. Brands, "Slatington," "Slatington D. R.," "Slatington S. B.," "Slatington Special," and "Slatington Norway." Edward Edwards, President and Business Manager; S. DeLong, Secretary and Treasurer; Lewis P. Hopkins, Superintendent.

Sterlingworth Railway Supply Company, Easton, Northampton county. Branch offices, Home Life Building, 256 Broadway, New York City, and Great Northern Building, Chicago. Built in 1900 and first put in operation June 1, 1900; 1 heating furnace and one 21-inch train of rolls; product, deck beams for brake beam sections; annual capacity, 10,000 gross tons. Fuel, bituminous coal. F. W. Coolbaugh, President; W. D. Ewing, Secretary and Manager; James R. Zearfoss, Treasurer; Jesse R. Lerch, Assistant Secretary.

Number of rolling mills and steel works in the Lehigh Valley: 11.
Of these 1 makes Bessemer, open-hearth, and crucible steel.

SCHUYLKILL VALLEY.

Embraces Blast Furnaces, Rolling Mills, Steel Works, and Bloomaries in Montgomery, Berks, and Schuylkill Counties; also in parts of Chester and Lebanon Counties.

ANTHRACITE, MIXED ANTHRACITE AND COKE, AND COKE FURNACES—18.

Anvil Furnace, (leased,) Glasgow Iron Company, Pottstown, Montgomery county. One stack; fuel, anthracite coal and coke.—*For description of furnace see page 90.*

Henry Clay Furnaces, Empire Steel and Iron Company, Catasauqua. Furnaces at Reading, Berks county. Two stacks; fuel, anthracite coal and coke.—*For description of furnaces see page 85.*

Keystone Furnaces, The E. and G. Brooke Iron Company, Birdsboro, Berks county. Two stacks: one, 57 x 15, built in 1871; and one, 66 x 15½, 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, basic open-hearth, foundry, and forge pig iron; total annual capacity, 65,000 gross tons. Brand, "Brooke." Cyrus G. Henry, Superintendent. Selling agents, Pilling & Crane, Girard Building, and J. J. Mohr, Bullitt Building, Philadelphia. (One stack, 50 x 12, built in 1853, dismantled in 1897.)—*Active in 1901. See Birdsboro Nail Works in this Valley.*

Keystone Furnace Department, Reading Iron Company, Reading, Berks county. One stack; fuel, anthracite coal and coke.—*For description of furnace see pages 93-4.*

Leesport Furnace, Leesport Furnace 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." P. W. Kieffaber, President, and O. A. Keim, Secretary and Treasurer. Selling agent, J. J. Mohr, Bullitt Building, Philadelphia.—*Active in 1901.*

Pioneer Furnaces, Pilling & Crane, Girard Building, Philadelphia. Works at 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." (Formerly operated by the Pottsville Iron and Steel Company.)—*Idle since 1893. See Pottsville Rolling Mills in this Valley.*

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, 55,000 gross tons. Brand, "Robesonian." W. C. Freeman, Chairman, Cornwall; William R. White, Secretary, Philadelphia; George R. Taylor, Manager, Robesonia. Selling agents, J. Tatnall Lea & Co., Stephen Girard Building, Philadelphia. (The old Robesonia Furnace, built in 1792 and rebuilt in 1845, was blown out for the last time in 1874 and dismantled in 1884.)—*Active in 1901.*

Sheridan Furnaces, Pennsylvania Furnace Company, principal office, 60 State st., Boston, Mass. Furnaces at Sheridan, Lebanon county, Pa. Two stacks: No. 1, 78 x 15, built in 1862 to use charcoal and changed to anthracite in 1867; iron stoves; No. 2, 75 x 16, built in 1874-5 and rebuilt in 1891; three fire-brick stoves; fuel, anthracite coal and coke; ores, Cornwall local hematite and Lake Superior; product, Bessemer, basic, and foundry pig iron; total annual capacity, 60,000 gross tons. Brands, "Sheridan" for Bessemer and "Vulcan" for foundry iron. J. A. Coram, Vice-President; T. E. Hopkins, Treasurer; S. H. Chauvenet, General Manager. Selling agent, J. J. Mohr, Bullitt Building, Philadelphia. (Formerly operated by the Sheridan Iron Works, Limited.)—*Active in 1901.*

Swede Furnaces, Richard Heckscher and Sons Company, Swedeland, Montgomery county. Main office, Manhattan Building, Philadelphia. Two stacks: No. 1, built in 1850 and rebuilt in 1881, 1887, 1897, and 1899; present size, 80 x 17; No. 2, 80 x 16½, built in 1890-1 and enlarged in 1899; No. 1 has three F. C. Roberts & Co. fire-brick stoves, each 20 x 80, and No. 2 has three Taws & Hartman regenerative stoves, each 70 x 18; fuel, anthracite coal and coke; ores, Lake Superior specular, New Jersey magnetic, and highest grades of foreign low-phosphorus; product, standard neutral mill, Bessemer, and basic open-hearth pig iron; annual capacity: No. 1, 80,000 gross tons; No. 2, 60,000 tons. Brand, "Swede." Equipped with one Uehling pig-iron casting machine and conveyor. Austin Heckscher, President; Richard P. Heckscher, Vice-President; Maurice Heckscher, Secretary and Treasurer; Ledyard Heckscher, General Manager; G. A. Heckscher, Assistant General Manager; H. A. Altenderfer, Superintendent. Selling agents for New York and New England only, John W. Quincy & Co., New York.—*Active in 1901.*

Temple Furnace, Temple Iron Company, Reading. Furnace at Temple, Berks county. One stack, 75 x 15, built in 1867 and rebuilt in 1875; three Durham stoves; fuel, anthracite coal and coke; ores, Lake Superior and local hematite and New Jersey magnetic; specialty, foundry and forge pig iron; annual capacity, 50,000 gross tons. Brand, "Temple." George F. Baer, President; Albert Broden, Manager; Geo. B. Connard, Assistant Treasurer.—*Active in 1901.*

Topton Furnace, Empire Steel and Iron Company, Catasauqua. Fur-

nace at Topton, Berks county. One stack; fuel, anthracite coal and coke.—*For description of furnace see page 85.*

Warwick Furnaces, Warwick Iron and Steel Company, Pottstown, Montgomery county. Two stacks, one, 70 x 16, built in 1875 and blown in in April, 1876; enlarged to present size in 1889; four Kennedy fire-brick stoves, three 20 x 60 and one 20 x 80; and one stack, 100 x 21, built in 1900-1 and first blown in October 8, 1901; four Cowper-Roberts stoves, each 100 x 21. Fuel, $\frac{1}{2}$ anthracite coal and $\frac{1}{4}$ coke; ores, New Jersey and New York magnetites and Lake Superior; specialties, sandless lake ore foundry and neutral mill pig iron; total annual capacity, 185,000 gross tons. Brand, "Warwick." Equipped with one pig-iron casting machine. Edgar S. Cook, President and General Manager; G. W. Nicolls, Secretary and Treasurer. Selling agents: for mill iron exclusively without regard to territory and for foundry iron in Philadelphia and its immediate vicinity, J. Wesley Pullman, 238 South Third st., Philadelphia; for foundry and basic iron, Pilling & Crane, Philadelphia; for foundry iron in New York and New England, C. L. Peirson & Co., Boston.—*Active in 1901.*

Number of anthracite, mixed anthracite and coke, and coke furnaces in the Schuylkill Valley: 18, of which 3 have long been idle.

ROLLING MILLS AND STEEL WORKS—31 COMPLETED AND 1 BUILDING.

Auburn Works, (Factory O.,) Shelby Steel Tube Company, Empire Building, Pittsburgh. Works at Auburn, Schuylkill county.—*For description of works see page 63.*

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, muck bar, and skelp; annual capacity, 250,000 kegs of cut nails and 16,500 gross tons of muck bar and skelp. Fuel, bituminous coal. 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. Edward Brooke, President; George Brooke, Jr., Secretary; Robert E. Brooke, Treasurer. Selling agents, C. J. Stebbins, 103 Reade st., and Patterson Brothers, 27 Park Row, New York.—*See Keystone Furnaces in this Valley.*

Blandon Rolling Mill, Simon Seyfert, Blandon, Berks county. Built in 1867 and enlarged and improved in 1880, 1887, 1890, 1891, and 1892; 1 single and 6 double puddling furnaces, 4 heating furnaces, rotary squeezers, and 3 trains of rolls (one muck, and one 8 and one 11-inch finishing); product, grooved pipe skelp; annual capacity, 20,000 gross tons. Fuel, bituminous coal. (Formerly operated by the Blandon Iron and Steel Company.)—*See Gibraltar Iron Works in this Valley.*

- Brylgon Foundry, Reading, Berks county. Two 2-gross-ton Tropenas steel converters built in 1901 and first blow made May 1, 1901; product, steel castings from one pound to any desired weight; annual capacity, 3,000 gross tons. Fuel, coke. Selden S. Deemer, Superintendent. (Owned by Andrew Bryson and Henry R. McElligott.)
- Carpenter Steel Company, Reading, Berks county. Executive offices, No. 1 Broadway, New York City. Experimental plant of 8 crucible steel-melting holes built at Reading, Pa., in 1889 on leased property; 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, 40 heating, welding, and annealing furnaces, 5 trains of hot rolls, (one 8, two 10, and two 16-inch,) 10 hammers, (one 600-lb., one 750-lb., two 1,000-lb., one 1,500-lb., one 1,800-lb., one 2,500-lb., one 3,500-lb., one 3-ton, and one 7½-ton,) four 30-pot gas-fired crucible steel-melting furnaces. Product, crucible steel for tools, dies, cutlery, wire, etc., and forgings and armor-piercing projectiles; annual capacity, 9,000 gross tons of crucible steel ingots and 25,000 tons of rolled and forged products. Fuel, bituminous coal. Also operates a machine shop and a cold-rolling and wire-drawing plant. John C. Barron, President; Henry M. Hawkesworth, 1st Vice-President; W. B. Kunhardt, 2d Vice-President; Lewis Gregory, Secretary and Treasurer; Robert W. Hawkesworth, Chairman of Board of Directors. Sales offices and warehouses: 107 John st., New York City; 65 West Washington st., Chicago, Illinois; 407 Washington st., Toledo, Ohio; and Reading, Pa.
- Conshohocken, Pennsylvania, and Corliss Iron Works, J. Wood and Brothers Company, Conshohocken, Montgomery county. Built in 1832, 1852, and 1864, respectively; rebuilt in 1882-3; 7 double puddling furnaces, 7 heating furnaces, and 8 trains of rolls, one of which is a 3-high 72-inch plate train; steam and water power; product, sheet, flue, and plate iron of all kinds; corrugated iron a specialty; annual capacity, 15,000 gross tons. Fuel, bituminous and anthracite coal. Brands, "Blue Annealed" iron and steel, "Hope," "Anchor," "R. G.," "Special Electric," "Best Bloom," and "Soft Steel." Contemplate adding one 3-high 60-inch flue mill. Charles M. Wood, President; James W. Wood, Vice-President and General Manager; William M. Wood, Secretary and Treasurer. Selling agent, A. C. Jessup, 120 Liberty st., New York.
- Diamond Drill and Machine Company, Birdsboro, Berks county. Building a steel casting plant, to contain one 20-gross-ton acid open-hearth steel furnace; product, all kinds of steel castings; annual capacity, 10,000 gross tons. Fuel, producer gas. An additional 20-gross-ton open-hearth steel furnace may be added. The company also operates a gray iron foundry, which is equipped with 2 cupolas, an air furnace, electric traveling cranes, and all modern appliances for man-

ufacturing castings; annual capacity, 16,000 gross tons. George Brooke, President; Robert E. Brooke, Vice-President; D. Owen Brooke, Secretary and Treasurer; W. E. Farrell, Superintendent.

Doulassville (The) Iron Company, Limited, Doulassville, Berks county. Built as a forge in 1878; rolling mill added in 1887 and enlarged in 1890; 6 double puddling furnaces, 1 hammer, 1 rotary squeezer, and 1 train of rolls; product, muck bar; annual capacity, 7,000 gross tons. Fuel, bituminous coal. D. K. Flannery, President and Manager; F. R. Gerhart, Secretary; John H. Egolf, Treasurer.

Ellwood Ivins, 487 Broadway, New York City. Works at Oak Lane Station, Montgomery county, Pa. Built in 1893 and first put in operation in 1894; 4 forge fires, 3 heating furnaces, and 2 trains of 21-inch rolls; product, blanks consumed by the works in the manufacture of seamless drawn steel tubes; specialty, small sizes of steel tubes; also tool steel tubes; annual capacity, 500 gross tons of blanks and 2,000,000 feet of steel tubes. Fuel, bituminous coal. Selling agent, George I. Cook, 487 Broadway, New York City. (Formerly operated by The Ellwood Ivins' Tube Company.)

Exeter Rolling Mill, Exeter Iron Company, 406 Drexel Building, Philadelphia. Works at Reading, Berks county. Built in 1892 and first put in operation in March, 1893; 6 heating furnaces, 3 trains of rolls, (one 10, one 12, and one 14-inch,) and 2 hammers (one 1,000-lb. and one 3,000-lb.); product, skelp, socket, and bar iron; annual capacity, 20,000 gross tons. Fuel, bituminous coal. F. Greiner, President; O. C. Schmidt, Secretary and Treasurer; J. Swanger, Superintendent. (Formerly called the Diamond Steel Works and operated by the Philadelphia Steel Company. Crucible steel plant dismantled.)

Gibraltar Iron Works, Simon Seyfert, Reading, Berks county. Built in 1846 and rebuilt in 1883-4; 4 heating furnaces and two 19-inch trains of rolls (one bar and one plate); product, boiler plate and boiler tube and pipe iron; annual capacity, 5,300 gross tons. A forge connected with the works was rebuilt in 1846 and again in 1891; it has 8 charcoal forge fires and one 4-ton steam hammer; product, charcoal blooms, all consumed in the rolling mill; annual capacity, 5,000 gross tons. Fuel, bituminous coal.—*See Blandon Rolling Mill in this Valley.*

Glasgow Iron and Steel Works, Glasgow Iron Company, Pottstown, Montgomery county. Works in ninth ward.—*For description of works see pages 90-1.*

Glendale Mill, Lucknow Iron and Steel Company, lessee, Harrisburg. Works at Pine Iron Works P. O., Berks county; telegraph address, Manatawny Station. Built in 1881; 2 heating furnaces; 2 trains of rolls, (one 2-high 84 x 26 and one 3-high 72 x 26-inch,) and one 100-inch Morgan shear; product, all kinds of iron and steel plates;

annual capacity, 10,000 gross tons. Fuel, bituminous coal. Brands, "Pine" iron and "Pine" steel for the most severe requirements. James B. Bailey, President; H. L. Champlain, Secretary and Treasurer; Joseph Bailey, Manager of Mill. (Owned and formerly operated by the Pine Iron Works Company. Pine Mill, built in 1845, and run by water-power, has been abandoned.)—See *Lucknow Forge in the Lower Susquehanna Valley in Pennsylvania*.

Hoopes and Townsend Company, P. O. Station S, Philadelphia. Works at Hoopeston, Montgomery county, Pennsylvania. Built in 1901 and put in operation in the winter of 1901-2; 8 puddling and 2 heating furnaces and 2 trains of rolls; product, bar iron and steel consumed by the company in the manufacture of bolts, nuts, washers, and boiler, sheet, and tank rivets; annual capacity, about 5,000 gross tons of bars. Fuel, coal. The bolt, nut, and rivet works of the company are located at 1330 Buttonwood st., Philadelphia. Clement R. Hoopes, President; Barton Hoopes, Jr., Vice-President; James M. Hibbs, Secretary; John M. Zook, Treasurer; Dawson Hoopes, Manager.

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, tack, and nail plate, and "Keystone" iron and steel cut nails; annual capacity, 27,000 gross tons of muck bar, 14,500 tons of tack, nail, and shovel plate, and 300,000 kegs of cut nails. Fuel, bituminous coal. George B. Lessig, Chairman and Manager; J. B. Lessig, Secretary and Treasurer.

Logan Manufacturing Company, Phoenixville, Chester county. Built in 1899-1900 and first blow made January 31, 1900; two 2-gross-ton Tropenas steel converters; product, steel castings; annual capacity, 1,000 gross tons. Fuel, coke. George F. Huff, President; J. Howard Rhoads, Secretary; John W. Logan, Treasurer and Manager.

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, 11,000 gross tons of muck bar or 10,000 tons of skelp iron. A plant for the manufacture of wrought-iron pipe, with an annual capacity of 12,000 tons, is connected with the works; also a plant for the manufacture of galvanized iron and steel products. Fuel, manufactured gas and bituminous coal. Jawood Lukens, President and Treasurer; Lewis N. Lukens, Vice-President; A. L. Murphy, Secretary and Superintendent of Tube Mills; S. Anderson, Superintendent of Rolling Mills. Selling agent, Lewis N. Lukens, 434 Drexel Building, Philadelphia.

Ninth Street Mills Department, Reading Iron Company, Reading, Berks county.—*For description of works see page 94.*

Norristown Iron Company, Norristown, Montgomery county. Built in 1846; 5 double puddling furnaces, 4 heating furnaces, 3 trains of rolls, (two 18-inch muck and skelp trains and one tandem bar train, the latter with 16-inch roughing and 10-inch finishing rolls,) 1 hammer, and 1 squeezer; product, skelp and bar iron; annual capacity, 20,000 gross tons. Fuel, bituminous coal. H. H. Light, President; William Ellis, Secretary; S. P. Light, Treasurer. (Formerly called the Norristown Iron Works.)

Norristown Works, American Steel Casting Company, Thurlow Station, Chester. Works at Earnest Station, Norristown, Montgomery county.—*For description of works see page 97.*

Oley Street Mills Department, Reading Iron Company, Reading, Berks county.—*For description of works see page 94.*

Pencoyd Iron Works, A. and P. Roberts Company, operators; general office, 261 South Fourth st., Philadelphia. Works in Montgomery county, opposite Manayunk. Controlled by The American Bridge Company.—*For description of works see page 59.*

Phoenix Iron Works, The Phoenix Iron Company, 410 Walnut st., Philadelphia. Works at Phoenixville, Chester county.—*For description of works see page 89.*

Plymouth Rolling Mills, E. Stanford, lessee, Conshohocken, Montgomery county. Built in 1881-2 and remodeled in 1901; 6 double puddling furnaces, 5 heating furnaces, and 2 trains of rolls (one 22-inch hot and one 22-inch cold); product, muck bar and black plates or sheets for tinning; annual capacity, 8,000 gross tons of muck bar and 2,000 tons of black plates or sheets. Fuel, bituminous coal. Adding one 22-inch hot and one 22-inch cold mill. (Owned by R. D. Wood & Co., Philadelphia. Cut-nail machines abandoned and dismantled.)—*See Tinplate Works in Pennsylvania.*

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, muck bar, and boiler plate, tank, flue, and pipe iron; annual capacity, 9,000 gross tons of muck bar and 12,000 tons of plate iron. Specialties, pipe and flue iron. Fuel, bituminous coal. George H. Potts, Chairman; H. C. Hitner, Secretary and Treasurer.

Pottstown Iron Works, (leased,) Glasgow Iron Company, Pottstown, Montgomery county.—*For description of works see page 91.*

Pottsville Rolling Mills, Pilling & Crane, 615 Girard Building, Philadelphia. Works at Pottsville, Schuylkill county. Original mill built to make rails in 1852; rebuilt and altered to make shapes in 1877; 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 basic open-hearth steel furnaces built in 1890; first steel 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. Fuel, coal and manufactured gas. The rolling mills and steel works are idle; the bridge shops connected with the works are leased to and are being operated by the Berlin Construction Company. (Formerly operated by the Pottsville Iron and Steel Company.)—*See Pioneer Furnaces in this Valley.*

Reading Works, American Iron and Steel Manufacturing Company, Lebanon. Works at Reading, Berks county.—*For description of works see page 92.*

Schuylkill Haven Iron Works, F. H. Clement & Co., 32 South Broad st., Philadelphia. Works at Schuylkill Haven, Schuylkill county. Put in operation October 1, 1873; 2 heating furnaces, 1 busheling furnace, and 2 trains of rolls, (one 10-inch and one 16-inch); product, merchant bar iron; annual capacity, 5,500 gross tons. Fuel, bituminous coal. (Formerly called the Schuylkill Haven Rolling Mill.)

Schuylkill Iron Works, Alan Wood Company, 519 Arch st., Philadelphia. Works at Conshohocken, Montgomery county. Built in 1858; 9 double puddling furnaces, 16 heating and 4 grate furnaces, 11 trains of rolls, (two 26 x 72 and two 24 x 54-inch 3-high plate, one 22 x 48, one 22 x 42, and two 20 x 42-inch 2-high sheet, one 20-inch 3-high bar with three stands, one 19-inch 2-high bar with one stand, and one 22 x 42-inch 2-high cold mill,) and 1 hammer; product, sheet and plate iron and steel; annual capacity, 25,000 gross tons. Fuel, anthracite and bituminous coal and manufactured gas. An open-hearth steel plant to contain five 50-gross-ton basic furnaces will be erected at Ivy Rock, near the works, in 1902. Howard Wood, President; Jonathan 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; 8 double puddling furnaces, 4 heating furnaces, one 4-ton hammer, 1 rotary squeezer, and three 22-inch trains of rolls; product, boiler-tube skelp, pipe skelp, and puddled bar; annual capacity, 15,000 gross tons of skelp iron and 10,000 tons of puddled bar. Fuel, bituminous coal. Brand, "Seyfert."—*For sale.*

Sheet Mill Department, Reading Iron Company, Reading, Berks county.—*For description of works see page 94.*

Number of rolling mills and steel works in the Schuylkill Valley: 31 completed and 1 building. Of these 2 have Bessemer steel plants, 2 make Tropenas steel, 5 make open-hearth steel, 1 open-hearth steel plant is being built, and 1 open-hearth steel plant is projected, and 1 makes crucible steel.

PIG AND SCRAP IRON BLOOMARIES—2.

Exeter Steam Forge, H. C. Seidel, Lorane, Berks county. Built in 1868, burned in 1894, rebuilt in the same year, and operations resumed January 1, 1895; 1 heating furnace and one 1,500-lb. hammer; steam-power; product, bars and forgings made from charcoal blooms and wrought-iron scrap; also billets from No. 1 wrought scrap; annual capacity, 500 gross tons. Fuel, bituminous coal.

Spring City Bloom Works, Spring City, Chester county. Built in 1884; 6 forge fires and 1 hammer; product, blooms for plate and sheet iron made from scrap iron; daily capacity, 12 gross tons. Fuel, coal and charcoal. S. H. Egolf, President; Willis Rogers, Secretary; Milton Latshaw, Treasurer; H. S. Hallman, Manager.

Number of pig and scrap iron bloomaries in the Schuylkill Valley: 2.

EASTERN PENNSYLVANIA DISTRICT.

Embraces Blast Furnaces, Rolling Mills, Steel Works, and Bloomaries located in Delaware County and in a part of Chester County.

MIXED ANTHRACITE COAL AND COKE FURNACES—1.

Tidewater Furnace, Tidewater Steel Company, Chester, 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, foundry, and basic pig iron; annual capacity, 50,000 gross tons. Brand, "Tidewater." (Formerly called Chester Furnace; later Wellman Furnace.)—*Active in 1901. See Tidewater Steel Company in this District.*

CHARCOAL FURNACES—1.

Isabella Furnace, William M. Potts, Wyebrooke, Chester county. One stack, 60 x 7½, 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 and a mixture of foreign and Lake Superior ores; annual capacity, 5,400 gross tons. Brand, "Wyebrooke."—*Idle since 1894 but in good condition.*

Number of mixed anthracite coal and coke and charcoal furnaces in the Eastern Pennsylvania District: 2 stacks.

ROLLING MILLS AND STEEL WORKS—12 COMPLETED AND 1 PROJECTED.

Brandywine Rolling Mills, Worth Brothers Company, Coatesville, Chester county. Original mills built in 1881-2 and put in operation in February, 1882; commenced rolling steel in January, 1885; 9 heating furnaces and 3 trains of rolls, (one 20-inch, one 28-inch, and one 3-high 36 x 132-inch.) Adding 1 soaking pit and one 10-ton elec-

tric traveling crane; roll trains have plate straightening machines attached; plant also includes one 154-inch and two 110-inch hydraulic, one 110-inch steam, and 1 rotary plate shear, the latter capable of trimming heads 1 inch thick by 12 feet in diameter; also a complete flanging and dishing plant, capable of producing heads up to 120 inches in outside diameter. A machine shop, equipped with modern tools, traveling cranes, boring mills, planers, punches, etc., is connected with the works; also an electric plant for lighting the works and for operating the electric cranes, etc.; one 10-ton electric traveling crane, with a 72-foot span, is located in the steel yard. Product, plates for best boiler, locomotive, tank, and structural work, all sizes of machine-flanged and dished heads, machine-flanged man-holes, saddles, etc.; annual capacity, 100,000 gross tons of plates. Steel department contains six 35-gross-ton open-hearth furnaces (4 basic and 2 acid) and 35 gas producers; first open-hearth steel made in June, 1896; annual capacity, 100,000 gross tons of ingots. A Wellman-Seaver electric charging crane is connected with this department. Fuel, manufactured gas and coal.—*See Viaduct Iron Works in this District.*

Chester Iron and Steel Company, lessee, Chester, Delaware county. Main office, Chester, Pa.; branch office, 52 Broadway, New York. Built in 1880; 6 heating furnaces, 4 busheling furnaces, and 3 trains of rolls (12, 18, and 23-inch); product, iron or steel angles, bars, shapes, light rails, splice bars, and skelp; annual capacity, 75,000 gross tons. Fuel, bituminous coal. Charles Dreifus, President; H. P. Nash, Vice-President; H. Whittemore, Secretary and Treasurer. (Formerly called the Tidewater Steel Works. Owned by the Combination Steel and Iron Company.)

Chester Steel Castings Company, 407 Sansom st., Philadelphia. Works at Chester, Delaware county. Built in 1871; one 20-gross-ton acid open-hearth steel furnace erected in 1893 and first steel made in May, 1893; 2 gas producers; adding one 20-gross-ton acid open-hearth furnace and 3 new gas producers; product, steel castings of every description from 1 to 40,000 lbs.; also produces castings by the Mc-Haffie process; annual capacity, single turn, 15,000 gross tons. Fuel, coal. E. P. Dwight, President and Treasurer; A. G. Lorenz, Secretary; C. R. H. Cunningham, General Manager.

Crum Lynne Iron and Steel Company, Crum Lynne, Delaware county. Philadelphia office, 505 Chestnut st. Built in 1887-8, enlarged in 1900, destroyed by fire in March, 1901; rebuilt in the same year; 2 double and 2 single puddling furnaces, 6 heating furnaces, 1 rotary squeezer, and 4 trains of rolls (two 3-high 18-inch muck and two 2-high 24 x 60-inch plate); a forge connected with the works contains 8 charcoal refinery fires and one 2½-ton steam hammer and has an annual capacity of 5,000 gross tons of blooms; product, skelp

iron for boiler tubes; annual capacity, 10,000 tons. Fuel, bituminous coal in the rolling mill and charcoal in the forge. Edward S. Buckley, Jr., President and Treasurer; John Graham, Jr., Vice-President and Secretary; J. Jones Hudson, General Manager. (Formerly operated by the Crum Creek Iron and Steel Company.)

Lukens Iron and Steel Works, Lukens Iron and Steel Company, Coatesville, Chester county.—*For description of works see pages 95-6.*

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 heating furnaces, one 20-inch train of 3-high muck rolls, three 2-high plate trains, (two 23 x 50 and one 23 x 60-inch,) and 3 hammers; product, boiler tube skelp iron; annual capacity, 15,000 gross tons. A forge connected with the works contains 16 charcoal finery fires and has an annual capacity of 12,000 tons of charcoal blooms, all consumed in the rolling mill in the manufacture of boiler tube skelp iron. Fuel, charcoal in the forge and bituminous coal in the heating furnaces. Brand, "P. I. Co." Horace A. Beale, Jr., President; A. J. Williams, Vice-President; W. C. Michener, Secretary; E. H. Brodhead, Treasurer and General Manager.

Penn Steel Casting and Machine Company, Chester, Delaware county. Built in 1892 and first steel made September 25, 1892; three 25-gross-ton acid open-hearth steel furnaces and 2 annealing furnaces; product, steel castings; annual capacity, single turn, 12,000 gross tons. Also manufactures cast-steel pipe. Fuel, manufactured gas. M. H. Bickley, President; John T. Dickson, Secretary; Charles W. Andrew, Treasurer; Frederick Baldt, Manager.

Seaboard Steel Casting Company, foot of Jeffrey st., Delaware river, Chester, Delaware county. Built in 1900 and first steel made December 29, 1900; two 20-gross-ton acid open-hearth steel furnaces; product, steel castings; annual capacity, 20,000 gross tons. Fuel, gas. Wm. C. Sproul, President; Joseph W. Cochran, Secretary and Treasurer; D. G. Stokes, Comptroller; S. E. Sproul, General Superintendent.

Solid Steel Casting 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; two 20-gross-ton acid open-hearth furnaces, 3 coal-fired annealing furnaces, and 5 mould drying ovens; annual capacity, 6,000 gross tons of castings. Specialties, all forms of locomotive and machinery castings. Fuel, producer gas. 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. Present company started plant in May, 1899, making extensive alterations and additions. Richard Peters, President; Felton Bent, Secretary, Treasurer, and Superintendent. (Crucible steel plant, erected in 1885, abandoned in 1893. Formerly operated by the Eureka Cast Steel Company.)

Thurlow Works, American Steel Casting Company, Thurlow Station, Chester, Delaware county. Works at Thurlow, Delaware county.—*For description of works see page 97.*

Tidewater Steel Company, Chester, Delaware county. Built in 1874-5; 7 gas heating furnaces, two 4-hole soaking pits, 1 steam hammer, and 3 trains of rolls (one 31-inch blooming, one 3-high plate mill with rolls 112 x 31 inches, and one 3-high plate mill with finishing rolls 72 x 25 inches in combination with 72 x 25-inch roughing rolls); product, blooms, slabs, billets, skelp, and boiler, ship, and tank plates; annual capacity, 50,000 gross tons of blooms, billets, and slabs, and 70,000 tons of plates. Open-hearth steel department added in 1881-2; three completed 50-gross-ton basic open-hearth steel furnaces and two to be added; annual capacity, 125,000 gross tons of ingots. Fuel, manufactured gas. Brand, "Tidewater." C. E. Stafford, President; Paul Lamorelle, Secretary and Treasurer; William D. Crawford, General Superintendent. (Formerly called the Wellman Steel Works. Two 3-gross-ton Bessemer steel converters, added in 1889, abandoned.)—*See Tidewater Furnace in this District.*

Viaduct Iron Works, Coatesville Rolling Mill Company, Coatesville, Chester county. Built in 1838; 3 double puddling furnaces, 8 heating furnaces, 2 trains of bar rolls, and 3 trains of plate rolls, (one 50, one 62, and one 80-inch,) 1 hammer, and one 120-inch steam shear; product, boiler tube skelp and iron and steel plates and sheets; annual capacity, 20,000 gross tons. A forge containing 8 charcoal fires and 2 steam hammers added to the works in 1898; product, blooms; annual capacity, 5,000 gross tons. Tube mill, added in 1900, contains 1 bending and 2 welding furnaces; product, boiler tubes from 1½ inches to 8 inches inclusive; annual capacity, 10,000 gross tons. Fuel, coal.—*See Brandywine Rolling Mills in this District.*

PROJECTED STEEL PLANT.

Eddystone Engineering Works, Tindel-Morris Company, Eddystone, Delaware county. Built in 1901; product, steel forgings, machinery, engines, etc. May erect an open-hearth steel furnace. Adam Tindel, President and Treasurer; L. I. Morris, Vice-President and Secretary; Thomas Dunlap, Superintendent.

Number of rolling mills and steel works in the Eastern Pennsylvania District: 12 completed and 1 projected. Of these 8 make open-hearth steel and 1 open-hearth steel plant is projected, and 1 makes McHafle steel.

PIG AND SCRAP IRON BLOOMARIES—1.

French Creek Forge, D. J. Knauer, St. Peters P. O., Chester county. Built in 1872; 4 fires and 1 hammer; water and steam power; product, charcoal blooms made from scrap iron; annual capacity, 800 gross tons. Thomas Wanner, Attorney.—*Idle and for sale or lease.*

Number of pig and scrap iron bloomaries in the Eastern Pennsylvania District: 1.

UPPER SUSQUEHANNA VALLEY.

Embraces Blast Furnaces, Rolling Mills, Steel Works, and Bloomaries in Lackawanna, Montour, Columbia, Northumberland, Luzerne, and Lycoming Counties; also in a part of Perry County.

MIXED ANTHRACITE COAL AND COKE FURNACES—2.

Danville Bessemer Furnace, Danville Bessemer Company, Danville, Montour county. Philadelphia office, 310 Land Title Building. One stack, 60 x 16, built in 1869 and remodeled in 1884; two nests of Grove iron stoves, each containing six stoves; fuel, anthracite coal and coke; ores, soft fossil, mined in Montour county, hematite and magnetic from New York, New Jersey, and Lake Superior, and foreign; product, foundry, Bessemer, and mill pig iron; annual capacity, 27,000 gross tons. Brand, "Danville." Address all communications to Danville. (Formerly called the North Branch Furnace. One stack, 42½ x 14, built in 1867, dismantled in 1900.)—*Active in 1900. See Rolling Mills and Steel Works in this Valley.*

Lackawanna Furnace, (owned,) The Lackawanna Iron and Steel Company, Buffalo, New York. Furnace at Scranton, Lackawanna county, Pa. One stack; fuel, anthracite coal and coke.—*For description of furnace see page 87.*

Number of mixed anthracite coal and coke furnaces in the Upper Susquehanna Valley: 2 stacks.

ROLLING MILLS AND STEEL WORKS—18.

Danville Bessemer Company, Danville, Montour county. Philadelphia office, 310 Land Title Building. Mill formerly known as the Co-operative Iron and Steel Works; also as the North Branch Steel Works. Established in 1871; open-hearth steel plant added in 1882-3 and first steel made February 15, 1883; one 10-gross-ton acid open-hearth steel furnace; annual capacity, 11,000 gross tons. Rolling mill contains 6 coal and 2 gas heating furnaces and one 28 x 62 and one 28 x 36-inch shovel plate train; product, plates, all consumed by the company in the manufacture of shovels, scoops, spades, agricultural seats, railroad tie plates, braces, etc.; annual capacity, 5,000 gross tons of plates and 50,000 dozen shovels. Fuel, manufactured gas and bituminous coal. Brands, "Danville," "Montour," and "Pennsylvania." John J. MacDonald, President; A. Loudon Snowden, Vice-President; H. Nelson Day, Secretary and Treasurer; J. L. Barber, General Manager. Address all communications to Danville. (Two 4-gross-ton Bessemer steel converters, built in 1887-8; put in operation in October, 1899; dismantled in 1900. Formerly called the North Branch Steel Works.)—*See Danville Bessemer Furnace in this Valley.*

Danville Rolling Mill Company, Bullitt Building, Philadelphia. Works at Danville, Montour county. Built in 1883 and first nails made in August, 1883; 9 double puddling furnaces, 2 large heating furnaces, and 2 trains of rolls (18-inch puddle and 3-high 20-inch plate); product, muck bar; annual capacity, 13,000 gross tons. Fuel, coal. Brand, "Danville." (Nail factory, containing 92 cut-nail machines, abandoned. Formerly called the Danville Nail Works.)

Duncannon Iron Works, The Duncannon Iron Company, Duncannon, Perry county. Office, 122 Race st., Philadelphia. Built in 1836; 20 single puddling furnaces, 7 heating furnaces, 4 trains of rolls, (one 8, one 16, and two 20-inch,) and 50 cut-nail machines; product, bar iron and iron and steel cut nails; annual capacity, 13,000 gross tons of bar iron and 125,000 kegs of nails. Fuel, bituminous coal. Brand, "Duncannon." Rodman Wister, President; J. B. Lequear, Secretary; Joseph E. Jackson, Treasurer; George Pennell, General Manager.

Green Ridge Iron Works, Scranton, Lackawanna county. Built at Providence, Pa., in 1876; removed to Green Ridge, Scranton, in 1879; enlarged in 1887; 2 heating furnaces, 4 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, single turn, 5,500 gross tons. Fuel, anthracite coal. Brand, "Green Ridge." New York selling agents, Topping Brothers, 92 Chambers st.

Howe & Polk, Danville, Montour county. Built in 1847 and rebuilt since; 9 double puddling furnaces, 6 heating furnaces, and 3 trains of rolls (one 19-inch puddle and breaking-down train and two 16-inch skelp, the latter equipped with patent tube-making machines); product, muck bar, structural tubing, angles, channels, odd shapes, and small zee bar mouldings; annual capacity, 12,000 gross tons of muck bar and 12,000 tons of structural tubing and other rolled products. Fuel, coal. The structural tubing is covered by patents, and consists of round unwelded tubing from $\frac{1}{2}$ inch to 3 inches in diameter. R. K. Polk, General Manager. Selling agent, National Structural Tubing Company, 171 Broadway, New York. (Formerly called the Mahoning Rolling Mill.)

Jackson and Woodin Works, American Car and Foundry Company, Lincoln Trust Building, St. Louis, Mo. Works at Berwick, Columbia county, Pa.—*For description of works see page 145.*

Milton (The) Manufacturing Company, Milton, Northumberland county. (Successor to the Milton Manufacturing Company.) Built in 1886-7 and first put in operation in February, 1889; fitted with machinery for manufacturing wrought-iron washers cut from new plates rolled expressly for the purpose; 5 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 a bolt and nut factory; product, muck bar, forgings, bar iron, washers, and bolts and nuts; annual capacity of rolled iron, 8,500 gross tons. Fuel used in rolling mill department, bituminous coal. Also operates foundry and machine shops. S. J. Shimer, President; E. S. Shimer, Secretary and Treasurer; G. S. Shimer, General Manager.

Milton Nail Works, F. A. Godcharles Company, Milton, Northumberland county. Built in 1875 and enlarged in 1889; destroyed by fire December 3, 1898; rebuilt in 1899 and put in operation in May of that year, using a part of the equipment formerly in the Lewisburg Rolling Mill, at Lewisburg, Pa.; 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 101 cut-nail machines; product, 3, 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. Fuel, coal. 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, 1 gas and 4 coal heating furnaces, 1 rotary squeezer, 5 trains of rolls, (8, 10, 15, 18, and 20-inch,) 2 hammers, and 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. Fuel, bituminous coal. Brand, "Milton." C. L. Rogers, President; John Jenkins, General Manager.

Montour Rolling Mills Department, Reading Iron Company, Reading. Works at Danville, Montour county.—*For description see page 94.*

Northumberland Iron and Nail Works, Van Alen & Co., Northumberland, Northumberland county. Built in 1883 and first put in operation in January, 1884; 9 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 cut nails and muck bar; annual capacity, 250,000 kegs of cut nails on single turn and 12,000 gross tons of muck bar on double turn. Fuel, bituminous coal. Brand, "Van Alen & Co."

North Works, (owned,) The Lackawanna Iron and Steel Company, Buffalo, New York. Works at Scranton, Lackawanna county, Pa.—*For description of works see page 87.*

Scranton Bolt and Nut Company, Scranton, Lackawanna county. New York office, 141 Broadway. Built in 1899 and first put in operation November 22, 1899; 2 double puddling furnaces, 2 heating furnaces, and 2 trains of rolls (one 20-inch muck and one 12-inch finishing); product, merchant bars, bolts, nuts, and other iron products;

- annual capacity, 12,000 gross tons. Fuel, anthracite and bituminous coal. Brand, the letter Z inclosed in a diamond. W. D. Zehnder, President; C. H. Welles, Vice-President; L. M. Horton, Secretary and Treasurer; E. M. Zehnder, General Superintendent.
- South Works, (owned,) The Lackawanna Iron and Steel Company, Buffalo, New York. Works at Scranton, Lackawanna county, Pa.—*For description of works see page 88.*
- 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; product, puddled bars and cut nails; annual capacity, 7,500 gross tons of puddled bars and 120,000 kegs of cut nails. Fuel, bituminous coal. Brand, "Sunbury." William M. Gordon, President, 1422 Venango st., Philadelphia; Newton R. Turner, Secretary and Treasurer, Pottstown, Pa.—*Idle and for sale or lease.*
- Timmes & Hecht, Scranton, Lackawanna county. New York office and warehouse, 281 North Sixth st., Brooklyn. Built in 1901 and put in operation on December 2, 1901; 3 heating furnaces, 2 trains of rolls, (one 10-inch guide and one 18-inch bar,) and 10 spike machines; product, merchant bar iron; also black and galvanized railroad, mine, dock, and boat spikes; also hand-made nails and rivets; annual capacity, 10,000 gross tons of bar iron. A galvanizing plant is connected with the works. Fuel, bituminous and anthracite coal. Brand, "T. & H."
- Williamsport Iron and Nail Works, Williamsport Iron and Nail Company, Williamsport, Lycoming county. Built in 1873-4; 5 double puddling furnaces, 1 coal and 1 Smith gas heating furnace, 2 trains of rolls, (17 and 18-inch,) and 85 cut-nail machines; product, iron and steel cut nails and muck bar; annual capacity, 150,000 kegs of nails and 3,600 gross tons of muck bar. Fuel, manufactured gas. Brand, "Williamsport Iron and Nail Co. Nails." C. LaRue Munson, President; John M. Young, Treasurer; J. Y. Schreyer, Secretary; John Jenkins, General Manager. Selling agents, E. L. Hand & Co., 616 Market st., Philadelphia; Dietrich Brothers, 325 North st., Baltimore, Maryland.
- Wyoming (The) Shovel Works, Wyoming, Luzerne county. Sales offices, Scranton, Pa., and New York City. Rolling mill added to a shovel plant in 1900 and first put in operation in 1901; 2 heating furnaces and one 18-inch train of rolls; product, shovel plates and light steel sheets; annual capacity, 6,000 gross tons. Fuel, anthracite and bituminous coal. Henry Belin, Jr., President; Nathaniel G. Robertson, Treasurer and Manager.
- Number of rolling mills and steel works in the Upper Susquehanna Valley: 18. Of these 2 make Bessemer steel and 1 makes open-hearth steel.

PIG AND SCRAP IRON BLOOMARIES—1.

Perry Forge, Seidel Brothers, Marysville, Perry county. Built in 1862; abandoned in 1889 and revived in 1899; 7 forge fires and 1 hammer; steam-power; product, charcoal blooms for boiler tubes, made from scrap iron; annual capacity, 1,875 gross tons.

Number of pig and scrap iron bloomaries in the Upper Susquehanna Valley: 1.

LOWER SUSQUEHANNA VALLEY.

Embraces Blast Furnaces, Rolling Mills, Steel Works, and Bloomaries in York, Lebanon, Dauphin, Cumberland, and Lancaster Counties.

COKE AND MIXED ANTHRACITE AND COKE FURNACES—20.

Aurora Furnace, Susquehanna Iron and Steel Company, Columbia.

Furnace at Wrightsville, York county. One stack; fuel, anthracite coal and coke.—*For description of furnace see page 98.*

Bird Coleman Furnaces, (leased,) The Lackawanna Iron and Steel Company, Buffalo, New York. Furnaces at Cornwall, Lebanon county, Pa. Two stacks; fuel, coke.—*For description of furnaces see pages 86-7.*

Chickies Furnaces, Chickies Iron Company, Limited, Bullitt Building, Philadelphia. Furnaces at 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 1855; iron stoves; fuel, anthracite coal and coke; ore, magnetic from Cornwall, Lebanon county; product, mill and Bessemer pig iron; total annual capacity, 33,500 gross tons. Brand, "Chickies."—*Active in 1900.*

Colebrook Furnaces, (owned,) The Lackawanna Iron and Steel Company, Buffalo, New York. Furnaces at Lebanon, Lebanon county, Pa. Two stacks; fuel, coke.—*For description of furnaces see page 87.*

Lebanon Furnaces, The Pennsylvania Steel Company, Girard Building, Philadelphia. Furnaces at Lebanon, Lebanon county. Two stacks; fuel, anthracite coal and coke.—*For description of furnaces see page 100.*

Lebanon Valley Furnace, J. & R. Meily, Lebanon, Lebanon county. One stack, 60 x 13, built in 1867, blown in December 23, 1867, and remodeled in 1884; two Whitwell stoves; fuel, $\frac{1}{4}$ anthracite coal and $\frac{3}{4}$ coke; ore, principally Cornwall; specialty, red-short gray forge pig iron; annual capacity, 20,000 gross tons. Brand, "Lebanon Valley."—*Active in 1901.*

Lochiel Furnace, The Pennsylvania Steel Company, Girard Building, Philadelphia. Furnace at Harrisburg, Dauphin county. One stack; fuel, anthracite coal and coke.—*For description of furnace see page 100.*

North Cornwall Furnace, (leased,) The Lackawanna Iron and Steel Company, Buffalo, New York. Furnace at Cornwall, Lebanon county, Pa. One stack; fuel, coke.—*For description of furnace see page 87.*

- Paxton Furnaces, The Paxton Iron and Steel Company, 223 Market st., Harrisburg, Dauphin county. Two stacks: one, 75 x 14, built in 1855 and rebuilt in 1886; and one, 80 x 14, built in 1872 and raised to present height in 1896; six Whitwell stoves; fuel, anthracite coal and coke; ores, various kinds; product, foundry, mill, Bessemer, and basic open-hearth pig iron; total annual capacity, 85,000 gross tons. Brands, "Paxton" and "Silver Spring." J. M. Cameron, President; Vance C. McCormick, Vice-President; Donald McCormick, Secretary and Treasurer.—*Active in 1901. See Harrisburg Nail Works in this Valley.*
- Steelton Furnaces, The Pennsylvania Steel Company, Girard Building, Philadelphia. Furnaces at Steelton, Dauphin county. Four stacks; fuel, anthracite coal and coke.—*For description of furnaces see pages 100-1.*
- 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, 9,000 gross tons.—*Idle since 1887.*
- Vesta Furnace, Susquehanna Iron and Steel Company, Columbia. Furnace at Vesta, Lancaster county. One stack; fuel, anthracite coal and coke.—*For description of furnace see page 98.*
- Number of coke and mixed anthracite and coke furnaces in the Lower Susquehanna Valley: 20 stacks, of which 1 has long been idle.

ROLLING MILLS AND STEEL WORKS—19.

- Central Iron and Steel Company, Harrisburg, Dauphin county. (Formed by the consolidation on May 1, 1897, of the Central Iron Works, the Chesapeake Nail Works, and the Paxton Rolling Mills.) Three works, two operated by the Central Iron and Steel Company and one (Chesapeake) leased to Charles L. Bailey & Co. Central Iron Works, Harrisburg, Dauphin county: First mill, built in 1853 and remodeled in 1896, has 2 coal heating furnaces and one 25-inch roughing and 1 Lauth 3-high 25-inch finishing train of rolls with small tables for handling plates, straightening rolls, and one Morgan shear; annual capacity, 14,000 gross tons. New universal mill, built in 1892, has 4 heating furnaces and 1 train of 48-inch rolls capable of producing plates 42 inches wide; annual capacity, 70,000 gross tons. New boiler plate mill, built in 1899, has 3 coal heating furnaces and one 3-high 89 x 28-inch train of rolls with tables, straightening machine, cooling beds, carriers, hydraulic shears, etc.; annual capacity, 36,000 gross tons. Product, boiler plate, marine and locomotive steel, ship plates, universal bridge and structural plates, tank steel, and iron plates. Fuel, coal and manufactured gas. Paxton Rolling Mills, Harrisburg, Dauphin county. Original mill built in 1869 and destroyed by fire in 1898; new mill built in 1892-3 and

- enlarged in 1899; 3 gas and 3 coal heating furnaces and 1 train of 3-high rolls, 34 x 136-inch; product, steel plates of all kinds; annual capacity, 80,000 gross tons. Fuel, coal and producer gas. A flanging shop is connected with these works. Brand, "Central." Both plants are equipped with modern machinery for handling plates of large size and in any quantity. An open-hearth steel plant, to contain six 50-gross-ton furnaces, (one acid and five basic,) will be built in 1901-2. Edward Bailey, President; James M. Cameron, Vice-President; S. B. Boude, Secretary; James B. Bailey, Treasurer and General Manager. Selling agents, William H. Wallace & Co., 66 Broadway, New York; George H. Lloyd, Boston; Charles K. Barns & Co., Real Estate Trust Building, Philadelphia; R. C. Hoffman & Co., Baltimore, Md.; W. H. H. Newman & Co., Buffalo, New York.
- Central Works, American Iron and Steel Manufacturing Company, Lebanon, Lebanon county.—*For description of works see pages 91-2.*
- Chesapeake Nail Works, Charles L. Bailey & Co., (incorporated,) lessees, Harrisburg, Dauphin county. Built in 1867; 18 single puddling and 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. Fuel, coal. Brand, "Chesapeake." James B. Bailey, President; Edward Bailey, Vice-President; John C. Harvey, Secretary and Treasurer. (Owned by the Central Iron and Steel Company.)
- Columbia Mill, Susquehanna Iron and Steel Company, Columbia, Lancaster county.—*For description of works see page 98.*
- East End Mill, Susquehanna Iron and Steel Company, Columbia, Lancaster county.—*For description of works see page 98.*
- East Works, American Iron and Steel Manufacturing Company, Lebanon, Lebanon county.—*For description of works see page 92.*
- Harrisburg Nail Works, 223 Market st., Harrisburg, Dauphin county. Works at Fairview, Cumberland county, on the Northern Central Railway. Built in 1810; 9 double puddling furnaces, 4 heating furnaces, and 1 train of muck rolls; steam and water power; product, muck bar; annual capacity, 10,000 gross tons. Fuel, bituminous coal. Henry McCormick, Jr., Treasurer. (Owned by the Paxton Iron and Steel Company.)—*See Paxton Furnaces in this Valley.*
- Harrisburg Rolling Mill Company, Harrisburg, Dauphin county. Original works built in 1865 to roll rails; 4 single and 15 double puddling furnaces, 6 heating furnaces, and 4 trains of rolls (one 9, one 16, and two 19-inch); product, skelp iron; annual capacity, 30,000 gross tons. Fuel, coal. R. C. Neal, President and Treasurer; C. E. Covert, Secretary. Selling agents, Charles K. Barns & Co., Real Estate Trust Building, Philadelphia.
- Lalanc 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; 9 heating furnaces, 1 bar, 1 sheet, and 4 tin mills, 3 stands of cold mills, and one 5,000-lb. hammer; product, sheet iron, sheet steel, and black plates for tinning; annual capacity, 2,500 gross tons of sheets and 7,500 tons of black plates. A forge connected with the works contains 2 run-out and 4 charcoal knobbling fires; idle. Brand, "L. & G." Fuel, coal. F. Grosjean, President; A. J. Cordier, Vice-President; James Cochran, Secretary and Treasurer; J. P. Luce, Manager.—*See Tinplate Works in Pennsylvania.*
- Lebanon Rolling Mills, Lebanon Rolling Mill Company, Lebanon, Lebanon county. Built in 1867; 14 double puddling furnaces, 9 heating furnaces, 7 trains of rolls, and 1 hammer; product, boiler plates, sheets, skelp, merchant bars, washers, and muck bar; annual capacity, 20,000 gross tons of plates and skelp iron. A forge, added to the works in 1885-6, has 12 fires and 2 hammers; product, charcoal scrap blooms, all consumed in the works; weekly capacity, 120 gross tons. Building two 30-gross-ton basic open-hearth steel furnaces. Fuel, coal and charcoal. Samuel E. Light, President.
- Norway Iron and Steel Company, York, York county. Built in 1900 and first put in operation December 13, 1900; one 10-gross-ton acid open-hearth steel furnace and 2 annealing furnaces; product, small steel castings for gear work, etc.; also makes malleable iron castings; annual capacity, 6,000 gross tons of steel castings. Fuel, coal, coke, and producer gas. Two additional annealing furnaces will be erected. W. F. Bay Stewart, President; Charles James, Vice-President and General Manager; H. H. Weber, Secretary; C. C. Frick, Treasurer.
- Penn Iron Works, Penn Iron Company, Limited, Lancaster, Lancaster county. First put in operation in April, 1873; 7 double puddling furnaces, 2 busheling furnaces, 5 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, 25,000 gross tons of rolled products. Fuel, bituminous coal. Brand, "Penn." A. J. Steinman, Chairman; C. S. Foltz, Treasurer; John Lorentz, Secretary.
- Pennsylvania Steel Works, The Pennsylvania Steel Company, Girard Building, Philadelphia. Works at Steelton, Dauphin county.—*For description of works see page 101.*
- Susquehanna Mill, Susquehanna Iron and Steel Company, Columbia, Lancaster county.—*For description of works see page 98.*
- Union Street Mill, Susquehanna Iron and Steel Company, Columbia, Lancaster county.—*For description of works see pages 98-9.*
- 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, (one 8, one 14, and

one 18-inch,) and 1 hammer; product, bar iron, skelp, chains, and car links; annual capacity, 5,000 gross tons of rolled products. Fuel, coal. Chain works erected in 1884. J. Henry Miller, President; H. M. Capp, Treasurer and General Manager; John R. Evans, Secretary. West Works, American Iron and Steel Manufacturing Company, Lebanon, Lebanon county.—*For description of works see page 92.*

York Mill, Susquehanna Iron and Steel Company, Columbia. Works at York, York county.—*For description of works see page 99.*

Number of rolling mills and steel works in the Lower Susquehanna Valley: 19. Of these 1 makes Bessemer steel, 2 make open-hearth steel, 1 open-hearth steel plant is being built, and 1 open-hearth steel plant is projected.

PIG AND SCRAP IRON BLOOMARIES—1.

Lucknow Forge, Lucknow Iron and Steel Company, lessee, Harrisburg, Dauphin county. Forge at Lucknow Station, P. R. R., 4 miles west of Harrisburg; 9 forge fires, 1 run-out, and 1 steam hammer; product, blooms for boiler plate, sheet iron, wire, tube, skelp, tinplates, etc., made from pig and scrap iron; annual capacity, 6,500 gross tons. John W. Reily, Manager of Forge. (Owned by the Lucknow Forge Company, Limited.)—*See Glendale Mill in the Schuylkill Valley in Pennsylvania.*

Number of pig and scrap iron bloomaries in the Lower Susquehanna Valley: 1.

JUNIATA VALLEY.

Embraces Blast Furnaces, Rolling Mills, Steel Works, and Bloomaries in Centre, Bedford, Huntingdon, Mifflin, and Blair Counties; also in a part of Perry County.

COKE AND MIXED ANTHRACITE AND COKE FURNACES—8.

Bellefonte Furnace, Bellefonte Furnace Company, Bellefonte, Centre county. Philadelphia office, 610 Bullitt Building. One stack, 70 x 16, built in 1887 and put in blast February 1, 1888; remodeled and improved in 1900; three Whitwell stoves; fuel, coke; ore, native hematite; product, foundry, forge, and malleable pig iron; annual capacity, 50,000 gross tons. Brands, "Bellefonte" and "Bellefonte-Nittany." J. W. Gephart, President and General Manager; Charles M. Clement, Vice-President; William H. Hollis, Secretary; William J. McHugh, Treasurer. Selling agents, Rogers, Brown & Co., New York and Cincinnati.—*Active in 1901.*

Colonial Furnaces, Colonial Iron Company, Riddlesburg, Bedford county. Two alternate stacks, each 60 x 14, built in 1868 and 1870; the first was put in blast July 4, 1869, and the second March 4, 1871; four Player stoves; fuel, Broad Top coke; ores, "Old Sterling" from Jefferson county, New York, and Lake Superior; product, principally a soft, strong, fluid foundry pig iron; total annual capacity, 36,000

gross tons. Brands, "Norway," "Keystone," "Kemble," and "Colonial." Henry H. Adams, President and Treasurer, 177 Broadway, New York City; John W. Reynolds, Vice-President, Bedford, Pa.; Joseph F. Moore, Secretary, Morristown, New Jersey; William Lauder, General Manager, Riddlesburg, Pa. Selling agent, Henry H. Adams, 177 Broadway, New York City. (Formerly called Kemble Furnaces.)—*Active in 1901.*

Everett Furnace, Joseph E. Thropp, Earlston, Bedford county. One stack, 75 x 18½, built in 1883-4 and first blown in December 9, 1884; three Siemens-Cowper-Cochrane stoves, each 75 x 18½, and one Hartman stove, 87 x 16; fuel, West Virginia and Broad Top coke, the latter made from coal mined and coked at Kearney; ores, Lake Superior, Pennsylvania, and West Virginia hematites; fossil and hematite iron-ore mines, coal mines, coke ovens, and a limestone quarry are a part of the furnace property; product, standard soft and strong foundry, mill, basic, and Bessemer pig iron; annual capacity, 75,000 gross tons. Brand, "Everett." Joseph E. Thropp, Jr., General Manager. General selling agents, Pilling & Crane, Girard Building, Philadelphia.—*Active in 1901.*

Marshall Furnace, Juniata Furnace and Foundry Company, Newport, Perry county. Philadelphia office, Girard ave. below Front st. 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." Alfred Marshall, President; Edward E. Marshall, Vice-President and General Manager; Edward T. Adams, Secretary; J. Howard Marshall, Treasurer. Selling agents, Marshall Brothers & Co., Girard ave. below Front st., Philadelphia. (Formerly called Juniata Furnace.)—*Active in 1901.*

Saxton Furnaces, Saxton Furnace Company, Saxton, Bedford county. Main office, Manhattan 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, hematite from the company's mines in Huntingdon county and from Lake Superior; product, foundry, forge, and basic pig iron; total annual capacity, 90,000 gross tons. Brand, "Saxton." Charles H. Scott, President; Ellwood W. Porter, Secretary and Treasurer; William Lauder, General Manager. Selling agents, L. & R. Wister & Co., Bullitt Building, Philadelphia, and 331 Fourth ave., Pittsburgh.—*One furnace active in 1901.*

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; ores, hematite from Centre

county and Lake Superior; product, foundry and forge pig iron; annual capacity, 36,000 gross tons. Brand, "Nittany." Property now in the hands of the American Bonding and Trust Company, Baltimore, Md., Trustee, to whom all communications should be addressed. (Formerly operated by the Empire Steel and Iron Company.)—*Active in 1900. Now idle and for sale or lease. See Rolling Mills and Steel Works in this Valley.*

Number of coke and mixed anthracite and coke furnaces in the Juniata Valley: 8 stacks, of which 1 (Saxton) has long been idle.

CHARCOAL FURNACES—3.

Eagle Furnace, Eagle Iron Company, lessee, Roland, Centre county. Telegraph address, Bellefonte. One stack, 29 x 8½, built in 1848; idle for a number of years; revived in 1899; original furnace built in 1817 half a mile from the present site; cold blast; open top, open hearth, and closed tuyere; water-power; ores, Nittany Valley and Lake Superior; product, pig iron for car wheels; annual capacity, 2,400 gross tons. John I. Potter, President; J. M. Dale, Secretary and Treasurer; H. R. Curtin, Superintendent. (Formerly operated by Curtins & Co. Owned by several estates.)—*Active in 1901.*

Greenwood Furnace, Logan Iron and Steel Company, Burnham, Mifflin county. Philadelphia office, Harrison Building, southwest corner Fifteenth and Market sts. Works at Greenwood Furnace P. O., Huntingdon county. 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." Frank G. Kennedy, Jr., Superintendent.—*Active in 1901. See Logan Iron and Steel Works in this Valley.*

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, abandoned in 1864.)—*Active in 1901. See Milesburg Iron Works (Rolling Mills and Steel Works) and Bloomeries in this Valley.*

Number of charcoal furnaces in the Juniata Valley: 3 stacks. Total number of furnaces in the Juniata Valley: 11 stacks.

ROLLING MILLS AND STEEL WORKS—10 COMPLETED AND 1 BUILDING.

Altoona Foundry and Machine Company, Altoona, Blair county. Building one 10-gross-ton Swindell acid open-hearth steel furnace; also 2 double annealing furnaces; product, to be malleable iron castings, but steel castings could be made; estimated daily capacity, 10 gross tons of malleable castings. Fuel to be used, manufactured gas. J. P. Levan, President; B. M. Bunker, Secretary and Treasurer.

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, (one 18-inch muck, and two 8 and one 16-inch finishing,) and one 3-ton hammer; product, refined bar, band, hoop, oval, half oval, half round, and scroll iron; specialties, brake-shoe key iron, brake levers, and padded switch plates rolled and furnished in continuous bars; annual capacity, 23,000 gross tons. Fuel, bituminous coal. Brand, "Altoona." D. K. Ramey, President; H. K. McCauley, Secretary and Treasurer.

Hollidaysburg Iron Works, Hollidaysburg Iron and Nail Company, Hollidaysburg, Blair county. Built in 1860; 1 double puddling furnace, 7 single puddling furnaces, 3 heating furnaces, 4 trains of rolls, (one 8-inch, one 16-inch, and two 18-inch,) and 27 cut-nail machines; product, merchant bar, channel, skelp, and hoop iron, flat and small T rails, and cut nails and spikes; annual capacity, 9,000 gross tons of bar iron and 60,000 kegs of cut nails. Fuel, bituminous coal. Brand for bar iron, "I. X. L." J. D. Hemphill, President; J. W. Bracken, Treasurer; Thomas J. Hemphill, Secretary.

Howard Rolling Mills, Jenkins Iron and Tool Company, Howard, Centre county. Built in 1840; 3 double and 2 single puddling furnaces, 2 heating furnaces, and 3 trains of rolls (8, 12, and 16-inch); steam and water power; product, bar iron, consumed by the company in the production of hardware specialties and chains; annual capacity, 5,500 gross tons. Fuel, bituminous coal. Brand, "Howard." S. W. Murray, President; J. Norris Bogle, Secretary; W. R. Jenkins, Treasurer.

Juniata Rolling Mill, The Eleanor Iron Company, lessee, Hollidaysburg, Blair county. Main office, Tyrone. Branch office, Harrisburg. Built and put in operation in 1866; 13 single puddling furnaces, 2 heating furnaces, 1 rotary squeezer, and 2 trains of rolls (10 and 20-inch); product, merchant iron, rounds, half rounds, squares, hexagons, socket iron, and grooved skelp iron; annual capacity, 11,000 gross tons of puddled iron and 10,000 tons of bar and skelp iron. Fuel, bituminous coal. Brands, "Eleanor" and "Juniata." R. C. Neal, President, Harrisburg; H. L. Sholly, Secretary and Treasurer, Tyrone. (Nail factory, containing 30 cut-nail machines, dismantled. Owned by the first mortgage bondholders of the Hollidaysburg and Gap Iron Works, who are represented by Thomas J. Baldrige, of Hollidaysburg.)

Logan Iron and Steel Works, Logan Iron and Steel Company, Burnham, 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; 1 single and 10 double puddling furnaces, 7 heating furnaces, 2 hammers, (one a heavy blooming hammer for Nor-

way and horseshoe iron and hammered charcoal bars,) and 4 trains of rolls (one 8, one 12, 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.; product, charcoal and refined bar iron, staybolt, crown bar, bridge iron, flats, rounds, squares, ovals, half ovals, half rounds, band iron, bevel-edge iron, angles, wagon and buggy tire in round or square edge, truck sides, switch iron, skelp, drill rods to 6 inches in diameter, and special small shapes of all sorts; annual capacity, 35,000 gross tons of rolled iron. Fuel, bituminous coal. Brands, "Logan," "Logan Staybolt," and "Logan Refined." H. T. Townsend, President, Frank G. Kennedy, Jr., Treasurer, and S. H. Pitcher, Secretary, Philadelphia; Frank G. Kennedy, Jr., Superintendent, Lewistown.—*See Greenwood (charcoal) Furnace in this Valley.*

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. Fuel, bituminous coal. A plant for the manufacture of wire is connected with the works; also a factory for the manufacture of all kinds of polished and cable chains.—*See Hecla (charcoal) Furnace and Bloomaries (Milesburg Iron Works) in this Valley.*

Portage Mill, American Steel Hoop Company, Carnegie Building, Pittsburgh. Works at Duncansville, Blair county.—*For description of works see page 51.*

Standard (The) Steel Works, Harrison Building, Philadelphia. Works at Burnham, Mifflin county. Built in 1869; 21 heating furnaces, 11 hammers, (two 10-ton and one 15-ton Tannet & Walker, one 7-ton Sellers, one 30-cwt. Morris, one 25-cwt. Sellers, and four 6,000 and one 8,000-lb. Bement, Miles & Co.,) and 2 tire mills. Steel department, added in 1895, contains three 15-gross-ton Wellman revolving acid open-hearth furnaces; first steel made March 18, 1895; product, steel ingots and castings; annual capacity, 23,000 gross tons. Finished products, steel locomotive and car-wheel tires, forgings, wrought-iron wheel centres, and wheels; specialties, locomotive and car-wheel tires, steel-tired wheels, steel forgings, and steel castings; annual capacity, 15,000 gross tons of steel tires, 3,500 tons of forged wrought-iron, cast steel, and cast-iron wheel centres, 6,000 tons of steel forgings, and 5,000 tons of steel castings. Fuel, bituminous coal and producer gas. Brand, the word "Standard" between two anchors. One 50-gross-ton Wellman revolving acid furnace will be added. William Burnham, President and Treasurer; Merle Middleton, Vice-President; Theodore J. Lewis, Secretary; J. P. Stevenson, Superintendent; A. A. Stevenson, Mechanical Engineer. Selling agents, E. S. Lewis,

Philadelphia; Charles Riddell, 1217 Monadnock Block, Chicago; W. E. Clark, 8 Oliver st., Boston; G. F. Jones, Richmond, Va.; S. H. Riddell, Security Building, St. Louis; H. W. Sheldon, New York City; McMullen & Eyre, San Francisco, Cal.; F. B. Howell & Co., St. Paul, Minn.

Tyrone Forges, The Tyrone Iron Company, Tyrone, Blair county. Office, Harrisburg. Forges established in 1809 and rebuilt in 1870; 10 refinery fires, 1 double run-out, and 1 large steam hammer; product, charcoal blooms, all consumed in the rolling mill; annual capacity, 7,500 gross tons of blooms. Rolling mill added in 1883 and enlarged in 1898; 2 regenerative gas heating furnaces, 2 direct Lauth coal-fired heating furnaces, and 2 trains of rolls (one 16-inch grooved skelp and one 23 x 54-inch two-high plate); product, sheared and grooved rolled iron and steel skelp; specialty, knobbled charcoal iron boiler-tube skelp; annual capacity, 16,000 gross tons. Fuel, manufactured gas and bituminous coal. John Y. Boyd, President, and R. C. Neal, Secretary and Treasurer, Harrisburg; H. L. Sholly, Superintendent, Tyrone. Sales made by the company.

Valentine (The) Iron Company, Bellefonte, Centre county. Built in 1798; 4 double puddling furnaces and 1 train of 18-inch rolls; water-power; product, muck bar; annual capacity, 4,000 gross tons. Fuel, bituminous coal. Brand, "Nittany." John P. Harris, President; Robert Valentine, Secretary and Treasurer. Property now in the hands of the American Bonding and Trust Company, Trustee, Baltimore, Maryland, to whom all communications should be addressed. (Formerly leased by the Empire Steel and Iron Company.)—*For sale or lease. See Furnaces in this Valley.*

Number of rolling mills and steel works in the Juniata Valley: 10 completed and 1 building. Of these 1 makes open-hearth steel and 1 open-hearth steel furnace is being built.

PIG AND SCRAP IRON BLOOMARIES—2.

Eagle Forge, Curtins & Co., Roland, Centre county. Telegraph address, Bellefonte. Built in 1809; remodeled in 1901; 8 fires and 1 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.

Milesburg Iron Works, McCoy & Linn, Milesburg, Centre county. Built in 1830; 7 fires and 1 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 carriage bolts.—*See Hecla (charcoal) Furnace and Milesburg Iron Works (Rolling Mills and Steel Works) in this Valley.*

Number of pig and scrap iron bloomaries in the Juniata Valley: 2.

ALLEGHENY COUNTY.

Embraces Blast Furnaces, Rolling Mills, and Steel Works in the City of Pittsburgh and in Allegheny County.

COKE FURNACES—34 COMPLETED AND 3 BUILDING.

- Carrie Furnaces, Carnegie Steel Company, Carnegie Building, Pittsburgh. Furnaces at Rankin, Allegheny county. Four stacks; fuel, coke.—*For description of furnaces see pages 4-5.*
- Clinton Furnace, Clinton Iron and Steel Company, West Carson st., Pittsburgh. New York office, 71 Broadway. One stack, 85 x 17, built in 1859, rebuilt in 1889-90, 1893, and in 1900-1; four C. H. Foote hot-blast stoves; fuel, coke; ore, Lake Superior; product, Bessemer and forge pig iron and an exceedingly soft and fluid foundry iron of rare strength, especially adapted for light work and fine machinery castings; annual capacity, 90,000 gross tons. Brands, "Hector" and "Clinton." Charles W. Friend, Furnace Superintendent.—*Active in 1901. See Clinton Rolling Mill in this county.*
- Duquesne Furnaces, Carnegie Steel Company, Carnegie Building, Pittsburgh. Furnaces at Cochran, Allegheny county. Four stacks; fuel, coke.—*For description of furnaces see page 5.*
- Edgar Thomson Furnaces, Carnegie Steel Company, Carnegie Building, Pittsburgh. Furnaces at Bessemer, Allegheny county. Nine stacks; fuel, coke.—*For description of furnaces see page 5.*
- Edith Furnace, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Furnace at Allegheny, Allegheny county. One stack; fuel, coke.—*For description of furnace see page 31.*
- Eliza Furnaces, Jones & Laughlins, Limited, Pittsburgh, Allegheny county. Four stacks; fuel, coke.—*For description of furnaces see pages 106-7.*
- Isabella Furnaces, operated by The Isabella Furnace Company, Incorporated, Etna, Allegheny county. Three stacks; fuel, coke. Controlled by the American Steel Hoop Company, Carnegie Building, Pittsburgh.—*For description of furnaces see page 49.*
- Lucy Furnaces, Carnegie Steel Company, Carnegie Building, Pittsburgh, Allegheny county. Two stacks; fuel, coke.—*For description of furnaces see page 5.*
- Monongahela Furnaces, (National Department,) National Tube Company, Conestoga Building, Pittsburgh. Furnaces at McKeesport, Allegheny county. Two stacks; fuel, coke.—*For description of furnaces see pages 24-5.*
- Neville Island Furnace, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Furnace on Neville Island, Neville township, Allegheny county, below Pittsburgh. One stack; fuel, coke.—*For description of furnace see page 31.*
- St. Clair Furnace Company, Empire Building, Pittsburgh. Building 3

blast furnaces at Clairton, Allegheny county; fuel, coke.—*For description of furnaces see page 114.*

Shoenberger Furnaces, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Furnaces at Pittsburgh. Two stacks; fuel, coke.—*For description of furnaces see page 31.*

Soho Furnace, Jones & Laughlins, Limited, Pittsburgh. One stack; fuel, coke.—*For description of furnace see page 107.*

Number of coke furnaces in Allegheny county: 34 completed stacks and 3 stacks building.

ROLLING MILLS AND STEEL WORKS—63 COMPLETED AND 4 BUILDING.

Allegheny Steel and Iron Company, Lewis Building, Pittsburgh. Works at Avenue, Allegheny county. Telegraph address, Tarentum. Built in 1900-1 and first put in operation in July, 1901; 6 sheet furnaces, 6 pair furnaces, 6 annealing furnaces, 1 train of hot rolls with 6 finishing mills, (one 26 x 50, three 26 x 40, one 26 x 36, and one 26 x 46-inch,) and 1 train of cold rolls with 3 pairs of 22 x 50-inch mills; one 50-gross-ton basic open-hearth steel furnace with an annual capacity of 25,000 gross tons of ingots; first steel made September 19, 1901. Product, sheet bars and sheet steel; annual capacity, 20,000 gross tons of sheet bars and 15,000 tons of sheet steel. Fuel, coal and manufactured and natural gas. Alfred Hicks, President; George A. McLean, Vice-President; R. D. Campbell, Secretary; H. M. Brackenridge, Treasurer; H. E. Sheldon, General Manager.

American Iron and Steel Works, Jones & Laughlins, Limited, Pittsburgh. Works in the Twenty-fourth and Twenty-fifth wards, South Side.—*For description of works see page 107.*

Anchor Mills, Neal Brothers, lessees, 421 Wood st., Pittsburgh. Works on Nineteenth st., South Side, built in 1842; 24 single puddling furnaces, 4 heating and 2 annealing furnaces, and 3 trains of rolls; product, muck bar, skelp, special electric steel sheets, sheet iron, and black plates; also produce terne or lead-coated sheets; annual capacity, 12,000 gross tons. Fuel, coal. Andrew G. Gourley, Superintendent. (Works owned by Chess Brothers.)—*See Tinplate Works in Pennsylvania.*

Anchor Nail and Tack Works and Central Expanded Metal Company, Chess Brothers, 531 Wood st., Pittsburgh. Two mills: Works on Nineteenth st., South Side, built in 1842; equipped with puddling furnaces, heating furnaces, and trains of rolls, which are leased to Neal Brothers and operated under the name of the Anchor Mills; part of plant not leased to Neal Brothers contains 90 cut-nail machines, (idle,) 76 tack machines, (active,) and 2 hammers; product, cut nails, tacks, shoe nails, etc.; annual capacity, 200,000 kegs of cut nails; fuel, coal. Works at Rankin Station, built in 1886 and

enlarged in 1888; 1 gas heating furnace and one 3-high 24-inch plate train; product, light steel plates for straps, nails, tacks, and stamping and die work; annual capacity, 12,000 gross tons of rolled products; 7 expanded metal machines for producing steel fire-proof lathing, fencing, screens, etc.; fuel, coal for steam and producer gas for heating and annealing.

Black Diamond Steel Works, operated by the Park Steel Company, Pittsburgh, Allegheny county. Controlled by the Crucible Steel Company of America, Empire Building, Pittsburgh.—*For description of works see pages 110-1.*

Boston Iron and Steel Works, (National Department,) National Tube Company, Conestoga Building, Pittsburgh. Works at McKeesport, Allegheny county.—*For description of works see page 25.*

Braddock Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Braddock, Allegheny county.—*For description of works see page 32.*

Byers (A. M.) & Co., (incorporated,) Pittsburgh. Works on Sixth st., South Side. Built in 1862-3; 25 single puddling furnaces, 5 heating furnaces, 1 scrap furnace, and 3 trains of rolls (one 21-inch muck, one 21-inch plate, and one 17-inch skelp); product, skelp iron, all consumed in the manufacture of pipe; annual capacity, 16,000 gross tons. Also operate a galvanizing department; also two pipe mills for the manufacture of lap and butt-welded wrought-iron gas, steam, and water pipe, oil-well tubing, casing, etc. Fuel, natural gas in finishing mills and coal in puddling furnaces. Dallas C. Byers, President; J. D. Lyon, Vice-President; Thomas J. Stevenson, Secretary and Treasurer.

Carbon Steel Works, Carbon Steel Company, Thirty-second st., Pittsburgh. Built in 1862 and rebuilt in 1888; 2 direct air heating furnaces, 6 soaking pits, eight 50-gross-ton acid open-hearth steel furnaces built in 1888 and subsequent years, and 2 trains of rolls (36-inch universal and 128-inch plate); product, acid open-hearth steel ingots, universal rolled plates, sheared plates, and locomotive driving axles; annual capacity, 125,000 gross tons of ingots and 85,000 tons of finished plates. Fuel, natural and producer gas except under boilers. C. M. Raymond, President; A. H. Keith, General Agent. Selling agents, E. G. Buchanan, Havemeyer Building, New York; Charles L. Harris, 714 North Second st., St. Louis.

Carnegie Tube Company, Carnegie, Allegheny county. Building works to be equipped with 6 heating furnaces and 3 trains of grooved rolls, (one 12, one 16, and one 22-inch,) for the manufacture of sheet bars and skelp iron; estimated annual capacity, 40,000 gross tons. Fuel, coal and producer gas. A plant for the manufacture of tubes is also being erected. Works will probably be ready for operation in the winter of 1901-2. A. A. Hutchinson, President; R. S.

Vincent, Vice-President; H. Nicols, Secretary; O. F. Grant, Treasurer; T. B. Everson, General Manager.

Chartiers Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Carnegie, Allegheny county.—*For description of works see page 54.*

Clark Mill, American Steel Hoop Company, Carnegie Building, Pittsburgh. Works at Thirty-fifth st., A. V. Railway, and Allegheny river, Pittsburgh, Allegheny county.—*For description of works see pages 49-50.*

Clinton Rolling Mill, Clinton Iron and Steel Company, West Carson st., Pittsburgh. New York office, 71 Broadway. Mill on the South Side. Built in 1846; 3 heating furnaces and one 22-inch plate train; product, plate iron; annual capacity, 15,000 gross tons. Fuel, natural gas. James W. Friend, President; Charles W. Friend, Vice-President; F. N. Hoffstot, Treasurer; Theo. W. Friend, Assistant Treasurer.—*See Clinton Furnace in this county.*

Columbia Iron and Steel Foundry Company, Thirty-fourth st. and A. V. Ry., Pittsburgh, Allegheny county. Built in 1900-1 and first steel made January 25, 1901; one 9-gross-ton acid open-hearth steel furnace; product, steel castings; annual capacity, 2,000 gross tons. Fuel, natural gas. C. C. Lee, President; Sibbet Macrum, Secretary and Treasurer; James W. L. Kerr, Manager.

Crescent Steel Works, Crucible Steel Company of America, Empire Building, Pittsburgh. Works, Forty-ninth to Fifty-first sts., Pittsburgh, Allegheny county.—*For description of works see page 111.*

Duquesne Steel Foundry Company, Germania Bank Building, Pittsburgh. Works at Kendall Station, P. & L. E. R. R., (P. O. address of works, Coraopolis,) Allegheny county. Built in 1900 and first steel made August 24, 1900; two 20-gross-ton acid open-hearth steel furnaces; product, steel castings; annual capacity, 10,000 gross tons. Fuel, natural gas. W. A. Herron, President; T. H. Bakewell, Secretary, Treasurer, and Selling Agent; W. A. Ruth, Superintendent.

Duquesne Steel Works, Carnegie Steel Company, Carnegie Building, Pittsburgh. Works at Cochran, (post office address, Duquesne,) four miles from Pittsburgh, on the Pennsylvania and the Union Railroads and the Monongahela river.—*For description of works see page 6.*

Edgar Thomson Steel Works, Carnegie Steel Company, Carnegie Building, Pittsburgh. Works at Bessemer, (post office address, Braddock,) two miles from Pittsburgh, on the Pennsylvania, the Baltimore and Ohio, the Pittsburgh and Lake Erie, the Pittsburgh, Bessemer, and Lake Erie and the Union Railroads and the Monongahela river.—*For description of works see page 6.*

Elba Rolling Mills, (Continental Department,) National Tube Company, Conestoga Building, Pittsburgh. Works on Second ave., Pittsburgh, Allegheny county.—*For description of works see page 25.*

Etna Iron and Tube Works, Spang, Chalfant & Co., Incorporated,

Pittsburgh. Office, 310 Sandusky st., Allegheny. Manufacturers of bar and skelp iron and wrought-iron welded tubes for gas, water, steam, and oil; also boiler tubes. Works at Etna, Allegheny county. Built in 1828; rolling mill department contains one double and 25 single puddling furnaces, 3 scrap furnaces, 7 heating furnaces, 5 trains of rolls, (one 8, one 12, one 16-inch, one plate mill, and one muck train,) and 3 hammers; product, pipe iron; annual capacity, 25,000 gross tons. Tube works department contains 2 butt weld and 4 lap weld furnaces; annual capacity, 66,500 gross tons. A fifth lap weld furnace, capable of making pipe up to 30 inches in diameter, is being added. This was the first mill to use natural gas exclusively; it still uses it in all departments. George A. Chalfant, President; Henry Chalfant, Secretary and Treasurer; C. W. Hanford, Assistant Secretary and Assistant Treasurer.

Firth-Sterling Steel Company, Pittsburgh. Works at Demmler, Allegheny county. Established in 1875; two 30-pot crucible steel-melting furnaces, 9 heating furnaces, 7 hammers, (800 lbs. to 5 tons,) and 3 trains of rolls (one 8, one 10, 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. Fuel, bituminous coal. Brand, "Firth-Sterling." Also operates a machine shop, containing lathes, boring mills, etc. Lewis J. Firth, President; Austin A. Wheelock, Vice-President; James E. Porter, Secretary; Eben B. Clarke, Treasurer. Selling agents, Wheelock, Lovejoy & Co., New York and Boston; MacFarland & Little, Philadelphia; E. S. Jackman, Chicago; Abner Doble Company, San Francisco. (Formerly operated by the Sterling Steel Company.)

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 acid furnaces; product, steel castings; annual capacity, 15,000 gross tons. Fuel, natural gas. N. A. Hemphill, President; W. Wade, Secretary; Pennock Hart, Treasurer; W. M. Westerman, Assistant Secretary and Assistant Treasurer.

Glassport Works, Pittsburgh Steel Company, 305 Ferguson Block, Pittsburgh. Works at Glassport, Allegheny county. Built in 1899-1900 and first put in operation in March, 1900; 1 continuous and 2 regenerative gas heating furnaces, 3 trains of rolls, (one 8, one 10, and one 20-inch,) and 1 hammer; product, steel billets, hoops, and bands; annual capacity, 30,000 gross tons of billets and 30,000 tons of hoops and bands. Fuel, manufactured gas and bituminous coal. Wallace H. Rowe, President; Edwin Bindley, Vice-President; Charles E. Beeson, Secretary; W. C. Reitz, Treasurer; J. J. Rebman, Superintendent.

(Formerly operated by the Pittsburgh Steel Hoop Company.)—*See Monessen Works (Rolling Mills and Steel Works) in the Western Pennsylvania District.*

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 6 trains of rolls (three 8, one 9, one 16, and one 18-inch); product, steel railroad and boat spikes, tie plates, and merchant bars; annual capacity, 54,000 gross tons of spikes and 27,000 tons of bar steel and tie plates. Fuel, natural gas and coal. Brands: for spikes, "Dilworth, Porter & Co.;" for tie plates, "Glendon Flange" and "Goldie Claw;" for merchant steel, "Glendon." Lawrence Dilworth, Chairman; Samuel T. Owens, Vice-Chairman; Joseph R. Dilworth, Secretary and Treasurer.

Homestead Steel Works, Carnegie Steel Company, Carnegie Building, Pittsburgh. Works at Munhall, 1 mile from Pittsburgh, on the Pennsylvania, the Pittsburgh and Lake Erie, and the Union Railroads and the Monongahela river.—*For description of works see pages 6-7.*

Howard Axle Works, Carnegie Steel Company, Carnegie Building, Pittsburgh. Works at Howard, one-half mile from Pittsburgh, on the Pennsylvania, the Pittsburgh and Lake Erie, and the Union Railroads and the Monongahela river.—*For description of works see page 7.*

Howe, Brown & Co. Works, Crucible Steel Company of America, Empire Building, Pittsburgh. Works at Penn ave. and Seventeenth st., Pittsburgh.—*For description of works see page 112.*

Jupiter Steel Works, Jupiter Steel and Coal Company, 616 Lewis Building, Pittsburgh. Building works near Carnegie, Allegheny county. Telegraph address, Rosslyn. Two 40-gross-ton Swindell open-hearth steel furnaces with an annual capacity of 12,000 gross tons of ingots. Crucible steel department will contain 4 furnaces, with 72 steel-melting pots; annual capacity, 3,000 tons. Product, "Jupiter" steel mining tools, oil-well and quarry outfits and supplies, etc. Fuel, manufactured gas. Works will probably be completed in January, 1902. John M. Anderson, President; H. B. Whall, Vice-President; James Hazlewood, Secretary and Treasurer; W. J. Wilson, Manager; D. B. Morris, Selling Agent.

Keystone Rolling Mill, Fort Pitt Iron and Steel Company, lessee, Murland Building, 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 18, and one 23-inch plate); product, iron and steel skelp, bar iron, and cotton-ties; annual capacity, 36,000 gross tons. Fuel, coal. Brand, "Fort Pitt." (Owned by the Estate of James McCutcheon.)

La Belle Steel Works, Crucible Steel Company of America, Empire Building, Pittsburgh. Works at Ridge ave. and Rebecca st., Allegheny, Allegheny county.—*For description of works see page 112.*

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; annual capacity, 5,000 gross tons. Fuel, natural gas and coal.

Lower Union Mills, Carnegie Steel Company, Carnegie Building, Pittsburgh. Works at Twenty-ninth st., Pittsburgh, on the Allegheny Valley Railway.—*For description of works see page 7.*

McConway (The) and Torley Company, Forty-eighth st. and A. V. Ry., Pittsburgh. Building one 25-gross-ton Siemens open-hearth steel furnace; product, steel car couplers; estimated annual capacity, 12,000 gross tons. Fuel, natural and producer gas. William McConway, President; Stephen C. Mason, Secretary; E. M. Grove, Treasurer.

McCutcheon Mill, American Steel Hoop Company, Carnegie Building, Pittsburgh. Works at 88 Rebecca st., Allegheny, Allegheny county.—*For description of works see page 50.*

McKeesport Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at McKeesport, Allegheny county.—*For description of works see page 55.*

Mesta Machine Company, Lewis Block, Pittsburgh. Works at Homestead, Allegheny county. Built in 1899 and first steel made November 21, 1899; one 25-gross-ton acid open-hearth steel furnace; product, steel rolls and general castings; also machine-molded gears; annual capacity, 10,000 gross tons. May add one 30-gross-ton basic open-hearth steel furnace. Fuel, natural gas. A foundry for the production of gray-iron castings is connected with the works and is equipped with 6 air furnaces and one 72 and three 84-inch cupolas. George Mesta, President; W. H. Rea, Treasurer; W. D. Rowan, Auditor; J. O. Horning, Secretary.

Monongahela Iron and Steel Company, Pittsburgh. Post-office address, Box 215. Works at Hays Station, Pittsburgh and Lake Erie Railroad and Pennsylvania Railroad, in Allegheny county. Built and put in operation in 1891; 22 single puddling furnaces, 3 heating furnaces, and 3 trains of rolls (one 20-inch muck and one 10 and one 18-inch finishing); product, fine grades of muck bar and merchant sizes of bar iron; annual capacity, 15,000 gross tons. Fuel, coal. A plant for the manufacture of chains is connected with the works. Robert A. Carter, President and Manager; H. L. Brunt, Secretary and Treasurer.

Monongahela Steel Works, (National Department,) National Tube Company, Conestoga Building, Pittsburgh. Works at McKeesport, Allegheny county.—*For description of works see pages 25-6.*

Monongahela Works, American Tin Plate Company, Battery Park Building, New York City. Works on South Fifteenth st., Pittsburgh, Allegheny county.—*For description of works see page 42.*

National Forge and Iron Works, (National Department,) National Tube Company, Conestoga Building, Pittsburgh. Works at McKeesport, Allegheny county.—*For description of works see page 26.*

National Rolling Mills, (National Department,) National Tube Company, Conestoga Building, Pittsburgh. Works at McKeesport, Allegheny county.—*For description of works see page 26.*

Nickel Steel and Forge Company, 800 Penn ave., Pittsburgh. Works at Carnegie, Allegheny county. Built in 1897; 8 crucible steel-melting holes, 1 cementing furnace, one 10-inch train of rolls, and 3 hammers (one 600-lb., one 750-lb., and one 6,000-lb.); product, steel bars and Damascus and nickel steel for tools, dies, etc.; annual capacity of rolled and forged products, 6,000 gross tons. Fuel, coal and coke. Brands, "Damascus" and "Nickel." Damascus department removed from Greensburg, Pa. George R. Reinhart, President; B. K. Jamison, Vice-President; John W. Woodside, Treasurer; Frank M. Wirgman, Secretary; Clinton A. Higbee, General Manager; A. A. Du Ban & Co., Auditors; Walton & Andre, Consulting Counsel. (Formerly operated by The Williams Company, Limited. Owned by the National Steel Refining Company, 618 Bourse Building, Philadelphia.)

Oliver Iron and Steel Company, Pittsburgh. Mills and factories located from Tenth to Fifteenth sts., South Side, Pittsburgh. Operations began in 1863; 36 single puddling furnaces, 13 heating furnaces, 14 hammers, 8 trains of rolls, and 1 continuous combination mill; product, bar iron and steel, rounds, squares, angles, small channels, and light rails; part of the steel and iron made is used in the production of finished track bolts, rivets, machine bolts, carriage bolts, coach screws, nuts, washers, hinges, wagon hardware, railway car forgings, railway track tools, telegraph and telephone supplies, etc.; annual capacity, 120,000 gross tons. Fuel, coal for steam purposes and natural gas for heating, the latter obtained from the company's properties in Washington and Greene counties, Pennsylvania. James B. Oliver, President; John C. Oliver and Henry B. Lupton, Vice-Presidents; Ralph Theophilus, Treasurer; C. E. Black, Secretary. (Formerly called the Allegheny, Monongahela, and Birmingham Iron Works. Steel works, containing two 2-ton Clapp-Griffiths converters, built in 1884, abandoned and dismantled in 1896.)

Painter Mill, American Steel Hoop Company, Carnegie Building, Pittsburgh. Works at South Side, Pittsburgh, Allegheny county.—*For description of works see page 51.*

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, stay bolt iron, draw bars, links and pins, arch bars, ham-

mered car and locomotive axles, and general railroad and heavy forgings; annual capacity, 24,000 gross tons of rolled and 20,000 tons of forged products. Fuel, manufactured and natural gas. Brands, "P. F. & I." and "Special." Calvin Wells, President and Treasurer; F. E. Richardson, Secretary; John H. Barr, Manager. Selling agent, F. B. Buss, Chicago.

Pittsburgh Steel Foundry, National Bank of Commerce Building, Pittsburgh. Works at Glassport, Allegheny county. Built in 1899 and first steel made in November, 1899; five 20-gross-ton open-hearth steel furnaces (two basic and three acid); product, steel castings for mills, electrical work, mining machinery, locomotive wheel centres and frames, couplers, knuckles, forging ingots, etc.; annual capacity, 60,000 gross tons. Fuel, natural gas. Stewart Johnston, President; J. M. Lockhart, Vice-President; Augustus Trump, Secretary and Treasurer; D. MacDougall, Superintendent. Selling agents, H. V. Seth, Philadelphia; E. H. Stroud, Chicago; George C. Beals, Buffalo.

Pittsburgh Steel Works, Crucible Steel Company of America, Empire Building, Pittsburgh. Works at McKees Rocks, Allegheny county, on the Pittsburgh and Lake Erie Railroad.—*For description of works see page 113.*

Rankin Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Rankin Station, Allegheny county.—*For description of works see page 34.*

Reliance Steel Casting Company, Limited, Pittsburgh. Works, corner Thirty-sixth st. and A. V. Ry. Built in 1889; one 24-pot crucible steel-melting furnace; first steel made in September, 1889. Open-hearth steel plant added in 1895; one 8-gross-ton acid furnace. Product, crucible and open-hearth steel castings from one to 20,000 pounds; specialty, small castings; annual capacity, single turn, 2,500 gross tons. Fuel, natural gas and coal. Charles Bailey, Chairman; Joseph A. Kelly, Secretary and Treasurer.

Republic Iron Works, (National Department,) National Tube Company, Conestoga Building, Pittsburgh. Works on Twenty-fifth st., South Side, Pittsburgh, Allegheny county.—*For description of works see page 26.*

Sable Iron Works, Zug & Co., Limited, Pittsburgh. Works, Thirteenth and Etna sts. Original works built in 1845; 22 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 stands.) Sheet mill, added in 1895, now contains 12 heating furnaces, 7 producer gas furnaces, 7 annealing furnaces, 11 stands of rolls, (2 pair roughing, 6 pair finishing, and 3 pair cold,) and 3 pair of squaring and 1 pair of doubling shears. An electric plant is connected with both mills and 2 electric cranes are connected with the sheet mill. 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 bars, black plates for tinning, and steel and iron sheets for corrugating, galvanizing, stamping, expanded metal, and electric work; annual capacity, 22,500 gross tons of bar iron and 14,000 tons of sheets. A galvanizing plant connected with the works has an annual capacity of 6,000 tons. Corrugated sheets are also produced. Fuel, coal, natural gas, and manufactured gas. Brand, "Sable." Charles H. Zug, Chairman; Charles H. Reid, Secretary and Treasurer. Eastern selling agents, Horne Brothers, Boston.
- St. Clair Steel Company, Empire Building, Pittsburgh. Building a rolling mill and steel plant at Clairton, Allegheny county.—*For description of works see page 114.*
- Shoenberger Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Fifteenth st. and Penn ave., Pittsburgh, Allegheny county.—*For description of works see page 34.*
- Singer, Nimick & Co. Works, Crucible Steel Company of America, Empire Building, Pittsburgh. Works in the thirty-fourth ward, Pittsburgh, Allegheny county.—*For description of works see page 113.*
- 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; boiler plates a specialty; make "Sligo" bars and "Ty-rone" refined iron; annual capacity, 24,000 gross tons. Fuel, producer gas and coal.
- Soho Department, Jones & Laughlins, Limited, Third avenue and Ross street, Pittsburgh. Works at Second avenue, near Brady street, Pittsburgh, Allegheny county.—*For description of works see page 107.*
- South Side Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Eighth and Bingham sts., Pittsburgh, Allegheny county.—*For description of works see page 34.*
- Star Works, American Tin Plate Company, Battery Park Building, New York City. Works at foot of Twelfth st., Pittsburgh, Allegheny county.—*For description of works see page 44.*
- Superior Steel Company, Pittsburgh. Works at Carnegie, Allegheny county. Built in 1892 and first put in operation January 3, 1893; 5 heating furnaces, 1 train of 14-inch hot rolls, and 10 pair of 10 and 4 pair of 14-inch cold rolls; product, hot and cold rolled strip steel; annual capacity, 15,000 gross tons. Fuel, natural gas and coal. Brand, "Superior." James H. Hammond, President; E. M. S. Young, Secretary and Treasurer; F. R. Schneider, Superintendent.
- Twenty-sixth Street Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Twenty-seventh

and Smallman sts., Pittsburgh, Allegheny county.—*For description of works see page 35.*

Union Steel Casting Company, Sixty-first st. and A. V. Ry., Pittsburgh, Allegheny county. Built in 1899 and first steel made July 10, 1899; two 20-gross-ton acid open-hearth steel furnaces; 2 forge fires for smith work; product, steel castings; annual capacity, 6,000 gross tons. Fuel, natural gas. C. C. Smith, President and General Manager; H. E. Wainwright, Jr., Secretary; Uriah Tinker, Treasurer.

United States (The) Wire and Nail Company, Lewis Block, Pittsburgh. Works at Shousetown, Allegheny county. Built in 1899–1900 and first put in operation July 1, 1900; 3 reverberatory heating furnaces, 3 trains of rolls, (one 9, one 12, and one 16-inch,) and 42 wire-nail machines; product, wire rods, wire, and wire nails; annual capacity, 30,000 gross tons of wire rods, 18,000 tons of wire, and 240,000 kegs of wire nails. Fuel, bituminous coal. I. N. DeNoon, President; E. W. Palmer, Vice-President; J. C. DeNoon, Secretary and Treasurer.

United States Works, American Tin Plate Company, Battery Park Building, New York City. Works at Demmler, (eighth ward, McKeesport,) Allegheny county.—*For description of works see page 44.*

Upper Union Mills, Carnegie Steel Company, Carnegie Building, Pittsburgh. Works at Thirty-third st., Pittsburgh, on the Allegheny Valley Railway.—*For description of works see pages 7–8.*

Vesuvius Iron and Nail Works, Moorhead, Brother & Co., Incorporated, Sharpsburg, Allegheny county. Built in 1846; 40 single puddling furnaces, 10 heating furnaces, one 4-ton hammer, and 5 trains of rolls (one 8, one 15, one 18, one 3-high 19, and one 24-inch); product, bar, boiler, sheet, tank, and skelp iron and steel; annual capacity, 100,000 gross tons of rolled products. Fuel, natural gas and coal. Brand, "Vesuvius." John Moorhead, Jr., President; John P. Carmack, Secretary and Treasurer.

Vulcan Forge and Iron Works, Lockhart Iron and Steel Company, Pittsburgh. Works at McKees 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, rolled bar iron, bridge iron, soft steel in bars, and hexagon, grooved, and angle iron and steel; annual capacity, 25,000 gross tons of finished rolled iron and steel; also hammered iron and steel and all kinds of heavy forgings; annual capacity, 2,500 tons of forgings. Fuel, natural gas and coal. Brands, "Vulcan" and "Lockhart." Charles Lockhart, President; T. J. Gillespie, Secretary and Treasurer.

Wayne Iron and Steel Works, Brown & Co., Incorporated, Pittsburgh. Works, cor. Tenth st. and Duquesne Way. Built in 1825. Decline to give any information for the Directory concerning their works.

Number of rolling mills and steel works in Pittsburgh and Allegheny county: 63 completed and 4 building. Of these 7 make Bessemer steel, 22 make open-hearth steel and 3 open-hearth steel plants are being built, 10 make crucible steel and 1 crucible steel plant is being built, and 4 make blister steel.

SHENANGO AND BEAVER VALLEYS.

Embraces Blast Furnaces, Rolling Mills, and Steel Works in Beaver, Lawrence, and Mercer Counties.

COKE FURNACES—19.

Atlantic Furnace, operated by the Atlantic Iron and Steel Company, New Castle, Lawrence county. One stack; fuel, coke. Controlled by the Republic Iron and Steel Company, Stock Exchange Building, Chicago.—*For description of furnace see page 70.*

Claire Furnace, Claire Furnace Company, Sharpsville, Mercer county. Branch office with M. A. Hanna & Co., Cleveland, Ohio. One stack, 75 x 16, built in 1869 and rebuilt in 1886, 1893, and 1897; four fire-brick stoves; fuel, coke; ore, Lake Superior; product, Bessemer and foundry pig iron; annual capacity, 85,000 gross tons. L. C. Hanna, Chairman, L. J. Robbins, Treasurer, A. M. Robbins, Secretary and General Manager, Cleveland; J. W. Robbins, Superintendent, Sharpsville. Selling agents, M. A. Hanna & Co., Cleveland.—*Active in 1901.*

Fannie Furnace, The Cherry Valley Iron Company, Murtland Building, Pittsburgh. Furnace at West Middlesex, Mercer county. One stack, 60 x 14, built in 1873 and first blown in October 13, 1873; remodeled in 1885, 1899, and 1901; iron stoves; fuel, coke; ore, Lake Superior; product, Bessemer and foundry pig iron; annual capacity, 45,000 gross tons. Brand, "Fannie." Joshua W. Rhodes, President; Edwin N. Ohl, Vice-President; Robert W. Flenniken, Secretary. Sole selling agents, Joshua W. Rhodes & Co., Pittsburgh. (Formerly operated by the Reed Furnace Company.)—*Active in 1901. See Cherry Valley Furnace in the Mahoning Valley, Ohio.*

Hall Furnace, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Furnace at Sharon, Mercer county. One stack; fuel, coke.—*For description of furnace see page 70.*

Mabel Furnace, Perkins & Co., Limited, Sharpsville, Mercer county. One stack, No. 1, 75 x 15, built in 1872 and rebuilt in 1883 and 1899; Pollock iron stoves; fuel, Connellsville coke; ore, Lake Superior; product, foundry, malleable, and standard Bessemer pig iron; annual capacity, 75,000 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. (One stack, No. 2, 65 x 15, built in 1880, abandoned and dismantled in 1899.)—*Active in 1901.*

New Castle Works, National Steel Company, Carnegie Building, Pittsburgh. Four stacks, all located at New Castle, Lawrence county; fuel, coke.—*For description of furnaces see page 20.*

Pickands, Mather & Co., Cleveland, Ohio. Two stacks: Alice Furnace, at Sharpsville, Mercer county; one stack, 70 x 14½, built in 1868, put in operation October, 1868, remodeled in 1882 and 1890, rebuilt in 1894, and again remodeled in 1897; four iron pipe stoves; brand, "Alice." Ella Furnace, at West Middlesex, Mercer county; one stack, 70 x 14½, built and blown in in 1882 and remodeled in 1892 and 1899; iron stoves; brands, "Ella Foundry" and "Ella Malleable." Fuel, coke; ore, Lake Superior; product, Bessemer, foundry, and malleable pig iron; total annual capacity, 133,000 gross tons. E. H. Williams, Manager. Selling agents, Pickands, Mather & Co., Cleveland, Ohio. (Both stacks formerly operated by the Wheeler Furnace Company.)—*Active in 1901.*

Sharon (The) Steel Company, Sharon, Mercer county. One stack; fuel, coke.—*For description of furnace see page 117.*

Sharon Works, National Steel Company, Carnegie Building, Pittsburgh. Furnaces at Sharon, Mercer county. Two alternate stacks; fuel, coke.—*For description of furnaces see page 21.*

Sharpsville Furnace, Sharpsville Furnace Company, (not incorporated,) Sharpsville, Mercer county. One stack, built in 1847 and torn down in 1882; new iron stack, 65 x 15, blown in October 15, 1882; remodeled in 1897; three iron stoves; fuel, coke; ore, Lake Superior; product, Bessemer, foundry, and red-short mill pig iron; annual capacity, 72,000 gross tons. Brand, "Sharpsville." Frank Pierce, Secretary and Treasurer; James B. Pierce, General Manager.—*Active in 1901.*

Shenango Furnaces, Shenango Furnace Company, Sharpsville, Mercer county. General offices, German National Bank Building, Pittsburgh. Two stacks: one 60 x 15, built in 1870, put in blast in March, 1871, and rebuilt and enlarged in 1879; and one, 60 x 15½, built in 1872, put in blast in February, 1873, and enlarged in 1881; additional blowing machinery added to furnaces in 1900; two Pierce and three Pollock iron pipe stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer, malleable, and basic pig iron; total annual capacity, 118,000 gross tons. Brand, "Shenango." Equipped with one Davies pig-iron casting machine. W. P. Snyder, President; A. W. Adair, Vice-President; Henry Irwin, Jr., Secretary and Treasurer; W. A. Barrows, Jr., Superintendent. Sales made by the company at its Pittsburgh office. (Formerly called Douglas Furnaces and operated as alternate stacks.)—*Active in 1901. See Spearman Furnace in these Valleys.*

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, 80 x 20; fuel, Connellsville coke; ore, Lake Superior; product, foundry and Bessemer pig iron; annual capacity, 72,000 gross tons. Brands, "Spearman" and "American Scotch." Joseph Forker, President; John Phillips, Vice-President; J. J. Spearman, Treasurer and Manager; M. H. Henderson, Secretary. Sales made by the company. (Furnace will be operated by the Shenango Furnace Company after January 1, 1902; its annual capacity will be increased to 100,000 tons and Bessemer pig iron only will be produced. Two alternate stacks, built in 1872, abandoned and dismantled.)—*Active in 1901. See Shenango Furnaces in these Valleys.*

Stewart Furnace, Stewart Iron Company, Limited, Sharon, Mercer county. One stack, 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, 82,000 gross tons. Brand, "Stewart." S. McClure, Agent and General Manager. Sales made by H. H. Brown, Treasurer, Cleveland, Ohio. (Formerly called Valley Furnaces.)—*Active in 1901. See Rolling Mills and Steel Works in these Valleys.*

Number of coke furnaces in the Shenango Valley: 19 stacks.

ROLLING MILLS AND STEEL WORKS—28 COMPLETED AND 3 BUILDING.

Aliquippa Steel Works, Crucible Steel Company of America, Empire Building, Pittsburgh. Works at Aliquippa, Beaver county.—*For description of works see page 110.*

Atlantic Tube Company, Pennsylvania Trust Company of Pittsburgh, Receiver, Pittsburgh. Works at Grand View Station, Pittsburgh, Fort Wayne, and Chicago Railway, Beaver county. Built in 1899 and first put in operation December 20, 1899; 2 heating furnaces, 2 piercing mills, and 2 stands of rolls; product, steel blanks, used by the company in the manufacture of seamless drawn tubes; annual capacity, 3,200 gross tons of blanks and 3,600,000 feet of tubes. Fuel, coal. (Works will be operated after January 1, 1902, by the Pittsburgh Seamless Tube Company, Second National Bank Building, Pittsburgh.)

Atlantic Works, operated by the Atlantic Iron and Steel Company, New Castle, Lawrence county. Controlled by the Republic Iron and Steel Company, Stock Exchange Building, Chicago.—*For description of works see page 71.*

Beaver Falls Steel Works, Crucible Steel Company of America, Empire Building, Pittsburgh. Works at Beaver Falls, Beaver county.—*For description of works see page 110.*

Beaver Falls Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Beaver Falls, Beaver county.—*For description of works see page 32.*

Bridgewater Steel Works, West Bridgewater, Beaver county. Experimental works for the manufacture of rolled car axles erected in 1900.—*Idle.*

Ellwood City Works, American Tin Plate Company, Battery Park Building, New York City. Works at Ellwood City, Lawrence county.—*For description of works see page 41.*

Ellwood Works, (Factory B.,) Shelby Steel Tube Company, Empire Building, Pittsburgh. Works at Ellwood City, Lawrence county.—*For description of works see page 63.*

Greenville Mill, American Steel Hoop Company, Carnegie Building, Pittsburgh. Works at Greenville, Mercer county.—*For description of works see page 50.*

Greenville Works, (Factory C.,) Shelby Steel Tube Company, Empire Building, Pittsburgh. Works at Greenville, Mercer county.—*For description of works see page 63.*

Hartman (The) Manufacturing Company, New Castle, Lawrence county. Eastern sales agency and export department, 50 Broadway, New York City. Original works established at Beaver Falls, Pa., in 1887 by The Hartman Manufacturing Company; plant removed to Ellwood City, Pa., in 1893 and name changed to The Hartman Manufacturing Company of Ellwood City; name again changed to The Hartman Manufacturing Company and machinery removed to New Castle in the fall of 1901 and installed in the buildings formerly occupied by the New Castle Tube Company. When completed new plant will contain 3 Bessemer steel converters with a total daily capacity of 100 gross tons, 8 heating furnaces, 2 wire-rod trains, 120 wire-drawing blocks, 300 wire-nail machines, and machinery for the production of poultry netting, barbed wire, wire mats, steel fencing, etc.; estimated annual capacity, 300,000 gross tons of Bessemer steel ingots, 275,000 tons of wire rods, 200,000 tons of wire, 2,000,000 kegs of wire nails, and 100,000 tons of wire fencing, barbed wire, poultry netting, etc. Fuel to be used, coal and producer gas. The wire-nail and fence departments are expected to be completed and put in operation in 1901, the wire department early in 1902, the wire-rod department about April 1, 1902, and the Bessemer steel department about September 1, 1902. Frank A. Umsted, President and General Manager; William L. Kiefer, Secretary and Treasurer; Willis Elton, General Sales Manager.

Keystone Axle Company, 304 Park Building, Pittsburgh. Works at Morado, (post office address, Beaver Falls,) Beaver county. Built in 1897 and put in operation in November, 1898; 1 continuous heating furnace and one 48 x 96-inch roll run in a housing fitted with dies; product, circumferentially rolled car axles; annual capacity, 21,000 gross tons. Fuel, coal. W. H. Trump, President; Frederick W. McKee, Vice-President; J. W. Howe, Secretary and Treasurer.

Kidd Brothers and Burgher Steel Company, Aliquippa, Beaver county.

Building works to be equipped with 2 crucible steel-melting furnaces; 60 pots can be used at a heat; daily capacity, 14 gross tons; also 8 double puddling furnaces and 3 trains of rolls (10, 18, and 22-inch); estimated annual capacity of rolled products, 27,000 gross tons. Fuel, natural gas, producer gas, and coal. Walter S. Kidd, President; Ruth-erford Burgher, Vice-President and General Manager; Samuel G. Staf-ford, Secretary; James B. Graham, Treasurer.

Myers (The H. M.) Company, Beaver Falls, Beaver county. Rolling mill built in 1883; 8 heating furnaces and 4 trains of 16-inch rolls; product, rolled shovel blanks, all consumed by the company in its shovel works; annual capacity, 2,000 gross tons. Fuel, coal and coke. C. H. Myers, President and Treasurer; E. D. Myers, Vice-President; C. S. Hubbard, Secretary.

National (The) Malleable Castings 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; three 15-gross-ton acid open-hearth steel furnaces; product, steel castings; annual capacity, about 18,000 gross tons. Fuel, producer gas. (Formerly operated by The Aschman Steel Casting Company.)

New Brighton Steel Company, New Brighton, Beaver county. Built in 1900-1 and first put in operation February 5, 1901; 1 heating furnace, 2 hammers, (one 700-lb. and one 3,500-lb.,) one 12-pot cru-cible steel furnace with 2 steel-melting holes, and 1 steel cement-ing furnace; product, crucible tool steel, wire-drawing plates, and steel forgings; annual capacity, 500 gross tons. Fuel, bituminous coal. J. J. Blake, President and General Manager; L. H. Blair, Sec-etary and Treasurer; Charles W. Fox, Superintendent. Selling agents, Gardner & Robinson, 1522 Monadnock Block, Chicago; Em-erson E. McCargo, 817 Filbert st., Philadelphia; M. S. Davis, Schmidt Building, Pittsburgh; William Burns, No. 1 Clifton ave., Allegheny, Pa.; L. B. Smith, New Brighton, Pa.

New Castle Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at New Castle, Lawrence county.
—*For description of works see pages 33-4.*

New Castle Works, American Tin Plate Company, Battery Park Build-ing, New York City. Works at New Castle, Lawrence county.—*For description of works see page 43.*

New Castle Works, National Steel Company, Carnegie Building, Pitts-burgh. Works at New Castle, Lawrence county.—*For description of works see page 22.*

Russel (J. C.) Shovel Company, Times Building, Pittsburgh. Works at Aliquippa, Beaver county. Built in 1893 and put in operation the same year; 3 heating furnaces and 1 train of rolls for reduc-ing purchased billets into shovel blanks; product, shovel blanks, all

consumed by the company in its shovel works; annual capacity, 1,700 gross tons, or 50,000 dozen, of blanks. Fuel, coal and gas. J. L. Cooper, President; W. A. Gartshore, Vice-President and Superintendent; E. H. King, Secretary; J. J. McKee, Treasurer.

Sharon Sheet Steel Company, Sharon, Mercer county. Building works to contain 10 sheet furnaces, 10 pair furnaces, 4 annealing furnaces, and 16 sheet mills (ten 28-inch hot and six 22-inch cold); product, to be black and galvanized sheets; estimated annual capacity, 30,000 gross tons. Fuel, manufactured gas and coal. A galvanizing plant will be connected with the works. George W. Darr, President; John Stevenson, Jr., Vice-President; V. M. Delamater, Secretary; David Adams, Treasurer.

Sharon (The) Steel Company, Sharon, Mercer county.—*For description of works see pages 117-8.*

Sharon Steel Hoop Company, Sharon, Mercer county. Built in 1900-1 and first put in operation March 15, 1901; 2 heating furnaces and one 8 and one 9-inch train of rolls; product, all sizes of steel hoops; annual capacity, 45,000 gross tons. Fuel, producer gas. Morris Bachman, President; T. S. Clark, Vice-President; John R. Hastings, Secretary; A. N. Perkins, Treasurer.

Sharon Tin Plate Works, Sharon Tin Plate Company, Sharon, Mercer county. Built in 1900-1 and first put in operation May 16, 1901; 20 sheet and pair furnaces, 5 double annealing furnaces, twenty 26-inch hot mills, and 13 sets of 22-inch cold mills; product, black plates for tinning; annual capacity, 48,000 gross tons. Fuel, manufactured gas. John Stevenson, Jr., President; H. P. Forker, Secretary; D. A. Adams, Treasurer; John B. Howat, Superintendent. Selling agent, American Tin Plate Company, Battery Park Building, New York City.—*See Tinplate Works in Pennsylvania.*

Sharon Works, American Steel Casting Company, Thurlow Station, Chester. Works at Sharon, Mercer county.—*For description of works see page 97.*

Sharon Works, National Steel Company, Carnegie Building, Pittsburgh. Works at Sharon, Mercer county.—*For description of works see page 23.*

Sharon Works, Republic Iron and Steel Company, Chicago. Works at Sharon, Mercer county.—*For description of works see page 75.*

Shenango Works, American Tin Plate Company, Battery Park Building, New York City. Works at New Castle, Lawrence county.—*For description of works see pages 43-4.*

Stewart Iron Works, Stewart Iron Company, Limited, Sharon, Mercer county. Built in 1870; 9 double puddling furnaces, 1 heating furnace, 2 hammers, (2½ ton and 5-ton,) and 2 trains of 3-high 18-inch rolls; product, muck bar, "B B" low-phosphorus bars, and hammered blooms for making crucible and open-hearth steel; annual capacity, 11,600 gross tons of either rolled or forged products. Fuel,

coal. Brand, "Stewart." 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 Furnace in these Valleys.*

Wheatland Rolling Mill, The Continental Iron Company, Wheatland, Mercer county. Built in 1872 to roll rails; 17 double puddling furnaces, 5 heating furnaces, and 2 trains of rolls (one 3-high 24-inch universal plate and one 3-high double 21-inch muck); product, muck bar, skelp iron, and iron and steel universal plates; annual capacity, 20,000 gross tons of muck bar and 30,000 gross tons of skelp and plates. Fuel, bituminous coal. W. D. McKeefrey, Trustee in Bankruptcy. (Formerly operated by The South Sharon Steel Company, Limited.)

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 3 trains of rolls (one 3-high 20-inch muck and one 24 x 38-inch sheet, both hot, and one 22 x 38-inch cold); product, muck bar, bar iron, sheet bars, and sheet iron; annual capacity, 2,500 gross tons of sheets and 6,000 tons of other rolled products. Fuel, bituminous coal. Brand, "Wilkes Iron." James B. Wilkes, President and Manager; Joseph H. Anderson, Vice-President; Samuel Wilkes, Secretary and Treasurer. Selling agents: for Cleveland, Ohio, only, Henderson & Trago, Cleveland, Ohio; for all other points, Follansbee Brothers Company, Pittsburgh.

Number of rolling mills and steel works in the Shenango and Beaver Valleys: 28 completed and 3 building. Of these 1 makes Bessemer steel and 1 Bessemer steel plant is projected, 5 make open-hearth steel, 3 make crucible steel and 1 crucible steel plant is being built, and 2 make blister steel.

WESTERN PENNSYLVANIA DISTRICT.

Embraces Blast Furnaces, Rolling Mills, and Steel Works in Western Pennsylvania, except Allegheny, Mercer, Lawrence, and Beaver Counties.

MISCELLANEOUS COKE FURNACES—12 COMPLETED AND 2 PROJECTED.

Cambria Furnaces, Cambria Steel Company, Harrison Building, Philadelphia. Works at Johnstown, Cambria county. Six stacks; fuel, coke.—*For description of furnaces see page 104.*

Charlotte Furnace, Corrigan, McKinney & Co., lessees, Scottsdale, Westmoreland county. General office, 716-9 Perry-Payne Building, Cleveland, Ohio. One stack, 65 x 16, built in 1872-3 and put in blast October 14, 1873; two 75 x 19 Foote patent fire-brick stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer, mill, and foundry pig iron; annual capacity, 75,000 gross tons. Brand, "Charlotte." Another fire-brick stove will be added. Selling agents, Cor-

rigan, McKinney & Co., Cleveland, Ohio; Rogers, Brown & Co., Pittsburgh; Rogers, Brown & Warner, Philadelphia. (Owned by the United States Cast Iron Pipe and Foundry Company.)—*Active in 1901. See page 140.*

Dunbar Furnaces, Dunbar Furnace Company, Dunbar, Fayette county. Two stacks: Furnace No. 1, 80 x 19½, built in 1790 and rebuilt in 1870, 1876, 1880, and 1900; four Whitwell stoves, two 92 x 18, one 76 x 22, and one 75 x 18. Furnace No. 2, 78 x 17, first put in blast in May, 1880, and remodeled in 1896-7; the size will probably be changed to 75 x 17; three Whitwell stoves, 60 x 18. Fuel, Connessville coke; ores, Lake Superior specular and soft, with a small quantity of mill cinder; product, mill, foundry, basic, Bessemer, car-wheel, and malleable pig iron; total annual capacity, 110,000 gross tons. Equipped with one pig-iron casting machine. Hazard Dickson, President, Reginald Palmer, Treasurer, and S. G. Valentine, Assistant General Manager, Dunbar; W. C. Harris, Vice-President and Secretary, Bullitt Building, Philadelphia. L. & R. Wister & Co., general sales agents, Bullitt Building, Philadelphia, and 331 Fourth ave., Pittsburgh.—*Active in 1901.*

Emporium Furnace, Emporium Iron Company, lessee, 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. Andrew Brady, President; E. D. White, Secretary. (Formerly called the Cameron Furnace. Owned by the Sinnemahoning Iron and Coal Company.)—*Active in 1901.*

Punxy Furnace, Punxsutawney Iron Company, Punxsutawney, Jefferson county. One stack, 80 x 18, built in 1896-7 and blown in September 29, 1897; three 80 x 18 Kennedy centre-combustion stoves; fuel, Walston coke; ores, Lake Superior hematite and specular; product, foundry and forge pig iron; annual capacity, 75,000 gross tons. Brand, "Punxy." William A. Rogers, President, and J. G. Munro, Treasurer, Erie County Bank Building, Buffalo, New York; Adrian Iselin, Jr., Vice-President, New York City; E. C. McKibben, Secretary, and John H. Kennedy, Superintendent, Punxsutawney. Selling agents, Rogers, Brown & Co., Pittsburgh, Buffalo, New York, Boston, Cincinnati, Cleveland, Chicago, San Francisco, and St. Louis; Rogers, Brown & Warner, Philadelphia.—*Active in 1901.*

Rebecca Furnace, Kittanning Iron and Steel Manufacturing Company, Kittanning, Armstrong county. One stack, 65 x 14½, first put in operation June 20, 1880; three Massicks & Croke stoves; fuel, coke; ores, native and Lake Superior; product, gray forge and foundry pig iron; annual capacity, 55,000 gross tons. Brands, "Kittanning" and "Rebecca."—*Active in 1901. See Kittanning Iron and Steel Manufacturing Company (Rolling Mills and Steel Works) in this District.*

PROJECTED—2 STACKS.

Union Steel Company, Empire Building, Pittsburgh. Contemplates erecting 2 blast furnaces at Donora, Washington county, with a daily capacity of 600 gross tons each; furnaces will each be 85 x 22 feet and will be completed about January 1, 1903.—*See Rolling Mills and Steel Works in this District.*

Number of coke furnaces in Western Pennsylvania outside of Allegheny County and the Shenango and Beaver Valleys: 12 completed stacks and 2 stacks projected.

ROLLING MILLS AND STEEL WORKS—32 COMPLETED, 5 BUILDING, AND 2 PROJECTED.

Alcania (The) Company, 303 Murtland Building, Pittsburgh. Works at Avonmore, Westmoreland county. Built in 1899 and first put in operation September 12, 1899; 1 bar heating furnace, 3 sheet and pair furnaces, one 2-high bar mill, three 26-inch hot mills, and three 22-inch cold mills; product, black plates for tinning; annual capacity, 7,500 gross tons. Fuel, bituminous coal. Brand, "Avon." W. H. R. Hilliard, President; M. M. Garland, Vice-President; Oliver Wylie, Secretary and Treasurer; Wm. C. Weichsel, Manager.—*See Tinplate Works in Pennsylvania.*

Apollo Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Apollo, Armstrong county, Pa.—*For description of works see page 53.*

Braeburn Steel Company, Braeburn, Westmoreland county. Built in 1897 and first put in operation in October of that year; 1 continuous regenerative and 7 Siemens heating furnaces, 2 trains of rolls, (one 10 and one 14-inch bar,) and 7 hammers (one 250-lb., one 500-lb., two 1,000-lb., two 1,500-lb., and one 3-ton); one 24-pot and one 36-pot Siemens crucible steel-melting furnace with an annual capacity of 4,000 gross tons of ingots; first crucible steel made in November, 1897; product, bar and tool steel; annual capacity, single turn, 7,200 tons of rolled and forged products. Fuel, coal and producer and natural gas. Brands, "B," "BS," "SBS," and "HB." William Metcalf, President; Charles Metcalf, Managing Director; R. P. Kelly, Secretary and Treasurer; George H. Neilson, General Manager. (One 5-gross-ton basic open-hearth steel furnace abandoned in 1900.)

Cambria Rolling Mills and Steel Works, Cambria Steel Company, Harrison Building, Philadelphia. Works at Johnstown, Cambria county, Pa.—*For description of works see pages 104-5.*

Canonsburg Works, American Tin Plate Company, Battery Park Building, New York City. Works at Canonsburg, Washington county, Pa.—*For description of works see page 40.*

Colonial Steel Company, 403 Bank of Commerce Building, Pittsburgh.

- Building works at South Monaca, Beaver county, to be equipped with puddling furnaces, open-hearth steel furnaces, crucible steel furnaces, bar mills, sheet mills, etc. Product, to be tool steel and crucible and high-grade open-hearth steel. James W. Brown, President; George A. Howe, 1st Vice-President; T. H. Childs, 2d Vice-President and General Manager; Charles M. Brown, Secretary and Treasurer.
- Cyclops Steel Works, Charles Burgess, Titusville, Crawford county. Built in 1879; rebuilt in 1884; 2 single puddling and 7 heating furnaces, one 16-inch train of rolls, and 8 hammers; six 6-pot crucible steel-melting holes with an annual capacity of 1,875 gross tons of ingots; product, special tool steel and refined hammered iron; annual capacity, 1,350 tons of hammered iron. Fuel, natural gas and coal.
- Eleanor (The) Iron and Steel Company, Irwin, Westmoreland county. Building works to contain 36 single puddling furnaces, 5 heating furnaces, and 3 trains of rolls (one 3-high 18-inch muck and one 3-high 12 and one 3-high 16-inch finishing); product, to be muck bar and skelp and merchant iron and steel; estimated annual capacity, 22,500 gross tons of muck bar and 30,000 tons of skelp and merchant iron and steel. Fuel, coal. John Robinsteen, President; George Robinsteen, Treasurer; Allan Wood Smith, Manager.
- Franklin (The) Steel Casting Company, Franklin, Venango county. Branch offices, New York, Chicago, and St. Louis. Built in 1895; one 20 and two 15-gross-ton Siemens acid open-hearth steel furnaces; first steel made in December, 1895; product, steel castings up to 60,000 pounds; specialties, M. C. B. automatic couplers, draft boxes, and truck bolsters; also metal of high permeability for electrical purposes; annual capacity, 12,000 gross tons. Fuel, natural and producer gas. Charles W. Mackey, President; James W. Rowland, First Vice-President; Charles Miller, Second Vice-President; Robert McCalmont, Secretary; W. J. Bleakley, Treasurer; B. F. Hadduck, General Superintendent; Edward E. Hughes, Solicitor.
- Griffiths Charcoal Iron Mills, Washington, Washington county. Building works to contain 6 single puddling furnaces, 2 sheet, 2 pair, and 2 heating furnaces, 2 annealing furnaces, 1 bar mill, and 4 black plate mills (2 hot and 2 cold); product, black plates for tinning; annual capacity, 3,600 gross tons. A forge containing 8 knobbling fires and two 6,000-pound hammers will be connected with the works; product, blooms made from charcoal pig iron and scrap iron; annual capacity, 4,500 gross tons. Fuel, natural gas in the rolling mills and charcoal in the forge. Works will probably be completed in the spring of 1902. W. H. Griffiths, President; N. R. Baker, Secretary and Treasurer.—*See Tinplate Works in Pennsylvania.*
- Griffiths (The W. H.) Company, Incorporated, Washington, Washington county. Building works at Waynesburg, Greene county, to contain 6 sheet and 6 pair heating furnaces, 3 annealing furnaces, five

- 26 x 32-inch hot mills, and four 22 x 34-inch cold mills; product, to be black plates for tinning; estimated annual capacity, 11,800 gross tons. Fuel, natural gas. William H. Griffiths, President; John A. Scott, Secretary; J. B. Rinehart, Treasurer.—*See Tinplate Works in Pennsylvania.*
- Humbert Works, American Tin Plate Company, Battery Park Building, New York City. Works at South Connellsville, Fayette county, Pa.—*For description of works see page 41.*
- Hussey, Binns & Co., Limited, 64 Fourth ave., Pittsburgh. Works originally built at Pittsburgh in 1875; new plant built in 1890-1 at Charleroi, Washington county, on the Monongahela Division of the Pennsylvania Railroad; one 24-pot crucible steel-melting furnace, 18 heating furnaces, 4 trains of rolls, 2 steam and 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, natural gas and coal. Ralph H. Binns, Chairman; George V. Willson, Secretary, Treasurer, and General Manager; Frank B. Newton, Superintendent.
- Hussey Steel Company, 215½ Fourth ave., Pittsburgh. Works at New Kensington, Westmoreland county. Built in 1891, destroyed by fire in August, 1892, and rebuilt in 1893; 3 heating furnaces, 3 annealing furnaces, 3 trains of hot rolls, (one 10, one 16, and one 18-inch,) and 4 trains of 10-inch cold rolls; product, bars, bands, cold-rolled strips, and deep stamping and deep drawing stock; specialty, soft open-hearth cold-rolled basic steel material; annual capacity, 20,000 gross tons. Fuel, bituminous coal and natural gas. C. G. Hussey, President; J. P. McCord, Vice-President and Secretary; Robert B. Little, Treasurer. Selling agents, Ely and Williams Company, 257 Broadway, New York City; George L. Coburn, Meriden, Conn. (Formerly called the Cold Rolled Steel Works.)
- Hyde Park Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Hyde Park, Westmoreland county, Pa.—*For description of works see page 55.*
- Johnson Works, The Lorain Steel Company, Lorain, Ohio. Works at Johnstown, Cambria county.—*For description of works see page 18.*
- Johnstown Works, American Tin Plate Company, Battery Park Building, New York City. Works at Johnstown, Cambria county.—*For description of works see page 42.*
- Kirkpatrick Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Leechburg, Armstrong county, Pa.—*For description of works see page 55.*
- 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, natural

gas exclusively. Charles T. Neale, President and General Manager; J. A. Colwell, Vice-President; Henry A. Colwell, Secretary, Treasurer, and Superintendent.—*See Rebecca Furnace in this District.*

Latrobe Works, 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 acid furnaces; first steel made August 5, 1889; annual capacity, 25,000 gross tons of ingots. Product, locomotive and car-wheel tires; annual capacity, 15,000 gross tons. Fuel, natural gas exclusively. Brand, "Latrobe." Marriott C. Smyth, President; C. C. Warren, Secretary; W. W. Turlay, Treasurer; Guillaem Aertsen, General Manager; Julian Kennedy, Chief Engineer.

McInnes Steel Company, Limited, Corry, Erie county. Works originally built and first steel made at Emporium, Pa., in 1894; removed to Corry in 1901 and first steel made July 2, 1901; one 6-pot crucible steel-melting furnace with an annual capacity of 180 gross tons of ingots, 4 heating furnaces, and 3 hammers (one 2,200-lb., one 1,500-lb., and one 500-lb.); product, "McInnes" hammered tool steel and self-hardening steel; estimated annual capacity of finished products, 500 gross tons. Fuel, coal, coke, and natural gas. W. G. Butler, President; Alex. McInnes, Jr., Secretary; H. E. Whittlesey, Treasurer; Alex. McInnes, Sr., Superintendent.

Monessen Mill, American Steel Hoop Company, Carnegie Building, Pittsburgh. Works at Monessen, Westmoreland county.—*For description of works see page 51.*

Monessen Plant, Page Woven Wire Fence Company, Monessen, Westmoreland county. Built in 1899-1900 and first put in operation May 31, 1900; 2 heating furnaces, 5 trains of rolls, (two 10, one 12, one 14, and one 24-inch,) 100 wire-drawing blocks, 10 wire-nail machines, and two 15-gross-ton Wellman basic open-hearth steel furnaces with an annual capacity of 20,000 gross tons of ingots; first steel made May 31, 1900; first rods rolled June 18, 1900; product, wire rods, plain and galvanized wire, wire nails, staples, and woven wire fencing; annual capacity, 35,000 gross tons of wire rods, 35,000 tons of wire, and 35,000 kegs of wire nails. Fuel, bituminous coal, coke, and natural gas. Brand, "Page." A galvanizing plant is connected with the works. J. Wallace Page, President; Austin Clement, First Vice-President; Charles M. Lamb, Second Vice-President and Manager; Arthur B. Cody, Secretary; L. B. Robertson, Treasurer.

Monessen Works, Pittsburgh Steel Company, 305 Ferguson Block, Pittsburgh. Building works at Monessen, Westmoreland county, to be equipped with 3 continuous heating furnaces, 2 annealing furnaces, and a complete semi-continuous rod mill, the latter consisting

of one 16-inch, one 14-inch, and three 12-inch trains, and equipped for rolling 4-inch billets direct into No. 5 wire rods; annual capacity, 130,000 gross tons. Wire-drawing department contains 160 wire-drawing blocks; annual capacity, 112,000 tons. Wire-nail department contains 175 wire-nail machines; annual capacity, 1,250,000 kegs of nails. A galvanizing department will be connected with the works; annual capacity, 45,000 gross tons. Also barb wire and field fencing departments; annual capacity, 27,000 gross tons. All kinds of high-grade plain and special wire are produced. Fuel, coal, coke, and natural and manufactured gas. Basic open-hearth steel furnaces and blooming mills will be added to the works. George Nash, Superintendent.—*See Glassport Works (Rolling Mills and Steel Works) in Allegheny county, Pennsylvania.*

National Works, American Tin Plate Company, Battery Park Building, New York City. Works at Monessen, Westmoreland county.—*For description of works see page 43.*

Old Meadow Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Scottdale, Westmoreland county.—*For description of works see page 56.*

Pennsylvania Works, American Tin Plate Company, Battery Park Building, New York City. Works at New Kensington, Westmoreland county.—*For description of works see page 43.*

Pittsburgh Works, American Tin Plate Company, Battery Park Building, New York City. Works at New Kensington, Westmoreland county.—*For description of works see page 43.*

Saltsburg Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Saltsburg, Indiana county.—*For description of works see pages 56-7.*

Scottdale Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Scottdale, Westmoreland county.—*For description of works see page 57.*

Tyler (The) Tube and Pipe Company, Washington, Washington county. New York office, 26 Cortlandt st. Built in 1890-1 and first put in operation in January, 1891; 8 forge fires, 1 run-out fire, 4 heating furnaces, 3 trains of rolls, (one 16 and two 18-inch,) and 2 hammers; product, charcoal blooms and charcoal skelp iron, used by the company in the manufacture of boiler tubes; annual capacity, 21,000 gross tons. Fuel, natural gas and charcoal. Brands, "Algerite," "Tyler," "Diamond T," and "Diamond T Special." William P. Tyler, President and Manager; N. E. Whitaker, Vice-President; C. A. Bumpus, Treasurer; Charles Stratman, General Superintendent.

Union Steel Company, Empire Building, Pittsburgh. Works at Donora, Washington county. Built in 1900-1 and first put in operation in September, 1901; 4 heating furnaces, 1 continuous and 1 right and 1 left hand Garrett finishing rod mill, 300 wire-drawing blocks, and

- 200 wire-nail machines; product, wire rods, bright and galvanized wire, barbed wire, wire fencing, and wire nails; annual capacity, 200,000 gross tons of wire rods, 200,000 tons of wire, and 1,000,000 kegs of wire nails. Fuel, natural gas and coal. Twelve 50-gross-ton basic open-hearth steel furnaces will be added. W. H. Donner, President; A. W. Mellon, Vice-President; S. H. Waddell, Secretary; R. B. Mellon, Treasurer.—*See Projected Furnaces in this District.*
- Vandergrift Steel Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Vandergrift, Westmoreland county, Pa.—*For description of works see page 57.*
- Washington Charcoal-Iron Tin Mills, Washington, Washington county. Built in 1899-1900 and first put in operation in July, 1900; 2 billet heating furnaces and 9 trains of rolls (one two-high 20-inch bar mill, two 24 and three 26-inch sheet mills, and three 22-inch cold mills); product, black plates for tinning; annual capacity, 11,000 gross tons. One 20-gross-ton Swindell acid open-hearth steel furnace built in 1900 and first steel made in August, 1900; annual capacity, 12,000 tons of ingots. An additional 20-gross-ton acid furnace may be erected. Fuel, natural gas exclusively. Thomas G. McClure, President; J. J. O'Connor, Vice-President; P. J. McNulty, Secretary and Treasurer. Selling agents, McClure & Co., Pittsburgh.—*See Tinplate Works in Pennsylvania.*
- Waynesburg Forge, Sheet, and Tin Mills, Waynesburg, Greene county. Built in 1900 and first put in operation October 16, 1900; 4 single puddling furnaces, 3 billet heating furnaces, 6 sheet and pair furnaces, 6 annealing furnaces, and four 26 x 32-inch, one 26 x 38-inch, and one 26 x 42-inch hot mills, and three 22 x 34-inch cold mills; product, sheet iron and steel and black plates for tinning; annual capacity, 5,700 gross tons of sheets and 9,500 tons of black plates. A forge connected with the works is equipped with charcoal knobbling fires and one 40-ton hammer; product, charcoal blooms, used by the company in the manufacture of black plates; annual capacity, 2,800 tons of blooms. Fuel, natural gas. W. H. Griffiths, President; H. B. Duncan, Secretary; T. Ross, Treasurer; W. H. Baker, General Manager.—*See Tinplate Works in Pennsylvania.*
- West Leechburg Steel and Tin Plate Company, Second National Bank Building, Pittsburgh. Works at West Leechburg, Armstrong county. Built in 1898; 2 heating furnaces and 7 trains of rolls (one 12-inch hot and one 12-inch and five 16-inch cold); product, hot and cold rolled strip steel for blanking, stamping, and drawing; annual capacity, 18,000 gross tons. Fuel, coal and natural gas. J. W. Kirkpatrick, President; F. R. Kenyon, Vice-President and General Manager; James Lippincott, Secretary; J. L. Kirkpatrick, Treasurer.
- Westmoreland Steel Company, Huff Station, near Greensburg, Westmoreland county. Pittsburgh office, 315 Fourth ave. Built in 1889-

90 by the Greensburg Steel Company; 2 forge fires, 4 heating furnaces, 1 welding furnace, 3 hammers, one 10 and one 12-inch train of rolls, and one 24-pot crucible steel-melting furnace with an annual capacity of 2,000 gross tons of ingots; product, forgings, tool steel, high-grade steel bars, small angles, and special steel; annual capacity, 200 gross tons of forged and 4,800 tons of rolled products. Fuel, bituminous coal. (A department for the manufacture of Damascus steel has been removed to Carnegie, Pa., and is now operated by the Nickel Steel and Forge Company.) F. A. Bailey, President; A. P. Burgwin, Secretary; E. Kaufman, Treasurer and General Manager. (Formerly operated by the Pittsburgh Tool Steel Company; later by the Westmoreland Steel and Manufacturing Company.)

PROJECTED ROLLING MILLS AND STEEL WORKS—2.

Jessop (William) & Sons, Limited, 91 John st., New York City. Contemplate erecting a crucible steel plant and a rolling mill at Washington, Washington county, Pa.

Rolling (The) Mill Company of America, South Connellsville, Fayette county. Contemplates building works to be equipped with open-hearth steel furnaces, bar mills, sheet mills, etc.

Number of rolling mills and steel works in Western Pennsylvania outside of Allegheny County and the Shenango and Beaver Valleys: 32 completed, 5 building, and 2 projected. Of these 1 makes Bessemer steel, 8 make open-hearth steel, 1 open-hearth steel plant is being built, and 3 open-hearth steel plants are projected, 5 make crucible steel, 1 crucible steel plant is being built, and 1 crucible steel plant is projected.

Total number of furnaces in Pennsylvania: 147 completed stacks, 3 stacks building, and 2 stacks projected.

Total number of rolling mills and steel works in Pennsylvania: 233 completed, 14 building, and 3 projected. Of these 15 make Bessemer steel and 1 Bessemer steel plant is projected, 3 make Tropenas steel, 55 make open-hearth steel, 7 open-hearth steel plants are being built, and 6 open-hearth steel plants are projected, 23 make crucible steel, 3 crucible steel plants are being built, and 1 crucible steel plant is projected, 7 make blister steel, and 1 makes McHaffie steel.

DELAWARE.

ROLLING MILLS AND STEEL WORKS—7.

Diamond State Steel Company, Wilmington, New Castle county. Philadelphia office, Real Estate Trust Building; New York office, 29 Broadway. Two mills: Diamond State Mill, built in 1853; 2 single puddling, 8 double puddling, and 4 heating furnaces, and 3 trains of rolls, (one 10 and two 18-inch.) Old Ferry Mill, built in 1868;

burned and rebuilt in 1891; 1 single puddling, 10 double puddling, and 9 heating furnaces, and 8 trains of rolls, (three 9, one 10, 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 annual capacity, 60,000 gross tons. Steel department added in 1899-1900; five 50-gross-ton Siemens open-hearth steel furnaces (4 basic and 1 acid); first steel made August 23, 1900; product, steel ingots, slabs, and billets; annual capacity, 150,000 gross tons of ingots. Fuel, coal and petroleum. Brand, the letter "S" inclosed in a diamond. H. T. Wallace, President; W. H. Wallace, Secretary; W. E. Boughton, Treasurer; E. H. Martin, General Superintendent; Charles G. Phillips, General Sales Agent.

Johnson Forge Company, Wilmington, New Castle county. Built in 1889; 4 puddling and 4 heating furnaces and 4 trains of rolls (one 3-high 20-inch muck and one 3-high 9-inch and two 3-high 12-inch bar); product, merchant bar iron; annual capacity, 20,000 gross tons. Fuel, coal. John R. Johnson, President; John Hare, Treasurer.

Marshallton Iron and Steel Company, Incorporated, Marshallton, New Castle county. Built in 1836; steam mill built in 1880; enlarged in 1884 and 1889; 3 double puddling furnaces, 4 grate heating furnaces, 2 reverberatory heating furnaces, 3 box annealing furnaces, and 4 trains of rolls (one 21 x 40, one 20 x 40, and two 22 x 40-inch); steam and water power; product, sheet iron and sheet steel; specialty, corrugated iron; annual capacity, 4,000 gross tons. Fuel, anthracite and bituminous coal. Brands, "Star" and "Delaware Cleaned." A factory for the manufacture of drip pans, roasters, elbows, etc., added in 1889; daily capacity, 2 gross tons. J. R. Bringhurst, President; James W. Wilson, Vice-President; J. A. Robinson, Secretary and Treasurer; James Clark, Superintendent. Sales made by the company. (Formerly operated by the Marshallton Iron Works.)

Minquas Iron Works, McCullough Iron Company, Equitable Building, Wilmington, New Castle county. Built in 1873 and put in operation in 1875; 1 heating, 4 sheet, and 5 annealing furnaces, 7 trains of rolls, (one 16-inch bar, and two 22, one 23, and one 24-inch sheet, all hot, and two 22-inch sheet, cold,) and 1 hammer; product, fine sheet steel, black and galvanized, and "Harvey's patent cleaned" sheet iron; annual capacity, 8,000 gross tons of rolled products. Fuel, bituminous coal and manufactured gas. Henry Whiteley, President; H. H. Haines, Vice-President; Martin E. Walker, Secretary and Treasurer.—*See North East Works (Rolling Mills and Steel Works) in Maryland.*

Newport Rolling Mills, Marshall Iron Company, Newport, New Castle county. Built in 1873; 1 double puddling furnace, 1 reverberatory heating furnace, 2 grate furnaces, 2 annealing furnaces, and

3 trains of rolls (two 22-inch sheet and one 22-inch bar); product, black sheet iron and sheet steel, Nos. 18 to 28; annual capacity, 2,400 gross tons. Fuel, anthracite and bituminous coal. Brands, a rooster and a diamond. Edward Mendinhall, President; John M. Mendinhall, Secretary and Treasurer. Sales made by the company.

Wilmington Rolling Mills, The Seidel and Hastings Company, Wilmington, New Castle county. First mill built in 1845, second in 1870, and another in 1875; 5 heating furnaces, 3 trains of rolls, (17, 19, and 24-inch,) and 2 hammers; product, charcoal iron boiler plates and plate iron generally; annual capacity, single turn, 5,000 gross tons of plate iron. A forge connected with the works, built in 1866, has 6 fires and 2 hammers; product, charcoal iron blooms, all consumed in the rolling mill; annual capacity, single turn, 3,000 gross tons. Fuel, bituminous coal in the rolling mill and charcoal in the forge. W. Hastings, President; E. T. Canby, Vice-President; W. P. Hastings, Secretary and Treasurer.

Number of rolling mills and steel works in Delaware: 7. Of these 1 makes open-hearth steel. There are no blast furnaces in Delaware.

MARYLAND.

COKE FURNACES—5.

Deborah Furnace, Blue Mountain Iron and Steel Company, 615-18 Hale Building, Philadelphia. Furnace at Catoctin Furnace P. O., Frederick county, Maryland. One stack, 60 x 13, built in 1873-4 and enlarged in 1900; two Raymond & Campbell stoves; fuel, Connellsville coke; ore, local hematite; product, foundry pig iron; annual capacity, 15,000 gross tons. Brands, "Catoctin" and "Blue Mountain." A. J. James, President; H. C. Terry, Vice-President and Treasurer; F. J. Deady, Secretary. Selling agents, Crocker Brothers, 99 John street, New York City.—*Active in 1901.*

Maryland Steel Company; general offices, Sparrows Point, Maryland, and Girard Building, Philadelphia. Furnaces at Sparrows Point, Baltimore county, Maryland. Four stacks; fuel, coke.—*For description of furnaces see pages 102-3.*

Number of coke furnaces in Maryland: 5 stacks.

CHARCOAL FURNACES—1.

Muirkirk Furnace, Charles E. Coffin, Muirkirk, Prince George county. One stack, 36 x 8½, 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, gun carriages, flange iron, shot and shell, etc.; annual capacity, 6,000 gross tons. Brand, "Muirkirk." Selling agents, E. H. Stroud & Co., 36 La Salle st., Chicago; Howe, Johnson & Co., Drexel Building,

Philadelphia; Robinson & Orr, 119 Wood st., Pittsburgh; S. R. Church, San Francisco.—*Active in 1901.*

Number of charcoal furnaces in Maryland: 1 stack. Total number of furnaces in Maryland: 6 stacks.

ROLLING MILLS AND STEEL WORKS—6.

Cumberland Rolling Mill, Schonthal Iron and Steel Company, lessee, Cumberland, Allegany county. First mill built in 1870 as an iron rail mill; bar mill added in 1873; 15 double puddling furnaces, 10 heating furnaces, 5 trains of rolls, (one 9, one 12, one 16, and two 23-inch,) and 1 hammer; product, muck bar, bar iron, fish plates, and renewed rails; annual capacity, 14,000 gross tons of muck bar, 20,000 tons of bar iron, and 25,000 tons of renewed rails. Fuel, bituminous coal. Joseph Schonthal, President; Bela Schonthal, Treasurer; George H. Tatnal, General Manager. (Formerly operated by the Potomac Steel Company. Owned by the Baltimore and Ohio Railroad Company.)
Cumberland Works, American Tin Plate Company, Battery Park Building, New York City. Works at Cumberland, Allegany county, Maryland.—*For description of works see page 41.*

Maryland Sheet and Steel Company, Cumberland, Allegany county. Built in 1873-4, rebuilt in 1884, and enlarged in 1889 and 1892; 3 forge fires, 5 heating furnaces, 5 hammers, and one 26-inch roughing, one 3-high 18-inch bar, and three 26-inch sheet mills; product, black plates, sheets, crow-bars, claw-bars, light sections of steel rails, open-hearth steel billets, and iron and steel forgings; annual capacity, 9,000 gross tons of rolled products and 1,200 tons of forgings. One 15-gross-ton basic open-hearth steel furnace; first steel made in 1899; annual capacity, 9,000 gross tons of ingots. Fuel, bituminous coal. H. H. Dickey, President and Manager; A. F. Baumgarten, Vice-President and Purchasing Agent; H. E. Weber, Secretary and Treasurer. (One 24-pot crucible steel furnace abandoned. Works formerly operated by the Cumberland Steel and Tin Plate Company; later by the Crucible Steel Company of America.)—*See pages 111-2.*

Maryland Steel Company; general offices, Sparrows Point, Maryland, and Girard Building, Philadelphia. Works at Sparrows Point, Baltimore county, Maryland.—*For description of works see page 103.*

North East Works, McCullough Iron Company, Equitable Building, Wilmington, Delaware. Works at North East, Cecil county, Maryland. Originally built in 1847; partly destroyed by fire in 1894 but rebuilt in the same year; 4 heating furnaces, 2 annealing furnaces, and 3 trains of 22-inch sheet rolls; steam and water power; product, sheet iron for galvanizing; annual capacity, 2,700 gross tons. A forge connected with the works was built in 1847 and 1875; 9 fires and 2 hammers; product, charcoal blooms made from pig iron or scrap, all consumed in the company's rolling mills; annual capacity, 2,700 gross

tons. Fuel, coal in the rolling mill and charcoal in the forge. One sheet mill was in operation during 1899, 1900, and 1901; the forge has been idle for several years.—*For list of officers see Rolling Mills and Steel Works in Delaware, (Minquas Iron Works.)*

Taylor (N. & G.) Company's Black Plate Mills, N. & G. Taylor Company, lessee, Mariner and Merchant Building, southwest cor. Third and Chestnut sts., Philadelphia. Works at Cumberland, Allegany county, Md. Built in 1899 and first put in operation in February, 1900; equipped with heating and annealing furnaces and 7 hot and 7 cold mills; product, black plates for tinning; annual capacity, 20,000 gross tons. Fuel, bituminous coal. (Owned by the Maryland Tin Plate Company.)—*See Tinplate Works in Pennsylvania.*

Number of rolling mills and steel works in Maryland: 6. Of these 1 makes Bessemer steel and 1 makes open-hearth steel.

PIG AND SCRAP IRON BLOOMARIES—1.

Principio Forge, Principio Forge Company, lessee, Principio Furnace P. O., Cecil county. Telegraph address, Perryville. Built in 1883-4; 12 fires, 1 heating furnace, and 1 hammer; coke run-out attached; 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; A. C. Whitaker, Secretary. (Owned by the Whitaker Iron Company, Wheeling, W. Va.)

Number of pig and scrap iron bloomaries in Maryland: 1.

VIRGINIA.

COKE FURNACES—22 COMPLETED, 1 PARTLY ERECTED, AND 1 PROJECTED.

Alleghany Furnace, Alleghany Iron and Steel Company, lessee, 80 Broadway, New York City. Furnace at Iron Gate, Alleghany county, Virginia. One stack, 65 x 13½, built in 1891-2 and blown in December 1, 1892; rebuilt in 1900; three Taws & Hartman improved Whitwell stoves; fuel, New River coke; ore, Oriskany brown hematite from Craig creek; product, high-grade foundry and basic pig iron; annual capacity, 30,000 gross tons. Brand, "Alleghany." M. D. Chapman, President; C. H. Eicks, Vice-President; E. R. Chapman, Treasurer; S. W. Cushman, Secretary; W. W. Taylor, Superintendent. Selling agents, Rogers, Brown & Co., Buffalo, New York, Boston, Cincinnati, Cleveland, Pittsburgh, Chicago, St. Louis, Birmingham, and San Francisco; Rogers, Brown & Warner, Philadelphia. (Owned by the Alleghany Iron Company, New York City.)—*Active in 1901.*

Bristol Furnace, Virginia Iron, Coal, and Coke Company, Bristol, Sullivan county, Tennessee. Furnace in Washington county, Virginia. One stack; fuel, coke.—*For description of furnace see page 126.*

Buena Vista Furnace, Virginia Iron, Coal, and Coke Company, Bristol,

- Sullivan county, Tenn. Furnace at Buena Vista, Rockbridge county, Virginia. One stack; fuel, coke.—*For description of furnace see page 126.*
- Crozer Furnaces, Virginia Iron, Coal, and Coke Company, Bristol, Sullivan county, Tennessee. Furnaces at Roanoke, Roanoke county, Va. Two stacks; fuel, coke.—*For description of furnaces see page 127.*
- Dora Furnace, Virginia Iron, Coal, and Coke Company, Bristol, Sullivan county, Tennessee. Furnace at Pulaski City, Pulaski county, Virginia. One stack; fuel, coke.—*For description of furnace see page 127.*
- Gem Furnace, Empire Steel and Iron Company, Catasauqua, Lehigh county, Pa. Furnace at Shenandoah, Page county, Virginia. One stack; fuel, coke.—*For description of furnace see pages 84-5.*
- Graham Furnace, Virginia Iron, Coal, and Coke Company, Bristol, Sullivan county, Tennessee. Furnace at Graham, Tazewell county, Virginia. One stack; fuel, coke.—*For description of furnace see page 127.*
- Ivanhoe Furnace, New River Mineral Company, Ivanhoe Furnace P. O., Wythe county. Main office, 100 William 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; one two-pass Foote stove, 16 x 65, and 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." Edwin Einstein, President, Jordan L. Mott, Vice-President, and J. T. Pearson, Secretary and Treasurer, New York; F. M. Masters, Manager, at the works. Selling agents, N. S. Bartlett & Co., Boston and New York.—*Active in 1901.*
- Jennie and Polly Furnaces, The Big Stone Gap Iron Company, 71 Broadway, New York. Furnaces at Big Stone Gap, Wise county, Virginia. One completed stack (Jennie) and one stack not completed, (Polly.) Jennie, 75 x 18, built in 1890-2 and blown in May 4, 1892; rebuilt in 1900-1; four Whitwell stoves; fuel, Pocahontas Flat Top and Wise county (Virginia) coke; ore, local fossil; product, high-grade foundry pig iron; annual capacity, 40,000 gross tons. Brand, "Big Stone Gap." Polly, to be 75 x 18, is partly erected; work stopped in 1892. E. L. Harper, President, and Thomas S. Holmes, Vice-President and Treasurer, 71 Broadway, New York City; E. L. Harper, Jr., Secretary and Superintendent, Big Stone Gap, Virginia. Sales made by the New York office.—*Active in 1901.*
- Longdale (The) Iron Company, Longdale, Alleghany county. Two stacks: No. 1, (formerly Lucy Selina,) 59 x 16½, built in 1827 and rebuilt in 1873, 1889, and 1897; No. 2, 60 x 17½, first blown in in February, 1881, and enlarged in 1890; rebuilt in 1897; six iron pipe stoves, three to each furnace; fuel, West Virginia coke; ore, brown hematite mined near the furnaces; 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, Chicago, St. Louis, Pittsburgh, New York, and Philadelphia.—*Active in 1901.*

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. An additional furnace, to be 90 x 19, may be built at Low Moor in 1902. E. C. Means, President and General Manager, John F. Winslow, Assistant Secretary, and S. G. Cargill, Assistant Treasurer, Low Moor, Virginia; Frank Lyman, Vice-President, Secretary, and Treasurer, 31 Burling Slip, New York. Selling agents: for the East, Dalton, Nash & Co., 31 Burling Slip, New York; for the West, Thomas A. Mack, Cincinnati.—*Active in 1901.*

Max Meadows Furnace, Virginia Iron, Coal, and Coke Company, Bristol, Sullivan county, Tenn. Furnace at Max Meadows, Wythe county, Va. One stack; fuel, coke.—*For description of furnace see page 127.*

Princess Furnace, Princess Iron Company, Wrightsville, Pa. Furnace at Glen Wilton, Botetourt county, Virginia. One stack, 60 x 12½, built in 1883-4; one Whitwell and two 2-pass Foote stoves, 15 x 60; 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." D. S. Cook, President and General Manager, Wrightsville, Pa.; Wilton Cook, Secretary and Treasurer, Glen Wilton, Virginia.—*Active in 1901.*

Pulaski Iron Company, Pulaski City, Pulaski county. Main office, 330 Walnut st., Philadelphia. One stack, 74 x 18, built in 1887 and blown in in February, 1888; rebuilt in 1898; four Whitwell stoves; fuel, Pocahontas coke; ores, brown hematite and limonite from the Cripple creek region, Va., and Gossan from the Virginia Mining Company's mines; product, high-grade foundry pig iron; annual capacity, 55,000 gross tons. A. J. Dull, President, Harrisburg, Pa.; E. P. Borden, Vice-President, and Horace L. Haldeman, Secretary and Treasurer, Philadelphia; John W. Eckman, General Manager, Pulaski City, Virginia.—*Active in 1901.*

Radford Furnace, Radford Furnace P. O., Pulaski county. One stack, 36 x 10, built in 1868; charcoal first used for fuel; rebuilt to use coke in 1900; cast-iron stoves; ore, Max Creek; fuel, Pocahontas coke; product, foundry and mill pig iron; annual capacity, 4,000 gross tons. Address all communications to Richard Wood, 400

Chestnut st., Philadelphia. (Formerly operated by The Rennie Iron Company.)—*Active for a short time in 1900.*

Radford-Crane Furnace, Virginia Iron, Coal, and Coke Company, Bristol, Sullivan county, Tenn. Furnace at Radford, Montgomery county, Va. One stack; fuel, coke.—*For description of furnace see page 127.*

Roanoke Furnace, Roanoke Furnace Company, Bullitt Building, Philadelphia. Furnace at Roanoke, Roanoke county, Virginia. 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, forge, and basic open-hearth pig iron; annual capacity, 48,000 gross tons. Brand, "Roanoke."—*Active in 1900.*

Victoria Furnace, Empire Steel and Iron Company, Catasauqua, Lehigh county, Pa. Furnace at Goshen, Rockbridge county, Virginia. One stack; fuel, coke.—*For description of furnace see page 85.*

Number of coke furnaces in Virginia: 22 completed stacks, 1 stack partly erected, and 1 stack projected.

CHARCOAL FURNACES—4.

Cedar Run Furnace, Graham & Robinson, Grahams 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.—*Idle for several years.*

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. (Owned by H. H. Yard, 415 Drexel Building, Philadelphia. Columbia Furnace, built in 1809, torn down in 1890.)—*Idle since 1893 and for sale or lease.*

Reed Island Furnace, Virginia Iron, Coal, and Coke Company, Bristol, Sullivan county, Tennessee. Furnace in Pulaski county, Virginia, on the Reed Island Branch of the Norfolk and Western Railway. One stack; fuel, charcoal.—*For description of furnace see page 128.*

White Rock Furnace, Lobdell Car Wheel Company, Wilmington, Delaware. Furnace in Smyth county, 5 miles from Rural Retreat Station, Wythe county, Virginia. One stack, 38 x 8½, built in 1875 and blown in August 9, 1875; idle for several years; revived and put in operation in July, 1900; ore, local brown hematite; product, warm and cold blast pig iron; annual capacity, 2,500 gross tons. Brand, "White Rock." William W. Lobdell, President, George G. Lobdell, Jr., Vice-

President, A. McLeod, Secretary, and Charles F. Wollaston, Treasurer, Wilmington, Delaware; J. H. Wissler, Manager, Rural Retreat, Virginia.—*Active in 1901.*

Number of charcoal furnaces in Virginia: 4 stacks. Total number of furnaces in Virginia: 26 completed stacks, 1 stack partly erected, and 1 stack projected.

ROLLING MILLS AND STEEL WORKS—6.

Crescent Horse Shoe and Iron Works, Virginia Iron, Coal, and Coke Company, Bristol, Sullivan county, Tennessee. Works at Max Meadows, Wythe county, Virginia.—*For description of works see page 128.*

Iron Gate Rolling Mill, Iron Gate, Alleghany county. Built in 1890-1; 13 single and 4 double puddling furnaces, 4 forge fires, 1 double gas and 2 coal heating furnaces, 2 trains of rolls, (9 and 19-inch,) and 1 hammer; product, muck bar, merchant iron, and light iron and steel rails; annual capacity, 22,500 gross tons. Fuel, bituminous coal. Works now owned by Hyde Brothers & Co., Lewis Building, Pittsburgh, Pa. New company will probably be formed and works put in operation in the near future. (Formerly operated by the Richmond Standard Steel, Spike, and Iron Company.)

Manchester Rolling Mill, Richmond Standard Steel, Spike, and Iron Company, Richmond. New York office, 20 Broad st. Works at Manchester, Chesterfield county, Virginia. Built in 1888-9 and put in operation in April, 1889; 1 double gas heating furnace, 2 forge fires, 3 automatic spike machines, 2 hand spike machines, and one 9-inch train of rolls; water-power; product, bar iron, used in the manufacture of railroad and boat spikes and harrow teeth; annual capacity, 7,200 gross tons. Fuel, bituminous coal. William L. Royall, President; Corbin Warwick, Vice-President and General Manager; Curtis Cauthorn, Secretary; J. A. Simmons, Treasurer.

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 nineteenth century. Owned, operated, and enlarged by present company since 1858; 10 double puddling furnaces, 13 heating furnaces, including 2 gas heating furnaces with Siemens producers, 1 squeezer, 6 trains of rolls, (one 9, two 10, two 18, and one 20-inch,) and 137 cut-nail machines. (Bessemer steel plant built in 1887; two 3-gross-ton converters and blooming mill, with an annual capacity of 60,000 gross tons; first blow made October 10, 1887; idle since 1888.) Works operated by 9 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, machine bolts, nuts, log screws, drift bolts, washers, harrow teeth, etc.; annual capacity, 75,000 gross tons of iron and steel exclusive of steel

plant and 300,000 kegs of cut nails. Fuel, anthracite and bituminous coal, coke, and producer gas. Brand, "Old Dominion" for cut nails, bar iron, and horse and mule shoes. Gifford V. Lewis, President; E. L. Bemiss, Vice-President; Arthur B. Clarke, Secretary and Treasurer; R. M. Blankenship, General Superintendent. All sales made by the company.—*See Tinplate Works in Virginia.*

Roanoke Iron Works, Virginia Rolling Mill Company, Bullitt Building, Philadelphia. Works at Roanoke, Roanoke county, Virginia. Built in 1891-2; put in operation in February, 1892; 1 scrap and 15 double puddling furnaces and one 3-high 22-inch train of muck rolls; product, muck and scrap bar; annual capacity, 21,500 gross tons. Fuel, coal. Brand, "Roanoke."

Tredegar Iron Works, The Tredegar Company, Richmond, Henrico county. Built in 1836; 9 coal and 7 gas heating furnaces, 1 scrap furnace, 7 trains of rolls, and 11 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. Fuel, bituminous coal and coke. Brands for horseshoes, "Piedmont," "Cranberry," and "Prairie." Foundry, run by water-power, contains 1 brass and 2 air furnaces 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. Archer Anderson, President; St. George M. Anderson, Superintendent 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.

Number of rolling mills and steel works in Virginia: 6. Of these 1 has an idle Bessemer steel plant.

WEST VIRGINIA.

COKE FURNACES—3 COMPLETED AND 1 BUILDING.

Belmont Furnace, Wheeling Steel and Iron Company, Wheeling, Ohio county. One stack; fuel, coke.—*For description of furnace see page 119.*

Riverside Furnace, (Riverside Department,) National Tube Company, Conestoga Building, Pittsburgh. Furnace at Benwood, Marshall county, West Virginia. One stack; fuel, coke.—*For description of furnace see page 25.*

Top Mill Furnace, Wheeling Steel and Iron Company, Wheeling, Ohio county. One stack; fuel, coke.—*For description of furnace see page 120.*

Tube Steel Company, controlled by the National Tube Company, Conestoga Building, Pittsburgh, is building a new furnace at Benwood, Marshall county, West Virginia. Fuel, coke.—*For description of furnace see page 25.*

Number of furnaces in West Virginia: 3 completed coke stacks and 1 coke stack building. No charcoal stacks.

ROLLING MILLS AND STEEL WORKS—12 COMPLETED AND
1 BUILDING.

Belmont Works, Wheeling Steel and Iron Company, Wheeling, Ohio county.—*For description of works see page 120.*

Benwood Works, Wheeling Steel and Iron Company, Wheeling, Ohio county. Works at Benwood, Marshall county.—*For description of works see page 120.*

Chester Works, American Tin Plate Company, Battery Park Building, New York City. Works at Chester, Hancock county, West Virginia.—*For description of works see pages 40-1.*

Crescent Iron Works, Whitaker Iron Company, Wheeling, Ohio county. Built in 1855; partly destroyed by fire in 1893 and remodeled and rebuilt in 1894; 5 double puddling furnaces, 3 bar and 16 sheet heating furnaces, 1 bar mill, five 22-inch sheet mills, one 22 and two 24-inch black plate mills, all hot, and five 22-inch cold mills; product, iron and steel sheets, black plates for tinning, and galvanized sheets; annual capacity, 20,000 gross tons. Fuel, bituminous coal and natural gas, chiefly natural gas. Brand, "Crescent." N. E. Whitaker, President; A. C. Whitaker, Secretary.

Jackson Iron and Tin Plate Works, The Jackson Iron and Tin Plate Company, Clarksburg, Harrison county. Building works to contain 4 heating furnaces, 7 pair furnaces, 2 double annealing furnaces, 3 sheet furnaces, 1 bar mill, 4 sheet mills, (3 hot and 1 cold,) and 8 black plate mills (4 hot and 4 cold); product, to be black plates for tinning and sheets for galvanizing; estimated annual capacity, 15,000 gross tons. Fuel, natural gas. A galvanizing plant will be connected with the works. T. M. Jackson, President; W. I. Grove, Secretary and Treasurer; C. C. Moore, General Manager; W. S. Collier, Superintendent.—*See Tinplate Works in West Virginia.*

La Belle Works, American Tin Plate Company, Battery Park Building, New York City. Works at Wheeling, Ohio county, West Virginia.—*For description of works see page 42.*

Parkersburg Iron and Steel Company, Times Building, Pittsburgh, Pa. Works at Parkersburg, Wood county, West Virginia. Built in 1901 and put in operation in the winter of 1901-2; 1 billet, 6 pair, and 6 sheet furnaces, 1 large annealing furnace, one 22-inch bar mill, and 14 trains of sheet rolls (one 30, three 32, one 36, two 40, and two 48-inch mills, all hot, and one 30, two 36, one 40, and one 48-inch cold mills); product, fine sheet iron and sheet steel; annual capacity, 18,000 gross tons. Fuel, coal and natural gas. A forge to contain 8 furnaces and 8 knobbling fires may be added in 1902. A. H. Geilfuss, President; W. R. Geilfuss, Secretary and Treasurer.

- Riverside Bar Mill, (Riverside Department,) National Tube Company, Conestoga Building, Pittsburgh. Works at Wheeling, Ohio county, West Virginia.—*For description of works see page 26.*
- Riverside Skelp Mills, (Riverside Department,) National Tube Company, Conestoga Building, Pittsburgh. Works at Benwood, Marshall county, West Virginia.—*For description of works see page 26.*
- Riverside Steel Works, (Riverside Department,) National Tube Company, Conestoga Building, Pittsburgh. Works at Benwood, Marshall county, West Virginia.—*For description of works see pages 26-7.*
- Top Mill, Wheeling Steel and Iron Company, Wheeling, Ohio county.—*For description of works see page 120.*
- Wheeling Steel Works, Wheeling Steel and Iron Company, Wheeling, Ohio county. Works at Benwood, Marshall county.—*For description of works see page 120.*
- Wheeling Works, La Belle Iron Works, Steubenville, Jefferson county, Ohio. Works at Wheeling, Ohio county, West Virginia. Built in 1852 and enlarged since; incorporated on December 3, 1875; 4 regenerative gas heating furnaces, one 3-high 22-inch nail-plate and one 2-high 21-inch nail-plate or skelp mill, and 173 cut-nail machines; product, steel and iron cut nails, nail and tack plate, skelp, and special plates for stamping purposes; annual capacity, 600,000 kegs of cut nails and 40,000 gross tons of skelp, tack plate, and stamping stock. Fuel, natural gas, producer gas, and coal. Brand, "La Belle." J. E. Wright, President; W. E. Beswick, Secretary. (Black plate mills formerly in these works now operated by the American Tin Plate Company.)—*See La Belle Furnace and Steubenville Works (Rolling Mills and Steel Works) in Ohio River Counties, Ohio.*
- Number of rolling mills and steel works in West Virginia: 12 completed and 1 building. Of these 2 make Bessemer steel.

KENTUCKY.

COKE AND BITUMINOUS COAL AND COKE FURNACES—8.

- Ashland Furnaces, Ashland Coal and Iron Railway Company, Ashland, Boyd county. Three stacks, all at Ashland: 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, Bath county and Lake Superior; 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; D. G. Putnam, General Superintendent. Selling agents, Matthew Addy & Co., St. Louis; M. A. Hanna & Co., Cleveland; Pickands, Brown & Co.

and A. H. Dunham & Co., Chicago; John S. Slagle, 804 Penn Building, Pittsburgh; T. A. Mack & Co. and the Domhoff and Joyce Company, Cincinnati.—*Active in 1901.*

Grand Rivers Furnaces, Hillman Land and Iron Company, Grand Rivers, Livingston county. Two stacks, Nos. 1 and 2, each 60 x 13½, built in 1890-1 to use charcoal for fuel; No. 1 blown in January 12 and No. 2 March 12, 1892; fuel changed to coke in 1901; eight Durham pipe stoves; ore, local brown hematite; product, foundry and forge pig iron; total annual capacity, 45,000 gross tons. Brand, "Grand Rivers." John W. Harrison, President, 400 Columbia Building, and E. H. Simmons, Vice-President and Treasurer, Ninth and Spruce sts., St. Louis, Missouri; Thomas J. Scott, Manager, Grand Rivers, Kentucky. (Furnace No. 1 formerly called Blood Furnace; and Furnace No. 2 formerly called Lawrence Furnace).—*Idle since 1892 but expect to blow in early in 1902.*

Paducah Furnace, S. Frank Eagle, lessee, Paducah, McCracken county. One stack, 70 x 14, built in 1889-90; first blown in in the spring of 1900; two Massicks & Crooke stoves; fuel, coke; annual capacity, 30,000 gross tons. (Formerly operated by the Kentucky Furnace Company. Owned by R. J. Lackland, J. W. Harrison, and K. M. and C. R. Howard; E. C. Lackland, Trustee, Laclede Building, St. Louis, Mo.)—*Active in 1900.*

Watts Furnaces, Virginia Iron, Coal, and Coke Company, Bristol, Sullivan county, Tenn. Works at Middlesborough, Bell county, Kentucky. Two stacks; fuel, coke.—*For description of furnaces see page 128.*

Number of coke and bituminous coal and coke furnaces in Kentucky: 8 stacks. There are no active charcoal furnaces in Kentucky.

ROLLING MILLS AND STEEL WORKS—9 COMPLETED AND 1 BUILDING.

Ashland Sheet Mill Company, Incorporated, Ashland, Boyd county. Building works to contain 1 regenerative gas billet heating furnace, 8 pair furnaces, 8 sheet furnaces, 4 annealing furnaces, one 3-high 20-inch bar mill, 8 hot sheet mills, (two 26 x 33, five 26 x 38, and one 26 x 48-inch,) and 4 cold mills (two 48 and two 54-inch); product, to be sheet and tinplate bars, merchant bars, and black and galvanized sheets of all grades; estimated annual capacity, 25,000 gross tons. Fuel, coal and manufactured gas. A galvanizing plant will be connected with the works. I. A. Kelly, President; L. R. Putnam, Secretary; George McCullough, Treasurer. Works are expected to be completed and in operation early in 1902.

Ashland Steel Company, Incorporated, Ashland, Boyd county. Built in 1891; two 5½-gross-ton Bessemer steel converters, two 4-hole gas-fired soaking pit furnaces, and one 32-inch blooming mill; first blow made December 26, 1891; 1 modern Garrett wire-rod train added in 1900;

- product, billets, slabs, sheet and tinplate bars, and wire rods; annual capacity, 150,000 gross tons of ingots and 110,000 tons of wire rods. Fuel, natural gas. I. A. Kelly, President; Thomas M. Adams, 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 1 hammer; annual capacity, 3,600 gross tons; not now 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, 1 bloom forge, 1 annealing furnace, 2 steam shingling hammers, and 5 trains of rolls (8, 12, 18, 100-inch plate, and 72-inch plate and sheet with chilled rolls); product, bar, guide, plate, and sheet iron, and tank, shell, and flange steel plates; annual capacity, single turn, 9,000 gross tons. Brands of iron, "Tennessee Charcoal Bloom Staybolt," "E. I. C. Charcoal," and "Laurel" charcoal iron. L. P. Ewald, President and General Manager, and J. P. Sweney, Secretary, St. Louis; E. S. Menard, Assistant Secretary, Louisville.
- Licking Iron Works, Licking Rolling Mill Company, Incorporated, Covington, Kenton county. Built in 1845 and overhauled in 1895; 6 double puddling, 5 Lauth heating, and 2 scrap furnaces, one 5-ton steam hammer, one 8-inch mill, one 12-inch mill, two 16-inch mills, and two 24 x 36-inch sheet mills, all hot, and two 24 x 38-inch cold mills; also one 24 x 30-inch hot tin mill; product, merchant bar iron, sheet iron, and angle, tee, rail, and sash iron; also black plates for tinning for their own use; special products, shafting and charcoal bar, angle, and tee iron; annual capacity, 14,000 gross tons. Fuel, coal. F. J. Droege, President; F. A. Droege, Vice-President; W. J. Droege, Secretary; J. C. Droege, Treasurer.—*See Tinplate Works in Kentucky.*
- Louisville Bolt and Iron Company, Incorporated, Louisville, Jefferson county. Built in 1900-1 and first put in operation on December 11, 1901; 2 heating furnaces and 2 trains of rolls (one 8 and one 12-inch); product, bar iron; annual capacity, 15,000 gross tons. Fuel, coal. Works for the manufacture of bolts and nuts are connected with the plant. L. S. Taylor, President and Manager; Frank W. Bonnie, Vice-President; C. A. Parker, Secretary and Treasurer.
- Mitchell-Tranter Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Covington, Kenton county, Kentucky.—*For description of works see page 74.*
- Newport Rolling Mill Company, Newport, Campbell county. Built in 1857 and rebuilt throughout in 1891 and 1899; 8 single puddling and 8 heating furnaces, 8 box annealing furnaces, and 12 trains of rolls (10 hot and 2 cold); product, steel sheets for roofing, corrugating, and galvanizing purposes; annual capacity, triple turn, 26,000

gross tons. Fuel, coal. Brands, "Newport Best," "Globe," and "Newport Steel." Also manufactures galvanized sheets. J. A. Andrews, President; J. B. Andrews, Secretary and Treasurer.

Norton Iron Works, Incorporated, 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, 50 wire-nail machines, and 2 trains of rolls (one 20 and one 22-inch); product, steel cut nails, cut and wrought spikes, wire, and wire nails; annual capacity, 350,000 kegs of cut nails and cut and wrought spikes and 420,000 kegs of wire nails. A wire-drawing plant connected with the works has an annual capacity of 30,000 gross tons of wire and a galvanizing plant has a capacity of 12,000 tons of galvanized wire; 6,000 tons of annealed wire can also be produced annually. Fuel, coal and natural, manufactured, and blast-furnace gas. Brand, "Norton." T. M. Adams, President; Joseph C. Butler, Vice-President; R. C. Richardson, Secretary; W. C. Richardson, Treasurer. Selling agents, J. C. McCarthy & Co., New York City.

Watts Works, Virginia Iron, Coal, and Coke Company, Bristol, Sullivan county, Tennessee. Works at Middlesborough, Bell county, Kentucky.—*For description of works see page 128.*

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

TENNESSEE.

COKE FURNACES—15.

Chattanooga Furnace, Chattanooga Furnace Company, Chattanooga, Hamilton county. One stack, 60 x 13, completed in 1874 and blown in in September, 1874; rebuilt in 1885, 1899, and 1901; three Whitwell stoves, each 60 x 18; fuel, Virginia and Tennessee coke; ores, hard and soft red hematite; specialty, foundry pig iron; annual capacity, 30,000 gross tons. Brand, "Chattanooga." C. E. Buek, President; J. R. Rice, Secretary and Treasurer. Selling agents, the Domhoff and Joyce Company, Cincinnati; J. K. Dimmick & Co., Philadelphia; Fieser, Wagoner & Bentley, Columbus, Ohio.—*Active in 1901.*

Citico Furnace, Citico Furnace Company, Chattanooga, Hamilton county. One stack, 69 x 17, built in 1883 and first put in blast in April, 1884; four 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.—*Active in 1901.*

Dayton (The) Coal and Iron Company, Limited, Dayton, Rhea county. Sales office, Johnston Building, Cincinnati, Ohio. Two stacks, one

75 x 17 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; M. H. Maury, General Superintendent, Dayton, Tenn.—*Active in 1901.*

Embreville Furnace, Virginia Iron, Coal, and Coke Company, Bristol, Sullivan county. Furnace at Embreville, Washington county. One stack; fuel, coke.—*For description of furnace see page 127.*

Helen Furnace, Red River Furnace Company, Clarksville, Montgomery county. One stack, 70 x 17, built in 1892 and first blown in December 8, 1895; three Whitwell stoves; fuel, coke; ore, local brown hematite; product, foundry, high silicon, and Tennessee Scotch pig iron; annual capacity, 45,000 gross tons. Brand, "Red River." Graham Macfarlane, President; H. L. Williams, Vice-President; R. B. Hickman, Secretary; Mary A. Senter, Treasurer; Henry T. De Bardeleben, Superintendent. Selling agents, Hickman, Williams & Co., St. Louis, Louisville, and Chicago; Thomas A. Mack & Co., Cincinnati. (Formerly operated by the Gracey-Woodward Iron Company.)—*Active in 1901.*

Johnson City Furnace, The Cranberry Furnace Company, lessee, Johnson City, Washington county. Philadelphia office, Drexel Building. One stack, 74½ x 18, partly erected by the Carnegie Iron Company; work suspended in 1892; stack completed in 1898 by the Carnegie Furnace Company and blown in January 2, 1899; three Whitwell stoves, each 65 x 18; fuel, coke; ore, Cranberry; product, low-phosphorus pig iron; annual capacity, 30,000 gross tons. Brand, "Cranberry." Frank Firmstone, President, Johnson City; Calvin Pardee, Vice-President, and F. P. Howe, Secretary and Treasurer, 225 Drexel Building, Philadelphia. (Formerly called the Carnegie Furnace. Owned by the Virginia Iron, Coal, and Coke Company.)—*Last active in 1900, but will be blown in in the spring of 1902. See pages 126-7.*

Napier Iron Works, Nashville, Davidson county. Furnace at Napier, Lewis county. One stack, 60 x 12½, built in 1891 and blown in with charcoal as fuel in February, 1892; remodeled in 1897 and fuel changed from charcoal to coke; two fire-brick stoves; fuel, Virginia coke; ore, local brown hematite from furnace property; product, foundry pig iron; annual capacity, 18,000 gross tons. Brand, "Columbia." W. R. Cole, President and General Manager, J. H. Fall, Vice-President, and J. Hill Eakin, Secretary, Nashville; Ira P. Jones, Jr., Treasurer, Napier. Selling agents, Rogers, Brown & Co., Buffalo, New York, Boston, Cincinnati, Cleveland, Chicago, Birmingham, Pittsburgh, St. Louis, and San Francisco.—*Active in 1901.*

Rockwood Furnace, Roane Iron Company, Rockwood, Roane county. Main office, Chattanooga. Two stacks: No. 3, 70 x 16½, built in 1893 and blown in January 6, 1894; four Hugh Kennedy hot-blast stoves; No. 4, 80 x 17, partly erected in 1893 and completed and blown in

in July, 1901; four Hugh Kennedy hot-blast stoves. Fuel, coke; ore, red fossiliferous; product, foundry pig iron; total annual capacity, 100,000 gross tons. Brand, "Rockwood." H. S. Chamberlain, President, C. M. McGhee, Vice-President, Orion L. Hurlbut, Secretary, and F. Nieland, Treasurer, Chattanooga; Willard Warner, Jr., Superintendent of Furnace, Rockwood. Selling agents for New England and Eastern New York, C. L. Peirson & Co., Boston, Massachusetts. (Two stacks, Nos. 1 and 2, dismantled.)—*Active in 1901.*

Searles Furnace, LaFollette Coal, Iron, and Railway Company, LaFollette, Campbell county. New York office, 1405-6 Lord's Court Building, 27 William st. One stack, 95 x 20, built in 1900-1 and to be put in blast in the winter of 1901-2; four modified Kennedy stoves, each 90 x 18; fuel, coke; ores, red fossiliferous and brown hematite; product, foundry pig iron; annual capacity, 125,000 gross tons. John E. Searles, President; H. M. LaFollette, Vice-President and Manager; George W. Oakley, Secretary; Winthrop M. Tuttle, Treasurer.

South Pittsburg Furnaces, Tennessee Coal, Iron, and Railroad Company, Birmingham, Jefferson county, Alabama. Furnaces at South Pittsburg, Marion county, Tennessee. Three stacks; fuel, coke.—*For description of furnaces see page 132.*

Warner Furnace, Warner Iron Company, Nashville. Furnace at Cumberland Furnace P. O., Dickson county. One stack, 60 x 12½, built on site of old furnace in 1892-3 and blown in March 25, 1893; two Gordon improved stoves; fuel, Virginia coke; ore, local brown hematite; product, foundry pig iron; annual capacity, 30,000 gross tons. Brand, "Warner." Joseph Warner, President; J. A. Cooper, Secretary and Treasurer; W. O. Jones, Superintendent. Selling agents, Rogers, Brown & Co., Buffalo, New York, Boston, Cincinnati, Cleveland, St. Louis, Birmingham, Pittsburgh, and San Francisco; Rogers, Brown & Warner, Philadelphia; Hickman, Williams & Co., Chicago. (Formerly called Cumberland Furnace.)—*Active in 1901.*

Number of coke furnaces in Tennessee: 15 stacks.

MIXED CHARCOAL AND COKE FURNACES—5.

Buffalo Iron Company, Nashville, Davidson county. Main office, Manie, Wayne county, but business transacted from Nashville. Telegraph office, Allens Creek, Wayne county. Four stacks: Aetna Furnace, at Aetna, Hickman county; one stack, 55 x 11, built in 1886 and first put in blast November 13, 1886; hot or cold blast; two Whitwell stoves; fuel, charcoal and coke mixed; ore, local brown hematite; product, car-wheel pig iron; annual capacity, 30,000 gross tons; brand, "Aetna." Warner Furnace, at Warner, Hickman county; one stack, 55 x 11, first put in blast November 12, 1881; hot or cold blast; fuel, charcoal and coke mixed; ore, local brown hematite; product, car-wheel pig iron; annual capacity, 30,000 gross tons; brand,

"Warner." Allens 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; fuel, charcoal and coke mixed; ore, local brown hematite; specialty, high-phosphorus, high-silicon, and low-sulphur pig iron; total annual capacity, 60,000 gross tons; brand, "Mannie." Total annual capacity of the four stacks, 120,000 gross tons. J. P. Williams, President; Robert Ewing, General Manager; C. Cooper, Secretary and Treasurer. Selling agents, Rogers, Brown & Co., Buffalo, New York, Boston, Cincinnati, Cleveland, Chicago, St. Louis, Birmingham, Pittsburgh, and San Francisco; Rogers, Brown & Warner, Philadelphia. The Cumberland Furnace, at Cumberland, Tenn., is now operated by the Warner Iron Company, the Standard Furnace, at Goodrich, Tenn., by the Standard Iron Company, and the Attalla Furnace, at Attalla, Alabama, by the Eagle Iron Company.)—*Allens Creek Furnaces active in 1901; Aetna and Warner Furnaces idle since 1893.*

Standard Furnace, Standard Iron Company, Goodrich, Hickman county. One stack, 55 x 12, built on site of old furnace in 1891 and blown in in 1891; original stack first blown in December 23, 1885, and dismantled in 1891; one cast-iron pipe stove; fuel, $\frac{2}{3}$ coke and $\frac{1}{3}$ charcoal; ore, local brown hematite; product, foundry pig iron; annual capacity, 24,000 gross tons. Brand, "Standard." H. D. Cooper, President, Acting Treasurer, and Superintendent; W. L. Granbery, Secretary. Selling agents, the Domhoff and Joyce Company, Cincinnati; Hickman, Williams & Co., St. Louis, Louisville, and Chicago. (Formerly owned by the Buffalo Iron Company.)—*Active in 1901.*

Number of mixed charcoal and coke furnaces in Tennessee: 5 stacks.

CHARCOAL FURNACES—1.

Bear Spring Furnace, Dover Iron Company, lessee, Bear Spring, Stewart county. Furnace located on the line of the Tennessee and Cumberland River Railroad, connecting with the Louisville and Nashville Railroad. Telegraph address, Tennessee Ridge. One stack, 47 x 9 $\frac{1}{2}$, 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." Graham Macfarlane, President; R. B. Hickman, Secretary; H. L. Williams, Treasurer; John H. Lory, General Manager. Selling agents, J. H. Hillman & Son, Pittsburgh. (Owned by the Cumberland River Estates, Limited.)—*Active in 1901.*

Number of charcoal furnaces in Tennessee: 1 stack.

Total number of furnaces in Tennessee: 21 stacks.

ROLLING MILLS AND STEEL WORKS—3.

Knoxville Iron Company, Knoxville, Knox county. Two works: Harriman Works, 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, 1 hammer, and 3 trains of rolls (18-inch muck, 16-inch bar, and 8-inch guide); product, bar iron, 12 to 30-lb. T rails, all sizes of fish plates, light sections of angle and channel iron, and iron and steel fence posts; annual capacity, 16,500 gross tons; fuel, coal; (formerly called the Harriman Rolling Mill.) Knoxville Works, Knoxville, Knox county; built in 1865; 9 single and 4 double puddling furnaces, 1 coal and 2 gas heating furnaces, and 4 trains of rolls (8, 15, 16, and 18-inch); product, merchant bars, fish-plates, bolts, and light T and street rails; annual capacity, 15,000 gross tons; fuel, manufactured gas and coal. Brand, "K. I. Co." The company will abandon and dismantle both works and will erect an entirely new rolling mill at Knoxville. Steel furnaces may also be added. William P. Chamberlain, President; T. I. Stephenson, Vice-President and General Manager; Otis A. Brown, Secretary and Treasurer. Sales made by the company.

Southern (The) Steel Works, John Leighton & Sons, 610-14 Boyce street, Chattanooga, Hamilton county. Removed from Kingston in 1877; remodeled and enlarged in 1883; 1 single puddling and 1 heating furnace, two 8-pot crucible steel-melting furnaces with an annual capacity, single turn, of 675 gross tons, one 3-gross-ton acid open-hearth steel furnace with an annual capacity of 900 tons, and one 2,000-lb. hammer; product, tool steel, forgings, and steel castings. Fuel, coal and coke.

Number of rolling mills and steel works in Tennessee: 3. Of these 1 makes crucible steel and 1 makes open-hearth steel.

NORTH CAROLINA.

COKE STACKS—2.

Cherokee Furnace, Empire Steel and Iron Company, Catasauqua, Lehigh county, Pennsylvania. Furnace at Greensboro, Guilford county, North Carolina. One stack; fuel, coke.—*For description of furnace see page 84.*

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."

R. F. Hoke, President; J. S. Wise, Secretary and Treasurer.—*Active in 1900.*

Number of furnaces in North Carolina: 2 coke stacks. No charcoal stacks. There are no rolling mills or steel works in North Carolina.

IRON-ORE FORGES—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.—*Idle for several years.*

Number of iron-ore forges in North Carolina: 1.

GEORGIA.

COKE FURNACES—1.

Rising Fawn Furnace, The Georgia Iron and Coal Company, Atlanta. Furnace at Rising Fawn, Dade county. One stack, 75 x 17, built in 1873-5 and 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." Joel Hurt, President; Litt Bloodworth, Jr., Secretary and Treasurer; George F. Hurt, General Manager; John F. Glenn, Purchasing Agent. (Formerly operated by the Georgia Mining, Manufacturing, and Investment Company.)—*Active in 1896.*

Number of coke furnaces in Georgia: 1 stack.

CHARCOAL FURNACES—4.

Cherokee Iron Works, Alabama and Georgia Iron Company, No. 71 Broadway, New York City. Furnace at Cedartown, Polk county, Georgia. One stack; fuel, charcoal.—*For description of furnace see page 138.*

Etna Furnace, Etna Manufacturing Company, Etna P. O., Polk county. One stack, 45 x 10, built in 1870; rebuilt in 1889; hot blast; ore, brown hematite mined on the furnace property; product, strictly first-class car-wheel pig iron; annual capacity, 10,000 gross tons. Brand, "Etna." D. B. Hamilton, Jr., President, Rome; A. S. Hamilton, Vice-President, Trion Factory; Harper Hamilton, Secretary and Treasurer, and Alex. T. Hamilton, General Manager, Etna.—*Idle for several years.*

Rome Furnace, The Rome Furnace 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; ores, red and brown hematite from Floyd, Polk, and Chattooga counties; product, high grades of car-wheel pig iron; annual capacity, 20,000 gross tons. Brands, "Rome" and "Colyar." This furnace used coke for fuel from July 1, 1899, to December 20, 1899; since the date last

named charcoal only has been used. L. S. Colyar, President and Treasurer; J. P. Hoskins, Vice-President; D. G. Crabtree, Secretary. Selling agents, Rogers, Brown & Co., Buffalo, New York, Boston, Cincinnati, Cleveland, Pittsburgh, Chicago, St. Louis, Birmingham, and San Francisco; Rogers, Brown & Warner, Philadelphia.—*Active in 1901.*

Tallapoosa Furnace, The Georgia Vineyard Company, Tallapoosa, Haralson county. One stack, 60 x 11, built in 1888-9 and blown in in May, 1890; idle for a number of years; revived in 1900; one Player iron stove; closed top; cold and warm blast; ores, red and brown hematite mixed with gray and magnetic from Cedartown, Georgia, and several points in Eastern Alabama; product, car-wheel and foundry pig iron; annual capacity, 13,500 gross tons. Brand, "Tallapoosa." N. C. Mathews, President; G. W. Anner, Vice-President; C. W. Fox, Secretary and Treasurer. (Formerly operated by the Southern Iron Company.)—*Active in 1900.*

Number of charcoal furnaces in Georgia: 4 stacks.

Total number of furnaces in Georgia: 5 stacks.

ROLLING MILLS—2.

Atlanta Mill, American Steel Hoop Company, Carnegie Building, Pittsburgh, Pa. Works at Atlanta, Fulton county, Georgia.—*For description of works see page 49.*

Atlanta Steel Hoop Company, Equitable Building, Atlanta, Fulton county. Built in 1901 and first put in operation in May, 1901; 1 straight draft and 2 gas heating furnaces and one 8-inch train of rolls; product, hoops, cotton-ties, bands, etc.; annual capacity, 12,000 gross tons. Fuel, bituminous coal and producer gas. S. T. Weyman, President; G. W. Connors, Secretary and Treasurer; P. H. Mynahan, Superintendent.

Number of rolling mills in Georgia: 2.

ALABAMA.

COKE FURNACES—39 COMPLETED AND 2 BUILDING.

Alice Furnaces, Tennessee Coal, Iron, and Railroad Company, Birmingham, Jefferson county. Two stacks; fuel, coke.—*For description of furnaces see page 131.*

Bessemer Furnaces, Tennessee Coal, Iron, and Railroad Company, Birmingham, Jefferson county. Furnaces at Bessemer, Jefferson county. Five stacks; fuel, coke.—*For description of furnaces see page 131.*

Central Iron and Coal Company, 116 Nassau st., New York City. Building one coke stack at Tuscaloosa, Tuscaloosa county, Alabama. J. Lodge, President; George F. Ross, Vice-President; W. L. Rogers, Secretary and Treasurer.

- Clifton Furnaces, Alabama Consolidated Coal and Iron Company, Birmingham, Jefferson county. Furnaces at Ironaton, Talladega county. Two stacks; fuel, coke.—*For description of furnaces see page 137.*
- Ella Furnace, C. E. Buek & Co., 2029½ First ave., Birmingham, Jefferson county. Furnace at Trussville, Jefferson county. One stack, 65 x 17, built in 1887-9 and blown in in April, 1889; rebuilt in 1901; three Whitwell stoves; fuel, Alabama coke; ores, local red hematite and brown ore from Georgia; product, foundry and mill pig iron; annual capacity, 50,000 gross tons. Brand, "Trussville." Furnace will probably be operated by the Lacey-Buek Iron Company after January 1, 1902. (Formerly called the Trussville Furnace.)—*Active in 1901.*
- Ensley Furnaces, Tennessee Coal, Iron, and Railroad Company, Birmingham, Jefferson county. Furnaces at Ensley, Jefferson county. Five stacks; fuel, coke.—*For description of furnaces see pages 131-2.*
- Gadsden-Alabama Furnace, Alabama Consolidated Coal and Iron Company, Birmingham, Jefferson county. Furnace at Gadsden, Etowah county. One stack; fuel, coke.—*For description of furnace see page 137.*
- Hattie Ensley Furnace, Sloss Sheffield Steel and Iron Company, Birmingham, Jefferson county. Furnace at Sheffield, Colbert county. One stack; fuel, coke.—*For description of furnace see page 135.*
- Jenifer Furnace Company, Jenifer, Talladega county. One stack, 75 x 16, built in 1901 and first put in operation September 26, 1901; one improved Whitwell and two Hugh Kennedy stoves; fuel, Alabama coke; ore, local brown hematite; product, foundry pig iron; annual capacity, 50,000 gross tons. Brand, "Jenifer." W. H. Weller, President and Treasurer, Anniston, Alabama; W. Aubrey Thomas, Vice-President and General Manager, Niles, Ohio; Edward F. Niedecken, Secretary, Milwaukee, Wisconsin. (One charcoal stack, 56 x 11, built in 1892, torn down in 1901.)—*Active in 1901.*
- Lady Ensley Furnace, operated by the North Alabama Furnace Company, Birmingham, Jefferson county. Furnace at Sheffield, Colbert county. One stack; fuel, coke. Controlled by the Sloss Sheffield Steel and Iron Company, Birmingham, Alabama.—*For description of furnace see page 135.*
- Mary Pratt Furnace, Alabama Consolidated Coal and Iron Company, Birmingham, Jefferson county. One stack; fuel, coke.—*For description of furnace see page 137.*
- Oxmoor Furnaces, Tennessee Coal, Iron, and Railroad Company, Birmingham, Jefferson county. Furnaces at Oxmoor, Jefferson county. Two stacks; fuel, coke.—*For description of furnaces see page 132.*
- Philadelphia Furnace, Sloss Sheffield Steel and Iron Company, Birmingham, Jefferson county. Furnace at Florence, Lauderdale county. One stack; fuel, coke.—*For description of furnace see page 135.*
- Pioneer Furnaces, operated by the Pioneer Mining and Manufacturing

Company, Thomas, Jefferson county. Two completed stacks and one stack building; fuel, coke. Controlled by the Republic Iron and Steel Company, Stock Exchange Building, Chicago, Illinois.—*For description of furnaces see page 70.*

Sheffield Furnaces, Tennessee Coal, Iron, and Railroad Company, Birmingham, Jefferson county. Furnaces at Sheffield, Colbert county. Three stacks; fuel, coke.—*For description of furnaces see page 132.*

Sloss Furnaces, Sloss Sheffield Steel and Iron Company, Birmingham, Jefferson county. Four stacks; fuel, coke.—*For description of furnaces see pages 135-6.*

Talladega Furnace, Northern Alabama Coal, Iron, and Railway Company, 25 Broad st., New York City. Furnace at Talladega, Talladega county, Alabama. One stack, 72 x 18, built in 1889 and blown in October 5, 1889; remodeled in 1900-1; three Whitwell stoves, each 62 x 26; fuel, Alabama coke; ores, local brown and red hematite; product, foundry and forge pig iron; annual capacity, 60,000 gross tons. W. T. Rosen, President; S. H. March, Vice-President; John Carlson, Secretary and Treasurer; George Dunglinson, Assistant Secretary and Assistant Treasurer; John C. Soley, General Manager. Selling agents, Rogers, Brown & Co., Boston, Buffalo, New York, Pittsburgh, Cincinnati, Cleveland, Chicago, St. Louis, San Francisco, and Birmingham; Rogers, Brown & Warner, Philadelphia.—*Active in 1900.*

Vanderbilt Furnace, Tutwiler Coal, Coke, and Iron Company, Birmingham, Jefferson county. Furnace at Boyles, Jefferson county. One stack, 75 x 15½; commenced building February 9, 1890; blown in August 23, 1890; remodeled in 1897 and rebuilt in 1899 and 1901; four Massicks & Crooke stoves; fuel, Alabama coke; ores, brown and red hematite; product, soft foundry and gray forge pig iron; annual capacity, 54,000 gross tons. Brand, "Vanderbilt." E. M. Tutwiler, President; E. L. Adler, General Manager. (Formerly called Clara Furnace; also Spathite Furnace No. 1.)—*Active in 1901.*

Williamson Furnace, Williamson Iron Company, Birmingham, Jefferson county. One stack, 65 x 14½, built in 1886 and first blown in in October, 1886; three Massicks & Crooke stoves; fuel, coke; ores, red fossil and brown hematite; product, foundry and mill pig iron; annual capacity, 20,000 gross tons. Brand, "Williamson." C. P. Williamson, President; Harry D. Williamson, Superintendent. (Formerly operated by the Jones Valley Iron Company.)—*Active in 1900.*

Woodstock Furnaces, The Woodstock Iron Works, Anniston, Calhoun county. Two stacks: No. 3, 80 x 20, built in 1887-9 and blown in October 10, 1889; rebuilt in 1901; four 2-pass stoves; No. 4, 75 x 17, built in 1887-9, blown in June 12, 1892, and rebuilt in 1896; four 2-pass stoves. Fuel, Alabama coke; ore, local brown hematite; prod-

uct, foundry pig iron; total annual capacity, 150,000 gross tons. Brand, "Woodstock, (W. I. W.)" Arthur Lehman, President, P. J. Goodhart, Treasurer, and Norbert Heinsheimer, Secretary, New York City; John B. Knox, Vice-President, J. W. Woolfolk, Manager, A. H. Quinn, Assistant Treasurer, and Noah B. Smith, Superintendent, Anniston, Alabama. (Stacks Nos. 1 and 2, charcoal, have been abandoned.)—*No. 4 active in 1901; No. 3 will be blown in as soon as improvements are completed.*

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; ten 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, 125,000 gross tons. Brand, "Woodward." J. H. Woodward, President; G. B. McCormack, Vice-President; R. H. Banister, Secretary; Silas Hine, Treasurer; A. H. Woodward, General Superintendent.—*Active in 1901.*

Number of coke furnaces in Alabama: 39 completed stacks and 2 stacks building.

CHARCOAL FURNACES—6.

Attalla Furnace, Eagle Iron Company, Chattanooga, Tennessee. Furnace at Attalla, Etowah county, Alabama. 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, "Rome." L. S. Colyar, President and Treasurer; D. G. Crabtree, Secretary and Assistant Treasurer. Selling agents, Rogers, Brown & Co., Buffalo, New York, Boston, Cincinnati, Cleveland, Chicago, St. Louis, Birmingham, Pittsburgh, and San Francisco; Rogers, Brown & Warner, Philadelphia.—*Active in 1901.*

Bibb Furnace, Southern Mineral Land 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."—*Idle since 1894 and for sale or lease. See Brierfield Rolling Mill in this State.*

Rock Run Furnace, Bass Foundry and Machine Company, Rock Run, Cherokee county. One stack, 54½ x 11, 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, C. T. Strawbridge, Secretary, and F. S. Lightfoot, Treasurer, Fort Wayne, Indiana; J. M. Garvin, Manager and Assistant Treasurer, Rock Run, Alabama.—*Active in 1901.*

- Round Mountain Furnace, Round Mountain Coal and Iron Company, 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." William C. Sibley, President, Augusta, Georgia. (Formerly called Round Mountain Iron Works.)—*Idle since 1896 and for sale.*
- 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, Birmingham, Alabama; B. Y. Frost, Secretary, and W. S. Gurnee, Treasurer, 80 Broadway, New York; A. H. Avery, Assistant Treasurer, Shelby, Alabama. Selling agents, Matthew Addy & Co., Cincinnati; C. L. Peirson & Co., Boston and New York.—*Active in 1901.*
- Number of charcoal furnaces in Alabama: 6 stacks.
- Total number of furnaces in Alabama: 45 completed stacks and 2 stacks building.

ROLLING MILLS AND STEEL WORKS—12.

- Alabama Steel and Wire Company, Birmingham, Jefferson county. Works at Ensley, Jefferson county. Built in 1899-1900 and first put in operation in March, 1900; 2 direct-fire heating furnaces, 2 annealing furnaces, 18 trains of rolls, (four 9, three 10, four 12, and seven 16-inch,) 173 wire-nail machines, and 211 wire-drawing blocks; product, small billets, wire rods, wire nails, plain, barbed, and galvanized wire, fence staples, and field fencing; annual capacity, 100,000 gross tons of rods, 130,000 tons of wire, and 1,000,000 kegs of wire nails. Fuel, coal. A galvanizing plant is connected with the works. E. T. Schuler, President; G. H. Schuler, Secretary and Treasurer.
- Alabama Tube and Iron Company, Birmingham, Jefferson county. Works at Helena, Shelby county. Started in March, 1873; enlarged in 1889; acquired in 1901 by present company, which refuses to give a detailed description of its works. F. L. Clark, President; William S. Roberts, Vice-President and General Manager; V. A. Moore, Secretary and Treasurer. (Formerly called the Shelby Rolling Mill.)
- Alabama Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Gate City, Jefferson county, Alabama.—*For description of works see page 71.*
- Anniston Rolling Mills, Anniston Rolling Mill Company, 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); product, merchant iron and steel, light T rails, angles, channels, and special shapes; annual capacity,

12,000 gross tons. Fuel, coal. Thomas J. Rowley, President; William Davies, Vice-President and General Manager; C. P. Burgess, Secretary and Treasurer; Ernest F. Rowley, Superintendent.

Anniston Works, (leased,) Southern Car and Foundry Company, Birmingham, Jefferson county, Alabama. Works at Anniston, Calhoun county.—*For description of works see page 144.*

Bessemer Rolling Mills, Tennessee Coal, Iron, and Railroad Company, Birmingham, Jefferson county, Alabama. Works at Bessemer, Jefferson county.—*For description of works see page 133.*

Birmingham Rolling Mills, operated by the Birmingham Rolling Mill Company, Birmingham, Jefferson county. Controlled by the Republic Iron and Steel Company, Stock Exchange Building, Chicago.—*For description of works see pages 71-2.*

Brierfield Rolling Mill, Southern Mineral Land 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. Fuel, coke. Herman Pfaff, President, Brierfield, Alabama; A. H. Plumb, Secretary and Treasurer, Emporia, Kansas. (Formerly operated by the Alabama Iron and Steel Company.)—*For sale. See Bibb Furnace (charcoal) in this State.*

Jefferson Steel Works, Union Steel and Chain Company, 71 Broadway, New York City. Works at Birmingham, Jefferson county, Alabama. Built in 1889-90; one 15-gross-ton basic open-hearth steel furnace; first steel made April 24, 1890; product, steel ingots; annual capacity, 8,100 gross tons. Fuel, manufactured gas. Brand, "Jefferson." (This furnace takes the place of 1 experimental Henderson open-hearth steel furnace built in 1887-8 and first steel made February 27, 1888. Hawkins steel was experimentally produced at these works in 1897. William Rotch, President, Boston, Mass.; E. L. Harper, Vice-President and General Manager, Thomas S. Holmes, Treasurer, and E. L. Harper, Jr., Secretary, New York. (Formerly operated by the Jefferson Steel and Manufacturing Company.)—*Idle and for sale or lease.*

Sheffield Rolling Mill, Sheffield Rolling Mill Company, Sheffield, Colbert county. Built in 1897-8, utilizing machinery from the abandoned Midway Iron Works and Roanoke Rolling Mill, at Roanoke, Virginia; first put in operation in October, 1898; 12 double puddling furnaces, 6 heating furnaces, and 4 trains of rolls (one 3-high 18-inch muck and billet, one 3-high 16-inch bar, one 10-inch guide, and one 10-inch hoop and cotton-tie); product, bar, rod, and band iron and steel; also iron and steel hoops, cotton-ties, cotton-tie buckles, and railroad and boat spikes; annual capacity, 30,000 gross tons. Fuel, bituminous coal. Robert C. Johnston, President; Thomas F. Johnston, Secretary and Treasurer.

Steel Casting Department, Tennessee Coal, Iron, and Railroad Company, Birmingham, Jefferson county. Works at Ensley, Jefferson county.—*For description of works see page 133.*

Steel Works Division, Tennessee Coal, Iron, and Railroad Company, Birmingham, Jefferson county. Works at Ensley, Jefferson county.—*For description of works see page 133.*

Number of rolling mills and steel works in Alabama: 12. Of these 4 have open-hearth steel plants.

TEXAS.

CHARCOAL FURNACES—4.

Jefferson Furnace, Jefferson Iron Company, main office, Nashville, Tennessee. Furnace at Jefferson, Marion county, Texas. One stack, 60 x 12, built in 1889-91 and blown in March 15, 1891; two Durham iron stoves; hot blast; ores, brown hematite, fossiliferous, bog, and carbonate; product, car-wheel pig iron; annual capacity, 13,500 gross tons. Brand, "Jefferson." F. J. Fuller, President, Nashville, Tennessee; W. B. Ward, Vice-President, and W. T. Atkins, Secretary and Treasurer, Jefferson, Texas. Selling agents, Rogers, Brown & Co., Boston, Buffalo, New York, Pittsburgh, Cincinnati, Cleveland, Birmingham, Chicago, St. Louis, and San Francisco; Rogers, Brown & Warner, Philadelphia.—*Active in 1900.*

Old Alcalde Furnace, State of Texas, owner, Rusk, Cherokee county. One stack, 55 x 10½, built in 1883 and put in blast February 27, 1884; rebuilt in 1896; hot blast; ore, brown hematite mined near the furnace; product, car-wheel, foundry, and basic pig iron; annual capacity, 10,000 gross tons. Brand, "Old Alcalde." A foundry for the manufacture of cast-iron pipe is connected with the works. J. F. Cochran, Superintendent of Furnace. Selling agent, W. M. C. Hill, Huntsville.—*Active in 1901.*

Star and Crescent Furnace, Frank A. Daniels, New Orleans, La. Furnace near Rusk, in Cherokee county, Texas. One stack, 65 x 11, built in 1890-1 and blown in November 26, 1891; iron stoves; hot blast; ores, brown hematite and black laminated; product, car-wheel and foundry pig iron; annual capacity, 18,000 gross tons. Brand, "Star and Crescent."—*Active in 1899.*

Tassie Belle Furnace, New Birmingham, Cherokee county. One stack, 60 x 11, built in 1889-90 and blown in in November, 1890; two Weimer pipe stoves; warm blast; ore, local brown hematite; product, car-wheel pig iron; annual capacity, 13,500 gross tons. Brand, "Tassie Belle." Richard L. Coleman, Trustee and Agent.—*Idle for several years and for sale or lease.*

Number of furnaces in Texas: 4 charcoal stacks, of which only 1 was active in 1901. No coke stacks.

There are no active rolling mills or steel works in Texas.

OHIO.

MAHONING VALLEY.

Embraces Blast Furnaces, Rolling Mills, and Steel Works in Mahoning and Trumbull Counties; also in a part of Columbiana County.

COKE FURNACES—15.

Anna Furnace, The Struthers Furnace Company, Perry-Payne Building, Cleveland. Furnace at Struthers, Mahoning county. One stack, 75 x 17, built and blown in in 1869; rebuilt in 1881 and in 1895; three Julian Kennedy stoves; fuel, Connellsville coke; ore, Lake Superior; product, basic, forge, and Bessemer pig iron; annual capacity, 100,000 gross tons. Equipped with one pig-iron casting machine. W. C. Runyon, President; J. B. Stubbs, Vice-President; W. C. Stubbs, Treasurer; A. Grossman, Secretary; S. A. Richards, Manager. (Formerly owned and operated by The Brown Bonnell Iron Company.)—*Active in 1901.*

Cherry Valley Furnace, The Cherry Valley Iron Company, Murtland Building, Pittsburgh. Furnace at Leetonia, Columbiana county, Ohio. One stack, 75 x 17, built in 1868 and rebuilt in 1883; four iron stoves; fuel, coke; ore, Lake Superior; product, "American-Scotch" foundry pig iron; annual capacity, 80,000 gross tons. Brands, "Cherry Valley" and "Leetonia." Sole selling agents, Joshua W. Rhodes & Co., Pittsburgh.—*Active in 1901. See Fannie Furnace in the Shenango and Beaver Valleys, Pennsylvania.*

Grace Furnace No. 2, The Brier Hill Iron and Coal Company, Youngstown, Mahoning county. One stack, 77 x 19, built in 1890; four Massicks & Crooke stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer, basic, strong foundry, and malleable Bessemer pig iron; annual capacity, 125,000 gross tons. Brand, "Brier Hill." Equipped with one pig-iron casting machine. George Tod, President; Henry Tod, Vice-President; J. G. Butler, Jr., General Manager; H. H. Stambaugh, Secretary and Treasurer. (Grace Furnace No. 1, 80 x 18, built in 1861, torn down in 1873, and rebuilt in 1882, abandoned in 1897.)—*Active in 1901.*

Hannah Furnace, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Furnace at Youngstown, Mahoning county, Ohio. One stack; fuel, coke.—*For description of furnace see page 70.*

Haselton Furnace, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Furnace at Haselton, (now a part of Youngstown,) Mahoning county, Ohio. One stack; fuel, coke.—*For description of furnace see page 70.*

Hubbard Furnaces, The Andrews and Hitchcock Iron Company, Youngstown, Mahoning county. Works at Hubbard, Trumbull county. Two stacks: No. 1, 77 x 17½, built in 1867, and No. 2, 75 x

17½, built in 1872; No. 1 rebuilt in 1886 and No. 2 rebuilt in 1883 and 1894; No. 1 stack has four Cowper-Kennedy stoves and No. 2 has iron stoves; fuel, Connellsville coke; product, Bessemer, gray forge, and foundry pig iron. Brands, "Hubbard Scotch" soft foundry and "Climax" strong foundry made from Lake Superior ores. Total annual capacity, 150,000 gross tons. Frank Hitchcock, President; W. J. Hitchcock, Vice-President; H. W. Heedy, Secretary and Treasurer. Selling agents, C. L. Peirson & Co., 44 Kilby st., Boston, Massachusetts; The Bourne-Fuller Company, Cleveland, Ohio.—*Active in 1901.*

Mary Furnace, The Ohio Iron and Steel Company, Lowellville, Mahoning county. One stack, 85 x 18, built in 1845, rebuilt in 1872, and remodeled in 1883, 1894, and 1898; four Cowper-Kennedy hot-blast stoves (three 80 x 18 and one 90 x 20); fuel, Connellsville coke; ore, Lake Superior; product, Bessemer, forge, and foundry pig iron; also basic pig iron cast in chills; also pig iron of special grades and analyses; annual capacity, 110,000 gross tons. Brands, "The Mary" for lake ore iron and "The Mary Ohio Scotch." May add one pig-iron casting machine in 1902. 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; Howe, Johnson & Co., Drexel Building, Philadelphia; N. S. Bartlett & Co., New York and Boston.—*Active in 1901.*

Mattie Furnace, Girard Iron Company, Girard, Trumbull county. One stack, 80 x 19, built in 1866, remodeled in 1879, stack raised in 1884, and rebuilt in 1892 and 1896; three Foote stoves, each 70 x 20; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer, foundry, and forge pig iron; annual capacity, 100,000 gross tons. Brand, "Girard." Sole owners, Executors of the Estate of A. M. Byers, Pittsburgh, Pennsylvania; Henry B. Shields, Manager, Girard, Ohio. Sales made by the company. (Formerly called Girard Furnace.)—*Active in 1901.*

Niles Works, National Steel Company, Carnegie Building, Pittsburgh. Furnace at Niles, Trumbull county, Ohio. One stack; fuel, coke.—*For description of furnace see page 21.*

Ohio Works, National Steel Company, Carnegie Building, Pittsburgh. Furnaces at Youngstown, Mahoning county, Ohio. Three stacks; fuel, coke.—*For description of furnaces see page 21.*

Seneca Furnace, The Salem Iron Company, Pittsburgh. Furnace at Leetonia, Columbiana county, Ohio. One stack, 76 x 17, built in 1866 and rebuilt in 1894; four Cowper-Kennedy stoves, each 75 x 20; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer, foundry, and forge pig iron; annual capacity, 90,000 gross tons. Brands, "Seneca," "Allegheny," and "Grafton." John McKeefrey,

President; W. D. McKeefrey, Vice-President and General Manager; N. J. McKeefrey, Secretary and Treasurer; S. R. Fellows, Superintendent. Selling agents, McKeefrey & Co., Leetonia and Pittsburgh. (One stack, 54 x 15, built in 1872, abandoned in 1894.)—*Active in 1901.*

Tod Furnace, The Youngstown Steel Company, Youngstown, Mahoning county. One stack, 79 x 16½, built in 1889 and rebuilt in 1896; four Massicks & Croke stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer, basic, and foundry pig iron; annual capacity, 90,000 gross tons. Tod Ford, President; Paul Jones, Vice-President; John Stambaugh, Jr., Secretary and Treasurer; E. L. Ford, General Superintendent. (Formerly known as Tod Furnace No. 2 of the Brier Hill Iron and Coal Company.)—*Active in 1901.*

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

ROLLING MILLS AND STEEL WORKS—13 COMPLETED, 1 BUILDING, AND 1 PROJECTED.

Andrews Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Youngstown, Mahoning county, Ohio.—*For description of works see page 71.*

Brown Bonnell Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Youngstown, Mahoning county, Ohio.—*For description of works see page 72.*

Falcon Works, American Tin Plate Company, Battery Park Building, New York City. Works at Niles, Trumbull county, Ohio.—*For description of works see page 41.*

Falcon Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Niles, Trumbull county, Ohio.—*For description of works see pages 54-5.*

Girard Mill, American Steel Hoop Company, Carnegie Building, Pittsburgh. Works at Girard, Trumbull county, Ohio.—*For description of works see page 50.*

Lower Union Mill, American Steel Hoop Company, Carnegie Building, Pittsburgh. Works at Youngstown, Mahoning county, Ohio.—*For description of works see page 50.*

Mahoning Valley Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Youngstown, Mahoning county, Ohio.—*For description of works see pages 73-4.*

Niles (The) Iron and Sheet Company, Niles, Trumbull county. Built in 1901 and first put in operation in May, 1901; 4 sheet and 4 pair furnaces, 2 double annealing furnaces, 1 bar mill, 4 hot sheet mills, and 2 cold mills; product, black sheet steel; annual capacity, 12,000 gross tons. Fuel, coal. James S. Paterson, President and Mana-

ger; H. M. Robinson, Vice-President; W. A. Thomas, Secretary and Treasurer.

Ohio Works, National Steel Company, Carnegie Building, Pittsburgh. Works at Youngstown, Mahoning county, Ohio.—*For description of works see page 22.*

Struthers Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Struthers, Mahoning county, Ohio.—*For description of works see page 57.*

Upper Union Mill, American Steel Hoop Company, Carnegie Building, Pittsburgh. Works at Youngstown, Mahoning county, Ohio.—*For description of works see page 51.*

Warren Mill, American Steel Hoop Company, Carnegie Building, Pittsburgh. Works at Warren, Trumbull county, Ohio.—*For description of works see pages 51-2.*

Youngstown (The) Iron and Steel Roofing Company, Youngstown, Mahoning county. Built in 1901 and first put in operation September 4, 1901; 2 double puddling furnaces, 2 scrap furnaces, 4 heating furnaces, 2 annealing furnaces, one 3-high 24-inch bar mill, and 8 sheet mills (six 26-inch hot and two 24-inch cold); product, sheet iron and sheet steel; annual capacity, 20,000 gross tons. Fuel, coal. Contemplates erecting an open-hearth steel plant. A galvanizing plant containing 2 pots is connected with the works. L. E. Cochran, President; G. M. McKelvey, Vice-President; C. A. Cochran, Secretary; Mason Evans, Treasurer; John O. Pew, Manager.

Youngstown (The) Iron Sheet and Tube Company, Youngstown, Mahoning county. Building works to contain 14 double puddling furnaces, 10 heating furnaces, 6 hot mills, and 2 cold mills; product, to be black and galvanized iron sheets and tubes; estimated annual capacity, 17,000 gross tons of sheets. Fuel, coal and manufactured gas. Plants for the production of tubes and galvanized sheets will be connected with the works; annual capacity of tubes, 50,000 gross tons. George D. Wick, President and Treasurer; J. A. Campbell, Vice-President and General Manager; W. H. Foster, Secretary; W. C. Reilly, Auditor.

PROJECTED STEEL PLANTS—1.

Youngstown (The) Engineering Company, Youngstown, Mahoning county. May erect a plant for the manufacture of Tropenas or open-hearth steel castings. Building an iron foundry and a machine shop. John Runnette, President; B. F. Boyd, Vice-President; Harry A. Boyd, Secretary and Treasurer; James Farrington, Manager.

Number of rolling mills and steel works in the Mahoning Valley: 13 completed, 1 building, and 1 projected. Of these 2 make Bessemer steel and 1 open-hearth steel plant is projected. The projected plant may contain a Tropenas converter or an open-hearth steel furnace.

LAKE COUNTIES.

Embraces Blast Furnaces, Rolling Mills, and Steel Works in Cuyahoga, Lorain, and Lucas Counties.

COKE FURNACES—8.

Central Furnaces, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Furnaces at Cleveland, Cuyahoga county, Ohio. Three stacks; fuel, coke.—*For description of furnaces see page 30.*

Emma Furnace, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Furnace at Cleveland, Cuyahoga county, Ohio. One stack; fuel, coke.—*For description of furnace see page 31.*

Lorain Furnaces, The Lorain Steel Company, Lorain, Lorain county. Two stacks; fuel, coke.—*For description of furnaces see page 17.*

Newburgh Furnace, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Furnace at Cleveland, Cuyahoga county. One stack; fuel, coke.—*For description of furnace see page 31.*

River Furnace, River Furnace and Dock Company, lessee, Perry-Payne Building, Cleveland, Cuyahoga county. One stack, 65 x 16½, built in 1879 and remodeled in 1889 and 1895; three Foote stoves; fuel, Connelville coke; ore, Lake Superior; product, Bessemer and foundry pig iron; annual capacity, 72,000 gross tons. Brands, "River," "Douglas," and "Lincoln." James Corrigan, President; Stevenson Burke, Vice-President; Price McKinney, Secretary and Treasurer; James E. Moyer, Superintendent. Selling agents, Corrigan, McKinney & Co., Cleveland; Rogers, Brown & Co., Cincinnati. (Owned by the Cleveland Iron Company.)—*Active in 1901.*

Number of coke furnaces in the Lake Counties: 8 stacks.

ROLLING MILLS AND STEEL WORKS—16.

American Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Cleveland, Cuyahoga county, Ohio.—*For description of works see page 32.*

Cleveland (The) Hardware Company, Lake st., between Belden and Kirtland sts., Cleveland, Cuyahoga county. Built in 1879; destroyed by fire in June, 1891, and entirely rebuilt; 2 heating furnaces with 2 Duff gas producers and one 10-inch train of rolls; product, shapes for wagon, carriage, and sleigh hardware rolled from soft steel; annual capacity, 16,000 gross tons. Fuel, bituminous coal and manufactured gas. Lee McBride, President; Charles E. Adams, Vice-President and General Manager; Thomas P. Robbins, Secretary and Treasurer.

Cleveland (The) Steel Casting Company, Burlington and Hubbard sts., Cleveland, Cuyahoga county. Works on Hubbard st. and the Cleveland and Pittsburgh Railroad. Built in 1893; first steel made Janu-

- ary 9, 1895; one 15-gross-ton acid open-hearth steel furnace; product, steel castings; annual capacity, 9,500 gross tons. Fuel, producer gas. W. W. Balkwill, President; N. P. Bowler, Vice-President and Treasurer; G. J. Chandler, Secretary and Assistant Treasurer.
- Cleveland (The) Steel Company, Cleveland, Cuyahoga county. Built in 1853 and rebuilt in 1873 and 1891; remodeled in 1894; 4 heating furnaces, 2 box annealing furnaces, and 2 trains of rolls containing 2 plate and 2 sheet mills; product, light steel plates and sheets; annual capacity, 30,000 gross tons. Fuel, producer gas and coal. L. M. Bowers, President; E. W. Oglebay, Vice-President; J. L. Severance, Secretary; H. E. Higgins, Treasurer and Manager. (Two 15-gross-ton open-hearth steel furnaces, one basic and one acid, dismantled. Formerly operated by the Britton Iron and Steel Company.)
- Cleveland Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Cleveland, Cuyahoga county, Ohio.—*For description of works see pages 72-3.*
- Consolidated Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Cleveland, Cuyahoga county, Ohio.—*For description of works see pages 32-3.*
- Crescent Works, American Tin Plate Company, Battery Park Building, New York City. Works at Cleveland, Cuyahoga county, Ohio.—*For description of works see page 41.*
- Empire (The) Rolling Mill Company, Cleveland, Cuyahoga county. Built in 1900 and first put in operation December 15, 1900; 2 puddling furnaces, 6 busheling furnaces, 1 forge fire, 2 gas heating furnaces, and 2 trains of rolls (one 12-inch roughing and one 10-inch Belgian); product, iron and steel bars; annual capacity, 20,000 gross tons. Fuel, manufactured gas. C. G. Barkwill, President; W. J. Morgan, Vice-President; D. R. James, Secretary and Treasurer; J. D. Paton, Superintendent.
- H. P. Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Cleveland, Cuyahoga county, Ohio.—*For description of works see page 33.*
- Lake Erie Iron Company, 155 St. Clair st., Cleveland, Cuyahoga county. Rolling mill added to a bolt and nut factory in 1899-1900 and first rolled products turned out September 28, 1900; 8 single puddling furnaces, 2 coal heating furnaces, and 2 trains of rolls (one 18-inch muck and one 10-inch finishing); product, bar iron, all consumed by the company in its bolt and nut works; annual capacity, 31,600 gross tons of bar iron. Fuel, coal in the rolling mill and oil in the bolt and nut works. W. C. Scofield, President; Frank R. Scofield, Vice-President; C. W. Scofield, Secretary and Treasurer.
- Lorain Works, The Lorain Steel Company, Lorain, Lorain county.—*For description of works see pages 17-8.*
- Newburgh Steel Works, American Steel and Wire Company of New

Jersey, Rookery Building, Chicago. Works at Newburgh, Cuyahoga county, Ohio.—*For description of works see page 33.*

Otis (The) Steel Company, Limited, Cleveland, Cuyahoga county. Built in 1873-4 and put in operation January 1, 1875; 11 Siemens heating furnaces, 8 hammers, 10 open-hearth steel furnaces, (one 18 and two 10-gross-ton acid furnaces, with an annual capacity of 20,000 gross tons of ingots, and five 18 and two 25-gross-ton basic furnaces, with an annual capacity of 70,000 gross tons of ingots,) and 3 trains of rolls (one 30, one 31, and one 34-inch); product, steel plates, bar steel, forgings, and castings; annual capacity, 50,000 gross tons of rolled products, 15,000 tons of forged products, and 8,000 tons of castings. Fuel, coal and producer gas. Brand, "Otis." George Bartol, General Manager; H. F. Deverell, Secretary in America; J. T. Smith, A. P. Head, and J. E. Touch, Directors; B. W. Head, Secretary in England. Selling agents, Thorpe, Platt & Co., 97-103 Cedar st., New York; C. A. Thompson, 516 North Third st., St. Louis; Austin P. Brown, Kellogg Building, Washington, D. C. (Two 5-gross-ton Bessemer steel converters, built in 1884, abandoned in 1900.)

Toledo Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at East Toledo, Lucas county, Ohio.—*For description of works see page 76.*

Toledo Works, (Factory D.,) Shelby Steel Tube Company, Pittsburgh, Pa. Works at Toledo, Lucas county, Ohio.—*For description of works see page 63.*

Union (The) Rolling Mill Company, Cleveland, Cuyahoga county. Works and office at Newburgh, in the city of Cleveland. Built in 1866-7; 3 single and 3 double puddling furnaces, 8 single scrapping 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 1 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, 175 gross tons of finished iron. Fuel, coal and manufactured gas. A. S. Upson, President; A. R. Treadway, Vice-President; H. A. Fuller, General Manager, Secretary, and Treasurer. Selling agents, The Bourne-Fuller Company, Cleveland, Ohio.

Number of rolling mills and steel works in the Lake Counties: 16. Of these 2 make Bessemer steel and 3 make open-hearth steel.

HANGING ROCK DISTRICT.

Embraces Blast Furnaces, Rolling Mills, and Steel Works in Lawrence, Jackson, and Scioto Counties.

COKE AND BITUMINOUS COAL AND COKE FURNACES—11.

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. Brand, "Belfont." Selling agents, Rogers, Brown & Co., Boston, Buffalo, New York, Pittsburgh, Cincinnati, Cleveland, Chicago, St. Louis, San Francisco, and Birmingham; Rogers, Brown & Warner, Philadelphia.—*Active in 1901. See Belfont Iron Works (Rolling Mills and Steel Works) in this District.*

Etna Furnace, The Marting Iron and Steel Company, Ironton, Lawrence county. One stack, 86 x 18, first blown in September 13, 1875; three Whitwell stoves and one Foote stove in course of erection; fuel, New River and Pocahontas coke; ores, Lake Superior and Kentucky; product, Bessemer, foundry, and malleable pig iron; annual capacity, 90,000 gross tons. Brand, "Nellie." H. A. Marting, President; C. B. Fowler, Vice-President; T. J. Gilbert, Secretary and Treasurer. (Formerly called the Etna Iron Works. Etna Furnace formerly called Alice Furnace. One alternate stack, Blanche, 86 x 18, likely to remain long inactive.)—*Active in 1901.*

Fulton Furnace, Globe Iron Company, Jackson, Jackson county. One stack, 76 x 16½, (jacket built to receive an 18½ foot bosh,) built in 1900-1 and first blown in February 12, 1901; three Foote stoves, each 18 x 75; fuel, ½ raw coal and ½ coke; ore, native; product, ferro-silicon and foundry pig iron; annual capacity, 42,000 gross tons of ferro-silicon or 90,000 tons of foundry iron. Brand, "Globe." Eben Jones, President; John E. Jones, Secretary and Treasurer; E. Crandall, General Superintendent. Selling agents, Matthew Addy & Co., Cincinnati, Ohio; F. A. Goodrich & Co., Detroit, Michigan; W. R. Thomas, New York; C. L. Peirson & Co., Boston, Massachusetts. (Fulton Furnace, 50 x 13½, built in 1868 and rebuilt in 1886-7, dismantled in 1900.)—*Active in 1901.*

Hamilton Furnace, The Hanging Rock Iron Company, Hanging Rock, Lawrence county. One stack, 65 x 16, built in 1883 and first blown in in March, 1886; one Foote and three Whitwell stoves; fuel, Pocahontas coke; ores, native block and limestone and Lake Superior; product, foundry and malleable pig iron; annual capacity, 35,000 gross tons. Brand, "Hamilton." D. B. Meacham, President; William Christie Herron, Vice-President; James Bull, Secretary; Edwin M. Birney, Treasurer. Selling agents, Rogers, Brown & Co., Boston, Buffalo, New York, Pittsburgh, Cincinnati, Cleveland, Chicago, St. Louis, San Francisco, and Birmingham; Rogers, Brown & Warner, Philadelphia.—*Active in 1901.*

Lawrence Furnace, The Lawrence Furnace Company, Culbertson, Lawrence county. Main office, Ironton. One stack, 65 x 13, built in 1889-90 using machinery removed from Waldorf Furnace, West Va.; blown in in March, 1891; two Gordon-Whitwell-Cowper stoves; fuel, raw coal and West Virginia coke; ores, native and from Bath county,

Ky.; product, high-silicon and strong Scotch foundry pig iron; annual capacity, 15,000 gross tons. Brands, "Lawrence" and "Pen-cost," the latter for 8 per cent. silicon. John Peters, Jr., President, Manager, and Selling Agent; A. B. Cole, Vice-President; George Peters, Secretary.—*Active in 1901.*

Sarah Furnace, Kelly Nail and Iron Company, 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." Sales made by the company.—*Active in 1901. See Kelly Nail Works (Rolling Mills and Steel Works) in this District.*

Star Furnace, Star Furnace Company, Jackson, Jackson county. One stack, 55½ x 14, built in 1866 and rebuilt in 1879 and 1897; three C. H. Foote stoves; fuel, about ½ native raw coal and ½ West Virginia coke; ores, native limonite and block; product, ferro-silicon, silvery softener, and Nos. 1 and 2 soft foundry pig iron; annual capacity, 16,000 gross tons. Brand, "Star." B. Kahn, President; C. O. Brown, Secretary; L. V. Brown, Manager. Selling agents, Rogers, Brown & Co., Boston, Buffalo, New York, Pittsburgh, Cincinnati, Cleveland, Chicago, St. Louis, San Francisco, and Birmingham; Rogers, Brown & Warner, Philadelphia.—*Active in 1901.*

Union Furnace, Union Iron and Steel Company, 71 Broadway, New York City. Furnace at Ironton, Lawrence county, Ohio. One stack, 75 x 16, built in 1873-4 and rebuilt in 1900; fuel, West Virginia coke; ore, Lake Superior; product, Bessemer and foundry pig iron; annual capacity, 40,000 gross tons. Brand, "Union." Thomas S. Holmes, President, E. L. Harper, Vice-President, General Manager, and Selling Agent, William F. Carey, Treasurer, and E. L. Harper, Jr., Secretary, 71 Broadway, New York City; Charles Peters, Superintendent of Furnace, Ironton, Ohio. (Formerly called Ironton Furnace.)—*Active in 1901.*

Wellston (The) Iron and Steel Company, Wellston, Jackson county. Three stacks: Wellston Furnaces, two stacks, each 52½ x 13: No. 1 built in 1874-5 and remodeled in 1879 and 1889; No. 2 built in 1874-5 and remodeled in 1889; four Thomas stoves. Milton Furnace, one stack, 62 x 13½, built in 1873-4 and first blown in June 6, 1874; rebuilt and remodeled in 1896; three Whitwell stoves. Fuel, Kanawha and Pocahontas coke; ores, local and Lake Superior; product, car-wheel, strong foundry, red-short mill, and malleable pig iron; total annual capacity, 80,000 gross tons. J. C. Clutts, President and General Manager; O. B. Gould, Vice-President; H. S. Willard, Secretary and Treasurer. Sole sales agents, Rogers, Brown & Co., Boston, Buffalo, New York, Pittsburgh, Cincinnati, Cleveland, Chicago, St. Louis, San Francisco, and Birmingham; Rogers, Brown & Warner,

Philadelphia.—*Active in 1901. See Madison (charcoal) Furnace in this District.*

Number of coke and bituminous coal and coke furnaces in the Hanging Rock District of Ohio: 11 stacks.

CHARCOAL FURNACES—8.

Bloom Furnace, The Clare Iron Company, Bloom Switch, Scioto county. 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." E. H. Clare, President and Selling Agent, J. R. Clare, Vice-President, E. S. Clare, Treasurer, and Thomas McConnell, Secretary and Superintendent, Portsmouth, Ohio.—*Active in 1901.*

Centre Furnace, Lindsey Kelly, Ironton, Lawrence county. One stack, 40 x 10½, built in 1837; warm blast; open top; ore, native limestone; product, car-wheel and extra strong machinery iron; annual capacity, 4,500 gross tons. Selling agents, Matthew Addy & Co., Cincinnati, St. Louis, Chicago, Pittsburgh, New York, and Philadelphia. Lindsey Kelly, Manager. (Owned by Mrs. Lindsey Kelly.)—*Active in 1901.*

Hecla Furnace, Hecla Iron and Mining Company, Hecla P. O., near Ironton, Lawrence county. One iron stack, 53 x 12, 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; limestone calcined with charcoal braise in oven before using; product, iron for car wheels, chilled rolls, and machinery; annual capacity, 7,500 gross tons. Brand, "Hecla." Stops on Sunday. H. S. Neal, President; Charles Campbell, General Manager, Secretary, and Treasurer; L. E. Howell, Furnace Manager.—*Active in 1900.*

Jefferson Furnace, Jefferson Iron Company, Oak Hill, Jackson county. One stack, 40 x 11½, built in 1854; idle for several years; revived in 1901; warm blast; ores, native limestone and block; product, foundry pig iron; annual capacity, 5,000 gross tons. Brand, "Anchor." J. C. Jones, President; Joseph J. Jones, Secretary; Eben J. Jones, Manager. Selling agents, Rogers, Brown & Co., Cincinnati; J. H. Hillman & Son, Pittsburgh.—*Active in 1901.*

Madison Furnace, The Wellston Iron and Steel Company, lessee, Wellston. Furnace at Rempel, Jackson county. One stack, 40 x 11, built in 1854; hot blast; closed top; ores, native and Lake Superior; product, car-wheel, cylinder, and foundry pig iron; annual capacity, 4,000 gross tons. Brand, "Madison." (Owned by Clare, Duda & Co., Portsmouth, Ohio.)—*Active in 1901. See Wellston Iron and Steel Company (Coke and Bituminous Coal and Coke Furnaces) in this District.*

Olive and Buckhorn Furnaces, The McGugin Iron and Coal Company, Olive Furnace, Lawrence county. Telegraph address, Moulton, care of C., H., & D. Ry. Furnaces situated on the Cincinnati, Hamilton, and Dayton Railway. 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 cold blast; ore, native limestone; product, foundry, car-wheel, and machinery pig iron; total annual capacity, 8,000 gross tons. Brands, "Olive" and "Buckhorn." W. N. McGugin, President; W. H. McGugin, Secretary and Treasurer. Sales made by the company.—*Olive active in 1901; Buckhorn idle for several years, but may be blown in in the near future.*

Vesuvius Furnace, The Vesuvius Charcoal Iron Company, lessee, Gray, 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." David Halley, President; John O. Yates, Vice-President; W. P. Lewis, Secretary; George N. Gray, Treasurer and Selling Agent, Ironton. (Owned by the Ironton Coal and Iron Company.)—*Active in 1901.*

Number of charcoal furnaces in the Hanging Rock District of Ohio: 8 stacks. Total number of furnaces in this District: 19 stacks.

ROLLING MILLS AND STEEL WORKS—4.

Belfont Iron Works, Belfont Iron Works Company, Ironton, Lawrence county. Built in 1852; 4 gas heating furnaces, 1 train of rolls, 126 cut-nail machines, 40 wire-drawing blocks, and 50 wire-nail machines; product, wire, wire nails, and cut nails; annual capacity, 300,000 kegs of cut nails and 500,000 kegs of wire nails. Fuel, bituminous coal. Brand, "Belfont." A galvanizing plant is connected with the works. John G. Peebles, President; B. H. Burr, Vice-President and General Manager; S. G. Gilfillan, Secretary and Treasurer.—*See Belfont Furnace in this District.*

Burgess Steel and Iron Works, Crucible Steel Company of America, Empire Building, Pittsburgh. Works at Portsmouth, Scioto county, Ohio.—*For description of works see page 111.*

Eagle Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Ironton, Lawrence county, Ohio.—*For description of works see page 73.*

Kelly Nail Works, Kelly Nail and Iron Company, Ironton, Lawrence county. Built in 1883 and first put in operation November 1, 1883; 2 gas heating furnaces, 2 forge fires, one 2-high 22-inch plate train of rolls, 42 wire-drawing blocks, 61 wire-nail machines, and 120 cut-nail machines; product, steel cut nails and spikes, wire nails, staples, and plain and galvanized wire; annual capacity, 250,000 kegs of cut nails, 30,000 gross tons of wire, and 700,000 kegs of wire nails. Fuel,

coal. Brand, "The Ironton Nail." A galvanizing plant is connected with the works. Oscar Richey, President and General Manager; Ironton A. Kelly, Vice-President; T. J. Hayes, Secretary and Treasurer.—*See Sarah Furnace in this District.*

Number of rolling mills and steel works in the Hanging Rock District of Ohio: 4. Of these 1 makes open-hearth steel.

INTERIOR COUNTIES.

Embraces Blast Furnaces, Rolling Mills, and Steel Works located in Franklin, Perry, Tuscarawas, Muskingum, Butler, Guernsey, Stark, Knox, Summit, Hancock, Allen, Marion, Richland, Licking, and Miami Counties.

COKE AND BITUMINOUS COAL AND COKE FURNACES—9.

Columbus (The) Iron and Steel Company, Columbus, Franklin county.

Two stacks, each 75 x 17; one built in 1900 and blown in in October, 1900, and the other built in 1900-1 and blown in in February, 1901; six Foote stoves; fuel, West Virginia and Connellsville coke; ore, Lake Superior; product, Bessemer, malleable, and foundry pig iron; total annual capacity, 120,000 gross tons. Brand, "Buck-eye." One McMyler slag and cinder removing machine for the production of granulated slag. H. A. Marting, President and Treasurer; J. G. Battelle, First Vice-President; F. H. Miller, Second Vice-President and General Manager; W. W. Marting, Secretary; George Dean, Superintendent. Sales made by the company.—*Active in 1901.*

Columbus Works, National Steel Company, Carnegie Building, Pittsburgh. Furnaces at Columbus, Franklin county, Ohio. Two stacks; fuel, coke.—*For description of furnaces see page 20.*

Dover Furnace, The Penn Iron and Coal Company, Canal Dover, Tuscarawas county. Cleveland office, Perry-Payne Building. One stack, 75 x 17, built in 1854 and blown in in 1855; rebuilt in 1878-9 and remodeled and enlarged in 1895; three Cowper-Roberts fire-brick stoves, each 70 x 18, and one Foote stove, 75 x 19; fuel, coke; ores, blackband and Lake Superior; specialties, "Tuscarawas" blackband, "Dover" all-lake ore strong foundry, and Bessemer and basic open-hearth pig iron; annual capacity, 100,000 gross tons. Brands, "Tuscarawas" and "Dover" for foundry pig iron. S. W. Croxton, President and Selling Agent, Cleveland; H. S. Ream, Secretary, and D. T. Croxton, Superintendent, Canal Dover.—*Active in 1901.*

Fieser, Wagoner & Bentley, Columbus, Franklin county, Ohio. Three furnaces, all leased: Bessie Furnace, at New Straitsville, Perry county; one stack, 60 x 14, built in 1877-8 and blown in in 1878; four Whitwell stoves; fuel, West Virginia coke and Hocking Valley coal; ore, Lake Superior low-phosphorus; product, ferro-silicon; annual capacity, 18,000 gross tons; brands, "Bessie" and "Pencost;" (owned by the Columbus and Hocking Coal and Iron Company, The Wyan-

dotte, Columbus.) New York Furnaces, at Shawnee, Perry county; two stacks: one, 50 x 14, built in 1877 and blown in November 10, 1877, has two cast-iron stoves; the other, 65 x 16, built in 1887 and blown in December 15, 1887, has two Gordon-Whitwell-Cowper stoves; fuel, raw coal and coke; ores, native from the furnace property and Lake Superior; product, silvery and "American Scotch" pig iron; total annual capacity, 54,000 gross tons; brand, "Hocking;" (owned by the Ohio Mining and Manufacturing Company, 156 Fifth avenue, New York City.) Total annual capacity of the three furnaces, 72,000 gross tons. Linn Bentley, Superintendent. Selling agents, Fieser, Wagoner & Bentley, Columbus and Chicago.—*Active in 1901.*

Zanesville Works, National Steel Company, Carnegie Building, Pittsburgh. Furnace at Zanesville, Muskingum county, Ohio. One stack; fuel, coke.—*For description of furnace see page 21.*

Number of coke and bituminous coal and coke furnaces in Ohio outside of the Mahoning Valley, Lake Counties, Ohio River Counties, and Hanging Rock District: 9 stacks.

ROLLING MILLS AND STEEL WORKS—31 COMPLETED, 4 BUILDING, AND 1 TO BE REBUILT.

Alliance Works, American Steel Casting Company, Thurlow Station, Chester, Pa. Works at Alliance, Stark county, Ohio.—*For description of works see page 97.*

American (The) Rolling Mill Company, Middletown, Butler county. Branch office, Cincinnati, Ohio. Built in 1900-1 and first put in operation February 7, 1901; 8 gas-fired heating furnaces, (4 sheet and 4 pair,) two 21-inch bar mills, (one 2-high and one 3-high,) 4 finishing mills, (26 x 38 and 26 x 44-inch,) and 2 cold mills; one 30-gross-ton basic open-hearth steel furnace with an annual capacity of 18,000 gross tons; first steel made February 7, 1901; product, steel ingots, billets, sheet bars, black and galvanized sheets, corrugated iron, and sheet steel building materials of all kinds; annual capacity, single turn, 13,800 gross tons of bars and 11,000 tons of sheets. Fuel, bituminous coal and producer gas. A galvanizing plant is connected with the works. George M. Verity, President, Treasurer, and General Manager; W. T. Simpson, Vice-President; R. C. Phillips, Secretary; James B. Strawbridge, General Superintendent.

Buckeye (The) Malleable Iron and Coupler Company, Columbus, Franklin county. Chicago office, Rookery Building. Building works to contain 3 open-hearth steel furnaces (one 10 and one 15-gross-ton acid and one 20-gross-ton basic); product, car couplers and general castings; annual capacity, 15,000 gross tons of acid and 12,000 tons of basic castings. Fuel, coal. Works will be completed in the spring

of 1902. W. F. Goodspeed, President and Treasurer; F. Rockefeller, Vice-President; Joseph Stafford, Secretary; S. P. Bush, Manager; J. L. Rodgers, General Selling Agent.

Cambridge Rolling Mill Company, Cambridge, Guernsey county. Built in 1901 and first put in operation in that year; 2 Lauth heating furnaces and 7 trains of 14-inch rolls; product, angles, tees, zees, rounds, flats, ovals, U bars, zee bars, plow beams, etc.; annual capacity, 30,000 gross tons. Fuel, bituminous coal and gas. Louis R. Davidson, President; T. W. Scott, Vice-President; H. P. Woodworth, Secretary; C. S. Sheppard, Treasurer; Alex Robins, Manager.

Cambridge Works, American Tin Plate Company, Battery Park Building, New York City. Works at Cambridge, Guernsey county, Ohio.—*For description of works see page 40.*

Cambridge Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Cambridge, Guernsey county, Ohio.—*For description of works see pages 53-4.*

Canton Crucible Steel Works, Canton, Stark county. Built in 1895; twelve 2-pot crucible steel-melting holes; first steel made April 15, 1895; one 1,500-lb. hammer; product, high-grade tool steel of all kinds, wire-drawing plates, and steel castings; annual capacity, 450 gross tons. Fuel, coke. A new company is being formed to operate these works. The Superintendent will be John Holroyd and the selling agents the C. R. Talbott Company, 9-10 Wiggins Block, Cincinnati; Paul E. Noe, Chicago; J. K. Dimmick & Co., 1051-53 Drexel Building, Philadelphia; The McIntosh Huntington Company, Cleveland. (Formerly operated by The Eagle Crucible Steel Company; later by The Canton Crucible Steel Company. Owned by James B. Baird, Edward Langenbach, and A. B. Titsworth.)

Canton (The) Saw Company, Canton, Stark county. One crucible steel-melting furnace with 2 pots added to a saw plant in 1900; first steel produced in the fall of 1900; product, small machine castings; annual capacity, 50 gross tons. Fuel, coal and coke. John Class, President; W. F. Voges, Secretary; H. F. Renz, Superintendent.

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 10-inch, one 12-inch, and one 20-inch train of rolls, and one 15 and two 10-gross-ton acid open-hearth steel furnaces; first open-hearth steel made August 17, 1875; product, tool steel, cast steel, and spring steel; annual capacity, 20,000 gross tons of ingots and 18,000 tons of rolled products. Fuel, bituminous coal. Brawd, "Canton." A. French, President; J. S. Young, Vice-President; R. H. Bulley, General Manager; D. C. Noble, Secretary and Treasurer.

Canton Works, The American Sheet Steel Company, New York City. Works at Canton, Stark county, Ohio.—*For description see page 54.*

- Carnahan Tin Plate and Sheet Company, Canton, Stark county. Built in 1900-1 and first put in operation in the winter of 1901-2; 6 heating and 5 annealing furnaces, 2 forge fires, one 26-inch bar mill, and 12 sheet mills (two 26 x 32 and four 26 x 30-inch hot and six 22 x 34-inch cold, arranged tandem); product, black plates for tinning, stamping sheets, etc., etc.; annual capacity, 16,000 gross tons. Fuel, bituminous coal and producer gas. Two 30-gross-ton open-hearth steel furnaces (1 basic and 1 acid) will be added. J. E. Carnahan, President; Edward Lannenbach, Vice-President and General Manager; W. M. Blecker, Secretary and Treasurer.—*See Tinplate Works in Ohio.*
- Columbus Iron Works, Standard Chain Company, First National Bank Building, Pittsburgh. Works at Columbus, Franklin county, Ohio.—*For description of works see page 115.*
- Columbus (The) Malleable Iron Company, Columbus, Franklin county. One 10-gross-ton acid open-hearth steel furnace built in 1900; 2 annealing furnaces; product, malleable iron castings, but can make steel castings; daily capacity, 10 gross tons of malleable castings. Fuel, producer gas. D. Birney Neil, President; Charles A. Klie, Vice-President; H. T. Irvin, General Manager; Otto C. Klie, Secretary and Treasurer.—*Destroyed by fire in the fall of 1901; to be rebuilt.*
- Columbus Works, National Steel Company, Carnegie Building, Pittsburgh. Works at Columbus, Franklin county, Ohio.—*For description of works see page 22.*
- Corns Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Massillon, Stark county, Ohio.—*For description of works see page 73.*
- Coxey, (Jacob S.,) Mount Vernon, Knox county. Built in 1900-1; 3 open-hearth steel furnaces (one 15 and one 25-gross-ton acid and one 25-gross-ton basic); two 4-pot crucible steel-melting furnaces; also 2 cupolas for gray iron castings, one 60 and one 80-inch; product, acid and basic open-hearth, crucible, semi-steel, brass, bronze, and gray iron castings; first castings made October 19, 1901; annual capacity, 45,000 gross tons of open-hearth and crucible steel castings and 30,000 tons of gray iron, semi-steel, brass, and bronze castings. Fuel, coal, coke, and natural gas.
- Curtis (The) Sheet Steel and Corrugating Company, Zanesville, Muskingum county. Built in 1900-1 and first put in operation in October, 1901; 4 sheet, 4 pair, 2 heating, and 2 annealing furnaces, 1 bar mill, and 5 sheet mills (4 hot and 1 cold); product, black and galvanized sheets and corrugated and various styles of metal roofing sheets; annual capacity, 12,000 gross tons. Fuel, coal. A galvanizing plant is connected with the works. M. L. Kirkland, President; L. T. Jack, Vice-President; C. H. Curtis, Secretary; E. J. Strong, Treasurer; Harry Ashton, Manager.
- Cuyahoga (The) Steel and Wire Company, Cuyahoga Falls, Summit

county. Consolidation of The Cuyahoga Iron and Steel Company, The E. A. Henry Wire Company, and The Summit Wire Company. Built in 1901 and first put in operation June 1, 1901; 1 Lauth continuous heating furnace, 3 trains of rolls, 42 wire-drawing blocks, and 30 wire-nail machines; product, wire rods, wire nails, fence wire, coppered and bright market wire, etc.; annual capacity, 15,000 gross tons of wire rods, 12,000 tons of wire, and 60,000 kegs of wire nails. Fuel, bituminous coal. Frank A. Umsted, President and General Manager; Willis Elton, Vice-President; William L. Kiefer, Secretary-Treasurer; Harry B. Hamlen, Assistant Secretary-Treasurer.

Dennison Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Dennison, Tuscarawas county, Ohio.—*For description of works see page 54.*

Dithridge Steel Car Works, Dithridge Steel Car Company, 76 Montgomery street, Jersey City, New Jersey. Building works at White City, near Newcomerstown, Tuscarawas county, Ohio, to contain 20 heating furnaces, 5 annealing furnaces, 10 forge fires, 3 trains of rolls, and 10 hammers; product, plates, car axles, etc.; annual capacity, 100,000 gross tons of rolled and forged products. Brand, "Dithridge." Trade-mark, interlocked triangles. Fuel, gas made from bituminous coal and oil. A basic open-hearth steel-casting plant will be erected; daily capacity, 50 tons. Also works for the manufacture of steel freight cars; daily capacity, 40 cars. Also an iron foundry for the manufacture of car wheels; daily capacity, 320 wheels. George W. Dithridge, President; Edward Lewis Dithridge, Vice-President; R. L. Wolterbeek, Secretary and Treasurer.

Dresden Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Dresden, Muskingum county, Ohio.—*For description of works see page 54.*

Falls Hollow Staybolt Company, Cuyahoga Falls, Summit county. Copartnership, consisting of C. M. Walsh and J. W. Walsh. Built in 1865; rebuilt in 1884; 2 heating furnaces and one 10-inch train of rolls; product, hollow and solid staybolts made from the best quality of refined charcoal iron or steel; annual capacity, 800 gross tons. Fuel, crude oil. Brands, "Falls Hollow Staybolt Iron," "Falls Hollow Staybolt Steel," and "Falls Solid Staybolt Iron." C. M. Walsh, General Manager. Selling agents, John W. Walsh and C. M. Walsh, Cuyahoga Falls; George W. Gibbs, San Francisco, California; J. Blair Farrar, Richmond, Virginia; J. Napier Dyer, 1425 Monadnock Block, Chicago; T. J. Noonan, Minneapolis, Minnesota.

Heckert-Baltzley Billet Company, Toledo. Works at Findlay, Hancock county. Built in 1888 and enlarged in 1891; remodeled in 1895; 2 basic open-hearth steel furnaces (one 8 and one 12-gross-ton) 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, seamless steel tubing, seamless tube specialties, and steel castings; annual capacity, 12,000 gross tons. Fuel, natural gas, coal, and oil. (Formerly operated by Coe, Powers & Co.)

Lima (The) Steel Casting Company, Lima, Allen county. Sales office, 490 Prospect st., Cleveland. Address all correspondence to Lima, Ohio. Built in 1892 and first put in operation in October, 1892; 2 acid open-hearth steel furnaces (one 5 and one 10-gross-ton); product, steel castings; annual capacity, 9,000 gross tons. Fuel, bituminous coal. L. G. Neely, President; G. W. Van Dyke, Vice-President; D. E. Harlan, Secretary and Treasurer. (Formerly operated by The Lima Locomotive and Machine Company.)

Marion (The) Steam Shovel Company, Marion, Marion county. Steel department built in 1900-1 and first steel made in February, 1901; one 3,000-lb. Robert-Bessemer converter; product, steel castings, all consumed by the company in the manufacture of steam shovels, dredgers, ditchers, ballast unloaders, etc.; annual capacity, 2,400 gross tons. Fuel, coke. Edward Huber, President; George W. King, Vice-President and General Manager; A. E. Cheney, Secretary and Sales Manager; Frank A. Huber, Treasurer; George W. Barnhart, Pacific Coast Manager, San Francisco, California.

Newark Iron and Steel Company, Newark, Licking county. Built in 1897 and enlarged in 1901; 2 heating furnaces, 1 forge fire, and one 18-inch train of rolls; one 10-gross-ton acid open-hearth steel furnace, built in 1901; first steel made August 1, 1901; product, open-hearth steel castings, forging steel, high-pressure and hydraulic fittings, and oil-well supply specialties; annual capacity, 3,000 gross tons of steel castings and 3,000 tons of rolled products. Fuel, coal and natural gas. Wm. E. Miller, President; S. B. Bishop, Vice-President; J. R. Goldsborough, Secretary and Treasurer; Samuel Morris, Superintendent.

New Philadelphia Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at New Philadelphia, Tuscarawas county, Ohio.—*For description of works see page 56.*

Ohio (The) Rolling Mill Company, Findlay, Hancock county. Built in 1900 and first put in operation June 10, 1900; 3 double puddling furnaces, 4 sand bottom furnaces, 2 heating furnaces, 2 trains of rolls, (one 20-inch muck and one 10-inch guide,) and one 2,000-lb. hammer; product, bar iron; annual capacity, 10,000 gross tons. Fuel, bituminous coal. William Brenner, President; Julius Leon, Secretary; S. Brenner, Treasurer; H. W. Briggs, Superintendent.

Ohio (The) Steel and Iron Specialty Company, Cuyahoga Falls, Summit county. Building works to contain 2 heating furnaces and one 10-inch train of rolls; product, channels, angles, tees, light railroad irons, flats, small structural shapes, and hollow and solid staybolts; annual capacity, 15,000 gross tons. Fuel, coal. E. A. Henry, President; G. W. Reid, Vice-President; L. H. Whitcomb, Secretary; H. B. Hamlen, Treasurer.

Piqua Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Piqua, Miami county, Ohio.—*For description of works see page 56.*

Reeves Works, American Tin Plate Company, Battery Park Building, New York City. Works at Canal Dover, Tuscarawas county, Ohio.—*For description of works see page 43.*

Reeves Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Canal Dover, Tuscarawas county, Ohio.—*For description of works see page 56.*

Shelby Works, (Factory A.,) Shelby Steel Tube Company, Pittsburgh, Pa. Works at Shelby, Richland county, Ohio.—*For description of works see page 63.*

Stark Rolling Mill, Stark Rolling Mill Company, Canton, Stark county. Built in 1900-1 and first put in operation October 1, 1901; 1 heating, 4 pair, 4 sheet, and 5 annealing furnaces, 6 hot mills, and 2 stands of cold mills; product, black sheets, galvanized sheets, pickled and cold rolled sheets, etc.; annual capacity, 10,000 gross tons of rolled products. Two 35-gross-ton basic open-hearth steel furnaces may be erected in 1902. Fuel, coal and manufactured gas. J. E. Carnahan, President; Joseph Biechle, Vice-President and Treasurer; Ed. Langenbach, Secretary; William McKibben, Superintendent.

Tuscora Steel Company, Newcomerstown, Tuscarawas county. Building works to contain 4 sheet furnaces, 4 pair furnaces, 4 annealing furnaces, and 7 sheet mills (two 38, one 40, and one 52-inch hot, and 3 cold); product, steel and iron sheets, black plates for tinning, and polished and galvanized sheets; annual capacity, 13,000 gross tons. Brand, "Tuscora." Fuel, coal and manufactured gas. A galvanizing department will be connected with the works. Thomas Hackett, President; Lakin C. Taylor, Secretary; R. L. Shoemaker, Treasurer.

Zanesville Iron Works, The Zanesville Iron Company, Zanesville, Muskingum county. Works originally built in 1848; now comprise 1 double and 19 single puddling furnaces, 1 scrap furnace, 3 coal and 3 gas heating furnaces, 1 reheating furnace, 1 hammer, and 4 trains of rolls (one 8, one 9, one 10, and one 16-inch); product, iron and steel bars, bands, and shapes; annual capacity, 45,000 gross tons. Fuel, coal and natural and manufactured gas. S. R. Wells, President and Treasurer; A. S. Farber, Vice-President; J. A. Wells, Secretary. (One 10-gross-ton acid open-hearth steel furnace abandoned. Formerly operated by the Ohio Iron Company.)

Number of rolling mills and steel works in the Interior Counties: 31 completed, 4 building, and 1 to be rebuilt. Of these 1 makes Bessemer steel, 1 makes Robert-Bessemer steel, 7 make open-hearth steel, 1 open-hearth steel plant is being built, 1 open-hearth steel plant is to be rebuilt, and 3 open-hearth steel plants are projected, and 3 make crucible steel.

OHIO RIVER COUNTIES.

Embraces Blast Furnaces, Rolling Mills, and Steel Works in Belmont, Jefferson, and Meigs Counties; also in a part of Columbiana County.

COKE FURNACES—8.

Bellaire Works, National Steel Company, Carnegie Building, Pittsburgh.

Furnaces at Bellaire, Belmont county, Ohio. Two stacks; fuel, coke.

—*For description of furnaces see pages 19-20.*

La Belle Furnace, La Belle Iron Works, Steubenville, Jefferson county.

One stack, 78 x 18½, built in 1865 and rebuilt in 1889; four Gordon-Whitwell-Cowper stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 80,000 gross tons. Furnace now being rebuilt; size will be increased to 20 x 90; the four Gordon-Whitwell-Cowper stoves will be replaced by four Massicks & Crooke stoves, each 21 x 85. James McCahon, Furnace Superintendent. (Formerly called the Jefferson Furnace.)—*Active in 1901. See Rolling Mills and Steel Works, (Wheeling Works in West Virginia and Steubenville Works in this District.)*

Martins Ferry Furnace, Wheeling Steel and Iron Company, Wheeling,

West Virginia. Furnace at Martins Ferry, Belmont county, Ohio.

One stack; fuel, coke.—*For description of furnace see pages 119-20.*

Mingo Works, National Steel Company, Carnegie Building, Pittsburgh.

Furnaces at Mingo Junction, Jefferson county, Ohio. Three stacks;

fuel, coke.—*For description of furnaces see page 20.*

Steubenville Furnace, (Riverside Department,) National Tube Company,

Conestoga Building, Pittsburgh. Furnace at Steubenville, Jefferson

county, Ohio. One stack; fuel, coke.—*For description see page 25.*

Number of coke furnaces in the Ohio River Counties: 8 stacks.

ROLLING MILLS AND STEEL WORKS—12 COMPLETED AND 1 BUILDING.

Aetna-Standard Works, The American Sheet Steel Company, Battery

Park Building, New York City. Works at Bridgeport, Belmont

county, Ohio.—*For description of works see page 53.*

Banfield Works, American Tin Plate Company, Battery Park Building,

New York City. Works at Irondale, Jefferson county, Ohio.—*For*

description of works see page 40.

Beaver Works, American Tin Plate Company, Battery Park Building,

New York City. Works at Lisbon, Columbiana county, Ohio.—*For*

description of works see page 40.

Bellaire Works, National Steel Company, Pittsburgh. Works at Bel-

laire, Belmont county, Ohio.—*For description of works see pages 21-2.*

Bridgeport Mill, American Steel Hoop Company, Carnegie Building,

Pittsburgh. Works at Bridgeport, Belmont county, Ohio.—*For descrip-*

tion of works see page 49.

Laughlin Nail Company, Wheeling, W. Va. Works at Martins Ferry, Belmont county, Ohio. Nail factory built in 1872-3; first keg of nails made March 4, 1873; works destroyed by fire August 8, 1881, and immediately rebuilt; 3 regenerative gas heating furnaces, 1 train of plate rolls, and 225 cut-nail machines; product, steel cut nails and spikes; annual capacity, 625,000 kegs of cut nails. Sheet department added in 1901; 6 sheet furnaces, 2 annealing furnaces, 6 pair furnaces, and 8 sheet mills (four 26 x 38 and two 26 x 44-inch hot and two 26 x 44-inch cold); annual capacity, 12,000 gross tons. Fuel, coal and manufactured gas. Brand, "Laughlin." Shovel works connected with the plant have an annual capacity of 100,000 dozen shovels of various kinds; galvanizing, corrugating, and metal ceiling departments are also connected with the works. W. L. Glessner, President; F. K. Dixon, Secretary.

Laughlin Works, American Tin Plate Company, Battery Park Building, New York City. Works at Martins Ferry, Belmont county, Ohio.—*For description of works see page 42.*

Mingo Mill, American Steel Hoop Company, Carnegie Building, Pittsburgh. Works at Mingo Junction, Jefferson county, Ohio.—*For description of works see pages 50-1.*

Mingo Works, National Steel Company, Pittsburgh. Works at Mingo Junction, Jefferson county, Ohio.—*For description of works see page 22.*

Pomeroy Mill, American Steel Hoop Company, Carnegie Building, Pittsburgh. Works at Pomeroy, Meigs county, Ohio.—*For description of works see page 51.*

Pope (The) Tin Plate Company, 421 Wood st., Pittsburgh, Pa. Building works at Steubenville, Jefferson county, Ohio, to be equipped with machinery for the manufacture of black plates for tinning; 12 mills will probably be installed with the necessary heating and annealing furnaces. Charles E. Pope, President; E. W. Mudge, Secretary and Treasurer.—*See Tinplate Works in Ohio.*

Steubenville Works, La Belle Iron Works, Steubenville, Jefferson county. Built in 1855 and enlarged in 1900; 6 regenerative gas heating furnaces, three 22-inch nail plate or skelp trains of rolls, and 128 cut-nail machines; product, steel skelp, shovel plate, tack plate, special plate for stamping purposes, and iron and steel cut nails; annual capacity, 250,000 gross tons of rolled products and 400,000 kegs of cut nails. Fuel, coal and manufactured gas. Brand, "La Belle." Six 50-gross-ton basic open-hearth steel furnaces are now being built and 4 additional 50-gross-ton furnaces are to be erected. A plant for the manufacture of wrought iron and steel tubes is also being built. It will probably be ready for operation in January, 1902. (Formerly called the Jefferson Iron Works.)—*See La Belle Furnace in this District; also Wheeling Works in West Virginia, (Rolling Mills and Steel Works.)*

Wellsville Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Wellsville, Columbiana county, Ohio.—*For description of works see page 57.*

Number of rolling mills and steel works in the Ohio River Counties: 12 completed and 1 building. Of these 2 make Bessemer steel and 1 open-hearth steel plant is being built.

Total number of blast furnaces in Ohio: 59 stacks.

Total number of rolling mills and steel works in Ohio: 76 completed, 6 building, 1 to be rebuilt, and 1 projected. Of these 7 make Bessemer steel, 1 makes Robert-Bessemer steel, 11 make open-hearth steel, 2 open-hearth steel plants are being built, 1 open-hearth steel plant is to be rebuilt, and 4 open-hearth steel plants are projected, and 3 make crucible steel. In addition 1 company may erect a Tropenas converter or an open-hearth steel furnace.

INDIANA.

ROLLING MILLS AND STEEL WORKS—34 COMPLETED AND 2 BUILDING.

Alexandria Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Alexandria, Madison county, Indiana.—*For description of works see page 71.*

American Works, American Tin Plate Company, Battery Park Building, New York City. Works at Elwood, Madison county, Indiana.—*For description of works see page 39.*

Anderson Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Anderson, Madison county, Indiana.—*For description of works see page 32.*

Anderson Works, American Tin Plate Company, New York. Works at Anderson, Madison county, Indiana.—*For description see page 39.*

Atlanta Works, American Tin Plate Company, Battery Park Building, New York City. Works at Atlanta, Hamilton county, Indiana.—*For description of works see page 40.*

Central Steel Company, 227 West Merrill street, Indianapolis, Marion county. Built in 1857, 1881-2, and 1886-7; remodeled in 1890-1; 7 single puddling furnaces, 2 heating furnaces, 8 soaking pits, 1 forge fire, and one 3-high 18-inch, one 3-high 26-inch beam, one 10 and one 12-inch Belgian, and one 2-high blooming train of rolls. Two 15-gross-ton basic open-hearth steel furnaces; first steel made in May, 1887; annual capacity, double turn, 18,000 gross tons of ingots. Two 5-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, merchant bar steel, and steel castings; annual capacity, single turn, 18,000 gross tons. Fuel, coal

- and producer and natural gas. Major Collins, President; W. J. Carlin, Vice-President; J. R. Paull, Secretary; Crawford Fairbanks, Treasurer; W. R. Palmer, Manager. (The 26-inch beam mill is leased by the Indiana Steel Company. Formerly operated by the Premier Steel Company.)—*With the exception of the 26-inch beam mill this plant is now being dismantled. See The Indiana Steel Company in this State.*
- Central Works, Republic Iron and Steel Company, Chicago. Works at Brazil, Clay county, Indiana.—*For description of works see page 72.*
- Chicago Horse Shoe Works, East Chicago, Lake county. Built in 1888-9; 1 large and 8 small heating furnaces, 7 bending machines, 7 planishing machines, 2 grubbing machines, 18 punching machines, and 1 train of 9-inch rolls; product, horseshoe bars and horse and mule shoes; annual capacity, single turn, 10,000 gross tons. Fuel, petroleum and coal. Gideon N. Caleb, General Manager. (Formerly operated by The Chicago Horse Shoe Company. Owned by John J. McCook, 120 Broadway, New York City.)
- Chicago Steel Manufacturing Company, Hammond, Lake county. Built in 1886-7; 4 gas heating furnaces, 2 trains of rolls, and 102 cut-nail machines; product, shovel and nail plate, iron and steel cut nails, pressed steel specialties, and shovels, spades, and scoops; annual capacity, 300,000 kegs of cut nails and 18,000 gross tons of rolled products. Fuel, manufactured gas. Brand, "Chicago Steel Manufacturing Company." The works also contain two 5-gross-ton Bessemer steel converters with an annual capacity of 150,000 gross tons of ingots; first blow made November 22, 1887; idle and for sale. Charles G. Hutchinson, President; Frank M. Baldwin, First Vice-President; Austin F. Cabel, Second Vice-President; L. Hugh O'Donnell, Secretary; M. S. Denslow, Treasurer; S. W. Ripley, Superintendent. Selling agents, Allerton, Clark & Co., New York and Chicago. (Formerly operated by the Lakeside Nail Company, lessee.)
- Emlyn Iron Works, 205-7 Western Union Building, Chicago. Works at East Chicago, Lake county, Indiana. Built in 1900 and first put in operation in July, 1900; 7 double and 3 single puddling furnaces, 5 heating furnaces, and 4 trains of rolls (8, 9, 16, and 18-inch); product, bar iron and steel; annual capacity, 40,000 gross tons. Fuel, coal. George Stewart, President; R. M. Cherrie, Vice-President; George F. Davie, Secretary and Treasurer; W. L. Simonton, Manager.
- Gould Steel Company, 25 West Thirty-third street, New York City. Works at Anderson, Madison county, Indiana. 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, natural gas. Brand, "G. C. Co." Charles A. Gould, President; Charles M. Gould, Vice-President; William E. Kurtz, Secretary and Manager; William S. Gould, Treasurer.
- Highland (The) Iron and Steel Company, Terre Haute, Vigo county.

Built in 1901 and first put in operation November 25, 1901; 6 double puddling furnaces, 4 single scrap furnaces, 4 heating furnaces, and 3 trains of rolls (one combined 10 and 12-inch Belgian, one 20-inch finishing, and one 20-inch muck); product, iron and steel merchant bars and special shapes; annual capacity, 40,000 gross tons. Fuel, bituminous coal. Philip Matter, President; John L. Smith, Vice-President; William M. Myers, Secretary; Walter C. Ely, Treasurer and General Manager.

Indiana (The) Steel Company, Indianapolis, Marion county. Operates under lease 1 double and 2 single heating furnaces and the 26-inch beam mill in the works of the Central Steel Company, at Indianapolis, capable of producing beams from 6 to 20 inches; daily capacity, 100 gross tons. Fuel, natural and producer gas. Jacob Christopher, President; William H. Brown, Vice-President; J. L. Ketcham, Secretary; W. R. Brown, Treasurer.—*Idle since May, 1893. See Central Steel Company in this State.*

Indiana Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Muncie, Delaware county, Indiana.—*For description of works see page 73.*

Inland Steel Company, 1225-29 Marquette Building, Chicago. Building works at Indiana Harbor, Lake county, Indiana, to contain four 50-gross-ton basic open-hearth steel furnaces, 10 heating furnaces, one 32-inch blooming mill, one 24-inch billet mill, and 12 finishing mills; product, ingots, billets, slabs, sheets, light plates, angles, shafting, and merchant bars; annual capacity, 125,000 gross tons of ingots and 75,000 tons of bars. Fuel, coal and manufactured gas. G. H. Jones, President; L. E. Block, Vice-President; P. D. Block, Vice-President and Treasurer; J. M. Butler, Secretary; R. J. Beatty, General Manager.—*See Rolling Mills and Steel Works in Illinois.*

Inland Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at East Chicago, Lake county, Indiana.—*For description of works see page 73.*

Irondale Works, American Tin Plate Company, Battery Park Building, New York City. Works at Middletown, Henry county, Indiana.—*For description of works see pages 41-2.*

Kokomo Wire and Nail Company, Kokomo, Howard county. Works for the manufacture of wire and wire nails built in 1900; wire rod train, with a daily capacity of 250 gross tons, now being added; 30 large and 12 small wire-drawing blocks and 21 wire-nail machines; product, wire rods, wire, and wire nails; annual capacity, 75,000 gross tons of rods, 21,000 tons of wire, and 200,000 kegs of nails. A. A. Charles, President; J. E. Fredrick, Secretary; Harry Ward, Treasurer and General Manager.

Marion Works, Republic Iron and Steel Company, Chicago. Works at Marion, Grant county, Indiana.—*For description of works see page 74.*

Midland Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Muncie, Delaware county, Indiana.—*For description of works see pages 55-6.*

Morewood Works, American Tin Plate Company, Battery Park Building, New York City. Works at Gas City, Grant county, Indiana.—*For description of works see page 42.*

Muncie Rolling Mill, American Rolling Mill Company, Rookery Building, Chicago. Works at Muncie, Delaware county, Indiana. Built in 1888-9 with part of machinery removed from Greencastle; put in operation in March, 1889; rebuilt in 1899; 10 busheling furnaces, 4 heating furnaces, and 3 trains of rolls (one 8, one 10, and one 18-inch); product, bar iron and steel; annual capacity, single turn, 25,000 gross tons. Fuel, natural gas. John H. Palmer, President; W. I. Moody, Secretary and Treasurer. (Formerly operated by the Palmer Steel and Iron Company.)—*See Rolling Mills and Steel Works in Michigan.*

Muncie Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Muncie, Delaware county, Indiana.—*For description of works see page 74.*

National Car Coupler Company, 621 Monadnock Block, Chicago. Works at Converse, Miami county, Indiana. One 15-gross-ton acid open-hearth steel furnace, built in 1898; product, National car couplers, National continuous platform buffers, and other steel castings; annual capacity, 7,500 gross tons. Fuel, natural gas. J. A. Hinson, President; J. M. Waugh, Secretary; E. D. Frazer, Treasurer; J. W. Harrison, Superintendent. (Formerly operated by the Hinson and Hurford Steel Casting Company.)

National Rolling Mill Company, Hartford City, Blackford county. Built in 1901 and first put in operation September 30, 1901; 5 scrapping furnaces, 2 Smith heating furnaces, and 2 trains of rolls (one 18-inch muck and one 10-inch finishing); product, muck bar and finished bar iron; annual capacity, 20,000 gross tons of muck bars and 20,000 tons of finished bars. Fuel, natural gas. E. B. Mitchell, President and Vice-President; J. H. Jones, Secretary and Treasurer; S. N. Bradshaw, General Manager and Selling Agent. General sales agent, A. E. Rosenthal, 36 La Salle st., Chicago.

National Steel Casting Company, Montpelier, Blackford county. Built in 1896-7; two 20-gross-ton Siemens acid open-hearth steel furnaces; product, car couplers, knuckles, and a general line of steel castings from 5 to 20,000 pounds; specialty, railroad and electric castings; annual capacity, 15,000 gross tons. Fuel, natural gas. G. M. Hoffmann, President, and F. E. W. Sheimann, Secretary and Treasurer, Fort Wayne, Indiana; James O'Donnell, Vice-President, and John J. Muir, Manager, Montpelier, Indiana. (Formerly operated by The Indiana Steel Castings Company.)

New Albany Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at New Albany, Floyd county, Indiana.—*For description of works see page 75.*

Ohio Falls Iron Company, New Albany, Floyd county. Built in 1866; entirely remodeled and enlarged in 1899; 14 single puddling furnaces, 3 scrap furnaces, 6 heating furnaces, and 4 trains of 3-high rolls (18-inch muck, 8 and 10-inch guide, and 16-inch bar); product, bar iron for bridge works, car works, and railroads; specialty, wide flats up to 12 inches; annual capacity, 36,000 gross tons. Fuel, coal. Brand, "Ohio Falls." George M. Clark, President; Henry Green, Vice-President and Superintendent. (Formerly called the Ohio Falls Iron Works.)

Oliver Chilled Plow Works, 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 capacity, 100 gross tons. Fuel, coke. James Oliver, President; Frank Abbott, Vice-President; George Ford, Secretary; J. D. Oliver, Treasurer and General Manager.

Peru Steel Casting Company, Peru, Miami county. Branch offices, New York, Chicago, Cleveland, Pittsburgh, Cincinnati, Buffalo, and San Francisco. Built in 1899 and first steel produced in 1900; two 25-gross-ton basic open-hearth furnaces; product, castings for machine and railroad work from 10 to 75,000 pounds; annual capacity, 18,000 gross tons. Fuel, oil. Philip Matter, President and Treasurer; George A. Swartwout, General Manager; John W. Galvin, Superintendent.

Terre Haute Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Terre Haute, Vigo county, Indiana.—*For description of works see pages 75-6.*

Wabash Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Terre Haute, Vigo county, Indiana.—*For description of works see page 76.*

Westerman Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Marion, Grant county, Indiana.—*For description of works see page 76.*

Wetherald Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Frankton, Madison county, Indiana.—*For description of works see page 76.*

Whiteley Steel Company, Muncie, Delaware county. Contracting and sales departments: Klopfer Block, Muncie, Ind., and Marquette Building, Chicago. This company controls the sale of McHaffie or Whiteley's crown steel, which is manufactured for it at Muncie by the Whiteley Malleable Castings Company; works at Muncie built in 1891-3 and first McHaffie castings produced in 1893; one 5-gross-ton furnace; product, McHaffie crown steel castings; annual capacity, 2,250 gross tons. Fuel, natural gas. The Whiteley Malleable Cast-

ings Company also produces malleable castings. Officers of the Whiteley Steel Company: William G. Wagner, President; Burt H. Whiteley, Vice-President and Manager; Amos Whiteley, Secretary; Elmer J. Whiteley, Treasurer.

Wright Shovel Company, Anderson, Madison county. Elwood Works, at Elwood, Madison county; plant formerly operated by the Akron Steam Forge Company; acquired in 1898 by the Wright Shovel Company and equipped with trains of rolls, etc., from that company's abandoned rolling mill at Greenfield, Indiana; first rolled materials produced in February, 1899; product, shovel plate; annual capacity, 6,000 gross tons. Fuel, natural gas. Thomas W. Wright, President; W. J. Alford, Secretary and Treasurer. (Greenfield Works, at Greenfield, destroyed by fire in 1898 and not rebuilt; Anderson Works, at Anderson, formerly equipped with hot trains of rolls, now produce shovels, spades, etc., only.)

Number of rolling mills and steel works in Indiana: 34 completed and 2 building. Of these 2 have Bessemer steel plants, 6 make open-hearth steel and 1 open-hearth steel plant is being built, 1 makes crucible steel, and 1 makes McHaffie steel. One completed plant, included above, containing trains of rolls, Bessemer converters, and open-hearth steel furnaces, is now being dismantled.

There are no blast furnaces in Indiana.

ILLINOIS.

COKE FURNACES—20.

Iroquois Iron Company, East Side Postal Station, Chicago. Furnaces at Ninety-fifth st. and Calumet river, South Chicago, Cook county. Two stacks: Furnace A, 80 x 17½, built in 1890-1 and blown in September 21, 1891; four Cowper-Kennedy stoves. Furnace B, 85 x 18½, built in 1900-1 and not blown in in December, 1901; four Kennedy central combustion chamber stoves. Fuel, coke; ore, Lake Superior; product, foundry and malleable pig iron; total annual capacity, 175,000 gross tons. Brands, "Iroquois" for strong iron, "Sterling Scotch" for soft iron, "Peerless" for high-silicon soft iron, and "Malleable" for iron suitable for malleable work. M. Cochrane Armour, President; William A. Rogers, Vice-President; George A. Tripp, Secretary and Treasurer; Samuel A. Kennedy, Superintendent. Selling agents, Rogers, Brown & Co., Chicago, St. Louis, San Francisco, Cincinnati, Cleveland, Pittsburgh, Buffalo, New York, Boston, and Birmingham. (Furnace A formerly called Iroquois Furnace.)—*Active in 1901.*

Joliet Works, The Illinois Steel Company, Rookery Building, Chicago. Furnaces at Joliet, Will county. Three stacks; fuel, coke.—*For description of furnaces see page 13.*

North Works, The Illinois Steel Company, Rookery Building, Chicago.

Two stacks; fuel, coke.—*For description of furnaces see page 14.*

South Chicago Furnace, South Chicago Furnace Company, Rookery Building, Chicago. Furnace at South Chicago, Cook county. One stack, 78 x 16, built in 1880 and blown in in 1881; one Massicks & Crooke and three Foote stoves; fuel, Connellsville coke; ore, Lake Superior; product, foundry and malleable Bessemer pig iron; annual capacity, 60,000 gross tons. W. L. Brown, President; D. M. Cummings, Vice-President; B. W. Wells, Secretary and Treasurer. Selling agents, Pickands, Brown & Co., Chicago. (Formerly called the Calumet Furnace.)—*Active in 1901.*

South Works, The Illinois Steel Company, Rookery Building, Chicago. Furnaces at South Chicago, Cook county. Ten stacks; fuel, coke.—*For description of furnaces see page 14.*

Union Works, The Illinois Steel Company, Rookery Building, Chicago, Cook county. Two stacks; fuel, coke.—*For description of furnaces see page 14.*

Number of coke furnaces in Illinois: 20 stacks. No charcoal stacks.

ROLLING MILLS AND STEEL WORKS—27 COMPLETED, 1 BUILDING,
AND 1 PROJECTED.

American Steel Foundry Company, Wells Building, St. Louis, Missouri. Works at Granite City, Madison county, Illinois. Five modified Siemens 20-gross-ton basic open-hearth steel furnaces, erected in 1894 and 1898; first steel made in November, 1894; product, railway and other large castings; annual capacity, 45,000 gross tons. Fuel, producer gas. A plant for building steel cars is connected with the works. Edward F. Goltra, President; L. J. Hayward, Treasurer; O. S. Pulliam, Secretary; E. S. Marshall, General Selling Agent. Selling agents, Spencer Otis, Plymouth Building, Chicago; E. P. Bigelow, Empire Building, New York City; J. V. Bell, Houston, Texas.

Chicago Splice Bar Mill, The Sellers Manufacturing Company, Chicago. Office and works, Chicago ave. and the Chicago river. Built in 1878; 1 forge fire, 3 heating furnaces, and one 15-inch train of rolls; product, all kinds of splice bars, including "Samson" bars; annual capacity, 20,000 gross tons. Fuel, coal. A punching and shearing department is connected with the works. Morris Sellers, President; John M. Sellers, Vice-President and General Manager; P. J. Geraghty, Secretary and Treasurer; John A. Lentz, Superintendent.

Chicago Malleable Castings Company, One Hundred and Twentieth street and Centre ave., Chicago. Works at West Pullman, Cook county. Built in 1899 and first steel made in October, 1901; one 2-gross-ton Siemens basic open-hearth furnace; product, gears, pinions, and small steel castings; annual capacity, 1,000 gross tons. Fuel, coal. A plant for the manufacture of malleable iron castings

is connected with the works. W. H. Jones, President; S. J. Llewellyn, Vice-President; E. H. Llewellyn, Secretary; John T. Llewellyn, Treasurer and General Manager.

Dillon-Griswold Wire Company, Sterling, Whiteside county. Rod mill added to a wire and wire-nail plant in 1899-1900 and first put in operation in January, 1900; 2 forge fires, 1 double heating furnace, 3 trains of rolls, (one 9, one 14, and one 16-inch,) 125 wire-drawing blocks, and 60 wire-nail machines; product, wire rods, plain, galvanized, copper, and tinned wire nails, barb wire, bale ties, woven fencing, etc.; annual capacity, 50,000 gross tons of rods, 35,000 tons of wire, and 315,000 kegs of wire nails. Fuel, bituminous coal. W. M. Dillon, President, Treasurer, and Manager; J. Wool Griswold, Vice-President; W. H. Shields, Secretary.

Grand Crossing Tack Company, Grand Crossing, Cook county. Sales offices, San Francisco, California; City of Mexico, Mexico; Buenos Ayres, Argentine Republic; Rio de Janeiro, Brazil; Glasgow, Scotland. Rolling mill added to a wire and wire-nail plant in 1899-1900 and first put in operation February 1, 1900; 1 Morgan continuous heating furnace, 1 continuous wire-rod train with 14 supplemental trains, 70 wire-drawing blocks, and 82 wire-nail machines; product, wire rods, wire, wire nails, staples, rivets, and tacks; annual capacity, 45,000 gross tons of wire rods, 20,000 tons of wire, 300,000 kegs of wire nails, 1,500 tons of rivets, 1,500 tons of tacks, and 500 tons of staples. Fuel, bituminous coal. Brand, "Grand Crossing Tack Company." T. E. Bassett, President; E. W. Hutchinson, Secretary and Superintendent; O. N. Hutchinson, Treasurer and Manager.

Granite City Rolling Mills, National Enameling and Stamping Company, 81-3 Fulton st., New York City. Works at Granite City, Madison county, Illinois.—*For description of works see page 150.*

Great Western Works, American Tin Plate Company, Battery Park Building, New York City. Works at Joliet, Will county, Illinois.—*For description of works see page 41.*

Hager Steel and Iron Company, Madison, Madison county. Building works to contain 1 double puddling furnace, 4 single puddling furnaces, 5 Lauth heating furnaces, and 3 trains of rolls (one 18-inch muck, one 9-inch guide, and one 16-inch bar); product, merchant bar and guide iron; annual capacity, 20,000 gross tons. Fuel, bituminous coal. A. W. Hager, President and Treasurer; Louis Hager, Vice-President; Luther McGilvray, Secretary and Manager.

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 85 cut-nail machines; product, iron and steel cut nails and tack and shovel plate; annual capacity, 5,000 gross tons of rolled material and 175,000 kegs of cut nails. Fuel, manufactured gas. E. E. Wangelin, Manager. (Formerly called the Crescent Nail Mills.)

Inland Steel Company, (successor to Chicago Steel Works,) 1225-29 Marquette Building, Chicago. Works at 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; 6 heating furnaces, one 8 and one 14-inch train of rolls, and 6 hammers; product, bars, angles, tees, channels, agricultural shapes, harrow teeth, plow beams, cultivator attachments, and fence posts; annual capacity, 30,000 gross tons of bar steel, 100,000 steel plow beams, and 1,500 tons of harrow teeth. Fuel, coal and coke in heating furnaces and bituminous coal under boilers. Brand, the word "Inland" in a diamond.—*See Rolling Mills and Steel Works in Indiana.*

Joliet Plant, American McKenna Process Company, Milwaukee, Wisconsin. Works at Joliet, Will county, Illinois. Built in 1897 and first put in operation August 11, 1897; two 12 x 35-foot heating furnaces and 3 trains of rolls (one 12 and two 24-inch, arranged tandem); product, renewed steel rails by the McKenna process; annual capacity, 100,000 gross tons. Fuel, bituminous coal. (Formerly called the Joliet Works and operated by the McKenna Steel Working Company.)—*See Rolling Mills and Steel Works in New Jersey (Tremley Point Plant) for a list of officers; also Rolling Mills in Kansas, (Kansas City Plant.)*

Joliet Works, The Illinois Steel Company, Rookery Building, Chicago. Works at Joliet, Will county.—*For description of works see page 15.*

Melrose Park Works, Latrobe Steel and Coupler Company, main office, 1200 Girard Building, Philadelphia. Chicago office, Old Colony Building. Works at Melrose Park, Cook county, Illinois. Steel department added to a tire mill in 1884-5; two 30-gross-ton acid open-hearth furnaces with an annual capacity of 35,000 gross tons; first steel made in February, 1885; product, castings, automatic steel car couplers, and elliptic and spiral springs; annual capacity, 62,500 gross tons. Fuel, coal. Marriott C. Smyth, President; C. C. Warren, Secretary; W. W. Turlay, Treasurer; T. S. Blair, Jr., Superintendent of Works. (Tire mill, built in 1881-2 and enlarged in 1888, abandoned in 1895.)

Phoenix Horse Shoe Company, Rookery Building, Chicago. Works at Joliet, Will county. Built in 1893 and put in operation in the same year; 2 gas regenerative 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, 12,000 gross tons. Fuel, coal and manufactured gas. Brand, "Phoenix."—*See Rolling Mills and Steel Works in New York for a list of officers.*

Pullman (The) Company, Pullman, Cook county. Chicago office, 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, 32,000 gross tons of bar iron and 12,000 tons of muck bar. Fuel, coal and manufactured gas. Robert T. Lincoln, President; T. H. Wickes, Vice-President; George F. Brown, General Manager. (Formerly operated by the Pullman Iron and Steel Company.)

Sandwich Iron and Steel Company, (not incorporated,) B. Manfield, proprietor, Sandwich, De Kalb county. Built in 1900 and first put in operation in October, 1900; 2 scrap heating furnaces and 2 trains of rolls (one 18-inch muck and one 9-inch guide); product, bar iron; annual capacity, 18,000 gross tons of finished bars. Fuel, bituminous coal.

Sargent (The) Company, 675 Old Colony Building, Chicago. Two works, both located in Cook county, one at Fifty-ninth and Wallace streets, Chicago, and the other at Chicago Heights. Fifty-ninth and Wallace Streets Works: 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; one 15-gross-ton Siemens acid furnace; first steel made September 17, 1892; product, general castings; annual capacity, 7,000 gross tons; fuel, producer gas in crucible furnace and oil in open-hearth furnace. Chicago Heights Works: built in 1899-1900; three 2-gross-ton Tropenas steel converters; first steel made in April, 1900; product, general castings; annual capacity, 5,000 gross tons; fuel, coke. George M. Sargent, Chairman of the Board; William D. Sargent, President; Henry K. Gilbert, Vice-President and Treasurer; Day McBirney, Secretary; J. C. Davis, Superintendent. Branch offices and selling agents: 130 Endicott Arcade, St. Paul, Minnesota; 403 Security Building, St. Louis; United States National Bank Building, Omaha, Nebraska; 49 Wells-Fargo Building, San Francisco, California; Havemeyer Building, New York City; A. T. Herr, Denver, Colorado.

Shickle, (The) Harrison, and Howard Iron Company, Shickle, Harrison, and Howard Building, Eighth and Locust streets, St. Louis, Missouri. Works at East St. Louis, St. Clair county, Illinois. Built in 1900; four Wellman-Seaver patent rolling basic open-hearth furnaces; first steel made June 14, 1900; product, car trucks, car bolsters, pilot couplers, and other steel castings; annual capacity, 20,000 gross tons. Fuel, producer gas. George B. Leighton, President; Clarence H. Howard, Vice-President and General Manager; George K. Hoblitzelle, Secretary and Treasurer.

South Works, The Illinois Steel Company, Rookery Building, Chicago. Works at South Chicago, Cook county.—*For description of works see pages 14-5.*

Springfield Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Springfield, Sangamon county, Illinois.

—*For description of works see page 75.*

Steel Department, Simonds Manufacturing Company, Fitchburg, Worcester county, Massachusetts. Sales offices, Fitchburg, Massachusetts; 85 First street, Portland, Oregon; 119 Jackson street, Seattle, Washington; 107 Liberty street, New York City. Works at Western avenue, Sixteenth and Seventeenth streets, Chicago, Cook county, Illinois. Built in 1900 and first put in operation in December, 1900; 4 heating furnaces, 2 trains of rolls, (one 18-inch and one 24-inch,) and one 6,000-lb. hammer; one 36-pot crucible steel-melting furnace with 6 holes; first crucible steel made December 17, 1900; annual capacity, 3,000 gross tons of ingots; product, saw plate and crucible sheet steel; annual capacity, 2,000 gross tons of rolled products. Fuel, bituminous coal and coke. Daniel Simonds, President; H. B. Eaton, Secretary; H. F. Coggeshall, Treasurer; J. J. Mahon, General Manager of Rolling Mill and Steel Plant.

Sylvan Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Moline, Rock Island county.—*For description of works see page 75.*

Tudor Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at East St. Louis, St. Clair county.—*For description of works see page 76.*

Union Works, The Illinois Steel Company, Rookery Building, Chicago. Works at 3179 Ashland ave., Chicago, Cook county.—*For description of works see pages 15-6.*

Valley Steel Works, Ernest E. Wangelin, Belleville, St. Clair county. Built in 1882 and remodeled in 1885-6; 1 coal and 2 gas heating furnaces, one 23½-inch slabbing train, and one 3-high 21-inch nail-plate train; product, steel nail plate and large flats. Fuel, bituminous coal. (Formerly operated by the Valley Steel Company.)—*Works being dismantled in November, 1901.*

Waukegan Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Waukegan, Lake county.—*For description of works see page 35.*

Western Tube Company, Kewanee, Henry county. Built in 1883 and put in operation in November, 1883; 8 double busheling furnaces, 1 squeezer, 12 heating furnaces, 4 trains of rolls, (one 18-inch muck and 3 finishing,) and two 5,000-pound hammers; product, skelp iron, used by the company in the manufacture of wrought iron and steel pipe; annual capacity, 75,000 gross tons. Fuel, coal and manufactured gas. The company also manufactures malleable and cast-iron fittings, brass and iron valves, and other similar products. J. H. Pierce, President; A. M. Hewlett, Vice-President; C. I. Pierce, Secretary; C. E. McCullough, Treasurer.

PROJECTED ROLLING MILLS—1.

Chicago Tin Plate and Can Company, Chicago, Cook county. Contemplates erecting works to contain annealing and heating furnaces and 18 black plate mills (twelve 32 x 26-inch hot and six 32 x 22-inch cold); product, to be black plates and sheets; estimated annual capacity, 22,000 gross tons. Fuel, bituminous coal.—*See Projected Tinplate Works in Illinois.*

Number of rolling mills and steel works in Illinois: 27 completed, 1 building, and 1 projected. Of these 3 make Bessemer steel, 1 makes Tropenas steel, 8 have open-hearth steel plants, and 2 make crucible steel. One of the completed rolling mills is being dismantled.

MICHIGAN.

CHARCOAL FURNACES—9 COMPLETED AND 1 BUILDING.

Antrim Iron Company, Mancelona, Antrim county. General office, Michigan Trust Building, Grand Rapids. One stack, 60 x 10½, built in 1887-8, blown in in February, 1888, and rebuilt in 1895; hot blast; charcoal supplied by 80 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; annual capacity, 35,000 gross tons. Brand, "Antrim." T. J. O'Brien, President, and J. C. Holt, Secretary and Treasurer, Grand Rapids; N. M. Langdon, Manager, Mancelona. Selling agent, The Superior Charcoal Iron Company, Grand Rapids, Michigan.—*Active in 1901.*

Elk Rapids Furnace, Elk Rapids Iron Company, Elk Rapids, Antrim county. One stack, 58 x 11, first put in blast in July, 1873; hot blast; ore, Lake Superior exclusively; specialties, Nos. 3 and 4 pig iron for car wheels and malleable castings; annual capacity, 28,000 gross tons. Brand, "Elk Rapids." Charcoal is made in 51 round brick kilns, holding 60 to 78 cords each; chemical works are connected with them. N. K. Fairbank, President, Chicago; H. B. Lewis, Vice-President, Secretary, and General Manager, and Charles Durkee, Treasurer, Elk Rapids. Selling agent, The Superior Charcoal Iron Company, Grand Rapids, Michigan.—*Active in 1901.*

Fruitport Furnace, The 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; J. C. Spencer, Vice-President; J. C. Ford, Secretary and Treasurer. Sales made by the company.—*Active in 1901.*

Gaylord Iron 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 especially adapted for malleable castings and car wheels; annual capacity, 12,000 gross tons. Brand, "G. I. Co. DET." Charles A. Kent, President; Frank B. Gaylord, Vice-President and Secretary; Nicholas Woods, Treasurer. Sales made by the company.—*Active in 1901. For sale.*

Manistique Iron Company, Manistique, Schoolcraft county. One stack, 58 x 12, built in 1890-1 and blown in March 4, 1891; three iron stoves; warm blast; blast heated to 850 or 900 degrees; ore, Lake Superior; product, car-wheel and malleable pig iron; annual capacity, 40,000 gross tons. Brand, "Champion." A chemical plant for the recovery of by-products is connected with the furnace. Joseph H. Berry, President, W. G. Smith, Vice-President, E. H. Flinn, Secretary and Treasurer, Detroit; W. H. Nelson, Manager, Manistique. Selling agents, The Superior Charcoal Iron Company, Grand Rapids. (Formerly called Weston Furnace.)—*Active in 1901.*

Michigan Iron Company, Room 12, German Insurance Building, Buffalo, New York. Furnace at Newberry, Luce county, Michigan. One stack, 52½ x 10, built in 1882-3 and blown in in May, 1883; rebuilt in 1892; closed top with patent charger; four iron stoves; warm blast; 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 used for fuel is made at the furnace in 64 kilns. (Formerly operated by the Newberry Furnace Company.)—*Idle since 1894.*

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, Lake Superior exclusively; product, car-wheel iron, iron for special purposes, and iron for malleable castings; annual capacity, 10,000 gross tons. Brand, "P. I. Co., Det." Theodore H. Eaton, President; Robert Leete, Vice-President; Solon Burt, Secretary and Treasurer; McKinstry Burt, Assistant Secretary and Assistant Treasurer. Sales made by the company.—*Active in 1901.*

Pioneer Furnace, The Cleveland-Cliffs Iron Company, Mercantile Bank Building, Cleveland, Ohio. Furnace at Gladstone, Delta county, Michigan. One stack, 60 x 12, built in 1895-6 and blown in April 16, 1896; two hot-blast stoves; ores, Lake Superior red specular and soft hematites; specialties, malleable, boiler-tube, and car-wheel pig iron; annual capacity, 45,000 gross tons. Brand, "Pioneer." 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 agent, The Superior Charcoal Iron Company, Grand Rapids.—*Active in 1901.*

Pioneer Iron Company, Mercantile Bank Building, Cleveland, Cuyahoga county, Ohio. One completed stack and one stack building; Carp

Furnace, at Marquette, Marquette county, Michigan, one stack, 58½ x 10, built in 1872-3, burned in 1882, and rebuilt in 1889-90; idle for several years; revived and rebuilt in 1899 and blown in October 16 of that year; two iron stoves; warm blast; ore, Lake Superior hematite; product, car-wheel and malleable pig iron; annual capacity, 15,000 gross tons. Brand, "Excelsior." Noah W. Gray, Manager. One stack, to be 70 x 12, now being built at Marquette, Marquette county; three hot-blast stoves; ore to be used, Lake Superior; product, to be car-wheel and malleable pig iron; estimated annual capacity, 45,000 gross tons; will probably be completed in the summer of 1902. George A. Garretson, President, William G. Mather, Vice-President, Fred A. Morse, Treasurer, and E. V. Hale, Secretary, Cleveland, Ohio. Selling agent, The Superior Charcoal Iron Company, Grand Rapids, Michigan.—*Carp Furnace active in 1901.*

Number of charcoal furnaces in Michigan: 9 completed stacks and 1 stack building. No coke stacks.

ROLLING MILLS AND STEEL WORKS—6.

American Rolling Mill Company, Rookery Building, Chicago. Works at Muskegon, Muskegon county, Michigan. Built and put in operation in 1890; 6 Siemens and 4 double scrapping furnaces and 3 trains of rolls (one 18-inch muck and one 9-inch and one 18-inch finishing); steel plant added in 1900; one 15-gross-ton Siemens acid open-hearth furnace; first steel made in June, 1900; product, steel ingots, muck bar, and bar iron; annual capacity, 12,000 gross tons of ingots and 40,000 tons of finished bars. Fuel, manufactured gas. John H. Palmer, President; Walter I. Moody, Secretary and Treasurer. (Formerly called the Muskegon Rolling Mills and operated by the Champion Iron and Steel Company. The black plate mills with which these works were formerly equipped are now operated by the American Tin Plate Company.)—*See Rolling Mills and Steel Works in Indiana.*

Detroit Steel and Spring Works, The Detroit Steel and Spring Company, Michigan and Hubbard avenues, Detroit, Wayne county. First put in operation in May, 1882; 13 large and 20 small heating furnaces, 3 trains of rolls, (9, 12, and 18-inch,) and 3 hammers; product, merchant steel; annual capacity, 40,000 gross tons. Robert-Bessemer Steel Casting Department built in 1889 and put in operation in July, 1889; two 2-gross-ton converters; first blow made July 11, 1889; product, steel castings; annual capacity, 5,000 gross tons. Spring shops for the manufacture of locomotive, elliptic, and spiral springs of all kinds for railroad and other purposes are connected with the works; annual capacity, 20,000 gross tons. Fuel, petroleum and coal. Brand, the letter "D" in a triangle. T. H. Newberry, President and Treasurer; DeWitt Loomis, Vice-President and General Manager; Allen W. Atterbury, Secretary; John S. Newberry, Assistant Man-

ager. Selling agent, James W. Harty, Chicago. (One 30-pot crucible steel-melting furnace, abandoned.)

Harrow Spring Company, Kalamazoo, Kalamazoo county. Built in 1900-1 and first put in operation January 30, 1901; 2 reverberatory heating furnaces and 2 trains of rolls (one 9 and one 16-inch); product, merchant steel; annual capacity, 10,000 gross tons. Fuel, bituminous coal. Jacob K. Wagner, President; E. R. Burdick, Secretary; W. P. Burdick, Treasurer and General Manager.

Michigan-Peninsular Works, American Car and Foundry Company, Lincoln Trust Building, St. Louis, Missouri. Works at Detroit, Wayne county, Michigan.—*For description of works see pages 145-6.*

Muskegon Works, American Tin Plate Company, Battery Park Building, New York City. Works at Muskegon, Muskegon county, Michigan.—*For description of works see pages 42-3.*

Seamless (The) Steel Tubes Company, 804 Union Trust Building, Detroit, Wayne county. Works at 833 River street, Detroit. Built in 1900 and first put in operation January 1, 1901; 3 heating furnaces, 1 piercing machine, and 2 sets of eccentric rolls; product, rolled blanks, all consumed by the company in the manufacture of seamless-drawn steel tubes; annual capacity, 3,000 gross tons of blanks. Fuel, bituminous coal and crude oil. James McMillan, President; William Thornburgh, Vice-President and General Manager; W. C. McMillan, Secretary and Treasurer; George M. Black, Auditor.

Number of rolling mills and steel works in Michigan: 6. Of these 1 makes Robert-Bessemer steel and 1 makes open-hearth steel.

WISCONSIN.

COKE FURNACES—5.

Mayville Furnace, The Northwestern Iron Company, Pabst Building, Milwaukee. Furnace at Mayville, Dodge county. One stack, 77 x 17, built in 1848 as a charcoal furnace, rebuilt in 1872 and 1884, and remodeled and enlarged in 1887 to use coke; again remodeled and enlarged in 1896; three Cowper-Foote stoves, each 60 x 18; fuel, Connellsville coke; ores, Menominee, Marquette, Gogebic, and local; product, Bessemer and foundry pig iron; annual capacity, 60,000 gross tons. Brands, "Sidney" and "Gertrude." Irving M. Bean, President and Treasurer, and James C. Spencer, Vice-President, Milwaukee; W. K. Packman, Secretary and Superintendent, Mayville. Selling agents, Pickands, Brown & Co., Chicago.—*Active in 1901.*

Milwaukee Works: Bay View Furnaces, The Illinois Steel Company, Rookery Building, Chicago. Furnaces at Milwaukee, Milwaukee county, Wisconsin. Two stacks; fuel, coke.—*For description of furnaces see page 13.*

Minerva Furnace, The Thomas Furnace Company, Milwaukee, Milwau-

kee county. One stack, 75 x 16, built and put in blast in the spring of 1873; rebuilt in 1892 and in 1901; two Hugh Kennedy hot-blast stoves, each 18 x 60, and one Massicks & Crooke stove, 18 x 75; fuel, Connellsville coke; ore, Lake Superior; product, foundry, malleable, and Bessemer pig iron; annual capacity, 75,000 gross tons. Brand, "Minerva." John M. Thomas, President, and E. C. Crowther, Superintendent, Milwaukee; T. E. Thomas, Vice-President, and W. Aubrey Thomas, Secretary, Niles, Ohio.—*Active in 1901.*

Spring Valley Furnace, Page Cherry, Trustee, 135 Adam street, Chicago. Furnace at Spring Valley, Pierce county, Wisconsin. One stack, 65 x 13, built in 1892-3 to use charcoal for fuel; equipped with machinery from the Fannie Furnaces, at Shawnee, Ohio; first blown in February 20, 1894; fuel changed from charcoal to coke in 1899; two 60-pipe Pollock stoves; ore, brown hematite, mined 1½ miles from the furnace; product, malleable, foundry, and forge pig iron; annual capacity, 22,000 gross tons. Brand, "Spring Valley Iron." (Formerly called Eagle Furnace.)—*Active in 1900.*

Number of coke furnaces in Wisconsin: 5 stacks.

CHARCOAL FURNACES—1.

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; remodeled in 1897; closed top; two Whitwell stoves; hot blast; ore, Lake Superior; product, foundry, car-wheel, and malleable pig iron; annual capacity, 45,000 gross tons. Brand, "Hinkle." A plant for the manufacture of charcoal, consisting of 60 Hottentot kilns, is connected with the furnace; also a chemical plant for the manufacture of by-products. Joseph H. Berry, President, and William G. Smith, Secretary and Treasurer, Detroit, Michigan; W. H. Hinkle, Acting Vice-President, and Lewis E. Dunham, Manager, Ashland, Wisconsin. Selling agents for the United States and abroad, Rogers, Brown & Co., Boston, Buffalo, New York, Pittsburgh, Cincinnati, Cleveland, Chicago, St. Louis, San Francisco, and Birmingham; Rogers, Brown & Warner, Philadelphia.—*Active in 1901.*

Number of charcoal furnaces in Wisconsin: 1 stack. Total number of furnaces in Wisconsin: 6 stacks.

ROLLING MILLS AND STEEL WORKS—9.

Crucible Steel Casting Company, 484-6 Clinton st., Milwaukee, Milwaukee county. Five 3-hole crucible steel-melting furnaces, built in 1898; first steel made in December of that year; 10 pots can be used at a heat; product, machinery castings of all kinds; annual capacity, 900 gross tons. Fuel, oil. F. A. Lange, President and Manager; C. F. Maynard, Secretary and Treasurer.

Dutcher (The J. A. and P. E.) Company, Milwaukee, Milwaukee

county. Four 4-pot Noble liquid-fuel crucible steel-melting furnaces, built in 1889 and first steel made in that year; one 3-gross-ton Wellman rotary acid open-hearth steel furnace, built and put in operation in 1895; product, chiefly bicycle and machinery castings; annual capacity, 900 gross tons of open-hearth castings and 75 tons of crucible castings. Fuel, oil. P. E. Dutcher, President; A. E. Dutcher, Vice-President; H. B. Goodrich, Secretary and Treasurer.

Eagle Horse Shoe Company, South Milwaukee, Milwaukee county. Built in 1892 and first put in operation July 1, 1892; destroyed by fire in 1901 and rebuilt in the same year; 2 forge fires, 8 heating furnaces, 3 trains of rolls, (one 9, one 10, and one 16-inch,) and 4 horseshoe machines; product, horseshoes, mule shoes, and bar iron; annual capacity, 15,000 gross tons of bar iron and 120,000 kegs of horseshoes. Fuel, coal and oil. Brand, "Eagle Horse Shoes." George B. Van Norman, President; James McAlpine, Vice-President and Treasurer; L. A. McElroy, Secretary and General Manager.

Falk (The) Company, Milwaukee, Milwaukee county. One 18-gross-ton Wellman-Seaver acid open-hearth steel furnace, built in 1900 and first steel made April 7, 1900; product, all kinds of open-hearth steel castings; annual capacity, 5,400 gross tons. Fuel, manufactured gas. Herman W. Falk, President; Otto H. Falk, Vice-President; Clement C. Smith, Second Vice-President; Adolph Quentin, Third Vice-President; E. A. Wurster, Secretary and Treasurer; Charles L. Jones, Assistant Secretary.

Milwaukee Works, The Illinois Steel Company, Rookery Building, Chicago. Works at Milwaukee, Milwaukee county, Wisconsin.—*For description of works see page 15.*

Shaw (The) Steel Casting Company, Milwaukee, Milwaukee county. Built in 1894; four crucible steel-melting furnaces with 3 chambers each; 18 holes can be used at a heat; first crucible steel made November 27, 1894; one 1-gross-ton acid open-hearth steel furnace, erected in 1897; first open-hearth steel made October 15, 1897; product, steel castings; annual capacity, 750 gross tons. Fuel, oil. B. T. Leuzarder, President; J. D. Miller, Vice-President; T. H. Rice, Secretary and Treasurer; David McLain, Foundry Superintendent.

Smith (George H.) Steel Casting Company, successors to Milwaukee Steel Casting Company, Milwaukee, Milwaukee county. Chicago office, 86 Lake st. Built in 1897; two 2-gross-ton special steel converters, built in 1899; first steel made in April, 1899; product, steel castings; annual capacity, 2,000 gross tons. One 6-pot crucible steel furnace, which is used for melting metal for the converters. Fuel, oil. George H. Smith, President and Manager; F. E. Hinners, Secretary and Treasurer. Selling agent, A. W. Wagner, 86 Lake st., Chicago. (One 6,000-lb. acid open-hearth steel furnace dismantled in 1898. Formerly operated by the Milwaukee Steel Casting Company.)

Waukesha (The) Sheet Steel Company, Waukesha, Waukesha county. Built in 1901 and first put in operation November 4, 1901; 2 bar heating and 6 annealing furnaces, 1 bar mill, 6 sheet mills, and 3 cold mills; product, black plates for tinning and galvanized sheets; annual capacity, 18,000 gross tons. Fuel, coal, but peat may be used. A galvanizing department is connected with the works. F. J. Patterson, President; John E. Jones, Vice-President and General Manager; George Firmenich, Secretary and Treasurer.—*See Tinplate Works in Wisconsin.*

West Superior Branch, United States Cast Iron Pipe and Foundry Company, 80 Broadway, New York City. Works at West Superior, Douglas county, Wisconsin.—*For description of works see page 140.*

Number of rolling mills and steel works in Wisconsin: 9. Of these 1 has a Bessemer steel plant, 3 make open-hearth steel, 4 have crucible steel plants, and 1 makes special steel.

MINNESOTA.

COKE FURNACES—1.

West Duluth Furnace, Duluth Furnace Company, Duluth. Furnace at West Duluth, St. Louis county. One stack, 76 x 16, built in 1889-90; improved in 1899; three Gordon-Whitwell-Cowper stoves; fuel, coke, made principally at Duluth from Connellsville coal; ore, Mesabi; product, Bessemer, malleable, and foundry pig iron; annual capacity, 60,000 gross tons. Brand, "Thomas." John M. Thomas, President, Milwaukee, Wisconsin; T. E. Thomas, Vice-President, Niles, Ohio; John G. Williams, Secretary, Duluth. Sales made by the company.—*Active in 1900.*

Number of furnaces in Minnesota: 1 coke stack.

ROLLING MILLS AND STEEL WORKS—4.

American Hoist and Derrick Company, St. Paul, Ramsey county. Branch offices, 60 South Canal st., Chicago; Taylor Building, New York City; Hennen Building, New Orleans. One 2-gross-ton Tropenas converter, built in 1900; first steel made July 1, 1900; product, steel castings; annual capacity, 1,000 gross tons. Fuel, coke. Oliver Crosby, President; F. J. Johnson, Secretary; H. S. Wood, Treasurer.

Duluth Car Works, Metropolitan Life Insurance Company, owners, New York City. Works at Duluth, St. Louis county, Minnesota. 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, rods, bolts, and forgings; annual capacity, 11,000 gross tons of rolled iron and 4,500 tons of forgings. Fuel, coal. A car-wheel plant, a car-axle plant, and a large carbuilding plant are connected with the works. O. H.

Simonds, Agent, Duluth, Minnesota. (Formerly operated by the Rupley Iron Company, lessee).—*Idle and for sale or lease.*

Ironton Structural Steel Works, Duluth, St. Louis county. Built in 1892-3; 2 gas heating furnaces and two 30-inch trains of rolls. One 20-gross-ton acid open-hearth steel furnace, erected in 1895; first steel made in June, 1895; annual capacity, 10,000 gross tons of ingots. Product, structural steel; annual capacity, 35,000 gross tons. Fuel, coal and manufactured gas. (Owned by the estate of John E. Searles; George D. Beatty, Receiver, 27 William st., New York City; O. H. Simonds, Agent, Duluth, Minnesota).—*Idle and for sale.*

Minnesota Iron Works, operated by the Minnesota Iron and Steel Company, Columbia Heights, Anoka county. Controlled by the Republic Iron and Steel Company, Stock Exchange Building, Chicago.—*For description of works see page 74.*

Number of rolling mills and steel works in Minnesota: 4. Of these 2 make open-hearth steel and 1 makes Tropenas steel.

MISSOURI.

COKE FURNACES—1.

Missouri Furnace, The St. Louis Blast Furnace Company, Union Trust Building, St. Louis. Furnace at South St. Louis. One stack, No. 2, 76 x 15, built in 1869 and blown in in 1870; remodeled in 1887 and rebuilt in 1895; one Massicks & Crooke and two Gordon-Whitwell-Cowper stoves; fuel, Connellsville coke; ores, Iron Mountain and West Plains; product, Bessemer, basic open-hearth, malleable Bessemer, and foundry pig iron cast in chills; annual capacity, 70,000 gross tons. Brands, "Missouri" and "Carondelet." Charles A. McNair, President; Arthur P. DeCamp, Vice-President; William Yule, Secretary; Frank B. DeCamp, General Manager. Sole selling agents, DeCamp Brothers & Yule, St. Louis. (One stack, No. 1, 58 x 15, built in 1869, dismantled in 1900).—*Active in 1901.*

Number of coke furnaces in Missouri: 1 stack.

CHARCOAL FURNACES—1.

Sligo Furnace, Sligo Furnace Company, Wells Building, 509 Olive street, St. Louis. Furnace at Sligo, Dent county. One stack, 55 x 11, built in 1880 and rebuilt in 1891; hot blast; ores, blue specular and red oxide mined near the furnace; product, Bessemer, foundry, car-wheel, and malleable pig iron; annual capacity, 20,000 gross tons. Brand, "Sligo." Edward F. Goltra, President, and O. S. Pulliam, Secretary and Treasurer, St. Louis; James G. McRoberts, Superintendent, Sligo. Sales made by the company.—*Active in 1901.*

Number of charcoal furnaces in Missouri: 1 stack. Total number of furnaces in Missouri: 2 stacks.

ROLLING MILLS AND STEEL WORKS—7.

- 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, 11 heating furnaces, 2 trains of rolls, (one 10 and one 19-inch,) and 9 hammers; product, bar, rod, and band iron, coupling links and pins, car, tender, and locomotive axles, shafts, and all kinds of railroad, steamboat, and machinery forgings; annual capacity, 18,000 gross tons of rolled and 7,000 tons of forged products. Fuel, coal. W. J. McBride, President; S. C. Leonard, Vice-President and Manager; D. A. Bixby, Secretary; S. S. DeLano, Treasurer; J. M. Buick, Auditor.
- Hirsch Rolling Mill Company, Ecoff ave. and Missouri Pacific Railroad tracks, St. Louis. Built in 1900 and first put in operation July 5, 1900; 6 heating furnaces and 3 trains of rolls (one 18-inch muck, one 8-inch Belgian, and one 16-inch finishing); product, merchant and refined bar iron and steel; also iron and steel angles, shapes, spikes, bolts, light rails, etc.; annual capacity, 15,000 gross tons. Fuel, bituminous coal. Marcus A. Hirsch, President and General Manager; Cal. Hirsch, Vice-President; Eugene D. Hirsch, Secretary; L. K. Hirsch, Treasurer.
- Kansas City (The) Bolt and Nut Company, Kansas City, Jackson county. Works at cor. of Independence and Centropolis aves. Built in 1887-8 and first put in operation in January, 1889; 2 heating furnaces and one 10-inch train of rolls; product, bar and bolt iron; also bolts, nuts, spikes, etc.; annual capacity, 12,000 gross tons of bar iron and 5,000 tons of bolts, nuts, etc. Fuel, producer gas in rolling mill and petroleum in bolt works. J. H. Sternbergh, President, Reading, Pa.; P. H. Sternbergh, Vice-President and Treasurer, and R. C. Howes, Secretary and General Manager, Kansas City, Missouri.
- St. Louis Iron and Steel Foundry Company, southeast corner Eighth and Hickory streets, St. Louis. Steel plant added to an iron foundry in 1901; steel had not been made down to November 25, 1901; two 2-gross-ton Tropenas steel converters; product, steel castings for machinery; annual capacity, 4,800 gross tons. Fuel, coal and coke. W. Grayson, President; A. W. Henry, Vice-President and General Manager; C. A. Pullis, Secretary.
- St. Louis Rolling Mills, National Enameling and Stamping Company, 81-3 Fulton street, New York City. Works at Second and Destrehan streets, St. Louis, Missouri.—*For description of works see page 150.*
- St. Louis Steam Forge and Iron Works, corner Main and Miller sts., St. Louis. Built in 1862; destroyed by fire in March, 1901, and immediately rebuilt; 1 double puddling furnace, 4 forge fires, 10 heating furnaces, 1 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, coal. G. C. McDonald, President; C. L. McDonald, Secretary and Treasurer.

Scullin-Gallagher Iron and Steel Company, Kraft street and Manchester avenue, St. Louis. Built in 1899-1900; three 20-gross-ton special open-hearth steel furnaces (1 acid and 2 basic); first steel made in September, 1900; product, miscellaneous steel castings up to 60,000 pounds; specialty, metal for electrical purposes of high permeability; annual capacity, 25,000 gross tons. Fuel, manufactured gas. Harry Scullin, President; Thomas M. Gallagher, Vice-President and General Manager; V. C. Turner, Secretary and Treasurer.

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

KANSAS.

ROLLING MILLS—1.

Kansas City Plant, American McKenna Process Company, Milwaukee, Wisconsin. Works at Kansas City, Wyandotte county, Kansas. Built in 1898 and first put in operation August 16, 1898; two 12 x 35-foot heating furnaces and 3 trains of rolls (one 12 and two 24-inch, arranged tandem); product, renewed steel rails by the McKenna process; annual capacity, 100,000 gross tons. Fuel, bituminous coal. D. H. Lentz, Manager.—*See Rolling Mills and Steel Works in New Jersey (Tremley Point Plant) for a list of officers; also Rolling Mills and Steel Works in Illinois, (Joliet Plant.)*

Number of rolling mills in Kansas: 1. There are no blast furnaces in Kansas.

COLORADO.

COKE FURNACES—3 COMPLETED, 2 BUILDING, AND 2 PROJECTED.

Minnequa Furnaces, The Colorado Fuel and Iron Company, Boston Building, Denver. Furnaces at Pueblo, Pueblo county. Three completed stacks, two stacks building, and two stacks projected; fuel, coke.—*For description of furnaces see page 123.*

Number of coke furnaces in Colorado: 3 completed stacks, 2 stacks building, and 2 stacks projected.

ROLLING MILLS AND STEEL WORKS—2.

Minnequa Rolling Mills and Steel Works, The Colorado Fuel and Iron Company, Boston Building, Denver. Works at Pueblo, Pueblo county.—*For description of works see pages 123-4.*

Union Rolling Mills, Union Rolling Mill and Foundry Company, Denver, Arapahoe county. New York office, 71 Broadway. Built in 1894 and improved in 1900; 2 coal-fired heating furnaces and 1 10-inch train of rolls; product, merchant bar iron, bolts, and 8, 12,

and 16-lb. T rails; annual capacity, 6,000 gross tons. Fuel, coal. Brand, "Union." William Rotch, President, Boston, Massachusetts; E. L. Harper, Vice-President and General Manager, Thomas S. Holmes, Secretary, and Hermann Cohen, Treasurer, 71 Broadway, New York City; W. P. Harris, Superintendent, Denver, Colorado. Sales made by the company. (Formerly operated by The Denver Rolling Mills and Iron Company; later by the Union Steel and Chain Company.)

Number of rolling mills and steel works in Colorado: 2. Of these 1 makes Bessemer steel and 1 open-hearth steel plant is being built.

WYOMING.

ROLLING MILLS—1.

Laramie Rolling Mills, operated by The Laramie Iron and Steel Company, Laramie, Albany county. The stock of The Laramie Iron and Steel Company is owned by The Colorado Fuel and Iron Company. —*For description of works see page 124.*

Number of rolling mills in Wyoming: 1. There are no blast furnaces in Wyoming.

WASHINGTON.

CHARCOAL FURNACES—1.

Irondale Furnace, The Pacific Steel Company, Irondale, (via Port Townsend,) Jefferson county. One stack, 50 x 10, built in 1880-1; blown in January 27, 1881; rebuilt in 1882-3, remodeled in 1884, and overhauled in 1901; closed top, with patent bell and hopper; iron stove; fuel, charcoal or coke, to be used experimentally; ores, bog and magnetic, mined in Jefferson county and on Texada Island, British Columbia; product, foundry pig iron; annual capacity, 10,000 gross tons. C. W. Wells, President, E. D. York, Secretary, and O. F. Thomas, Treasurer, 71 Broadway, New York City; Homer H. Swaney, Vice-President, and Frederick Crabtree, Superintendent of Furnace, Irondale, Washington.—*Blown in on December 15, 1901, after an idleness of several years. See Projected Rolling Mills and Steel Works in this State.*

Number of furnaces in Washington: 1 charcoal stack.

ROLLING MILLS—1.

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 30-ton hammer; product, merchant bar iron; annual capacity, 24,000 gross tons. Fuel, bituminous coal. E. M. Wilson,

President and Treasurer; Alexander Bain, Vice-President; William S. Burt, Secretary; William D. Jones, Superintendent.

PROJECTED ROLLING MILLS AND STEEL WORKS—1.

Pacific (The) Steel Company, Irondale, (via Port Townsend,) Jefferson county. Contemplates erecting a rolling mill and an open-hearth steel plant at Irondale.—*See Irondale Furnace in this State.*

Number of rolling mills and steel works in Washington: 1 completed rolling mill and 1 projected rolling mill and open-hearth steel plant.

OREGON.

CHARCOAL FURNACES—1.

Oswego Furnace, Oregon Iron and Steel Company, Oswego, Clackamas county. Main office and telegraph address, Sherlock Building, Portland. One stack, 60 x 13, built in 1888 and first blown in in October, 1888; three Whitwell stoves; hot blast; 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." The company owns and operates a cast-iron pipe foundry at Oswego. William M. Ladd, President; Charles E. Ladd, Vice-President; A. S. Pattullo, Secretary and General Superintendent.—*Furnace idle since 1894; cast-iron pipe foundry in operation.*

Number of furnaces in Oregon: 1 charcoal stack.

ROLLING MILLS—1.

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, crude oil. W. B. Ayer, President; H. C. Jeffers, Secretary; N. E. Ayer, Treasurer and Manager. (Formerly operated by N. E. Ayer & Co.)

Number of rolling mills in Oregon: 1.

CALIFORNIA.

ROLLING MILLS AND STEEL WORKS—3.

Judson Manufacturing Company, Oakland, Alameda county. Office and salesroom, cor. Howard and Beale sts., San Francisco. Built in 1882; 5 oil heating furnaces, one 4-door 7 x 18 gas heating furnace, 4 trains of rolls, (one 8, one 10, and two 16-inch,) 15 cut-nail machines, and 16 wire-nail machines; product, bar iron, tack plate, tacks, fine lath and cut nails, and structural and agricultural shapes; annual capacity, single turn, 11,000 gross tons of finished iron, 25,000 kegs of cut nails, and 35,000 kegs of wire nails. Fuel, oil. Brand,

"Judson." H. E. Bothin, President and General Manager; J. D. Osborne, Secretary. Sales made from the San Francisco office.

Southern Pacific Company Rolling Mill, Southern Pacific Company, Sacramento, Sacramento county. Built in 1881; 13 heating furnaces, 4 trains of rolls, (two 12 and two 18-inch,) and 6 hammers; product, all kinds of bar and shaped iron, including I beams, angle iron, etc.; annual capacity, 25,800 gross tons of rolled and 4,000 tons of forged products. Fuel, Australian coal. Brand, "S. P. Co." H. J. Small, General Manager of Mill. (Formerly called the Central Pacific Railroad Rolling Mill.)

Union Iron Works, San Francisco, San Francisco county. London office, Moorgate Court, Moorgate Place, London, E. C., England. One 2-gross-ton Tropenas steel converter, erected in 1899; first steel made November 4, 1899; product, steel castings, consumed in the company's shipbuilding plant; annual capacity, 2,000 gross tons. Fuel, coke and oil. Steel plant may be enlarged. A hydraulic press for forgings and a large bending press for handling and shaping heavy steel plates for ship work are connected with the works. H. T. Scott, President and Treasurer; Irving M. Scott, Vice-President and General Manager; J. O'B. Gunn, Secretary; G. W. Dickie, Manager. Number of rolling mills and steel works in California: 3. Of these 1 makes Tropenas steel. There are no active blast furnaces in California.

UNITED STATES.

Total number of furnaces in the United States in November, 1901, which were then active or may some time be put in blast: 406 stacks. Of these 55 use charcoal as fuel, 5 use charcoal and coke mixed, 85 use anthracite coal or mixed anthracite coal and coke, and 261 use coke or raw bituminous coal. In addition there were 12 furnaces building and 7 furnaces projected, one of which was partly built and work suspended.

Total number of furnaces in April, 1898: 420 stacks.

Total number of rolling mills and steel works in the United States in November, 1901: 527 completed, 28 building, 1 rebuilding, 1 to be rebuilt, and 6 projected. Of these 35 have Bessemer steel plants, 1 Bessemer steel plant is being built, and 1 Bessemer steel plant is projected; 1 has a Clapp-Griffiths steel plant, 2 have Robert-Bessemer steel plants, 8 have Tropenas steel plants and 1 Tropenas steel plant is projected, 112 have open-hearth steel plants, 12 open-hearth steel plants are being built, 1 open-hearth steel plant is to be rebuilt, and 13 open-hearth steel plants are projected; 45 have crucible steel plants, 3 crucible steel plants are being built, and 1 crucible steel plant is projected; 8 have plants for making blister steel, 3 have plants for making special steel, and 2 have plants for making McHaffie steel. Total number of rolling mills and steel works in April, 1898: 504.

ABANDONED, DISMANTLED, OR LONG INACTIVE IRON AND STEEL WORKS.

This list embraces blast furnaces, rolling mills, steel works, forges, and bloomaries which have been abandoned or have been long inactive and which did not appear in the abandoned and inactive list of the Directory for 1898 or in previous editions of the Directory. Some of the establishments named below have been inactive for several years but are still equipped with fair machinery; others, however, have been permanently abandoned. When companies or individuals are mentioned it is understood that they were the owners at the time the properties were reported to us as abandoned or inactive.

NEW HAMPSHIRE.

ROLLING MILLS AND STEEL WORKS.

Nashua Iron and Steel Company, Nashua, Hillsborough county. Built in 1848; steel-tire mill added in 1867; equipped with hot trains of rolls and one 10-gross-ton basic open-hearth steel furnace; product, homogeneous steel and iron plates, steel plates, steel locomotive and car-wheel tires, bar iron, etc.—*Rolling mill and steel plant dismantled.*

MASSACHUSETTS.

ROLLING MILLS AND STEEL WORKS.

Franconia Iron and Steel Works, Wareham, Plymouth county. Built in 1866; product, bar iron of all kinds and sizes.—*Dismantled.*

Mannesmann Cycle Tube Works, Zylonite, Adams, Berkshire county.

Built in 1896 and put in operation in 1897; product, brass and copper tubes and steel blanks for seamless bicycle tubing.—*Abandoned.*

Robinson Iron Company, Plymouth, Plymouth county. Built about 1800; product, nails and tack plate.—*Dismantled.*

Worcester Cycle Manufacturing Company, Worcester, Worcester county. Rolling mill built in 1857; open-hearth steel plant erected in 1885; product, merchant steel, steel castings, etc.—*Dismantled.*

CONNECTICUT.

BLAST FURNACES.

Landon Furnace, The Landon Iron Company, Chapinville P. O., Litchfield county. One charcoal stack, 32 x 9, built in 1825.—*Abandoned.*

ROLLING MILLS AND STEEL WORKS.

Hartford Works, (Factory M.,) Shelby Steel Tube Company, Pittsburgh, Pa. Works at Hartford, Hartford county, Connecticut. Rolling mill added to tube works in 1897; product, blanks for the manufacture of seamless drawn tubes.—*Rolls removed.*

Thames (The) Iron Works, Norwich, New London county. Built in 1863; product, merchant bar iron and spike rods.—*Dismantled.*

Windsor Locks Steel Works, Farist & Windsor, Bridgeport. Works at Windsor Locks, Hartford county. Built in 1860; equipped with trains of rolls and crucible steel furnaces; product, merchant steel, tack plate, and tool and die steel.—*Abandoned.*

NEW YORK.

BLAST FURNACES.

Kirkland Furnace, Kirkland, Oneida county. One stack, 65 x 14, built in 1873 and reconstructed in 1882 and 1889; fuel, anthracite coal and coke; annual capacity, 18,000 gross tons. Address all communications to I. A. Williams, Utica.—*Idle since the fall of 1890 and for sale.*

Phenix Furnace, Estate of Caleb S. Maltby, Millerton, Dutchess county. One stack, 32 x 9, rebuilt in 1840; fuel, charcoal; annual capacity, 5,000 gross tons.—*Idle for several years.*

ROLLING MILLS AND STEEL WORKS.

Monhagen Steel Works, Wheeler, Madden, and Clemson Manufacturing Company, Middletown, Orange county. Built in 1862-3; one train of rolls and crucible steel furnaces; product, saw steel.—*Abandoned.*

Newburgh Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Newburgh, New York. Built in 1890; product, wire rods, wire, and wire nails.—*Abandoned.*

Rome Steel Company, Rome, Oneida county. Built in 1900 and first put in operation in March, 1900; product, angles and rods for iron bedsteads, rerolled from old steel rails.—*Abandoned.*

Somerton Tin Plate Works, American Tin Plate Company, Battery Park Building, New York City. Works at Brooklyn, Kings county. First put in operation in October, 1892; product, iron or steel black plates.—*Dismantled.*

IRON-ORE FORGES.

Russia Iron Works, Chateaugay Ore and Iron Company, Plattsburgh, Clinton county. Forge at Moffittsville, Clinton county. Built in 1844; product, charcoal blooms and charcoal billets.—*Abandoned.*

NEW JERSEY.

BLAST FURNACES.

Musconetcong Furnace, Musconetcong Iron Works, Stanhope, Sussex

county. One stack, 70 x 17, built in 1841; fuel, anthracite coal and coke.—*Abandoned.*

Secaucus Iron Company, Secaucus, Hudson county. Post-office and telegraph address, Rutherford, Bergen county. One stack, 65 x 17, completed in 1877 and first blown in in June, 1879; fuel, anthracite coal; annual capacity, 27,000 gross tons.—*Idle since 1893.*

ROLLING MILLS AND STEEL WORKS.

Harvey Steel Company, Brills Station, Newark, Essex county. Built in 1889; equipped with one train of rolls and two 4-pot crucible steel-melting holes.—*Abandoned.*

Lansing (The) Company, 229 West Fifty-second st., New York City. One experimental crucible steel-melting furnace, with six 100-pound pots, erected at Jersey City, Hudson county, New Jersey, in 1901; product, tool steel. Works burned September 28, 1901.—*Abandoned.*

Newark Steel Works, Benjamin Atha & Co., Newark, Essex county. Began operations in 1864; two 30-pot Siemens crucible steel-melting furnaces, 7 heating furnaces, 3 steam hammers, and 3 trains of rolls.—*Equipment described above dismantled.*

New York Switch and Crossing Company, Fifteenth and Madison sts., Hoboken, Hudson county. One 6-gross-ton acid open-hearth steel furnace, built in 1894; three 6-pot crucible steel-melting holes, built in 1896-7; product, steel castings.—*Abandoned.*

Trenton Iron Works, American Bridge Company, No. 1 Exchange Place, Jersey City, New Jersey. Works at Trenton, Mercer county. Built in 1845; product, iron and steel structural shapes, merchant bars, etc.—*Rolling mill department dismantled.*

Trenton Steel Works, Trenton, Mercer county. Built in 1891; one 7-gross-ton acid open-hearth steel furnace. Owned by the Estate of Samuel K. Wilson, Barclay L. Stokes, Executor.—*Abandoned and for sale.*

PIG AND SCRAP IRON BLOOMARIES.

Paterson Bloomary, Isaac P. Oberg, Paterson, Passaic county. Built in 1878; product, cold-blast charcoal blooms and charcoal iron for boiler plate and wire, made from scrap iron; annual capacity, 2,250 gross tons.—*Idle and for sale.*

PENNSYLVANIA.

BLAST FURNACES.

Atlantic Furnace, Atlantic Iron and Steel Company, New Castle, Lawrence county. One stack, 75 x 16, built in 1868; fuel, coke. Controlled by the Republic Iron and Steel Company.—*Dismantled.*

Bethlehem Steel Company, South Bethlehem, Northampton county. One stack, No. 1, 61 x 15½, built and blown in in 1863; fuel, anthracite coal and Connellsville coke.—*Abandoned.*

- Boiling Springs Iron Company, Boiling Springs, Cumberland county. One stack, 33 x 12, built in 1798 by Michael Ege and rebuilt in 1815; fuel, charcoal; annual capacity, 3,000 gross tons.—*Idle since 1894.*
- Chestnut Grove Furnace, John C. Long, Carlisle. Furnace at Idaville, Adams county. One stack, 32 x 8½, built in 1830; fuel, charcoal; annual capacity, 1,500 gross tons.—*Idle since 1894.*
- Coleraine Iron Works, Estate of William T. Carter, deceased, Redington, Northampton county. Two stacks, each 60 x 17, built in 1869 and 1872; fuel, anthracite coal.—*Dismantled.*
- Edith Furnace, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Furnace in Allegheny City. One stack, 75 x 16½, built in 1882; fuel, coke.—*Abandoned.*
- Eliza Furnaces, Jones & Laughlins, Limited, Pittsburgh, Allegheny county. Two stacks: old No. 2, 75 x 15, built in 1861, and old No. 3, 80 x 20, built in 1886-7; fuel, coke.—*Dismantled.*
- Emma Furnace, Logan Iron and Steel Company, Burnham, Mifflin county. One stack, 54 x 10½, built in 1867; fuel, coke.—*Abandoned.*
- Falling Spring Furnace, Bonbrake, Burkhart & Co., Chambersburg, Franklin county. One stack, 40 x 8½, built in 1880; fuel, charcoal; annual capacity, 3,000 gross tons.—*Idle since 1892.*
- Glendon Iron Works, Glendon Iron Company, Easton, Northampton county. Established in 1843. Furnaces at Glendon, near Easton. Two stacks, No. 2 and No. 3, each 81 x 18; dismantled. Original furnaces were first blown in in 1844, 1845, 1850, and 1869; fuel, anthracite coal and coke. Three other stacks were dismantled in 1890 and 1897.—*All dismantled.*
- Jackson Iron Company, Berwick. Furnace at Gleniron, Union county. One stack, 35 x 8, built in 1827; abandoned in 1856; revived in July, 1880; fuel, charcoal; annual capacity, 2,500 gross tons. (Formerly called the Berlin Iron Works.)—*Idle for several years and for sale.*
- Jefferson Furnace, Mrs. 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; fuel, charcoal; annual capacity, 2,300 gross tons.—*Idle for several years and for sale.*
- Joanna Furnace, Estate of L. Heber Smith, Joanna Furnace, Berks county. One stack, 45 x 8½, built in 1792 by Potts & Rutter and rebuilt in 1847; remodeled in 1889; fuel, charcoal; annual capacity, 4,000 gross tons.—*Idle since 1898.*
- Keystone Furnace, Reading Iron Company, Reading, Berks county. One stack, 65 x 14½, built in 1873; fuel, anthracite coal and coke.—*Abandoned.*
- Lackawanna Furnaces, Lackawanna Iron and Steel Company, Buffalo, New York. Furnaces at Scranton, Lackawanna county. Three stacks: two built in 1849 and one in 1872; No. 1, 80 x 17; No. 2, 75 x 16½; No. 3, 75 x 16½; fuel, anthracite coal and coke.—*Dismantled.*

Mabel Furnace, Perkins & Co., Limited, Sharpsville, Mercer county.

One stack, No. 2, 65 x 15, built in 1880; fuel, coke.—*Dismantled.*

Maiden Creek Furnace, Jacob K. Spang, Reading. Furnace at Lenhartsville, Berks county. One stack, 33 x 9, built in 1854; fuel, charcoal; annual capacity, 3,500 gross tons.—*Idle for several years.*

Mont Alto Furnace, Mont Alto Iron Company, David Knepper, Receiver, Mont Alto, Franklin county. 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 the same year to 50 x 11; fuel, charcoal.—*Idle since 1892.*

Norristown Iron Works, Frank Samuel, Harrison Building, Philadelphia. Furnace at Norristown, Montgomery county. One stack, 55 x 16, built in 1869; fuel, anthracite coal and coke.—*Dismantled.*

Pine Grove Furnace, South Mountain Mining and Iron Company, Pine Grove Furnace P. O., Cumberland county. One stack, 53 x 9, built in 1770; fuel, charcoal; annual capacity, 5,000 gross tons.—*Idle since 1895.*

Rockhill Furnaces, Rockhill Iron and Coal Company, Rockhill Furnace, Huntingdon county. Office, 320 Walnut st., Philadelphia. Two stacks, one, 65 x 17, and one, 65 x 15, built in 1875 and blown in January 1, 1876; fuel, coke; annual capacity, 30,000 gross tons.—*Idle since 1893.*

Shenango Furnace, National Steel Company, Carnegie Building, Pittsburgh. Furnace at New Castle, Lawrence county. One stack, 80 x 17½, built in 1872; fuel, coke.—*Dismantled.*

Tom Thumb Furnace, Arthur Losey, Point Marion, Fayette county. One stack, 20 x 4½, built in 1900 and blown in October 22, 1900; destroyed by an explosion on the same day; fuel, coke.—*Abandoned.*

ROLLING MILLS AND STEEL WORKS.

Apollo Sheet Iron Mills, The American Sheet Steel Company, Battery Park Building, New York City. Works in Westmoreland county, Pa. Built in 1886; product, fine sheet iron, black plates, etc. (Formerly operated by P. H. Laufman & Co.)—*Dismantled.*

Atlantic Works, American Steel Hoop Company, Carnegie Building, Pittsburgh. Works at Sharon, Mercer county. Built in 1867; product, bar, plate, hoop, and rod iron, and cut nails. (Formerly operated by the P. L. Kimberly Company.)—*Dismantled.*

Bellefonte Iron and Nail Works, Henry A. Hitner's Sons, Philadelphia. Works at Bellefonte, Centre county. Built in 1881-2; product, muck bar, bar iron, and cut nails and spikes.—*Dismantled.*

Blairsville Works, American Tin Plate Company, Battery Park Building, New York City. Works at Blairsville, Indiana county. Built in 1892; product, black plates for tinning. (Formerly operated by the Blairsville Rolling Mill and Tin Plate Company.)—*Dismantled.*

Braeburn Steel Company, Braeburn, Westmoreland county. One 5-gross-ton Siemens basic open-hearth steel furnace; first open-hearth

steel made in January, 1898; product, bar and tool steel.—*Open-hearth furnace only dismantled.*

Columbia Works, National Steel Company, Carnegie Building, Pittsburgh. Works at Uniontown, Fayette county. Built in 1886-7; equipped with two 5-gross-ton Bessemer steel converters and several trains of rolls; product, blooms, billets, slabs, and special shapes. (Formerly operated by The Columbia Iron and Steel Company.)—*Dismantled.*

Davis Brothers Rolling Mill, Davis Brothers, Canal st. near Germantown ave., Philadelphia. Built in 1874; product, bar iron, all consumed in the works in the manufacture of railroad, ship, bridge, and wharf spikes.—*Destroyed by fire in October, 1899.*

Exeter Rolling Mill, Exeter Iron Company, Drexel Building, Philadelphia. Works at Reading, Berks county. Twenty 4-pot crucible steel-melting holes; product, special steel for tools, dies, etc. (Formerly called the Diamond Steel Works.)—*Crucible furnaces only dismantled.*

Glen Iron Works, The Allentown Rolling Mills, 229 Drexel Building, Philadelphia. Works at Allentown, Lehigh county. First put in operation in 1870; product, puddled bar and spike rods.—*Dismantled.*

Hamilton Works, American Tin Plate Company, Battery Park Building, New York City. Works at West Newton, Westmoreland county, Pennsylvania. Built in 1897 and put in operation in February, 1898; product, black plates. (Formerly operated by Hamilton & Co.)—*Dismantled.*

Keystone Iron Works, 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.—*Idle and for sale or lease.*

Kirkpatrick Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Leechburg, Armstrong county. One 20-gross-ton basic and one 30-gross-ton acid open-hearth steel furnace. (Formerly called the Leechburg Iron Works.)—*Open-hearth furnaces only dismantled.*

Leechburg Rolling Mill, The American Sheet Steel Company, Battery Park Building, New York City. Works at Leechburg, Armstrong county, Pa. Built in 1886; product, fine sheet steel, etc. (Formerly called the West Penn Steel Works.)—*Dismantled.*

Lewisburg Rolling Mill, Lewisburg, Union county. Built in 1884 and first put in operation November 10, 1884; product, muck bar and cut nails.—*Dismantled.*

Lickdale Iron Works, Lebanon Rolling Mill 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.—*Dismantled.*

Linden Steel Works, W. J. Carlin Company, Lewis Building, Pittsburgh.

Works on Second ave., Pittsburgh. Open-hearth steel works, built in 1879; one 25 and two 15-gross-ton acid open-hearth furnaces; also equipped with trains of rolls.—*Dismantled*.

McIlvain (William) & Sons' Boiler Plate Mill, Reading, Berks county. First put in operation in 1857; product, every variety of steel and iron plates.—*Dismantled*.

McInnes (The) Steel Company, Emporium, Cameron county. Works for the manufacture of crucible steel erected in 1894; product, "McInnes" tool steel.—*Abandoned*.

Marshall Works, American Tin Plate Company, Battery Park Building, New York City. Works at Beach and Marlborough sts., Philadelphia. Built in 1856; product, sheets and black plates for tinning. (Formerly called the Penn Treaty Iron Works.)—*Dismantled*.

Mill A, C. R. Baird & Co., Bullitt Building, Philadelphia. Works at Catasauqua, Lehigh county; product, bars. (Formerly operated by the Catasauqua Manufacturing Company.)—*Dismantled*.

Mill D, Joseph H. McClure & Sons, 202 Walnut Place, Philadelphia. Works at Ferndale, Lehigh county; product, plates. (Formerly operated by the Catasauqua Manufacturing Company.)—*Dismantled*.

Millholland Tube Company, Reading, Berks county. Built in 1894 and put in operation the same year; product, blanks for the manufacture of seamless-drawn steel tubes.—*Dismantled*.

Neshannock Works, American Tin Plate Company, Battery Park Building, New York City. Works at New Castle, Lawrence county, Pennsylvania. Built in 1873; product, black plates for tinning. (Formerly operated by the Neshannock Sheet and Tin Plate Company.)—*Dismantled*.

New Castle Works, (Factory G.,) Shelby Steel Tube Company, Pittsburgh. Works at New Castle, Lawrence county. Built in 1895 and put in operation in December, 1895; product, blanks for the manufacture of seamless-drawn steel tubes. (Formerly called the New Castle Tube Works.)—*Dismantled*.

North Branch Steel Works, Danville Bessemer Company, Danville, Montour county. Bessemer steel works built in 1887-8 and first put in operation in October, 1899; two 4-gross-ton converters, one 32-inch blooming train, and one 22-inch shape and rail train.—*Equipment above described dismantled and removed to Canada in 1900*.

Ohio River Works, American Tin Plate Company, Battery Park Building, New York City. Works at Remington Station, Beaver county, Pa. Built in 1895 and put in operation August 22, 1896; product, sheet iron and black plates for tinning. (Formerly operated by the Ohio River Sheet and Tinplate Company.)—*Dismantled*.

Orient Steel Works, Preble ave., Allegheny, Allegheny county. Built at Leechburg, Armstrong county, in 1881, and removed to Allegheny in 1890; one 10-gross-ton acid open-hearth steel furnace, one 8-ton

hammer, and 2 trains of rolls; product, ingots, steel sheets, bars, strips, and light gauges of sheets and plates for stamping purposes. (Formerly called the West Penn Steel Works.)—*Dismantled.*

Pittsburgh Sheet Manufacturing Works, The American Sheet Steel Company, Battery Park Building, New York. Works at Shousetown, Allegheny county, Pa. Built in 1899 by the Pittsburgh Sheet Manufacturing Company; product, iron and steel sheets.—*Dismantled.*

Pittsburgh Works, American Steel Casting Company, Thurlow Station, Chester. Works at Twenty-sixth and Railroad sts., Pittsburgh. Built in 1871; 2 open-hearth steel furnaces; product, steel castings.—*Abandoned.*

Portage Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Duncansville, Blair county, Pa. Wire-rod train and wire-nail factory formerly operated by the Portage Iron Company, Limited, abandoned; remainder of plant operated by the American Steel Hoop Company.—*Partly dismantled.*

Reading Iron Company, Reading, Berks county. Rolling mill built in 1836; product, grooved skelp iron.—*Dismantled.*

Spang (The) Steel and Iron Company, Etna, Allegheny county. Built in 1880-1; 3 open-hearth steel furnaces (2 basic and 1 acid); two 3-ton Clapp-Griffiths steel converters, built in 1886-7; also equipped with trains of rolls; product, plates and machinery steel.—*Dismantled.*

Thorndale Iron Works, Thorndale Iron Works Company, Thorndale, Chester county. Built in 1847; product, muck bar.—*Dismantled.*

Tidewater Steel Company, Chester. Bessemer steel plant built in 1889; two 3-gross-ton converters. (Formerly called the Wellman Steel Works.)—*Bessemer converters only abandoned.*

Totten and Hogg Iron and Steel Foundry Company, Twenty-fourth st. and A. V. Railway, Pittsburgh. One 15-gross-ton acid open-hearth steel furnace; product, steel castings.—*Abandoned. Company operates an iron foundry.*

United States Investment Company, Limited, 216 Fourth ave., Pittsburgh. Rolling mill for the manufacture of black plates partly erected at Hammondville, Fayette county, in 1892; work suspended.—*Abandoned.*

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, plates; annual capacity, 10,000 gross tons. Fuel, bituminous coal.—*Idle and for sale.*

Walter Steel Company, Reading, Berks county. Built in 1899; product, crucible steel castings.—*Abandoned.*

Washington Works, American Tin Plate Company, Battery Park Building, New York City. Works at Washington, Washington county, Pa.

Built in 1896; product, black plates for tinning. (Formerly called the Washington Steel and Tin Plate Mills.)—*Dismantled.*

Watsonstown Nail Works, J. E. Godcharles, Watsonstown, Northumberland county. Built in 1886-7; first put in operation in May, 1887; product, muck bar and iron and steel cut nails.—*Destroyed by fire in 1901.*

Woodsons (The) Steel Company, Pittsburgh. Contemplated erecting a rolling mill and steel plant on the Monongahela river in Allegheny county for the manufacture of Bessemer steel.—*Enterprise abandoned.*

PIG AND SCRAP IRON BLOOMARIES.

Laurel Forge, South Mountain Mining and Iron Company, Pine Grove Furnace, Cumberland county. Built in 1830; product, charcoal blooms.—*Dismantled.*

Mont Alto Iron Works, Mont Alto Iron Company, David Knepper, Receiver, Mont Alto, Franklin county. Built in 1866; product, charcoal blooms.—*Idle for several years.*

DELAWARE.

ROLLING MILLS AND STEEL WORKS.

Edge Moor Iron Company, Edge Moor, New Castle county. Rolling mill partly built in 1882 and completed in 1897; product, sheared and universal plates.—*Dismantled.*

Riverside Iron Works, Delaware Iron Company, New Castle, New Castle county. Mill removed from Bristol, Pa., to New Castle in 1874-5; product, charcoal boiler plate, tank plate, and other iron.—*Dismantled.*

Wilmington Malleable Iron Company, Wilmington, New Castle county. One 8-gross-ton Siemens open-hearth steel furnace, built in 1895; product, malleable iron castings.—*Furnace dismantled.*

MARYLAND.

BLAST FURNACES.

Isabella Furnace, Blue Mountain Iron and Steel Company, Hale Building, Philadelphia. Furnace at Catoctin, Frederick county, Maryland. One stack, 32 x 9, built in 1856; fuel, charcoal; annual capacity, 3,300 gross tons.—*Idle since 1893.*

Stickney (The) Iron Company, Canton, Baltimore county. One charcoal stack, Furnace B, 48 x 11, blown in May 15, 1882.—*Dismantled.*

ROLLING MILLS AND STEEL WORKS.

Baltimore Works, American Tin Plate Company, Battery Park Building, New York City. Works at Locust Point, Baltimore, Maryland. Built in 1862; product, black plates for tinning. (Formerly operated by the Baltimore Tin Plate Company.)—*Dismantled.*

Cumberland Steel and Tinplate Works, Crucible Steel Company of America, Empire Building, Pittsburgh, Pa. Works at Cumberland, Allegany county, Md. One 24-pot crucible steel-melting furnace; first steel made in 1872; product, tool and spring steel, agricultural steel, soft-centre steel, etc.—*Crucible furnace only dismantled; remainder of plant operated by the Maryland Sheet and Steel Company.*

South Baltimore Rolling Mill Company, 44 South st., Baltimore. Rolling mill at South Baltimore, partly erected in 1892.—*Dismantled.*

Stickney Works, American Tin Plate Company, Battery Park Building, New York City. Works at Canton, Baltimore county, Maryland. Put in operation November 5, 1895; product, black plates for tinning. (Formerly operated by The Stickney Iron Company.)—*Dismantled.*

VIRGINIA.

BLAST FURNACES.

Basic City Furnace, Basic City, Augusta county. Foundations laid at Basic City in 1890 for one coke stack, to be 75 x 16.—*Abandoned.*

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; fuel, coke; annual capacity, 15,000 gross tons.—*Idle.*

Salem Furnace, Virginia Iron, Coal, and Coke Company, Bristol, Tennessee. Furnace at Salem, Roanoke county, Virginia. One stack, 75 x 14½, built and blown in in 1891; fuel, coke.—*Dismantled.*

ROLLING MILLS.

Virginia Nail and Iron Works, Reusens, Campbell county. Built in 1867 and refitted in 1880; product, guide iron, round, square, and flat bar iron, and light T rails.—*Idle since 1891 and likely to be long inactive.*

WEST VIRGINIA.

BLAST FURNACES.

Irondale Furnace, Independence, Preston county. One stack, 60 x 13½, built in 1861; fuel, coke.—*Dismantled.*

KENTUCKY.

BLAST FURNACES.

Bellefonte Furnace, Means and Russell Iron Company, Ashland, Boyd county. Furnace in Greenup county. One stack, 33 x 10½, built in 1826; fuel, charcoal.—*Dismantled.*

ROLLING MILLS.

American Nut and Bolt Company, Newport, Campbell county. Rebuilt and fitted with new machinery in 1874; product, bar, roofing, and stove-pipe iron, bridge rods, bolts and nuts, and coach screws. (Formerly called the Anchor Iron and Steel Works.)—*Dismantled.*

TENNESSEE.

BLAST FURNACES.

Sewanee Furnace, Tennessee Coal, Iron, and Railroad Company, Birmingham, Alabama. Furnace at Cowan, Franklin county, Tennessee. One stack, 75 x 16; first blown in in 1880; fuel, coke.—*Dismantled.*

ROLLING MILLS.

Harriman Muck Bar Mill, Harriman, Roane county. Built in 1892 and first put in operation in March, 1893; product, muck bar and arch iron for railroads.—*Dismantled.*

IRON-ORE FORGES.

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 for several years.*

GEORGIA.

ROLLING MILLS.

Georgia Cotton Tie Mill, Rome, Floyd county. Built in 1889 and put in operation in July, 1889; product, bar, band, and hoop iron, and cotton-ties.—*Dismantled.*

ALABAMA.

BLAST FURNACES.

Bay State Furnace, Empire Steel and Iron Company, Catasauqua, Pa. One coke stack, partly erected at Fort Payne, DeKalb county, Alabama, in 1890-1 by the Bay State Furnace Company; work suspended in 1891.—*Dismantled.*

Fort Payne Furnace, DeKalb Furnace Company, Fort Payne, DeKalb county. One stack, 65 x 14, built in 1889-90 and blown in September 3, 1890; fuel, coke.—*Dismantled.*

Jenifer Furnace, Jenifer Furnace Company, Jenifer, Talladega county. One stack, 56 x 11, built in 1892 and blown in December 5, 1892; fuel, charcoal.—*Dismantled.*

Spathite Furnace, Tennessee Coal, Iron, and Railroad Company, Birmingham, Alabama. Furnace at Florence, Lauderdale county. One stack, 75 x 14, blown in in October, 1889; fuel, coke.—*Dismantled.*

ROLLING MILLS AND STEEL WORKS.

Alabama Steel Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Fort Payne, DeKalb county, Alabama. Built in 1889-90; two 15-gross-ton basic open-hearth steel furnaces and 2 trains of rolls; product, ingots, blooms, billets, and slabs.—*Dismantled.*

TEXAS.

ROLLING MILLS AND STEEL WORKS.

Jefferson Iron Company, Jefferson, Marion county. Rolling mill partly erected in 1891 by the Lone Star Iron Company.—*Dismantled*.

Kelly (G. A.) Plow Company, Longview, Gregg county. One 1-gross-ton Tropenas steel converter built in 1899 by the Longview Kelly Plow Manufacturing Company and first steel made in December of that year; product, steel castings.—*Abandoned*.

Texas Iron Rolling Mill, H. H. Rowland, Tyler, Smith county. Built in 1891-2; product, merchant bars, cotton-ties, etc.—*Dismantled*.

OHIO.

BLAST FURNACES.

Blanche Furnace, The Marting Iron and Steel Company, Ironton, Lawrence county. One stack, 86 x 18, first blown in in 1888; fuel, coke.—*Likely to be long inactive*.

Columbus and Hocking Coal and Iron Company, Columbus. Three stacks: Akron Furnace, at Buchtel, Athens county, one stack, 60 x 16, blown in in 1877; Winona Furnace, at Winona Furnace P. O., Hocking county, one stack, 50 x 12½, blown in February 20, 1878; Greendale Furnace, at Greendale, Hocking county, one stack, 58 x 15, blown in November 8, 1879. Fuel, raw bituminous coal.—*All dismantled*.

Fulton Furnace, Globe Iron Company, Jackson, Jackson county. One stack, 50 x 13½, built in 1868 and rebuilt in 1886-7; fuel, raw coal and coke.—*Dismantled*.

Mingo Furnace, National Steel Company, Carnegie Building, Pittsburgh. Furnace at Mingo Junction, Jefferson county, Ohio. One stack: old No. 1, 75 x 17, built in 1871 and rebuilt in 1886; fuel, coke.—*Dismantled*.

Mount Vernon Furnace, The Vernon Iron Company, Ironton. Furnace at Campbell, Lawrence county. One stack, 32 x 10½, built in 1833; fuel, charcoal.—*Abandoned*.

Phoenix Furnace, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Furnace at Youngstown, Mahoning county, Ohio. One stack, 60 x 15, built in 1854; fuel, coke.—*Dismantled*.

Tropic Furnace, Tropic Iron Company, Jackson, Jackson county. One stack, 47 x 13, built in 1872-3; fuel, raw coal.—*Dismantled*.

ROLLING MILLS AND STEEL WORKS.

Britton Works, American Tin Plate Company, Battery Park Building, New York. Works at Cleveland, Cuyahoga county, Ohio. Built in 1890-1; product, soft steel sheets and black plates for tinning. (Formerly operated by the Britton Rolling Mill Company.)—*Dismantled*.

Burgess Steel and Iron Works, Portsmouth, Scioto county. One 24-pot crucible steel-melting furnace.—*Crucible department only abandoned*.

- Cincinnati Works, American Tin Plate Company, Battery Park Building, New York City. Works at Riverside, Hamilton county, Ohio. Built in 1880 and enlarged in 1882; converted into a black plate mill in 1897; product, black plates for tinning. (Formerly operated by the Cincinnati Rolling Mill and Tin Plate Company.)—*Dismantled.*
- Cleveland (The) Steel Company, Cleveland, Cuyahoga county. Two 15-gross-ton open-hearth steel furnaces, (1 basic and 1 acid,) built in 1897; product, ingots.—*Open-hearth furnaces only dismantled.*
- Coleman Shields Works, The Continental Iron Company, Wheatland, Pa. Works at Niles, Trumbull county, Ohio. Built in 1841; product, pipe casing and tube iron. (Formerly operated by the Coleman Shields Company.)—*Dismantled.*
- Coshocton Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Coshocton, Coshocton county, Ohio. Built in 1899-1900 and first put in operation March 19, 1900; product, sheet steel. (Formerly operated by the Coshocton Rolling Mill Company.)—*Dismantled.*
- Coxey, (Jacob S.) Massillon, Stark county. Works at Pauls, Stark county, (post office, Crystal Spring.) One crucible steel-melting furnace, built in 1900; product, steel castings.—*Dismantled.*
- Leetonia Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Leetonia, Columbiana county, Ohio. Built in 1871; product, muck bar and merchant bars. (Formerly operated by the Cherry Valley Iron Works.)—*Dismantled.*
- Mansfield Works, (Factory H.,) Shelby Steel Tube Company, Pittsburgh, Pa. Works at Mansfield, Richland county, Ohio. Built in 1895-6 and first put in operation in 1896; product, blanks for the manufacture of cold-drawn seamless steel tubes. (Formerly called the Mansfield Machine Works.)—*Rolls removed.*
- Otis (The) Steel Company, Limited, Cleveland, Cuyahoga county. Two 5-gross-ton Bessemer steel converters; first blow made August 5, 1884; product, ingots.—*Bessemer converters only abandoned.*
- Russia Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Niles, Trumbull county, Ohio. Built in 1864; product, iron and steel skelp, sheet iron, and sheet steel. (Formerly called the Russia Sheet Iron Mills.)—*Abandoned.*
- Toledo Works, (Factory F.,) Shelby Steel Tube Company, Pittsburgh, Pa. Works at Toledo, Lucas county, Ohio. Rolling mill put in operation in May, 1896; product, blanks for the manufacture of seamless-drawn steel tubes, trolley poles, etc.—*Rolls removed.*
- Youngstown (The) Steel Company, Youngstown, Mahoning county. Built in 1883 and put in operation in May, 1884; one 10-ton Pernot revolving furnace.—*Abandoned.*
- Zanesville Iron Works, The Zanesville Iron Company, Zanesville, Muskingum county. One 10-gross-ton acid open-hearth steel furnace,

completed in 1886; product, steel ingots. (Formerly operated by the Ohio Iron Company.)—*Open-hearth furnace only dismantled.*

INDIANA.

ROLLING MILLS AND STEEL WORKS.

Albany Works, (Factory N.,) Shelby Steel Tube Company, Pittsburgh, Pennsylvania. Works at Albany, Delaware county, Indiana. Rolling mill added to a tube plant in 1898; product, blanks for the manufacture of cold-drawn seamless steel tubes. (Formerly operated by the Albany Manufacturing Company.)—*Rolls removed.*

Central Steel Company, Indianapolis, Marion county. Built in 1857, 1881-2, and 1886-7; remodeled in 1890-1; equipped with two 15-gross-ton basic open-hearth steel furnaces; first steel made in May, 1887; also with two 5-gross-ton basic-Bessemer converters, erected in 1892-3; also with trains of rolls. Product, billets, angles, channels, miscellaneous shapes, merchant bar steel, and steel castings. (A 26-inch beam mill is leased by the Indiana Steel Company.)—*With the exception of the beam mill this plant is now being dismantled.*

Corning Works, The American Sheet Steel Company, Battery Park Building, New York. Works at Hammond, Lake county, Indiana. Put in operation October 17, 1892; product, steel sheets. (Formerly operated by the Corning Steel Company.)—*Dismantled.*

Montpelier Works, American Tin Plate Company, Battery Park Building, New York City. Works at Montpelier, Blackford county, Indiana. Built in 1894 and first put in operation in May, 1895; product, black plates for tinning.—*Dismantled.*

White River Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Muncie, Delaware county, Indiana. Built in 1891-2; product, merchant bar iron and steel. (Formerly called the Park Iron and Steel Works.)—*Dismantled.*

Wright Shovel Company, Anderson, Madison county. Two works: Anderson Works, at Anderson, put in operation January 1, 1892; product, sheets for shovels, spades, and scoops. Greenfield Works, at Greenfield, Hancock county, built in 1889; product, shovel plate.—*Rolls removed from Anderson Works; Greenfield Works destroyed by fire.*

ILLINOIS.

ROLLING MILLS AND STEEL WORKS.

American Can Company, Bowling Green Building, New York City. Works at Maywood, Cook county, Illinois. One 6-gross-ton acid open-hearth steel furnace, erected in 1890-1; plant also equipped with machinery for the production of steel sheets from fluid metal. (Formerly operated by Norton Brothers.)—*Abandoned.*

Calumet Works, Republic Iron and Steel Company, Stock Exchange

- Building, Chicago. Works at South Chicago, Cook county. Built in 1876; product, bar iron and steel, angle splices, and shafting. (Formerly operated by the Calumet Iron and Steel Company.)—*Dismantled*.
- Garden City Wire and Spring Company, Cragin Station, Chicago, Cook county. Wire-rod train added to a wire and wire-nail plant in 1898; product, wire rods.—*Destroyed by fire in May, 1899*.
- Hercules (The) Steel Casting Company, Harvey, Cook county. Works for the manufacture of steel by a special process built in 1899; product, castings.—*Abandoned*.
- Midland Rolling Mill Company, Cragin Station, Chicago, Cook county. Built in 1899 and first put in operation in 1900; product, flats, rounds, angle bars, etc.—*Dismantled*.
- Melrose Park Works, Latrobe Steel and Coupler Company, Philadelphia. Works at Melrose Park, Cook county, Illinois. Tire mill built in 1881-2; product, tires.—*Trains of rolls only abandoned*.
- North Works, The Illinois Steel Company, Rookery Building, Chicago. Works at Chicago, at the foot of Wabansia ave., built in 1857. Two 6-gross-ton Bessemer steel converters and all appliances for manufacturing rails and beams.—*Dismantled*.
- Peoria Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Averyville, Peoria county. Put in operation in 1892; product, bars, bands, hoops, etc. (Formerly called the Peoria Steel and Iron Works.)—*Dismantled*.
- Plano Steel Works, Albert H. Sears, Plano, Kendall county. First put in operation January 1, 1885; product, steel shapes for agricultural implements.—*Abandoned*.
- Rock Island Arsenal, Rock Island, Rock Island county. Equipped with 1 train of rolls.—*Rolls dismantled*.
- Springfield Works, Republic Iron and Steel Company, Chicago. Works at Springfield, Sangamon county. Two 5-gross-ton Bessemer steel converters; first blow made September 8, 1887.—*Removed to the Brown Bonnell Works of the company, at Youngstown, Ohio, in 1900*.
- Sylvan Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Moline, Rock Island county. One 5-gross-ton basic open-hearth steel furnace, built in 1898; product, steel ingots.—*Open-hearth furnace only dismantled*.
- Valley Steel Works, Ernest E. Wangelin, Belleville, St. Clair county. Built in 1882 and remodeled in 1885-6; product, steel cut nails, nail plate, and large flats. (Formerly operated by the Valley Steel Company.)—*Being dismantled in November, 1901*.

MICHIGAN.

BLAST FURNACES.

- Detroit Iron Furnace Company, Detroit, Wayne county. One stack, 50 x 10½, built in 1870; fuel, charcoal.—*Abandoned*.

Excelsior Furnace, Pioneer Iron Company, Mercantile Bank Building, Cleveland, Ohio. Furnace at Ishpeming, Marquette county, Michigan. One stack, 50 x 10, built in 1872, burned and rebuilt in 1880, and again rebuilt in 1890; one iron stove; hot blast; fuel, charcoal; product, Bessemer, foundry, car-wheel, and malleable pig iron; annual capacity, 27,500 gross tons.—*Idle and likely to remain long inactive.*

Martel Furnace, St. Ignace, Mackinac county. One stack, 53 x 10½, first put in blast August 15, 1881; two Whitwell stoves, each 60 x 15; fuel, charcoal; product, car-wheel pig iron; annual capacity, 21,000 gross tons. (Owned by Fanny D. Galbraith, Erie, and Arnold A. Plumer, Franklin, Pa.)—*Idle since 1892 and for sale.*

Northern Furnace Company, Marquette. Furnace at Chocolay, Marquette county. One stack, 50 x 10½, built in 1860 and rebuilt in 1890; hot blast; fuel, charcoal; product, foundry, car-wheel, and malleable pig iron; annual capacity, 25,000 gross tons.—*Idle since 1891.*

Union Iron Company, Jefferson avenue east, Detroit, Wayne county. One stack, 46 x 10, built in 1871-2 and blown in in 1872; fuel, charcoal.—*Dismantled.*

STEEL PLANT.

Detroit Steel and Spring Works, The Detroit Steel and Spring Company, Detroit. Crucible steel department first made steel in February, 1884; one 30-pot crucible steel-melting furnace; product, ingots.—*Crucible steel furnace only abandoned.*

WISCONSIN.

STEEL PLANT.

Milwaukee Steel Casting Company, Milwaukee, Milwaukee county. One 6,000-lb. acid open-hearth steel furnace; product, steel castings.—*Open-hearth steel furnace only dismantled.*

MISSOURI.

BLAST FURNACES.

Missouri Furnace, The St. Louis Blast Furnace Company, Union Trust Building, St. Louis. Furnace at South St. Louis. One stack, No. 1, 58 x 15, built in 1869; fuel, coke.—*Dismantled.*

ROLLING MILLS AND STEEL WORKS.

Clinton Rolling Mill, Clinton, Henry county. Built in 1892; product, horseshoe bar and refined and common bar iron.—*Dismantled.*

St. Joseph Bar and Axle Works, H. Stern, 272-8 South Clinton st., Chicago. Works at St. Joseph, Buchanan county, Mo. Built in 1889; product, merchant iron and steel and steel cut nails.—*Dismantled.*

Shickle, Harrison, and Howard Iron Works, C. H. Huff & Co., St. Louis. Built in 1860; steel plant added in 1892; three 8-gross-ton

basic open-hearth steel furnaces; product, car couplers, car bolsters, car trucks, and railway and machine castings.—*Dismantled.*

IOWA.

ROLLING MILLS.

Muscatine Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Muscatine, Muscatine county, Iowa. Put in operation in October, 1893; product, bars, bands, and flats. (Formerly called the Williams Rolling Mill.)—*Dismantled.*

KANSAS.

STEEL WORKS.

Kansas City Steel and Iron Works, Argentine, Wyandotte county. Built in 1895; one 18-pot crucible steel-melting furnace; first steel made in June, 1895; product, fine crucible steel castings.—*Dismantled.*

CALIFORNIA.

ROLLING MILLS AND STEEL WORKS.

Los Angeles Iron and Steel Works, Los Angeles, Los Angeles county. Built in 1893-4 and put in operation August 27, 1894; 1 scrap furnace, 2 annealing furnaces, 2 direct heating furnaces, (1 pair and 1 sheet,) and 4 trains of rolls; product, iron and steel sheets and light plates; annual capacity, 7,000 gross tons. Fuel, petroleum. A galvanizing plant is connected with the works. Address all communications to J. J. Fay and John M. C. Marble, Trustees, Los Angeles.—*Idle for several years and for sale or lease.*

Pacific Iron and Nail Company, Oakland, Alameda county. Commenced operations May 1, 1883; product, muck bar, nail plates, etc.—*Rolling mill abandoned.*

Pacific Rolling Mill and Forge, Risdon Iron and Locomotive Works, S. E. cor. Howard and Beale streets, San Francisco. Works at Potrero, San Francisco. Put in operation July 25, 1868; product, bar iron, angle iron, beams, channels, etc. Steel department added in 1884; 3 open-hearth steel furnaces (one 5 and one 18-gross-ton acid and one 18-gross-ton basic); first steel made July 15, 1884; product, ingots and castings.—*Dismantled.*

UNITED STATES.

Since June, 1898, when the last edition of the Directory appeared, 61 blast furnaces have been dismantled, abandoned, or transferred to the inactive list. During the same period 118 rolling mills, Bessemer steel plants, open-hearth steel plants, crucible steel plants, or plants equipped for the manufacture of steel by special processes have also been dismantled, abandoned, or transferred to the inactive list. In addition 5 forges and bloomaries have been similarly treated.

THE IRON AND STEEL WORKS

OF

THE UNITED STATES.

PART III—CLASSIFIED BY PRODUCTS.

In this division of the Directory the iron and steel works of the United States, except blast furnaces and some minor branches of the iron trade, that have been fully described in preceding pages are classified according to their products. This classification is for ready reference only. In this classified list brief mention is also made of some works which have not previously been described, as, for instance, tin-plate and terne plate works that are not connected with rolling mills or steel works, but these are exceptions to the general scheme of this division of the Directory, which is devoted to the manufacturers of iron and steel and is not intended to embrace the consumers of pig iron and other iron and steel products. We have found it necessary to confine this edition of the Directory substantially to the producers of iron and steel. Lists of the leading consumers of iron and steel in 1898 will be found in the edition of the Directory for that year. A more complete list is in course of preparation by the American Iron and Steel Association.

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 Tropenas process. A list of plants equipped for the production of Bessemer steel castings will be found beginning on page 335.

MASSACHUSETTS—1.

Tremont Nail Works, Tremont Nail Company, West Wareham, Plymouth county. One 3-gross-ton Clapp-Griffiths converter.

CONNECTICUT—1.

Driggs-Seabury Gun and Ammunition Company, 25 Broad st., New York City. Works at Derby, New Haven county, Connecticut. One 2-gross-ton side-blow acid Tropenas converter.

NEW YORK—1 COMPLETED AND 1 BUILDING.

Lackawanna (The) Iron and Steel Company, Buffalo. New York office, 100 Broadway. Building works at West Seneca, Erie county, for the manufacture of Bessemer steel.—*See Pennsylvania.*

Troy (The) Steel Company, Troy, Rensselaer county. General office, Troy; branch office, 56 Pine st., New York City. Works on Breaker Island, (opposite Troy.) Three 15-gross-ton basic converters.—*Idle.*

PENNSYLVANIA—18 COMPLETED AND 1 PROJECTED.

American Iron and Steel Works, Jones & Laughlins, Limited, Pittsburgh. Two 10-gross-ton acid converters.

American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Two Bessemer steel works in Pennsylvania: Shoenberger Works, Fifteenth st. and Penn ave., Pittsburgh; two 7-gross-ton acid converters. Twenty-sixth Street Works, Twenty-seventh and Smallman sts., Pittsburgh; two 5-gross-ton acid converters.—*See Newburgh Steel Works in Ohio.*

Bethlehem Steel Company, South Bethlehem, Northampton county. Four 7½-gross-ton acid converters.

Birdsboro Nail Works, E. and G. Brooke Iron Company, Birdsboro, Berks county. Two 2-gross-ton acid converters.—*Idle.*

Brylgon Foundry, Reading, Berks county. Two 2-gross-ton Tropenas converters, used for steel castings only.

Cambria Steel Company, Harrison Building, southwest cor. Fifteenth and Market sts., Philadelphia. Works at Johnstown. Four 11½-gross-ton acid converters.

Carnegie Steel Company, Carnegie Building, Pittsburgh. Three Bessemer steel works, all located in Allegheny county. Edgar Thomson Steel Works, at Bessemer, two miles from Pittsburgh; four 15-gross-ton acid converters. Duquesne Steel Works, at Cochran, four miles from Pittsburgh; two 10-gross-ton acid converters. Homestead Steel Works, at Munhall, one mile from Pittsburgh; two 12-gross-ton acid converters.

Hartman (The) Manufacturing Company, New Castle, Lawrence county. Contemplates erecting 3 Bessemer steel converters.

Lackawanna (The) Iron and Steel Company, Buffalo, New York. New York office, 100 Broadway. Two works at Scranton, Lackawanna county, Pa. North Works; three 7-gross-ton acid converters. South Works; two 9-gross-ton acid converters.—*See New York.*

- Logan Manufacturing Company, Phoenixville, Chester county. Two 2-gross-ton Tropenas converters, used for steel castings only.
- Monongahela Steel Works, (National Department,) National Tube Company, Conestoga Building, Pittsburgh. Works at McKeesport, Allegheny county. Two 8-gross-ton acid converters.—*See Riverside Steel Works in West Virginia.*
- New Castle Works, National Steel Company, Carnegie Building, Pittsburgh. Works at New Castle, Lawrence county. Two 8-gross-ton acid converters.—*See Ohio.*
- Pennsylvania Steel Works, The Pennsylvania Steel Company, Steelton, Dauphin county. Office, 312-19 Girard Building, Philadelphia. Three 10-gross-ton acid converters.
- Pottstown Iron Works, Glasgow Iron Company, lessee, Pottstown, Montgomery county. Three 10-ton basic converters. *May be dismantled.*
- Wharton, Jr., (William) & Co., Incorporated, Station "D," Twenty-fifth st. and Washington ave., Philadelphia. One 2-gross-ton Tropenas converter, used for steel castings only.

MARYLAND—1.

- Maryland Steel Company; general offices, Sparrows Point, Maryland, and Girard Building, Philadelphia. Works at Sparrows Point, Baltimore county, Maryland. Two 20-gross-ton acid converters.

VIRGINIA—1.

- Old Dominion Nail Works, Old Dominion Iron and Nail Works Company, Richmond, Henrico county. Works on Belle Isle, Richmond. Two 3-gross-ton acid converters.—*Converters idle since 1888.*

WEST VIRGINIA—2.

- Riverside Steel Works, (Riverside Department,) National Tube Company, Conestoga Building, Pittsburgh. Works at Benwood, Marshall county, West Virginia. Two 5-gross-ton acid converters.—*See Monongahela Steel Works in Pennsylvania.*
- Wheeling Steel Works, Wheeling Steel and Iron Company, Wheeling. Works at Benwood. Two 6-gross-ton acid converters.

KENTUCKY—1.

- Ashland Steel Company, Incorporated, Ashland, Boyd county. Two 5½-gross-ton acid converters.

OHIO—8 COMPLETED AND 1 PROJECTED.

- Brown Bonnell Works, Republic Iron and Steel Company, Chicago. Works at Youngstown, Ohio. Two 6-gross-ton acid converters.
- Lorain Works, The Lorain Steel Company, Lorain, Lorain county. Two 12-gross-ton acid converters.

Marion (The) Steam Shovel Company, Marion, Marion county. One 3,000-lb. Robert-Bessemer converter, used for steel castings only.

National Steel Company, Carnegie Building, Pittsburgh, Pa. Four Bessemer steel works in Ohio: Bellaire Works, Bellaire, Belmont county; two 10-gross-ton acid converters. Columbus Works, Columbus, Franklin county; two 4½-gross-ton acid converters. Mingo Works, Mingo Junction, Jefferson county; two 10-gross-ton acid converters. Ohio Works, Youngstown, Mahoning county; two 10-gross-ton acid converters.—*See New Castle Works in Pennsylvania.*

Newburgh Steel Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Newburgh, Cuyahoga county, Ohio. Two 10-gross-ton acid converters.—*See Pennsylvania.*

Youngstown (The) Engineering Company, Youngstown, Mahoning county. May erect a Tropenas converter.

INDIANA—2.

Central Steel Company, 227 West Merrill street, Indianapolis, Marion county. Two 5-gross-ton basic-Bessemer converters.—*Being dismantled.* Chicago Steel Manufacturing Company, Hammond, Lake county. Two 5-gross-ton acid converters.—*Idle and for sale.*

ILLINOIS—4.

Illinois (The) Steel Company, Rookery Building, Chicago. Three works in Illinois—South Works, Joliet Works, and Union Works. South Works, at South Chicago; three 12-gross-ton acid converters. Joliet Works, at Joliet, Will county; two 10-gross-ton acid converters. Union Works, at 3179 Ashland ave., Chicago; two 10-gross-ton acid converters; the converters in the Union Works are partly dismantled and are not likely to be again operated.

Sargent (The) Company, 675 Old Colony Building, Chicago. Works at Chicago Heights, Cook county. Three 2-gross-ton Tropenas converters, used for steel castings only.

MICHIGAN—1.

Detroit Steel and Spring Works, The Detroit Steel and Spring Company, Michigan and Hubbard avenues, Detroit, Wayne county. Two 2-gross-ton Robert-Bessemer converters, used for steel castings only.

WISCONSIN—2.

Smith (George H.) Steel Casting Company, successors to Milwaukee Steel Casting Company, Milwaukee, Milwaukee county. Two 2-gross-ton special steel converters, used for steel castings only.

West Superior Branch, United States Cast Iron Pipe and Foundry Company, 80 Broadway, New York City. Works at West Superior, Douglas county, Wisconsin. Two 4-gross-ton acid converters.—*Idle and for sale or lease.*

MINNESOTA—1.

American Hoist and Derrick Company, St. Paul, Ramsey county.
One 2-gross-ton Tropenas converter, used for steel castings only.

MISSOURI—1.

St. Louis Iron and Steel Foundry Company, southeast corner Eighth and Hickory streets, St. Louis. Built in 1901. Two 2-gross-ton Tropenas converters, intended for steel castings only. Steel had not been made down to November 25, 1901.

COLORADO—1.

Minnequa Rolling Mills and Steel Works, The Colorado Fuel and Iron Company, Boston Building, Denver. Branch office, Empire Building, New York City. Works at Pueblo, Pueblo county, Colorado. Two 5-gross-ton acid converters. New Bessemer steel converting department now being built will be completed in the spring of 1902 and will be equipped with two 15-gross-ton converters.

CALIFORNIA—1.

Union Iron Works, San Francisco, San Francisco county. One 2-gross-ton Tropenas converter, used for steel castings only.

UNITED STATES.

Total number of Bessemer steel works in the United States in November, 1901: 47 completed, 1 building, and 2 projected. Of the completed works 35 are standard Bessemer plants with 81 converters, 1 is a Clapp-Griffiths plant with 1 converter, 2 are Robert-Bessemer plants with 3 converters, 8 are Tropenas plants with 13 converters, and 1 plant with 2 converters makes steel by a special process. Total number of completed converters: 100.

OPEN-HEARTH STEEL WORKS.

A list of plants equipped for the production of open-hearth steel castings will be found beginning on page 335. The capacities of the furnaces here mentioned are given in gross tons of 2,240 pounds.

MASSACHUSETTS—4.

South Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Worcester, Worcester county, Mass. One 15 and three 20-gross-ton acid furnaces and four 50-gross-ton basic furnaces.

Thomson-Houston Electric Company, Steel Foundry Department, 42 Centre st., Lynn, Essex county. (Operating for the General Electric Company; general office, Schenectady, New York.) Three 15-gross-ton acid furnaces.

Tremont Nail Works, Tremont Nail Company, West Wareham, Plymouth county. One 20-gross-ton basic furnace.

United States Steel Company, Everett, Middlesex county. Two 15-gross-ton acid furnaces.

RHODE ISLAND—1 COMPLETED AND 1 BUILDING.

Wales (John) Wire Company, Auburn, Providence county. Building two 30-gross-ton basic furnaces. Will probably be ready for operation early in 1902.

Washburn Wire Company, Phillipsdale, Providence county. Two 15-gross-ton Wellman tilting furnaces, (1 acid and 1 basic.)

CONNECTICUT—1.

Malleable Iron Fittings Company, Branford, New Haven county. One 20-gross-ton acid furnace.

NEW YORK—6 COMPLETED AND 1 PROJECTED.

Buffalo Steel Foundry, Pratt and Letchworth Company, Buffalo, Erie county. Two acid open-hearth steel furnaces, (one 7 and one 9-gross-ton.)

Elmira Steel Works, Elmira, Chemung county. Two 20-gross-ton basic furnaces.

Johnson (Isaac G.) & Co., Spuyten Duyvil, New York City. One 10 and two 8-gross-ton acid furnaces.

New York Steel and Wire Company, 69 South street, New York City. Works at Astoria, Queens county. Two 30-gross-ton basic furnaces; 2 additional 30-gross-ton basic furnaces may be erected.

Onondaga Steel Works, Sweet's Steel Company, Syracuse, Onondaga county. One 12-gross-ton basic furnace.

Osborne (D. M.) & Co., Auburn, Cayuga county. Contemplate erecting two 15-gross-ton basic furnaces.

Syracuse Works, American Steel Casting Company, Thurlow Station, Chester, Pa. Works at Geddes, Onondaga county, New York. Two 10-gross-ton Siemens acid furnaces.—*See Pennsylvania (American Steel Casting Company) and Ohio, (Alliance Works.)*

NEW JERSEY—4.

Atha (Benjamin) & Co., Newark, Essex county. Two furnaces, (one 15-gross-ton acid and one 20-gross-ton basic.)

Carteret Steel Company, 150 Broadway, New York City. Works at Carteret, Middlesex county, New Jersey. One 5-gross-ton basic experimental furnace.—*Idle.*

Oliphant Steel and Iron Company, Trenton, Mercer county. One 6-gross-ton acid furnace.

Passaic (The) Rolling Mill Company, Paterson, Passaic county. New York office, 45 Broadway; Boston office, 31 State street. Five 25-gross-ton furnaces, (2 acid and 3 basic.)

PENNSYLVANIA—55 COMPLETED, 7 BUILDING, AND 6 PROJECTED.

Allegheny Steel and Iron Company, Lewis Building, Pittsburgh. Works at Avenue, Allegheny county. Telegraph address, Tarentum. One 50-gross-ton basic furnace.

Altoona Foundry and Machine Company, Altoona, Blair county. Building one 10-gross-ton Swindell acid furnace; product, to be malleable iron castings, but steel castings could be made.

American Steel Casting Company, general offices, Thurlow Station, Chester, Delaware county. Three open-hearth steel works in Pennsylvania. Thurlow Works, Thurlow, Delaware county; two 12 and two 20-gross-ton acid furnaces. Norristown Works, Earnest Station, Norristown, Montgomery county; two 15-gross-ton acid furnaces. Sharon Works, Sharon, Mercer county; one 20 and two 25-gross-ton acid furnaces.—*See New York (Syracuse Works) and Ohio, (Alliance Works.)*

American (The) Sheet Steel Company, Battery Park Building, New York City. Three open-hearth steel plants in Pennsylvania. Apollo Works, Apollo, Armstrong county; two 20-gross-ton acid furnaces. McKeesport Works, McKeesport, Allegheny county; two 15-gross-ton acid furnaces. Vandergrift Steel Works, Vandergrift, Westmoreland county; four 30-gross-ton acid and two 30-gross-ton basic furnaces.—*See Indiana, (Midland Works.)*

Bethlehem Steel Company, South Bethlehem, Northampton county. Eight open-hearth steel furnaces, (two 40-gross-ton basic and one 10, one 20, and four 40-gross-ton acid.)

Brandywine Rolling Mills, Worth Brothers Company, Coatesville, Chester county. Six 35-gross-ton furnaces, (4 basic and 2 acid.)

Cambria Steel Company, Harrison Building, southwest cor. Fifteenth and Market streets, Philadelphia. Works at Johnstown, Cambria county. Ten furnaces, (one 20 and one 50-gross-ton acid and one 20 and five 50-gross-ton basic; also two 20-gross-ton basic Wellman.)

Carbon Steel Works, Carbon Steel Company, Thirty-second st., Pittsburgh. Eight 50-gross-ton acid furnaces.

Carnegie Steel Company, Carnegie Building, Pittsburgh. Two open-hearth steel plants in Allegheny county. Duquesne Steel Works, at Cochran, (post office address, Duquesne,) four miles from Pittsburgh; twelve 50-gross-ton basic furnaces. Homestead Steel Works, at Munhall, one mile from Pittsburgh; one 20, nineteen 40, and twenty-four 45-gross-ton basic furnaces.

- Central Iron and Steel Company, Harrisburg, Dauphin county. Contemplates erecting six 50-gross-ton furnaces, (1 acid and 5 basic.)
- Chester Steel Castings Company, 407 Sansom st., Philadelphia. Works at Chester, Delaware county. One 20-gross-ton acid furnace; another 20-gross-ton acid furnace is being added.
- Clark Mill, American Steel Hoop Company, Carnegie Building, Pittsburgh. Works at Thirty-fifth st., A. V. Ry., and Allegheny river, Pittsburgh. Two 12-gross-ton acid furnaces.
- Colonial Steel Company, 403 Bank of Commerce Building, Pittsburgh. Building works at South Monaca, Beaver county, to be equipped with several open-hearth steel furnaces.
- Columbia Iron and Steel Foundry Company, Thirty-fourth st. and A. V. Ry., Pittsburgh. One 9-gross-ton acid furnace.
- Crucible Steel Company of America; general offices, Empire Building, Pittsburgh. Seven open-hearth steel works in Pennsylvania. Aliquippa Steel Works, Aliquippa, Beaver county; one 15-gross-ton acid furnace. Black Diamond Steel Works, (operated by the Park Steel Company,) Pittsburgh, Allegheny county; two 18 and three 30-gross-ton acid and one 50 and two 30-gross-ton basic furnaces. Crescent Steel Works, Forty-ninth to Fifty-first sts., Pittsburgh, Allegheny county; two 15-gross-ton special open-hearth furnaces. Howe, Brown & Co. Works, Penn ave. and Seventeenth st., Pittsburgh, Allegheny county; one 15 and one 20-gross-ton acid furnace. La Belle Steel Works, Ridge ave. and Rebecca st., Allegheny, Allegheny county; two 15-gross-ton acid furnaces. Pittsburgh Steel Works, McKees Rocks, Allegheny county, on the Pittsburgh and Lake Erie Railroad; one 20-gross-ton acid furnace. Singer, Nimick & Co. Works, in the thirty-fourth ward, Pittsburgh, Allegheny county; one idle 10-gross-ton acid furnace.—*See Ohio, (Burgess Steel and Iron Works.)*
- Danville Bessemer Company, Danville, Montour county. Philadelphia office, 310 Land Title Building. One 10-gross-ton acid furnace.
- Diamond Drill and Machine Company, Birdsboro, Berks county. Building one 20-gross-ton acid furnace. An additional 20-gross-ton acid furnace may be erected.
- Duquesne Steel Foundry Company, Germania Bank Building, Pittsburgh. Works at Kendall Station, P. & L. E. R. R., (P. O. address, Coraopolis,) Allegheny county. Two 20-gross-ton acid furnaces.
- Eddystone Engineering Works, Tindel-Morris Company, Eddystone, Delaware county. May erect an acid open-hearth steel furnace.
- Fort Pitt Foundry, Mackintosh, Hemphill & Co., Pittsburgh. Works, foot of Twelfth st. Two 12-gross-ton acid furnaces.
- Franklin (The) Steel Casting Company, Franklin, Venango county. One 20 and two 15-gross-ton Siemens acid furnaces.
- Johnson Works, The Lorain Steel Company, Lorain, Ohio. Works at Johnstown, Pa. One 2 and one 7-gross-ton acid furnace.

- Jones and Laughlins, Limited, Pittsburgh. Two works in Pittsburgh, Allegheny county. American Iron and Steel Works, in the twenty-fourth and twenty-fifth wards, South Side; one 25-gross-ton acid and six 40-gross-ton basic furnaces. Soho Department, Second avenue, near Brady street; two 15-gross-ton acid furnaces.
- Jupiter Steel Works, Jupiter Steel and Coal Company, 616 Lewis Building, Pittsburgh. Building works near Carnegie, Allegheny county, to contain two 40-gross-ton Swindell furnaces, (1 acid and 1 basic.)
- Keystone Saw, Tool, Steel, and File Works, Henry Disston & Sons, (incorporated,) Tacony, Philadelphia. Address all communications to P. O. Box 1537, Philadelphia. One 9-gross-ton basic furnace.
- Latrobe Works, Latrobe Steel Company, Latrobe, Westmoreland county. Main office, 1200 Girard Building, Broad and Chestnut streets, Philadelphia. Two 20-gross-ton acid furnaces.
- Lebanon Rolling Mills, Lebanon Rolling Mill Company, Lebanon, Lebanon county. Building two 30-gross-ton basic furnaces.
- Lukens Iron and Steel Company, Coatesville, Chester county. Two 40-gross-ton acid and four 40-gross-ton and six 50-gross-ton basic furnaces.
- McConway (The) and Torley Company, Forty-eighth st. and A. V. Ry., Pittsburgh, Allegheny county. Building one 25-gross-ton Siemens acid furnace.
- Mesta Machine Company, Lewis Block, Pittsburgh. Works at Homestead, Allegheny county. One 25-gross-ton acid furnace. May add one 30-gross-ton basic furnace.
- Midvale (The) Steel Company, Nicetown, Philadelphia. Makes acid and basic open-hearth steel.
- Monessen Plant, Page Woven Wire Fence Company, Monessen, Westmoreland county. Two 15-gross-ton Wellman basic furnaces.
- Monessen Works, Pittsburgh Steel Company, 305 Ferguson Block, Pittsburgh. Building works at Monessen, Westmoreland county, to be equipped with basic open-hearth steel furnaces.
- National (The) Malleable Castings Company, Sharon, Mercer county. Three 15-gross-ton acid furnaces.
- Norway Iron and Steel Company, York, York county. One 10-gross-ton acid furnace.
- Pencoyd Iron Works, A. and P. Roberts Company, operators, 261 South Fourth st., Philadelphia. Works in Montgomery county, opposite Manayunk. One 75-gross-ton and ten 30-gross-ton basic furnaces. Controlled by the American Bridge Company.
- Penn Steel Casting and Machine Company, Chester, Delaware county. Three 25-gross-ton acid furnaces.
- Pennsylvania Steel Works, The Pennsylvania Steel Company, Steelton, Dauphin county. Office, 312-19 Girard Building, Broad and Chestnut

- sts., Philadelphia. Four 20 and six 50-gross-ton basic furnaces and two 6 and two 40-gross-ton acid furnaces.
- Phoenix Iron Works, The Phoenix Iron Company, 410 Walnut st., Philadelphia. Works at Phoenixville, Chester county. Two 30 and two 40-gross-ton acid and two 30 and two 40-gross-ton basic furnaces.
- Pittsburgh Steel Foundry, National Bank of Commerce Building, Pittsburgh. Works at Glassport, Allegheny county. Five 20-gross-ton furnaces, (2 basic and 3 acid.)
- Pottstown Iron Works, Glasgow Iron Company, lessee, Pottstown, Montgomery county. One 12-gross-ton Siemens basic furnace.—*May be dismantled.*
- Pottsville Rolling Mills, Pilling & Crane, Girard Building, Philadelphia. Works at Pottsville, Schuylkill county. Two 20-gross-ton basic furnaces.—*Idle.*
- Reliance Steel Casting Company, Limited, Pittsburgh. Works, corner Thirty-sixth st. and A. V. Ry. One 8-gross-ton acid furnace.
- Rolling (The) Mill Company of America, South Connellsville, Fayette county. Contemplates building works to be equipped with open-hearth steel furnaces.
- St. Clair Steel Company, Empire Building, Pittsburgh. Building twelve 50-gross-ton basic and acid furnaces at Clairton, Allegheny county.
- Schuylkill Iron Works, Alan Wood Company, 519 Arch st., Philadelphia. Works at Conshohocken, Montgomery county. Contemplates erecting five 50-gross-ton basic furnaces near Conshohocken.
- Seaboard Steel Casting Company, foot of Jeffrey st., Delaware river, Chester, Delaware county. Two 20-gross-ton acid furnaces.
- Sharon (The) Steel Company, Sharon, Mercer county. Eight completed 50-gross-ton basic furnaces ; 5 additional 50-gross-ton furnaces are being built.
- Sharon Works, National Steel Company, Carnegie Building, Pittsburgh. Works at Sharon, Mercer county. Six 30-gross-ton basic furnaces.
- Shoenberger Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Fifteenth st. and Penn ave., Pittsburgh. Three 35-gross-ton basic furnaces.—*See Ohio, (Newburgh Steel Works.)*
- Solid Steel Casting Company, Chester, Delaware county. Works at Lamokin, one mile south of Chester. Two 20-gross-ton acid furnaces.
- Standard (The) Steel Works, Harrison Building, Philadelphia. Works at Burnham, Mifflin county. Three 15-gross-ton Wellman revolving acid furnaces ; one 50-gross-ton Wellman revolving acid furnace will be added.
- Tidewater Steel Company, Chester, Delaware county. Three completed 50-gross-ton basic furnaces and 2 basic furnaces to be added.
- Union Steel Casting Company, Sixty-first st. and A. V. Ry., Pittsburgh, Allegheny county. Two 20-gross-ton acid furnaces.

Union Steel Company, Empire Building, Pittsburgh. Works at Donora, Washington county. Twelve 50-gross-ton basic furnaces projected. Washington Charcoal-Iron Tin Mills, Washington, Washington county. One 20-gross-ton Swindell acid furnace; another 20-gross-ton acid furnace may be built.

DELAWARE—1.

Diamond State Steel Company, Wilmington, New Castle county. Five 50-gross-ton Siemens furnaces, (4 basic and 1 acid.)

MARYLAND—1.

Maryland Sheet and Steel Company, Cumberland, Allegany county. One 15-gross-ton basic furnace.

KENTUCKY—2.

Mitchell-Tranter Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Covington, Kenton county. One 7-gross-ton Siemens acid furnace.—*See Alabama, (Birmingham Rolling Mills,) Illinois, (Springfield Works,) and Minnesota, (Minnesota Iron Works.)*

Watts Works, Virginia Iron, Coal, and Coke Company, Bristol, Tennessee. Works at Middlesborough, Bell county, Kentucky. Seven 25-gross-ton basic furnaces, (4 completed and 3 partly erected.)

TENNESSEE—1.

Southern (The) Steel Works, John Leighton & Sons, 610-14 Boyce street, Chattanooga, Hamilton county. One 3-gross-ton acid furnace.

ALABAMA—4.

Birmingham Rolling Mills, (operated by the Birmingham Rolling Mill Company,) Birmingham, Jefferson county. Two 30-gross-ton Siemens basic furnaces. Controlled by the Republic Iron and Steel Company, Stock Exchange Building, Chicago.—*See Kentucky, (Mitchell-Tranter Works,) Illinois, (Springfield Works,) and Minnesota, (Minnesota Iron Works.)*

Jefferson Steel Works, Union Steel and Chain Company, 71 Broadway, New York City. Works at Birmingham, Jefferson county, Alabama. One 15-gross-ton basic furnace.

Tennessee Coal, Iron, and Railroad Company; general offices, Birmingham, Alabama. Two open-hearth steel works. Steel Casting Department, Ensley, Jefferson county, Alabama; one 20-gross-ton basic furnace. Steel Works Division, Ensley, Jefferson county, Alabama; ten 50-gross-ton basic tilting furnaces.

OHIO—11 COMPLETED, 2 BUILDING, 1 TO BE REBUILT, AND 5 PROJECTED.

Alliance Works, American Steel Casting Company, Thurlow Station, Chester, Pa. Works at Alliance, Stark county, Ohio. Four 15-gross-

- ton acid furnaces.—*See New York (Syracuse Works) and Pennsylvania, (American Steel Casting Company.)*
- American (The) Rolling Mill Company, Middletown, Butler county. One 30-gross-ton basic furnace.
- Buckeye (The) Malleable Iron and Coupler Company, Columbus, Franklin county. Chicago office, Rookery Building. Building 3 furnaces, (one 10 and one 15-gross-ton acid and one 20-gross-ton basic.)
- Burgess Steel and Iron Works, Crucible Steel Company of America, Empire Building, Pittsburgh. Works at Portsmouth, Scioto county, Ohio. Four 30-gross-ton Swindell furnaces, (2 acid and 2 basic.)—*See Pennsylvania, (Crucible Steel Company of America.)*
- Canton Steel Works, Canton Steel Company, Canton, Stark county. General office, corner Twenty-first and Liberty sts., Pittsburgh, Pa. One 15 and two 10-gross-ton acid furnaces.
- Carnahan Tin Plate and Sheet Company, Canton, Stark county. May add two 30-gross-ton furnaces, (1 basic and 1 acid.)
- Cleveland (The) Steel Casting Company, Burlington and Hubbard streets, Cleveland, Cuyahoga county. Works on Hubbard st. and the Cleveland and Pittsburgh Railroad. One 15-gross-ton acid furnace.
- Columbus (The) Malleable Iron Company, Columbus, Franklin county. One 10-gross-ton acid furnace to be rebuilt; product, malleable iron castings, but can make steel castings.
- Coxey, (Jacob S.,) Mount Vernon, Knox county. Three furnaces, (one 15 and one 25-gross-ton acid and one 25-gross-ton basic.)
- Dithridge Steel Car Company, 76 Montgomery st., Jersey City, New Jersey. Building works at White City, near Newcomerstown, Tuscarawas county, Ohio. May erect a basic open-hearth steel-casting plant.
- Heckert-Baltzley Billet Company, Toledo, Ohio. Works at Findlay, Hancock county. Two basic furnaces, (one 8 and one 12-gross-ton.)
- Lima (The) Steel Casting Company, Lima, Allen county. Two acid furnaces, (one 5 and one 10-gross-ton.)
- Newark Iron and Steel Company, Newark, Licking county. One 10-gross-ton acid furnace.
- Newburgh Steel Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Newburgh, Cuyahoga county, Ohio. One 50-gross-ton acid and three 50-gross-ton basic furnaces.—*See Pennsylvania, (Shoenberger Works.)*
- Otis (The) Steel Company, Limited, Cleveland, Cuyahoga county. Ten open-hearth steel furnaces, (one 18 and two 10-gross-ton acid and five 18 and two 25-gross-ton basic.)
- Stark Rolling Mill, Stark Rolling Mill Company, Canton, Stark county. May erect two 35-gross-ton basic furnaces.
- Steubenville Works, La Belle Iron Works, Steubenville, Jefferson county. Now building six 50-gross-ton basic furnaces; 4 additional 50-gross-ton basic furnaces are to be erected.

Youngstown (The) Engineering Company, Youngstown, Mahoning county. May erect an open-hearth steel furnace.

Youngstown (The) Iron and Steel Roofing Company, Youngstown, Mahoning county. May erect an open-hearth steel furnace.

INDIANA—6 COMPLETED AND 1 BUILDING.

Central Steel Company, 227 West Merrill street, Indianapolis, Marion county. Two 15-gross-ton basic furnaces.—*Now being dismantled.*

Gould Steel Company, 25 West Thirty-third street, New York City. Works at Anderson, Madison county, Indiana. Two 15-gross-ton acid furnaces.

Inland Steel Company, Marquette Building, Chicago. Building works at Indiana Harbor, Lake county, Indiana, to contain four 50-gross-ton basic furnaces.

Midland Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Muncie, Delaware county, Indiana. Two 30-gross-ton furnaces, (1 basic and 1 acid.)—*See Pennsylvania, (The American Sheet Steel Company.)*

National Car Coupler Company, 621 Monadnock Block, Chicago. Works at Converse, Miami county, Indiana. One 15-gross-ton acid furnace.

National Steel Casting Company, Montpelier, Blackford county. Two 20-gross-ton Siemens acid furnaces.

Peru Steel Casting Company, Peru, Miami county. Two 25-gross-ton basic furnaces.

ILLINOIS—8.

American Steel Foundry Company, Wells Building, St. Louis, Missouri. Works at Granite City, Madison county, Illinois. Five modified Siemens 20-gross-ton basic furnaces.

Chicago Malleable Castings Company, One Hundred and Twentieth street and Centre ave., Chicago. Works at West Pullman, Cook county. One 2-gross-ton Siemens basic furnace.

Granite City Rolling Mills, National Enameling and Stamping Company, 81-83 Fulton st., New York. Works at Granite City, Madison county, Illinois. Basic open-hearth steel furnaces.

Melrose Park Works, Latrobe Steel and Coupler Company, 1200 Girard Building, Philadelphia; Chicago office, Old Colony Building. Works at Melrose Park, Cook county, Ill. Two 30-gross-ton acid furnaces.

Sargent (The) Company, 675 Old Colony Building, Chicago. Works at Fifty-ninth and Wallace streets, Chicago. One 15-gross-ton Siemens acid furnace.

Shickle, (The) Harrison, and Howard Iron Company, Shickle, Harrison, and Howard Building, Eighth and Locust streets, St. Louis, Missouri. Works at East St. Louis, St. Clair county, Illinois. Four Wellman-Seaver patent rolling basic furnaces.

South Works, The Illinois Steel Company, Rookery Building, Chicago. Works at South Chicago. Ten furnaces, (one 35-gross-ton Siemens

acid, four 50-gross-ton basic Wellman rolling, and five 30-gross-ton basic Siemens.)

Springfield Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Springfield, Sangamon county, Illinois. Two 20-gross-ton Siemens-Pernot acid furnaces and 1 Pernot furnace for dephosphorizing pig metal.—*See Kentucky, (Mitchell-Tranter Works,) Alabama, (Birmingham Rolling Mills,) and Minnesota, (Minnesota Iron Works.)*

MICHIGAN—1.

American Rolling Mill Company, Rookery Building, Chicago. Works at Muskegon, Muskegon county, Michigan. One 15-gross-ton Siemens acid furnace.

WISCONSIN—3.

Dutcher (The J. A. and P. E.) Company, Milwaukee, Milwaukee county. One 3-gross-ton Wellman rotary acid furnace.

Falk (The) Company, Milwaukee, Milwaukee county. One 18-gross-ton Wellman-Seaver acid furnace.

Shaw (The) Steel Casting Company, Milwaukee, Milwaukee county. One 1-gross-ton acid furnace.

MINNESOTA—2.

Iron-ton Structural Steel Works, Duluth, St. Louis county. One 20-gross-ton acid furnace.

Minnesota Iron Works, (operated by the Minnesota Iron and Steel Company,) Columbia Heights, Anoka county. One 22 and two 15-gross-ton basic furnaces. Controlled by the Republic Iron and Steel Company, Chicago.—*See Kentucky, (Mitchell-Tranter Works,) Alabama, (Birmingham Rolling Mills,) and Illinois, (Springfield Works.)*

MISSOURI—1.

Scullin-Gallagher Iron and Steel Company, Kraft st. and Manchester ave., St. Louis. Three 20-gross-ton special furnaces, (1 acid and 2 basic.)

COLORADO—1 BUILDING.

Minnequa Rolling Mills and Steel Works, The Colorado Fuel and Iron Company, Boston Building, Denver. Adding open-hearth steel furnaces to a Bessemer plant and rolling mill at Pueblo, Pueblo county.

WASHINGTON—1 PROJECTED.

Pacific (The) Steel Company, Irondale, (via Port Townsend,) Jefferson county. May erect an open-hearth steel plant.

UNITED STATES.

Total number of open-hearth steel works in the United States in November, 1901: 112 completed, 12 building, 1 to be rebuilt, and 13 projected. Number of furnaces in the completed works, 167 acid and 236 basic: total, 403.

CRUCIBLE STEEL WORKS.

A list of works equipped for the production of crucible steel castings will be found beginning on page 335.

MASSACHUSETTS—1.

United States Steel Company, Everett, Middlesex county. One 24-pot crucible steel-melting furnace; product, steel castings.

CONNECTICUT—2.

Collins (The) Company, Collinsville, Hartford county. Four 2-pot crucible steel-melting holes and one 24-pot Siemens furnace; 32 pots; product consumed wholly by the company in the manufacture of "Collins" edge tools, steel plows, etc.

Farist (The) Steel Company, Bridgeport, Fairfield county. One 24-pot Siemens furnace; product, rolled and hammered steel.

NEW YORK—3.

Chrome Steel Works, Brooklyn, Kings county. Office and works, Kent ave. and Keap and Hooper sts. New York office, 11 Pine st. Nine 6-pot steel-melting holes; 54 pots; 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.

Johnson (Isaac G.) & Co., Spuyten Duyvil, New York City. Four 5-pot steel-melting holes; 20 pots; product, steel castings.

Sanderson Brothers Steel Works, Crucible Steel Company of America, Empire Building, Pittsburgh. Works at Syracuse, Onondaga county, New York. Four 24 and four 12-pot Siemens crucible steel-melting furnaces; 144 pots; product, hammered and rolled crucible steel of every description, shear steel, and sheet steel; specialty, the finest quality of tool steel.—*See New Jersey and Pennsylvania, (Crucible Steel Company of America.)*

NEW JERSEY—5.

Crucible Steel Company of America, Empire Building, Pittsburgh. Two crucible steel works in New Jersey. Atha Steel Company, Harrison, Hudson county; one 30 and two 48-pot crucible steel-melting furnaces; 126 pots; product, tool, die, spring, and cutlery steel. West Bergen Steel Works, (operated by The Spaulding and Jennings Company,) Jersey City, Hudson county; telegraph address, West Bergen; one 48-pot gas and twenty-four 4-pot crucible steel-melting

holes; 144 pots; product, crucible cast steel, bright-drawn steel, and flat cold-rolled steel.—See *New York (Sanderson Brothers Steel Works) and Pennsylvania, (Crucible Steel Company of America.)*

Heller Brothers Company, Newark, Essex county. Thirty 2-pot crucible steel-melting furnaces; 60 pots; product used by the firm in making rasps, files, and other tools.

Ludlum (The) Steel and Spring Company, Pompton, Passaic county. Forty-eight crucible steel-melting pots; product, crucible cast steel and railway car springs.

Uniform Steel Company, 320 Broadway, New York City. Works at Belleville, Essex county, New Jersey. Twelve 4-pot coal-fired crucible steel-melting furnaces; 48 pots; product, tools, dies, and high-grade machine castings.

PENNSYLVANIA—23 COMPLETED, 3 BUILDING, AND 1 PROJECTED.

Bethlehem Steel Company, South Bethlehem, Northampton county. Two crucible steel-melting furnaces.

Braeburn Steel Company, Braeburn, Westmoreland county. One 24-pot and one 36-pot Siemens crucible steel-melting furnace; 60 pots; product, bar and tool steel.

Carpenter Steel Company, Reading, Berks county. Executive offices, No. 1 Broadway, New York City. Four 30-pot gas-fired steel-melting furnaces; 120 pots; product, steel for tools, dies, cutlery, wire, etc., and forgings and armor-piercing projectiles.

Colonial Steel Company, 403 Bank of Commerce Building, Pittsburgh. Building crucible steel furnaces at South Monaca, Beaver county.

Crucible Steel Company of America; general offices, Empire Building, Pittsburgh. Eight crucible steel works in Pennsylvania. Aliquippa Steel Works, Aliquippa, Beaver county; three crucible steel-melting furnaces (one 24, one 36, and one 48-pot); 108 pots; product, special qualities of plate and sheet steel. Beaver Falls Steel Works, Beaver Falls, Beaver county; one 24-pot crucible steel-melting furnace; product, plow, spring, cutlery, file, and tool steel. Black Diamond Steel Works, (operated by the Park Steel Company,) Pittsburgh, Allegheny county; two 24, one 30, two 42, and seven 48-pot crucible steel-melting furnaces; 498 pots; product, hammered and rolled crucible steel of every description. Crescent Steel Works, Forty-ninth to Fifty-first sts., Pittsburgh, Allegheny county; one 60-pot, two 36-pot, and two 24-pot crucible steel-melting furnaces; 180 pots; product, hammered and rolled bar steel, and cast, spring, and edge tool steel. Howe, Brown & Co. Works, Penn ave. and Seventeenth st., Pittsburgh, Allegheny county; six 24-pot and two 30-pot crucible steel-melting furnaces; 204 pots; product, crucible cast steel in bars, sheets, rods, plates, and special forgings. La Belle Steel Works, Ridge ave. and Rebecca st., Allegheny, Allegheny county;

one 36-pot and two 42-pot crucible steel-melting furnaces; 120 pots; product, high-grade merchant steel of every description. Pittsburgh Steel Works, McKees Rocks, Allegheny county, on the Pittsburgh and Lake Erie Railroad; two 33-pot crucible steel-melting furnaces; 66 pots; product, plow, saw, sheet, plate, best edge tool, agricultural, and other grades of crucible steel. Singer, Nimick & Co. Works, in the thirty-fourth ward, Pittsburgh, Allegheny county; crucible steel plant with an annual capacity of 13,200 gross tons of ingots; product, tool, saw, sheet, plate, and agricultural steel.—*See New York (Sanderson Brothers Steel Works) and New Jersey, (Crucible Steel Company of America.)*

Cyclops Steel Works, Charles Burgess, Titusville, Crawford county. Six 6-pot crucible steel-melting holes; 36 pots; product, special tool steel.

Fairmount Steel Works, Alexander Foster & Co., 2325 Spring Garden st., Philadelphia. Six 4-pot steel-melting furnaces; 24 pots; product, frog plates, points, forgings, etc.

Firth-Sterling Steel Company, Pittsburgh. Works at Demmler, Allegheny county. Two 30-pot crucible steel-melting furnaces; 60 pots; product, fine crucible tool steel and Wheeler-Sterling projectiles.

Hussey, Binns & Co., Limited, 64 Fourth avenue, Pittsburgh. One 24-pot crucible steel-melting furnace; product, crucible cast steel used by the firm in making shovels, spades, and scoops.

Jessop (William) & Sons, Limited, 91 John st., New York City. Contemplate erecting a crucible steel plant at Washington, Washington county.

Jupiter Steel Works, Jupiter Steel and Coal Company, 616 Lewis Building, Pittsburgh. Building works near Carnegie, Allegheny county. Crucible steel department will contain 4 furnaces with 72 steel-melting pots. Product, "Jupiter" steel mining tools, oil well and quarry outfits and supplies, etc.

Keystone Saw, Tool, Steel, and File Works, Henry Disston & Sons, (incorporated,) Tacony, Philadelphia. Address all communications to P. O. Box 1537, Philadelphia. One 30-pot and three 24-pot crucible steel-melting furnaces; 102 pots; product, principally saw steel, engravers' plates, and sheet steel for all other purposes.

Kidd Brothers and Burgher Steel Company, Aliquippa, Beaver county. Building works to be equipped with 2 crucible steel-melting furnaces; 60 pots can be used at a heat.

McInnes Steel Company, Limited, Corry, Erie county. One 6-pot crucible steel-melting furnace; product, "McInnes" hammered tool steel and self-hardening steel.

Midvale (The) Steel Company, Philadelphia. Makes crucible steel.

New Brighton Steel Company, New Brighton, Beaver county. One 12-pot crucible steel furnace with 2 steel-melting holes; product, crucible tool steel, wire-drawing plates, and steel forgings.

Nickel Steel and Forge Company, 800 Penn ave., Pittsburgh. Works at Carnegie, Allegheny county. Eight crucible steel-melting holes; product, steel bars and Damascus and nickel steel for tools, dies, etc.

Reliance Steel Casting Company, Limited, Pittsburgh. Works, corner Thirty-sixth st. and A. V. Railway. One 24-pot crucible steel-melting furnace; product, steel castings.

Wayne Iron and Steel Works, Brown & Co., Incorporated, Pittsburgh. Works, cor. Tenth st. and Duquesne Way. Make crucible steel.

Westmoreland Steel Company, Huff Station, near Greensburg, Westmoreland county. Pittsburgh office, 315 Fourth ave. One 24-pot crucible steel-melting furnace; product, forgings, tool steel, etc.

TENNESSEE—1.

Southern (The) Steel Works, John Leighton & Sons, 610-14 Boyce st. Chattanooga, Hamilton county. Two 8-pot crucible steel-melting furnaces; 16 pots; product, tool steel, forgings, and castings.

OHIO—3.

Canton Crucible Steel Works, Canton, Stark county. Twelve 2-pot crucible steel-melting holes; 24 pots; product, tool steel, wire-drawing plates, and steel castings.

Canton (The) Saw Company, Canton, Stark county. One crucible steel-melting furnace with 2 pots; product, small machine castings.

Coxey, (Jacob S.,) Mount Vernon, Knox county. Two 4-pot crucible steel-melting furnaces; 8 pots; product, steel castings.

INDIANA—1.

Oliver Chilled Plow Works, South Bend, St. Joseph county. Number of pots, 96. Entire product used by the works in the manufacture of plows.

ILLINOIS—2.

Sargent (The) Company, 675 Old Colony Building, Chicago. Works at Fifty-ninth and Wallace streets, Chicago. One 24-pot Siemens steel-melting furnace; product, brake shoe inserts and general castings.

Steel Department, Simonds Manufacturing Company, Fitchburg, Worcester county, Massachusetts. Works at Western avenue, Sixteenth and Seventeenth streets, Chicago. One 36-pot crucible steel-melting furnace with 6 holes; product, saw plate and crucible sheet steel.

WISCONSIN—4.

Crucible Steel Casting Company, 484-6 Clinton st., Milwaukee, Milwaukee county. Five 3-hole crucible steel-melting furnaces; 10 pots can be used at a heat; product, machinery castings of all kinds.

Dutcher (The J. A. and P. E.) Company, Milwaukee, Milwaukee county. Four 4-pot Noble liquid-fuel crucible steel-melting furnaces; 16 pots; product, chiefly bicycle and machinery castings.

Shaw (The) Steel Casting Company, Milwaukee, Milwaukee county.

Four crucible steel-melting furnaces with 3 chambers each; 18 holes can be used at a heat; product, steel castings.

Smith (George H.) Steel Casting Company, successor to Milwaukee Steel Casting Company, Milwaukee, Milwaukee county. One 6-pot crucible steel-melting furnace. The crucible pots are used only for melting metal for 2 special converters.

UNITED STATES.

Total number of crucible steel works in the United States in November, 1901: 45 completed, 3 building, and 1 projected. Number of pots in completed works that can be used at each heat: 2,896.

STEEL CASTING WORKS.

A complete list of all works which are equipped for the manufacture of Bessemer, open-hearth, crucible, and "special" steel castings is given below. Capacities are given in gross tons of 2,240 pounds.

MASSACHUSETTS—2.

Thomson-Houston Electric Company, Steel Foundry Department, 42 Centre st., Lynn, Essex county. (Operating for the General Electric Company; general office, Schenectady, New York.) Acid open-hearth steel castings; annual capacity, 9,000 gross tons.

United States Steel Company, Everett, Middlesex county. Crucible and acid open-hearth steel castings from $\frac{1}{4}$ of a pound to 60,000 pounds; annual capacity, 5,000 gross tons.

CONNECTICUT—2.

Driggs-Seabury Gun and Ammunition Company, 25 Broad st., New York City. Works at Derby, New Haven county, Connecticut. Tro-penas steel castings; annual capacity, 2,500 gross tons.

Malleable Iron Fittings Company, Branford, New Haven county. Acid open-hearth steel castings for machinery, bicycle, and gun work; annual capacity, 3,000 gross tons of steel castings. Also makes malleable iron castings.

NEW YORK—4.

Buffalo Steel Foundry, Pratt and Letchworth Company, Buffalo, Erie county. Acid open-hearth steel castings; annual capacity, 6,000 gross tons.

Chrome Steel Works, Brooklyn, Kings county. Office and works, Kent ave. and Keap and Hooper sts. New York office, 11 Pine

street. Crucible chrome steel castings; annual capacity, 3,500 gross tons.

Johnson (Isaac G.) & Co., Spuyten Duyvil, New York City. Crucible and acid open-hearth steel castings; annual capacity, single turn, 180 gross tons of crucible and 5,800 tons of open-hearth steel castings.

Syracuse Works, American Steel Casting Company; general offices, Thurlow Station, Chester, Pa. Works at Geddes, Onondaga county, New York. Acid open-hearth steel castings; annual capacity, 3,000 gross tons.—*See Pennsylvania (American Steel Casting Company) and Ohio, (Alliance Works.)*

NEW JERSEY—5.

Atha (Benjamin) & Co., Newark, Essex county. Acid and basic open-hearth steel castings; annual capacity, 12,000 gross tons.

Graphite Metal Company, 15 Cortlandt st., New York City. Works at Garwood, Union county, New Jersey. Graphitic steel castings with a tensile strength of from 35,000 to 70,000 pounds; graphitic steel can be forged, welded, or tempered; annual capacity, 2,000 gross tons.

Oliphant Steel and Iron Company, Trenton, Mercer county. Acid open-hearth steel castings; annual capacity, 2,000 gross tons.

Taylor Iron and Steel Company, High Bridge, Hunterdon county. Hadfield's manganese, chrome, and other steel castings.

Uniform Steel Company, 320 Broadway, New York City. Works at Belleville, Essex county, New Jersey. Crucible steel castings for tools, dies, and high-grade machines; annual capacity, 3,150 gross tons.

PENNSYLVANIA—28 COMPLETED AND 3 BUILDING.

Altoona Foundry and Machine Company, Altoona, Blair county. Building works for the production of malleable iron castings, but open-hearth steel castings could be made; estimated daily capacity, 10 gross tons of malleable castings.

American Iron and Steel Works, Jones & Laughlins, Limited, Pittsburgh. Works in the twenty-fourth and twenty-fifth wards, South Side. Acid open-hearth steel castings; annual capacity, 2,500 gross tons.

American Steel Casting Company; general offices, Thurlow Station, Chester, Delaware county. Three works in Pennsylvania, all of which produce acid open-hearth steel castings only. Thurlow Works, Thurlow, (post office address, Chester,) Delaware county; annual capacity, 36,000 gross tons. Norristown Works, Earnest Station, Norristown, Montgomery county; annual capacity, 5,400 tons. Sharon Works, Sharon, Mercer county; annual capacity, 36,000 tons.—*See New York (Syracuse Works) and Ohio, (Alliance Works.)*

Bethlehem Steel Company, South Bethlehem, Northampton county. Open-hearth and crucible steel castings.

- Brylgon Foundry, Reading, Berks county. Tropenas steel castings from one pound to any desired weight; annual capacity, 3,000 gross tons.
- Chester Steel Castings Company, 407 Sansom st., Philadelphia. Works at Chester, Delaware county. Acid open-hearth steel castings of every description from 1 to 40,000 lbs.; also produces castings by the McHaffie process; annual capacity, single turn, 15,000 gross tons.
- Columbia Iron and Steel Foundry Company, Thirty-fourth st. and A. V. Ry., Pittsburgh, Allegheny county. Acid open-hearth steel castings; annual capacity, 2,000 gross tons.
- Diamond Drill and Machine Company, Birdsboro, Berks county. Building works for the manufacture of all kinds of acid open-hearth steel castings; estimated annual capacity, 10,000 gross tons of steel castings; also makes gray iron castings.
- Duquesne Steel Foundry Company, Germania Bank Building, Pittsburgh. Works at Kendall Station, P. & L. E. R. R., (P. O. address of works, Coraopolis,) Allegheny county. Acid open-hearth steel castings; annual capacity, 10,000 gross tons.
- Fort Pitt Foundry, Mackintosh, Hemphill & Co., Pittsburgh. Works, foot of Twelfth st. Acid open-hearth steel castings; annual capacity, 15,000 gross tons.
- Franklin (The) Steel Casting Company, Franklin, Venango county. Acid open-hearth steel castings up to 60,000 pounds; specialties, M. C. B. automatic couplers, draft boxes, and truck bolsters; also metal of high permeability for electrical purposes; annual capacity, 12,000 gross tons.
- Homestead Steel Works, Carnegie Steel Company, Carnegie Building, Pittsburgh. Works at Munhall, one mile from Pittsburgh. Basic open-hearth steel castings; annual capacity, 2,500 gross tons.
- Johnson Works, The Lorain Steel Company, Lorain, Ohio. Works at Johnstown, Cambria county, Pa. Acid open-hearth steel castings; annual capacity, 6,500 gross tons of street railroad specialties.
- Logan Manufacturing Company, Phoenixville, Chester county. Tropenas steel castings; annual capacity, 1,000 gross tons.
- McConway (The) and Torley Company, Forty-eighth st. and A. V. Ry., Pittsburgh. Building a plant for the manufacture of acid open-hearth steel car couplers; annual capacity, 12,000 gross tons.
- Mesta Machine Company, Lewis Block, Pittsburgh. Works at Homestead, Allegheny county. Acid open-hearth steel rolls and general castings; also machine-molded gears; annual capacity, 10,000 gross tons; also produces gray iron castings.
- Midvale (The) Steel Company, Nicetown, Philadelphia. Open-hearth and crucible steel castings.
- National (The) Malleable Castings Company, Sharon, Mercer county. Acid open-hearth steel castings; annual capacity, about 18,000 tons.
- Norway Iron and Steel Company, York, York county. Small acid

- open-hearth steel castings for gear work, etc.; annual capacity, 6,000 gross tons; also makes malleable iron castings.
- Penn Steel Casting and Machine Company, Chester, Delaware county. Acid open-hearth steel castings; annual capacity, single turn, 12,000 gross tons; also manufactures cast-steel pipe.
- Pennsylvania Steel Works, The Pennsylvania Steel Company, Steelton, Dauphin county. Office, 312-19 Girard Building, Philadelphia. Acid open-hearth steel castings; annual capacity, 18,000 gross tons.
- Phoenix Iron Works, The Phoenix Iron Company, 410 Walnut st., Philadelphia. Works at Phoenixville, Chester county, Pa. Open-hearth steel castings; annual capacity, 2,500 gross tons.
- Pittsburgh Steel Foundry, National Bank of Commerce Building, Pittsburgh. Works at Glassport, Allegheny county. Acid and basic open-hearth steel castings for mills, electrical work, mining machinery, locomotive wheel centres and frames, couplers, knuckles, forging ingots, etc.; annual capacity, 60,000 gross tons.
- Reliance Steel Casting Company, Limited, Pittsburgh. Works, corner Thirty-sixth st. and A. V. Ry. Crucible and acid open-hearth steel castings from one to 20,000 pounds; specialty, small castings; annual capacity, single turn, 2,500 gross tons.
- Seaboard Steel Casting Company, foot of Jeffrey st., Delaware river, Chester, Delaware county. Acid open-hearth steel castings; annual capacity, 20,000 gross tons.
- Solid Steel Casting Company, Chester, Delaware county. Works at Lamokin, one mile south of Chester. Acid open-hearth steel castings; annual capacity, 6,000 gross tons. Specialties, all forms of locomotive and machinery castings.
- Standard (The) Steel Works, Harrison Building, Philadelphia. Works at Burnham, Mifflin county. Acid open-hearth steel castings; annual capacity, 5,000 gross tons.
- Union Steel Casting Company, Sixty-first st. and A. V. Ry., Pittsburgh. Acid open-hearth steel castings; annual capacity, 6,000 gross tons.
- Wharton, Jr., (William) & Co., Incorporated, Twenty-fifth st. and Washington ave., Philadelphia. Tropenas steel castings, consumed by the firm in its switch works; annual capacity, 2,000 gross tons.

TENNESSEE—1.

- Southern (The) Steel Works, John Leighton & Sons, 610-14 Boyce st., Chattanooga, Hamilton county. Open-hearth and crucible steel castings.

ALABAMA—1.

- Tennessee Coal, Iron, and Railroad Company, Birmingham, Alabama. Steel Casting Department: Works at Ensley, Jefferson county, Alabama. Basic open-hearth car couplers, gears, rolls, and other steel castings; annual capacity, 12,000 gross tons.

OHIO—9 COMPLETED, 1 BUILDING, 1 TO BE REBUILT,
AND 2 PROJECTED.

- Alliance Works, American Steel Casting Company; general offices, Thurlow Station, Chester, Pa. Works at Alliance, Stark county, Ohio. Acid open-hearth steel castings; annual capacity, 36,000 gross tons.—*See New York (Syracuse Works) and Pennsylvania, (American Steel Casting Company.)*
- Buckeye (The) Malleable Iron and Coupler Company, Columbus, Franklin county. Chicago office, Rookery Building. Building works for the manufacture of acid and basic open-hearth car couplers and general castings; annual capacity, 15,000 gross tons of acid and 12,000 tons of basic castings.
- Canton Crucible Steel Works, Canton, Stark county. Crucible steel castings. A new company is being organized to operate these works.
- Cleveland (The) Steel Casting Company, Burlington and Hubbard sts., Cleveland, Cuyahoga county. Works on Hubbard st. and the Cleveland and Pittsburgh Railroad. Acid open-hearth steel castings; annual capacity, 9,500 gross tons.
- Columbus (The) Malleable Iron Company, Columbus, Franklin county. Malleable iron castings, but can make acid open-hearth steel castings.—*Destroyed by fire in the fall of 1901; to be rebuilt.*
- Coxey, (Jacob S.), Mount Vernon, Knox county. Crucible and acid and basic open-hearth steel castings; annual capacity, 45,000 gross tons; also produces gray iron, semi-steel, brass, bronze, and other castings.
- Dithridge Steel Car Company, 76 Montgomery street, Jersey City, New Jersey. Building works at White City, near Newcomerstown, Tuscarawas county, Ohio, which may contain a basic open-hearth steel casting plant; daily capacity, about 50 gross tons.
- Heckert-Baltzley Billet Company, Toledo. Works at Findlay, Hancock county. Basic open-hearth steel castings.
- Lima (The) Steel Casting Company, Lima, Allen county. Sales office, 490 Prospect st., Cleveland. Address all correspondence to Lima. Acid open-hearth steel castings; annual capacity, 9,000 gross tons.
- Marion (The) Steam Shovel Company, Marion, Marion county. Robert-Bessemer steel castings, all consumed by the company; annual capacity, 2,400 gross tons.
- Newark Iron and Steel Company, Newark, Licking county. Acid open-hearth steel castings; annual capacity, 3,000 gross tons.
- Otis (The) Steel Company, Limited, Cleveland, Cuyahoga county. Acid and basic open-hearth steel castings; annual capacity, 12,000 gross tons.
- Youngstown (The) Engineering Company, Youngstown, Mahoning county. Contemplates erecting works for the manufacture of Tropenas or open-hearth steel castings; now building a gray iron foundry.

INDIANA—6.

- Central Steel Company, 227 West Merrill street, Indianapolis. Basic open-hearth and basic-Bessemer steel castings.—*Works being dismantled.*
- Gould Steel Company, 25 West Thirty-third street, New York City. Works at Anderson, Madison county, Indiana. Acid open-hearth steel castings; annual capacity, 9,000 gross tons.
- National Car Coupler Company, 621 Monadnock Block, Chicago. Works at Converse, Miami county, Indiana. Acid open-hearth National car couplers, National continuous platform buffers, and other steel castings; annual capacity, 7,500 gross tons.
- National Steel Casting Company, Montpelier, Blackford county. Acid open-hearth steel car couplers, knuckles, and other castings from 5 to 20,000 pounds; annual capacity, 15,000 gross tons. Specialty, railroad and electric castings.
- Peru Steel Casting Company, Peru, Miami county. Basic open-hearth castings for machine and railroad work from 10 to 75,000 pounds; annual capacity, 18,000 gross tons.
- Whiteley Steel Company, Muncie, Delaware county. Contracting and sales departments: Klopfer Block, Muncie, and Marquette Building, Chicago. McHaffie crown steel castings; annual capacity, 2,500 gross tons.

ILLINOIS—6.

- American Steel Foundry Company, Wells Building, St. Louis, Mo. Works at Granite City, Madison county, Illinois. Basic open-hearth steel railway and other large castings; annual capacity, 45,000 tons.
- Chicago Malleable Castings Company, One Hundred and Twentieth street and Centre avenue, Chicago. Works at West Pullman, Cook county. Basic open-hearth steel gears, pinions, and small castings; annual capacity, 1,000 gross tons; also makes malleable iron castings.
- Melrose Park Works, Latrobe Steel and Coupler Company; main office, 1200 Girard Building, Philadelphia; Chicago office, Old Colony Building. Works at Melrose Park, Cook county, Illinois. Acid open-hearth steel automatic car couplers and other castings.
- Sargent (The) Company, 675 Old Colony Building, Chicago. Two works, both located in Cook county, one at Fifty-ninth and Wallace streets, Chicago, and the other at Chicago Heights. Fifty-ninth and Wallace Streets Works: crucible and open-hearth steel castings; annual capacity, 900 gross tons of crucible brake shoe inserts and general castings and 7,000 tons of acid open-hearth castings. Chicago Heights Works: Tropenas steel castings; annual capacity, 5,000 tons.
- Shickle, (The) Harrison, and Howard Iron Company, Shickle, Harrison, and Howard Building, Eighth and Locust streets, St. Louis, Missouri. Works at East St. Louis, St. Clair county, Illinois. Basic open-hearth car trucks, car bolsters, pilot couplers, and other steel castings; annual capacity, 20,000 gross tons.

MICHIGAN—1.

Detroit (The) Steel and Spring Company, Detroit, Wayne county.
Robert-Bessemer steel castings; annual capacity, 5,000 gross tons.

WISCONSIN—5.

Crucible Steel Casting Company, Milwaukee. Crucible steel machinery castings of all kinds; annual capacity, 900 gross tons.

Dutcher (The J. A. & P. E.) Company, Milwaukee, Milwaukee county.
Crucible and acid open-hearth steel castings, chiefly for bicycle and machinery purposes; annual capacity, 900 gross tons of open-hearth and 75 tons of crucible castings.

Falk (The) Company, Milwaukee, Milwaukee county. All kinds of acid open-hearth steel castings; annual capacity, 5,400 gross tons.

Shaw (The) Steel Casting Company, Milwaukee. Crucible and acid open-hearth steel castings; annual capacity, 750 gross tons.

Smith (George H.) Steel Casting Company, Milwaukee, Milwaukee county. Special steel castings; annual capacity, 2,000 gross tons.

MINNESOTA—1.

American Hoist and Derrick Company, St. Paul, Ramsey county. Tropenas steel castings; annual capacity, 1,000 gross tons.

MISSOURI—2.

St. Louis Iron and Steel Foundry Company, St. Louis. Built in 1901. Tropenas steel castings; annual capacity, 4,800 gross tons. Steel had not been made down to November 25, 1901.

Scullin-Gallagher Iron and Steel Company, Kraft st. and Manchester ave., St. Louis. Acid and basic open-hearth steel castings up to 60,000 pounds; specialty, metal for electrical purposes of high permeability; annual capacity, 25,000 gross tons.

COLORADO—1.

Minnequa Rolling Mills and Steel Works, The Colorado Fuel and Iron Company, Boston Building, Denver. Works at Pueblo, Pueblo county. Bessemer steel castings; may make open-hearth steel castings.

CALIFORNIA—1.

Union Iron Works, San Francisco, San Francisco county. Tropenas steel castings, consumed by the company in its shipbuilding plant; annual capacity, 2,000 gross tons.

UNITED STATES.

Total number of steel casting works in the United States in November, 1901: 75 completed, 4 building, 1 to be rebuilt, and 2 projected. Of the completed plants 13 make Bessemer steel or modified Bessemer steel castings, 56 make open-hearth steel castings, 14 make crucible steel castings, and 4 make special steel castings.

IRON AND STEEL RAIL MILLS.

Works equipped for the manufacture of all kinds of rails are included in this list.

NEW YORK—1 BUILDING.

Lackawanna (The) Iron and Steel Company, Buffalo, Erie county. New York office, 100 Broadway. Erecting works at West Seneca, Erie county, to manufacture standard sections of steel rails.—*See Pennsylvania.*

NEW JERSEY—1 BUILDING.

Tremley Point Plant, American McKenna Process Company, Milwaukee, Wisconsin. Building works at Tremley Point, Union county, New Jersey, for renewing old steel rails by the McKenna process.—*See Illinois (Joliet Plant) and Kansas, (Kansas City Plant.)*

PENNSYLVANIA—13.

- American Iron and Steel Works, Jones & Laughlins, Limited, Pittsburgh. Light steel rails.
- Bethlehem Steel Company, South Bethlehem, Northampton county. Iron rails and standard steel rails.
- Cambria Steel Company, Harrison Building, southwest corner Fifteenth and Market streets, Philadelphia. Works at Johnstown, Cambria county. Standard and street rails.
- Carnegie Steel Company, Carnegie Building, Pittsburgh. Edgar Thomson Works, at Bessemer, (post office address, Braddock.) Standard sections of steel rails; also light rails.
- Chester Iron and Steel Company, lessee, Chester, Delaware county. Light rails.
- Green Ridge Iron Works, Scranton, Lackawanna county. Strap rails.
- Hollidaysburg Iron and Nail Company, Hollidaysburg, Blair county. Flat and small T rails.
- Lackawanna (The) Iron and Steel Company, Buffalo, Erie county, New York. New York office, 100 Broadway. Two works at Scranton, Lackawanna county, Pennsylvania. Light and heavy steel rails.—*See New York.*
- Montour Rolling Mills Department, Reading Iron Company, Reading. Works at Danville, Montour county. Iron and steel rails.
- Oliver Iron and Steel Company, Pittsburgh. Mills and factories located from Tenth to Fifteenth sts., South Side, Pittsburgh. Light rails.
- Pennsylvania (The) Steel Company, Steelton. Office, 312-19 Girard Building, Philadelphia. Rails of all sections; also street rails.

Sharon Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Sharon, Mercer county. Light T rails.
—See *Alabama, Ohio, (Eagle Works,) Indiana, and Illinois.*

MARYLAND—3.

Cumberland Rolling Mill, Schonthal Iron and Steel Company, lessee, Cumberland, Allegany county. Renewed rails. (Works owned by the Baltimore and Ohio Railroad Company.)

Maryland Sheet and Steel Company, Cumberland, Allegany county. Light sections of steel rails.

Maryland Steel Company, general offices, Sparrows Point, Maryland, and Girard Building, Philadelphia. Works at Sparrows Point, Baltimore county. Standard sections of steel rails.

VIRGINIA—1.

Iron Gate Rolling Mill, Iron Gate, Alleghany county. Light iron and steel rails.

TENNESSEE—2.

Knoxville Iron Company, Knoxville, Knox county. Two works in Tennessee equipped for the manufacture of rails: Harriman Works, Harriman, Roane county; twelve to 30-lb. T rails. Knoxville Works, Knoxville; light T and street rails.

ALABAMA—3 COMPLETED AND 1 BUILDING.

Anniston Rolling Mill Company, Anniston, Calhoun county. Light T rails.

Republic Iron and Steel Company, Stock Exchange Building, Chicago. Two works in Alabama equipped for the manufacture of rails: Alabama Works, Gate City, Jefferson county; light T rails. Birmingham Rolling Mills, (operated by the Birmingham Rolling Mill Company,) Birmingham, Jefferson county; small T rails.—See *Pennsylvania, (Sharon Works,) Ohio, (Eagle Works,) Indiana, and Illinois.*

Tennessee Coal, Iron, and Railroad Company, Birmingham, Alabama. Building at its Steel Works Division, at Ensley, Jefferson county, one 27-inch rail train for the production of open-hearth steel rails.

OHIO—7.

American Steel Hoop Company, Carnegie Building, Pittsburgh, Pa. Two works in Ohio equipped for the manufacture of rails: Bridgeport Mill, Bridgeport, Belmont county; light T rails. Girard Mill, Girard, Trumbull county; small steel T rails.

Columbus Iron Works, Standard Chain Company, First National Bank Building, Pittsburgh, Pa. Works at Columbus, Franklin county, Ohio. Light T rails.

Eagle Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Ironton, Lawrence county. Eight to

16-lb. rails.—*See Pennsylvania, (Sharon Works,) Alabama, Indiana, and Illinois.*

Lorain Works, The Lorain Steel Company, Lorain, Lorain county. Girder and T rails.

Newburgh Steel Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Newburgh, Cuyahoga county, Ohio. Bessemer steel rails, girder rails, and small T and tram rails.

Ohio Works, National Steel Company, Carnegie Building, Pittsburgh, Pa. Works at Youngstown, Mahoning county, Ohio. Standard sections of T rails.

INDIANA—4.

Republic Iron and Steel Company, Stock Exchange Building, Chicago.

Four works in Indiana equipped for the manufacture of rails: Alexandria Works, Alexandria, Madison county; small rails. Central Works, Brazil, Clay county; light T rails. Terre Haute Works, Terre Haute, Vigo county; light T rails. Wabash Works, Terre Haute, Vigo county; light T rails.—*See Pennsylvania, (Sharon Works,) Alabama, Ohio, (Eagle Works,) and Illinois.*

ILLINOIS—6.

Illinois (The) Steel Company, Rookery Building, Chicago. Three works in Illinois equipped for the manufacture of rails: South Works, South Chicago, Cook county; standard sections of steel rails. Joliet Works, Joliet, Will county; standard sections of steel rails. Union Works, 3179 Ashland ave., Chicago; standard sections of steel rails; the Union Works are partly dismantled and are not likely to be again operated.—*See Wisconsin, (Milwaukee Works.)*

Joliet Plant, American McKenna Process Company, Milwaukee, Wisconsin. Works at Joliet, Illinois. Renewed steel rails by the McKenna process.—*See New Jersey (Tremley Point Plant) and Kansas, (Kansas City Plant.)*

Republic Iron and Steel Company, Stock Exchange Building, Chicago.

Two works in Illinois equipped for the manufacture of rails: Springfield Works, Springfield, Sangamon county; light rails. Tudor Works, East St. Louis, St. Clair county; T rails.—*See Pennsylvania, (Sharon Works,) Alabama, Ohio, (Eagle Works,) and Indiana.*

WISCONSIN—1.

Milwaukee Works, The Illinois Steel Company, Rookery Building, Chicago. Works at Milwaukee, Milwaukee county, Wisconsin. Light rails, (12 to 45 pounds per yard.)—*See Illinois.*

MISSOURI—1.

Hirsch Rolling Mill Company, Ecoff avenue and Missouri Pacific Railroad tracks, St. Louis. Light rails.

KANSAS—1.

Kansas City Plant, American McKenna Process Company, Milwaukee, Wisconsin. Works at Kansas City, Wyandotte county, Kansas. Renewed steel rails by the McKenna process.—*See New Jersey (Tremley Point Plant) and Illinois, (Joliet Plant.)*

COLORADO—2.

Minnequa Rolling Mills and Steel Works, The Colorado Fuel and Iron Company, Boston Building, Denver. Works at Pueblo. Standard steel rails and mine rails; also street rails.—*See Wyoming, (Laramie Rolling Mills.)*

Union Rolling Mills, Union Rolling Mill and Foundry Company, Denver, Arapahoe county. New York office, 71 Broadway. Eight, 12, and 16-lb. T rails.

WYOMING—1.

Laramie Rolling Mills, (operated by The Laramie Iron and Steel Company,) Laramie, Albany county. Mine rails. (The stock of this company is owned by The Colorado Fuel and Iron Company.)—*See Colorado, (Minnequa Rolling Mills and Steel Works.)*

UNITED STATES.

Total number of mills in the United States in November, 1901, which roll iron or steel rails: 45 completed and 3 building.

IRON AND STEEL STRUCTURAL MILLS.

Works equipped for the manufacture of bridge rods, building rods, plates for bridge work, structural tubing, etc., are included in this list.

MAINE—1.

Portland Rolling Mill, Ligonias, South Portland. Angle and shaped iron.

MASSACHUSETTS—1.

Kinsley Iron and Machine Company, Canton, Norfolk county. Building rods, etc.

NEW YORK—3.

Buffalo Steel Company, Tonawanda, Erie county. Bessemer steel angles, channels, tees, and special shapes for agricultural implements and other purposes; bedstead angles a specialty.

Elmira Steel Works, Elmira. Iron and steel angles, universal plates, etc.
Standard Rolling Mill, M. J. Dempsey, Fortieth st. and Eleventh ave., New York City. Iron angles for buildings, bridges, etc.

NEW JERSEY—2.

- Boonton Iron Works, Boonton Iron and Steel Company, lessee, Boonton, Morris county. Iron angles.
- Passaic (The) Rolling Mill Company, Paterson, Passaic county. Structural material, including beams, channels, angles, tees, universal mill plates, etc. A bridge-building department and a steel eye-bar plant are connected with the works.

PENNSYLVANIA—28.

- Allentown (The) Rolling Mills, 229 Drexel Building, Philadelphia. Works at Allentown, Lehigh county. Iron I beams, channels, angles, bridge work, etc.
- American Iron and Steel Works, Jones & Laughlins, Limited, Pittsburgh. Works in the twenty-fourth and twenty-fifth wards, South Side. Steel structural shapes. Operate shops equipped with special machinery for fabricating all kinds of structural material, especially for "steel skeleton buildings."
- Bethlehem Steel Company, South Bethlehem, Northampton county. Iron and steel beams, tees, angles, etc.
- Brandywine Rolling Mills, Worth Brothers Company, Coatesville, Chester county. Plates for tank and structural work.
- Cambria Steel Company, Harrison Building, southwest cor. Fifteenth and Market streets, Philadelphia. Works at Johnstown, Cambria county. Steel structural shapes.
- Carnegie Steel Company, Carnegie Building, Pittsburgh. Three mills in Allegheny county which are equipped for the manufacture of structural shapes: Homestead Steel Works, at Munhall. Duquesne Steel Works, at Cochran. Upper Union Mills, at Thirty-third street, Pittsburgh. Product, structural shapes, columns, girders, and other fitted structural work.
- Central Iron and Steel Company, Harrisburg, Dauphin county. Universal bridge and structural plates.
- Chester Iron and Steel Company, lessee, Chester. Iron or steel angles.
- Glasgow Iron Company, Pottstown, Montgomery county. Two works at Pottstown: Glasgow Iron and Steel Works (owned); bridge plates. Pottstown Iron Works (leased); bridge plates.
- Hollidaysburg Iron and Nail Company, Hollidaysburg, Blair county. Channel iron.
- Howe & Polk, Danville, Montour county. Structural tubing, covered by patents, consisting of round unwelded tubing from $\frac{1}{2}$ inch to 3 inches in diameter; also angles, channels, odd shapes, and small zee bar mouldings.
- Logan Iron and Steel Company, Burnham, Mifflin county, 4 miles from Lewistown. Philadelphia office, Harrison Building. Bridge iron, angles, etc.

- Lukens Iron and Steel Company, Coatesville, Chester county. Bridge plates.
- Montour Rolling Mills Department, Reading Iron Company, Baer Building, Reading. Works at Danville, Montour county. Angle iron and iron and steel angle bars.
- Oliver Iron and Steel Company, Pittsburgh. Mills and factories located from Tenth to Fifteenth sts., South Side, Pittsburgh. Angles, small channels, etc.
- Pencoyd Iron Works, A. and P. Roberts Company, operators, general office, 261 South Fourth st., Philadelphia. Works in Montgomery county, opposite Manayunk. Open-hearth steel channel bars from 2 to 15 inches, beams from 3 to 24 inches, deck beams from 5 to 12 inches, tees from 1 to 6 inches, and angles from 1 to 8 inches. Bridge and construction department contains equipment for all classes of bridge and architectural work; also hydraulic forge shop for manufacturing solid forged steel eye-bars from 3 to 12 inches wide. Controlled by the American Bridge Company.
- Penn Iron Company, Limited, Lancaster, Lancaster county. Iron for bridge work, etc.
- Pennsylvania (The) Steel Company, 312-19 Girard Building, Broad and Chestnut streets, Philadelphia. Works at Steelton, Dauphin county. Bessemer and open-hearth steel structural shapes.
- Phoenix (The) Iron Company, 410 Walnut st., Philadelphia. Works at Phoenixville, Chester county. Open-hearth steel beams, channels, angles, tees, and miscellaneous structural shapes. Construction department erects steel buildings and bridges. An eye-bar plant, making bars from 3 inches to 16 inches inclusive in width, is connected with the works; also a hydraulic testing machine with a capacity of 2,000,000 pounds.
- Pottsville Rolling Mills, Pilling & Crane, Girard Building, Philadelphia. Works at Pottsville, Schuylkill county. Iron and steel beams, channels, angles, tees, etc.—*Idle*.
- Reading Works, American Iron and Steel Manufacturing Company, Lebanon. Works at Reading, Berks county. Rods, plates, straps, and forgings for cars, bridges, buildings, etc.
- Sligo Rolling Mills, Phillips, Nimick & Co., Pittsburgh, Allegheny county. Works on the South Side, below the Monongahela bridge. Angles.
- Sterlingworth Railway Supply Company, Easton, Northampton county. Deck beams for brake beam sections.
- Vulcan Forge and Iron Works, Lockhart Iron and Steel Company, Pittsburgh. Works at McKees Rocks, Allegheny county. Bridge iron and angle iron and steel.
- Westmoreland Steel Company, Huff Station, near Greensburg, Westmoreland county. Pittsburgh office, 315 Fourth ave. Small angles.

DELAWARE—2.

Diamond State Steel Company, Wilmington, New Castle county. Two mills. Bridge rods.

VIRGINIA—2.

Old Dominion Iron and Nail Works Company, Richmond, Henrico county. Works on Belle Isle, Richmond. Flat, round, and square iron for structural and bridge work.

Tredegar Iron Works, The Tredegar Company, Richmond. Bridge iron.

KENTUCKY—2.

Licking Iron Works, Licking Rolling Mill Company, Incorporated, Covington, Kenton county. Angle, tee, jail, sash iron, etc.

Mitchell-Tranter Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Covington, Kenton county, Kentucky. Iron and steel channels, angles, etc., for buildings, bridges, etc.—*See Alabama, Ohio, and Indiana.*

TENNESSEE—1.

Harriman Works, Knoxville Iron Company, Knoxville, Knox county. Works at Harriman, Roane county. Light sections of angle and channel iron.

ALABAMA—4.

Anniston Rolling Mill Company, Anniston, Calhoun county. Angles, channels, and special shapes.

Republic Iron and Steel Company, Stock Exchange Building, Chicago. Two mills in Alabama which are equipped for the manufacture of structural shapes: Alabama Works, Gate City, Jefferson county; angles from 1 to 2½ inches and light channels for buildings, bridges, etc. Birmingham Rolling Mills, (operated by the Birmingham Rolling Mill Company,) Birmingham, Jefferson county; iron and open-hearth steel angles for bridges.—*See Kentucky, (Mitchell-Tranter Works,) Ohio, and Indiana.*

Tennessee Coal, Iron, and Railroad Company, Birmingham. Works at Ensley, Jefferson county. Open-hearth steel I beams, channels, and angles.

OHIO—9 COMPLETED AND 1 BUILDING.

American (The) Rolling Mill Company, Middletown, Butler county. Sheet steel building materials of all kinds.

American Steel Hoop Company, Carnegie Building, Pittsburgh, Pa. Three mills in Ohio which are equipped for the manufacture of structural shapes: Bridgeport Mill, Bridgeport, Belmont county; angles, tees, channels, and miscellaneous shapes. Girard Mill, Girard, Trumbull county; angles, channels, tees, and special shapes. Upper Union Mill, Youngstown, Mahoning county; angles and special shapes.

Cambridge Rolling Mill Company, Cambridge, Guernsey county. Angles, tees, zeos, U bars, etc.

Newburgh Steel Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works at Newburgh, Cuyahoga county. Steel beams, channels, angles, and other structural shapes.

Ohio (The) Steel and Iron Specialty Company, Cuyahoga Falls, Summit county. Building works to be equipped for the manufacture of channels, angles, tees, flats, small structural shapes, etc.

Republic Iron and Steel Company, Stock Exchange Building, Chicago, Illinois. Two mills in Ohio which are equipped for the manufacture of structural shapes: Brown Bonnell Works, Youngstown, Mahoning county; beams, channels, angles, universal mill plates, etc. Mahoning Valley Works, Youngstown, Mahoning county; iron angles.—*See Kentucky, (Mitchell-Tranter Works,) Alabama, and Indiana.*

Union (The) Rolling Mill Company, Cleveland, Cuyahoga county. Works and office at Newburgh, in the city of Cleveland. Bridge iron.

INDIANA—5 COMPLETED AND 1 BUILDING.

Central Steel Company, 227 West Merrill street, Indianapolis, Marion county. Angles, channels, miscellaneous shapes, etc.—*Being dismantled.*

Indiana (The) Steel Company, Indianapolis, Marion county. Beams from 6 to 20 inches.—*Works idle since May, 1893.*

Inland Steel Company, 1225-29 Marquette Building, Chicago. Building works at Indian Harbor, Lake county, Indiana, to be equipped for the manufacture of angles, etc.—*See Illinois.*

Ohio Falls Iron Company, New Albany, Floyd county. Bar iron for bridge works, etc.; specialty, wide flats up to 12 inches.

Republic Iron and Steel Company, Stock Exchange Building, Chicago. Two mills in Indiana which are equipped for the manufacture of structural shapes: Indiana Works, Muncie, Delaware county; iron and steel bridge rods, etc. New Albany Works, New Albany, Floyd county; structural iron.—*See Kentucky, (Mitchell-Tranter Works,) Alabama, and Ohio.*

ILLINOIS—1.

Inland Steel Company, 1225-29 Marquette Building, Chicago. Works at Chicago Heights, Cook county. Angles, tees, channels, etc.—*See Indiana.*

WISCONSIN—1.

West Superior Branch, United States Cast Iron Pipe and Foundry Company, 80 Broadway, New York. Works at West Superior, Douglas county. Steel structural shapes.

MINNESOTA—1.

Ironton Structural Steel Works, Duluth, St. Louis county. Structural steel.—*Idle.*

MISSOURI—1.

Hirsch Rolling Mill Company, Ecoff avenue and Missouri Pacific Railroad tracks, St. Louis. Angles, shapes, etc.

COLORADO—1.

Minnequa Rolling Mills and Steel Works, The Colorado Fuel and Iron Company, Boston Building, Denver. Branch office, Empire Building, New York City. Works at Pueblo, Pueblo county, Colorado. Structural shapes, tank plate, angle bars, etc.

CALIFORNIA—2.

Judson Manufacturing Company, Oakland, Alameda county. Office and salesroom, cor. Howard and Beale sts., San Francisco. Structural shapes.

Southern Pacific Company, Sacramento, Sacramento county. I beams, angle iron, etc.

UNITED STATES.

Total number of works in the United States in November, 1901, which roll iron or steel structural shapes: 67 completed and 2 building.

IRON AND STEEL WIRE-ROD MILLS.

The capacities given below are in gross tons of 2,240 pounds. A list of wire-nail works will be found beginning on page 382.

MASSACHUSETTS—1.

South Works, American Steel and Wire Company of New Jersey; general offices, Rookery Building, Chicago. Works at Worcester, Massachusetts. Annual capacity, 135,000 tons.—*See Pennsylvania, Ohio, Indiana, (Anderson Works,) and Illinois, (Waukegan Works.)*

RHODE ISLAND—1 COMPLETED AND 1 BUILDING.

Wales (John) Wire Company, Auburn. Building works for the manufacture of wire rods, etc.; estimated annual capacity, 25,000 tons.

Washburn Wire Company, Phillipsdale, Providence county. Flat and round rods; annual capacity, 20,000 tons.

CONNECTICUT—1 REBUILDING.

National (The) Wire Corporation, New Haven, New Haven county. Annual capacity, 90,000 tons.—*Works destroyed by fire in 1901; now being rebuilt.*

NEW YORK—2.

New York Steel and Wire Company, 69 South street, New York City.

Works at Astoria, Queens county. Annual capacity, 35,000 tons.

Wickwire Brothers, Cortland. Annual capacity, 40,000 tons.

NEW JERSEY—3.

Atha Steel Company, Harrison, Hudson county. Annual capacity, 7,000 tons of wire rods in coils. Controlled by the Crucible Steel Company of America, Empire Building, Pittsburgh.

Roebling's (John A.) Sons Company, Trenton, Mercer county. Annual capacity, 45,000 tons.

Trenton (The) Iron Company, Trenton. Annual capacity, 18,000 tons.

PENNSYLVANIA—13 COMPLETED, 1 BUILDING, AND 1 PROJECTED.

American Iron and Steel Works, Jones & Laughlins, Limited, Pittsburgh. Annual capacity, 100,000 tons.

American Steel and Wire Company of New Jersey; general offices, Rookery Building, Chicago. Six works in Pennsylvania: Allentown Works, at Allentown; annual capacity, 75,000 tons. Beaver Falls Works, at Beaver Falls; annual capacity, 100,000 tons. Braddock Works, at Braddock; annual capacity, 80,000 tons. New Castle Works, at New Castle; annual capacity, 90,000 tons. Rankin Works, at Rankin Station; annual capacity, 100,000 tons. South Side Works, at Eighth and Bingham sts., Pittsburgh; annual capacity, 90,000 tons.—*See Massachusetts, (South Works,) Ohio, Indiana, (Anderson Works,) and Illinois, (Waukegan Works.)*

Carpenter Steel Company, Reading. Annual capacity, 3,000 tons.

Hartman (The) Manufacturing Company, New Castle. May erect a wire-rod plant; estimated annual capacity, 275,000 tons.

Monessen Plant, Page Woven Wire Fence Company, Monessen. Annual capacity, 35,000 tons.

Monessen Works, Pittsburgh Steel Company, 305 Ferguson Block, Pittsburgh. Building works at Monessen to be equipped for the manufacture of wire rods; estimated annual capacity, 130,000 tons.

Milesburg Iron Works, McCoy & Linn, Milesburg. Iron rods. Annual capacity, 1,350 tons.

Sharon (The) Steel Company, Sharon. Annual capacity, 125,000 tons.

Union Steel Company, Empire Building, Pittsburgh. Works at Donora. Annual capacity, 200,000 tons.

United States (The) Wire and Nail Company, Lewis Block, Pittsburgh. Works at Shousetown. Annual capacity, 30,000 tons.

KENTUCKY—1.

Ashland Steel Company, Incorporated, Ashland. Annual capacity, 110,000 tons.

ALABAMA—1.

Alabama Steel and Wire Company, Birmingham. Works at Ensley, Jefferson county. Annual capacity, 100,000 tons.

OHIO—5.

American Steel and Wire Company of New Jersey; general offices, Rookery Building, Chicago. Four works in Ohio: American Works, at Cleveland; annual capacity, 125,000 tons. Consolidated Works, at Cleveland; annual capacity, 80,000 tons. H. P. Works, at Cleveland; annual capacity, 60,000 tons. Newburgh Steel Works, at Newburgh; annual capacity, 140,000 tons.—*See Massachusetts, (South Works,) Pennsylvania, Indiana, (Anderson Works,) and Illinois, (Waukegan Works.)*

Cuyahoga (The) Steel and Wire Company, Cuyahoga Falls, Summit county. Annual capacity, 15,000 tons.

INDIANA—1 COMPLETED AND 1 BUILDING.

Anderson Works, American Steel and Wire Company of New Jersey; general offices, Rookery Building, Chicago. Works at Anderson, Indiana. Annual capacity, 75,000 tons.—*See Massachusetts, (South Works,) Pennsylvania, Ohio, and Illinois, (Waukegan Works.)*

Kokomo Wire and Nail Company, Kokomo, Howard county. Building a wire-rod mill. Estimated annual capacity, 75,000 tons.

ILLINOIS—4.

Dillon-Griswold Wire Company, Sterling, Whiteside county. Annual capacity, 50,000 tons.

Grand Crossing Tack Company, Grand Crossing. Annual capacity, 45,000 tons.

Joliet Works, The Illinois Steel Company, Rookery Building, Chicago. Works at Joliet. Annual capacity, 260,000 tons.

Waukegan Works, American Steel and Wire Company of New Jersey; general offices, Rookery Building, Chicago. Works at Waukegan. Annual capacity, 100,000 tons.—*See Massachusetts, (South Works,) Pennsylvania, Ohio, and Indiana, (Anderson Works.)*

COLORADO—1 BUILDING.

Minnequa Rolling Mills and Steel Works, The Colorado Fuel and Iron Company, Boston Building, Denver. Branch office, Empire Building, New York City. Building works at Pueblo, Pueblo county, to be equipped for the manufacture of wire rods.

UNITED STATES.

Total number of iron and steel wire-rod mills in the United States in November, 1901: 32 completed, 4 building, 1 rebuilding, and 1 projected.

PLATE, SHEET, AND SKELP MILLS.

Mills that are equipped for making nail plate, tack plate, or shovel plate are 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 making black plates for tinning are included. Except where otherwise stated capacities are given in tons of 2,240 pounds and on double turn.

MASSACHUSETTS—3.

Bridgewater Foundry, Machine, and Rolling Mill Company, Bridgewater, Plymouth county. Bessemer and open-hearth nail and tack plate.

Mount Hope Iron Works, Mount Hope Iron Company, Somerset, Bristol county. Skelp iron, tack and shovel plate, nail plate, etc.

Tremont Nail Works, Tremont Nail Company, West Wareham, Plymouth county. "Percha" plates for nails and tacks.

CONNECTICUT—1.

Wilnot and Hobbs (The) Manufacturing Company, Bridgeport, Fairfield county. Plate and sheet steel.

NEW YORK—6.

Chrome Steel Works, Brooklyn, Kings county. Office and works, Kent avenue and Keap and Hooper streets. New York office, 11 Pine street. Chrome steel and iron 5-ply plates for safes, jails, etc.

Cohoes Rolling Mill, Cohoes Rolling Mill Company, Cortland and Canvass sts., Cohoes, Albany county. Skelp iron.

Elmira Steel Works, Elmira, Chemung county. Universal plates from 6 to 30 inches wide and of any thickness.

Sanderson Brothers Steel Works, Crucible Steel Company of America, Empire Building, Pittsburgh. Works at Syracuse, Onondaga county, New York. Hammered and rolled crucible sheet steel, etc.—*See Pennsylvania and Ohio, (Burgess Steel and Iron Works.)*

Troy (The) Steel Company, Troy, Rensselaer county. Two works, one of which manufactures sheets and the other skelp.

NEW JERSEY—3.

American Sheet Iron Works, American Sheet Iron Company, Phillipsburg, Warren county. Best qualities of sheet iron and sheet steel

for stamping and enameling and black plates for tinning; annual capacity, triple turn, 2,400 gross tons of sheets and 1,500 tons of black plates.

Cumberland Nail and Iron Works, Bridgeton, Cumberland county. Nail plate and skelp.

Passaic Rolling Mills and Bridge Works, The Passaic Rolling Mill Company, Paterson, Passaic county. New York office, 45 Broadway. Universal mill plates, etc.

PENNSYLVANIA—124 COMPLETED, 6 BUILDING, AND 1 PROJECTED.

Alcania (The) Company, 303 Murtland Building, Pittsburgh. Works at Avonmore, Westmoreland county. Black plates for tinning; annual capacity, 7,500 gross tons.

Allegheny Steel and Iron Company, Lewis Building, Pittsburgh. Works at Avenue, Allegheny county. Telegraph address, Tarentum. Sheet steel; annual capacity, 15,000 gross tons.

American (The) Sheet Steel Company, Battery Park Building, New York City. Nine mills in Pennsylvania which make plates and sheets: Apollo Works, Apollo, Armstrong county; black sheets for galvanizing; annual capacity, triple turn, 18,000 net tons. Chartiers Works, Carnegie, Allegheny county; iron and steel sheets; annual capacity, triple turn, 7,200 net tons. Hyde Park Works, Hyde Park, Westmoreland county; fine grades of soft steel sheets for stamping, japanning, tinning, galvanizing, and armatures, including pickled and cold-rolled, open-pickled, double-annealed and cold-rolled, and cold-rolled and annealed finishes; annual capacity, triple turn, 14,000 net tons. Kirkpatrick Works, Leechburg, Armstrong county; steel sheets; annual capacity, triple turn, 24,000 net tons. McKeesport Works, McKeesport, Allegheny county; sheet iron and sheet steel, both black and planished; specialty, patent planished sheet iron; annual capacity, triple turn, 33,600 net tons. Old Meadow Works, Scottdale, Westmoreland county; sheet iron; annual capacity, triple turn, 17,000 net tons. Saltsburg Works, Saltsburg, Indiana county; fine sheet iron; annual capacity, triple turn, 12,000 net tons. Scottdale Works, Scottdale, Westmoreland county; iron and steel sheets; annual capacity, triple turn, 24,000 net tons. Vandergrift Steel Works, Vandergrift, Westmoreland county; black and galvanized sheets; annual capacity, triple turn, 92,000 net tons of black sheets and 94,500 net tons of galvanized sheets.—*See Ohio and Indiana, (Midland Works.)*

American Steel Hoop Company, Carnegie Building, Pittsburgh. Three mills in Pennsylvania which make skelp: Clark Mill, Thirty-fifth st., A. V. Railway, and Allegheny river, Pittsburgh, Allegheny county; skelp. Greenville Mill, Greenville, Mercer county; iron and steel skelp. Painter Mill, South Side, Pittsburgh, Allegheny county; skelp.—*See Ohio, (Warren Mill.)*

American Tin Plate Company, Battery Park Building, New York City.

Twelve mills in Pennsylvania which make plates or sheets: Canonsburg Works, Canonsburg, Washington county; fine sheet iron and steel for stamping and tinning purposes; annual capacity, 10,000 gross tons. Ellwood City Works, Ellwood City, Lawrence county; black plates for tinning and cold-rolled steel sheets; annual capacity, 12,000 tons. Humbert Works, South Connellsville, Fayette county; black plates for tinning; annual capacity, 12,000 tons. Johnstown Works, Johnstown, Cambria county; black plates for tinning; annual capacity, 3,750 tons. Monongahela Works, South Fifteenth st., Pittsburgh, Allegheny county; black plates for tinning; annual capacity, 24,000 tons. National Works, Monessen, Westmoreland county; black plates for tinning; annual capacity, 50,000 tons. New Castle Works, New Castle, Lawrence county; black plates for tinning; annual capacity, 40,000 tons. Pennsylvania Works, New Kensington, Westmoreland county; black plates for tinning; annual capacity, 12,000 tons. Pittsburgh Works, New Kensington, Westmoreland county; black plates for tinning and soft stamping sheets; annual capacity, 14,000 tons. Shenango Works, New Castle, Lawrence county; black plates for tinning; annual capacity, 60,000 tons. Star Works, foot of Twelfth st., Pittsburgh, Allegheny county; black plates for tinning; annual capacity, 16,000 tons. United States Works, Demmler, (eighth ward, McKeesport,) Allegheny county; refined and cold-rolled black sheet iron, Bessemer and open-hearth steel sheets, and black plates for tinning; annual capacity, 18,000 tons.—*See Maryland, (Cumberland Works,) West Virginia, Ohio, Indiana, Illinois, (Great Western Works,) and Michigan, (Muskegon Works.)*

Anchor Mills, Neal Brothers, lessees, 421 Wood st., Pittsburgh. Works on Nineteenth st., South Side. Special electric steel sheets, sheet iron, and black plates; annual capacity, 12,000 gross tons.

Anchor Nail and Tack Works and Central Expanded Metal Company, Chess Brothers, 531 Wood st., Pittsburgh. Works at Rankin Station. Light steel plates for straps, nails, tacks, stamping, and die work; annual capacity, 12,000 gross tons.

Bethlehem Steel Company, South Bethlehem, Northampton county. Forged armor plate; annual capacity, 5,000 gross tons.

Birdsboro Nail Works, E. and G. Brooke Iron Company, Birdsboro, Berks county. Nail plate and skelp iron.

Blandon Rolling Mill, Simon Seyfert, Blandon. Grooved pipe skelp; annual capacity, 20,000 gross tons.—*See Gibraltar Iron Works in this State.*

Brandywine Rolling Mills, Worth Brothers Company, Coatesville, Chester county. Steel plates for best boiler, locomotive, and tank and structural work; all sizes of machine-flanged and dished heads and machine-flanged man-holes, saddles, etc.; annual capacity, 100,000 gross tons of plates.—*See Viaduct Iron Works in this State.*

- Byers (A. M.) & Co., (incorporated,) Pittsburgh. Works on Sixth st., South Side. Skelp iron, all consumed in the manufacture of pipe; annual capacity, 16,000 gross tons.
- Cambria Steel Company, Harrison Building, Philadelphia. Works at Johnstown, Cambria county. Steel plates.
- Carbon Steel Works, Carbon Steel Company, Thirty-second st., Pittsburgh. Acid open-hearth steel universal and sheared plates; annual capacity, 85,000 gross tons of finished plates.
- Carnegie Steel Company, Carnegie Building, Pittsburgh. Three mills in Allegheny county which make plates: Homestead Steel Works, at Munhall, one mile from Pittsburgh; steel boiler, ship, tank, universal, and armor plates; finishing capacity of armor plate department, 5,000 gross tons per annum. Upper Union Mills, at Thirty-third street, Pittsburgh, on the Allegheny Valley Railroad; steel universal plates, etc. Lower Union Mills, at Twenty-ninth st., Pittsburgh, on the Allegheny Valley Railroad; sheared plates, etc.
- Carnegie Tube Company, Carnegie, Allegheny county. Building works for the manufacture of skelp iron.
- Catasauqua Rolling Mill, Catasauqua Rolling Mill Company, Bullitt Building, Philadelphia. Works at Catasauqua, Lehigh county. Skelp iron.
- Central Iron and Steel Company, Harrisburg, Dauphin county. Two mills at Harrisburg: Central Iron Works; boiler plate, marine and locomotive steel, ship plates, universal bridge and structural plates, tank steel, and iron plates; annual capacity, 120,000 gross tons. Paxton Rolling Mills; steel plates of all kinds; annual capacity, 80,000 gross tons.
- Chesapeake Nail Works, Charles L. Bailey & Co., (incorporated,) lessees, Harrisburg, Dauphin county. Iron and steel nail plate.
- Chester Iron and Steel Company, lessee, Chester, Delaware county. Iron and steel skelp.
- Clinton Rolling Mill, Clinton Iron and Steel Company, West Carson st., Pittsburgh. New York office, 71 Broadway. Mill on the South Side. Plate iron; annual capacity, 15,000 gross tons.
- Colonial Steel Company, 403 Bank of Commerce Building, Pittsburgh. Building works at South Monaca, Beaver county, for the manufacture of sheets, etc.
- Conshohocken, Pennsylvania, and Corliss Iron Works, J. Wood and Brothers Company, Conshohocken, Montgomery county. Sheet, flue, and plate iron of all kinds; corrugated iron a specialty; annual capacity, 15,000 gross tons.
- Crucible Steel Company of America, Empire Building, Pittsburgh. Five mills in Pennsylvania which make plates and sheets: Aliquippa Steel Works, Aliquippa, Beaver county; special qualities of plate and sheet steel. Black Diamond Steel Works, (operated by the Park

Steel Company,) Pittsburgh, Allegheny county; steel plates and sheets. Howe, Brown & Co. Works, Penn ave. and Seventeenth st., Pittsburgh, Allegheny county; crucible steel sheets and plates and open-hearth steel plates for boilers, hulls of vessels, etc. Pittsburgh Steel Works, McKees Rocks, Allegheny county, on the Pittsburgh and Lake Erie Railroad; crucible and open-hearth saw, sheet, and plate steel, etc. Singer, Nimick & Co. Works, in the thirty-fourth ward, Pittsburgh, Allegheny county; saw, sheet, and plate steel, etc. —See *Ohio (Burgess Steel and Iron Works)* and *New York, (Sanderson Brothers Steel Works.)*

Crum Lynne Iron and Steel Company, Crum Lynne, Delaware county. Philadelphia office, 505 Chestnut st. Skelp iron for boiler tubes; annual capacity, 10,000 gross tons.

Danville Bessemer Company, Danville, Montour county. Philadelphia office, 310 Land Title Building. Plates, all consumed by the company in the manufacture of shovels, scoops, spades, etc.; annual capacity, 5,000 gross tons of plates.

Danville Rolling Mill Company, Bullitt Building, Philadelphia. Works at Danville, Montour county. Iron nail plate.

Duncannon Iron Works, The Duncannon Iron Company, Duncannon, Perry county. Office, 122 Race st., Philadelphia. Iron and steel nail plate.

Easton Sheet Iron Works, Theodore Oliver, Easton, Northampton county. Steel and refined iron sheets; annual capacity, 1,000 gross tons.

Eleanor (The) Iron and Steel Company, Irwin, Westmoreland county. Building works for the manufacture of skelp iron and steel.

Etna Iron and Tube Works, Spang, Chalfant & Co., Incorporated, Pittsburgh. Office, 310 Sandusky st., Allegheny. Works at Etna, Allegheny county. Pipe iron; annual capacity, 25,000 gross tons.

Exeter Rolling Mill, Exeter Iron Company, 406 Drexel Building, Philadelphia. Works at Reading, Berks county. Skelp iron.

Fullerton Rolling Mill, Fullerton Rolling Mill Company, Bullitt Building, Philadelphia. Works at Fullerton, Lehigh county. Skelp iron.

Gibraltar Iron Works, Simon Seyfert, Reading, Berks county. Boiler plate and boiler tube and pipe iron; annual capacity, 5,300 gross tons.

—See *Blandon Rolling Mill in this State.*

Glasgow Iron Company, Pottstown, Montgomery county. Two works at Pottstown, one owned and one leased: Glasgow Iron and Steel Works (owned); iron and steel bridge, tank, and boiler plate, flanged and dished boiler heads, man-holes, man-hole saddles for boilers, buckle plates, etc.; annual capacity, 24,000 gross tons. Pottstown Iron Works (leased); boiler, ship, bridge, and tank plates; universal plates, 36 inches wide, can be rolled; annual capacity, 127,000 tons.

Glendale Mill, Lucknow Iron and Steel Company, lessee, Harrisburg. Works at Pine Iron Works P. O., Berks county; telegraph address,

- Manatawny Station. Iron and steel plates; annual capacity, 10,000 gross tons.
- Griffiths Charcoal Iron Mills, Washington, Washington county. Building works for the manufacture of black plates for tinning; estimated annual capacity, 3,600 gross tons.
- Griffiths (The W. H.) Company, Incorporated, Washington. Building works at Waynesburg, Greene county, for the manufacture of black plates for tinning; estimated annual capacity, 11,800 gross tons.
- Harrisburg Rolling Mill Company, Harrisburg, Dauphin county. Skelp iron; annual capacity, 30,000 gross tons.
- Hollidaysburg Iron Works, Hollidaysburg Iron and Nail Company, Hollidaysburg, Blair county. Skelp, etc.
- Hughes & Patterson, Richmond street and Susquehanna avenue, Philadelphia. Iron skelp.
- Hussey, Binns & Co., Limited, 64 Fourth avenue, Pittsburgh. Works at Charleroi, Washington county, on the Monongahela Division of the Pennsylvania Railroad. Crucible cast steel, used by the firm in making shovels, spades, and scoops.
- Hussey Steel Company, 215½ Fourth ave., Pittsburgh. Works at New Kensington, Westmoreland county. Deep-stamping and deep-drawing stock.
- Jones & Laughlins, Limited, Third avenue and Ross street, Pittsburgh. Two mills which make plates and sheets: American Iron and Steel Works, Pittsburgh, Allegheny county; works in the twenty-fourth and twenty-fifth wards, South Side; steel plates and sheets. Soho Department, Second avenue, near Brady street, Pittsburgh, Allegheny county; steel plates; can roll plates 12 inches thick, 7 feet wide, and 15 tons in weight; annual capacity, 100,000 gross tons.
- Juniata Rolling Mill, The Eleanor Iron Company, lessee, Hollidaysburg, Blair county. Main office, Tyrone. Grooved skelp iron.
- Keystone Nail Works, Ellis and Lessig Steel and Iron Company, Limited, Pottstown, Montgomery county. Iron and steel shovel, tack, and nail plate; annual capacity, 14,500 gross tons.
- Keystone Rolling Mill, Fort Pitt Iron and Steel Company, lessee, Murtland Building, Pittsburgh, Allegheny county. Works, Second ave. near Morris st., Soho. Iron and steel skelp.
- Keystone Saw, Tool, Steel, and File Works, Henry Disston & Sons, (incorporated,) Tacony, Philadelphia. Address all communications to P. O. Box 1537, Philadelphia. Principally saw steel of every description, engravers' plates, and sheet steel for other purposes; annual capacity, 5,380 gross tons.
- Lalance and Grosjean Manufacturing Company, Harrisburg, Dauphin county. Main office, 19 Cliff st., New York. Sheet iron and sheet steel and black plates for tinning; annual capacity, 2,500 gross tons of sheets and 7,500 tons of black plates.

- Lebanon Rolling Mills, Lebanon Rolling Mill Company, Lebanon, Lebanon county. Boiler plates, sheets, skelp, etc.; annual capacity, 20,000 gross tons of plate and skelp iron.
- Logan Iron and Steel Company, Burnham, Mifflin county. Philadelphia office, Harrison Building. Skelp.
- Longmead Iron Works, Longmead Iron Company, Conshohocken. Grooved skelp iron; annual capacity, 10,000 gross tons.
- Lukens Iron and Steel Company, Coatesville, Chester county. All kinds of acid and basic open-hearth steel boiler, ship, bridge, and tank plates; also universal plates; also machine-flanged boiler heads and patent hydraulic-pressed boiler braces; annual capacity, 175,000 tons. Adding a 3-high plate mill; annual capacity, 100,000 tons.
- Milton Nail Works, F. A. Godcharles Company, Milton, Northumberland county. Iron and steel nail plate.
- Myers (The H. M.) Company, Beaver Falls. Rolled shovel blanks, used by the company in its shovel works; annual capacity, 2,000 tons.
- National Tube Company, Conestoga Building, Pittsburgh. Four mills in Allegheny county which make plates, sheets, or skelp: Boston Iron and Steel Works, (National Department,) McKeesport; wrought iron and steel skelp; annual capacity, 40,000 gross tons. Elba Rolling Mills, (Continental Department,) Second ave., Pittsburgh; wrought iron and steel skelp, all consumed by the Continental Pipe Mills; annual capacity, 40,000 tons. National Rolling Mills, (National Department,) McKeesport; wrought iron and steel skelp; annual capacity, 240,000 tons. Republic Iron Works, (National Department,) Twenty-fifth st., South Side, Pittsburgh; wrought iron and steel skelp, plates, and sheets; annual capacity, 40,000 tons of grooved skelp, 22,500 tons of plates, and 13,500 tons of sheets.—*See West Virginia.*
- New Brighton Steel Company, New Brighton, Beaver county. Crucible steel wire-drawing plates.
- Norristown Iron Company, Norristown. Skelp iron.
- Northumberland Iron and Nail Works, Van Alen & Co., Northumberland, Northumberland county. Iron and steel nail plate.
- Oxford Iron and Steel Works, William & Harvey Rowland, Incorporated, Frankford, Philadelphia. Bessemer and open-hearth sheets.
- Parkesburg Iron Works, The Parkesburg Iron Company, Parkesburg, Chester county. Boiler tube skelp iron; annual capacity, 15,000 tons.
- Pencoyd Iron Works, A. and P. Roberts Company, operators, 261 South Fourth st., Philadelphia. Works in Montgomery county. Steel plates. Controlled by the American Bridge Company.
- Pennsylvania Steel Works, The Pennsylvania Steel Company, Steelton. Office, 312-19 Girard Building, Broad and Chestnut sts., Philadelphia. Bessemer steel plates, open-hearth steel boiler plates, etc.
- Plymouth Rolling Mills, E. Stanford, lessee, Conshohocken. Black plates for tinning; annual capacity, 2,000 gross tons.

Pottsgrove Iron Works, Potts Brothers Iron Company, Limited, Pottstown, Montgomery county. Boiler plate, and tank, flue, and pipe iron; annual capacity, 12,000 gross tons. Specialties, pipe and flue iron.

Reading Iron Company, Baer Building, Reading. Four mills which make skelp or plate iron: Montour Rolling Mills Department, Danville, Montour county; grooved skelp iron. Ninth Street Mills Department, Reading, Berks county; skelp iron; adding a universal mill for the production of skelp iron. Oley Street Mills Department, Reading, Berks county; skelp iron; annual capacity, 35,000 gross tons. Sheet Mill Department, Reading, Berks county; sheared skelp and plate iron; annual capacity, 25,000 tons.

Republic Iron and Steel Company, Stock Exchange Building, Chicago. Two works in Pennsylvania which make plates or skelp: Atlantic Works, (operated by the Atlantic Iron and Steel Company,) New Castle, Lawrence county; skelp iron. Sharon Works, Sharon, Mercer county; tank plate, etc.—*See Kentucky, (Mitchell-Tranter Works,) Alabama, (Birmingham Rolling Mills,) Ohio, and Illinois, (Springfield Works.)*

Rolling (The) Mill Company of America, South Connellsville, Fayette county. Contemplates building works for the manufacture of sheets.

Russel (J. C.) Shovel Company, Times Building, Pittsburgh. Works at Aliquippa, Beaver county. Shovel blanks, all consumed by the company in its shovel works; annual capacity, 1,700 gross tons.

Sable Iron Works, Zug & Co., Limited, Pittsburgh. Works, Thirteenth and Etna sts. Black plates for tinning, and steel and iron sheets for corrugating, galvanizing, and stamping; also sheets for expanded metal and electrical work; annual capacity, 14,000 gross tons of sheets; corrugated sheets are also produced.

Schuylkill Iron Works, Alan Wood Company, 519 Arch st., Philadelphia. Works at Conshohocken, Montgomery county. Iron and steel plates and sheets; annual capacity, 25,000 gross tons.

Seyfert Rolling Mills, Samuel R. Seyfert & Brother, Reading, Berks county. Works at Seyfert Station, W. & N. R. R. Iron boiler-tube skelp, pipe skelp, etc.; annual capacity, 15,000 gross tons.—*For sale.*

Sharon Sheet Steel Company, Sharon, Mercer county. Building works for the manufacture of black and galvanized sheets; estimated annual capacity, 30,000 gross tons.

Sharon (The) Steel Company, Sharon. Open-hearth steel skelp.

Sharon Tin Plate Works, Sharon Tin Plate Company, Sharon, Mercer county. Black plates for tinning; annual capacity, 48,000 gross tons.

Shoenberger Works, American Steel and Wire Company of New Jersey, Rookery Building, Chicago. Works, Fifteenth st. and Penn ave., Pittsburgh. Basic open-hearth steel plates, sheets, skelp, etc.

Sligo Rolling Mills, Phillips, Nimick & Co., Pittsburgh. Works on the South Side. Iron plates and sheets; boiler plates a specialty.

- Sunbury Iron Works, Sunbury, Northumberland county. Nail plate.
- Susquehanna Iron and Steel Company, Columbia, Pa. Two mills in Pennsylvania which make plate or skelp iron: Columbia Mill, Columbia, Lancaster county; skelp and tube iron; annual capacity, 20,000 gross tons. York Mill, York, York county; plate and skelp iron; annual capacity, 10,000 tons.
- Tidewater Steel Company, Chester, Delaware county. Skelp, and boiler, ship, and tank plates; annual capacity, 70,000 gross tons of plates.
- Tyler (The) Tube and Pipe Company, Washington, Washington county. New York office, 26 Cortlandt st. Charcoal skelp iron, used by the company in the manufacture of boiler tubes.
- Tyrone Forges, The Tyrone Iron Company, Tyrone, Blair county. Office, Harrisburg. Sheared and grooved rolled iron and steel skelp; specialty, knobbled charcoal iron boiler-tube skelp; annual capacity, 16,000 gross tons.
- Vesuvius Iron and Nail Works, Moorhead, Brother & Co., Incorporated, Sharpsburg, Allegheny county. Boiler, sheet, tank, and skelp iron and steel.
- Viaduct Iron Works, Coatesville Rolling Mill Company, Coatesville, Chester county. Boiler-tube skelp and iron and steel plates and sheets; annual capacity, 20,000 gross tons.—*See Brandywine Rolling Mills in this State.*
- Washington Charcoal-Iron Tin Mills, Washington, Washington county. Black plates for tinning; annual capacity, 11,000 gross tons.
- Waynesburg Forge, Sheet, and Tin Mills, Waynesburg, Greene county. Sheet iron and steel and black plates for tinning; annual capacity, 5,700 gross tons of sheets and 9,500 tons of black plates.
- Wayne Iron and Steel Works, Brown & Co., Incorporated, Pittsburgh, Allegheny county. Works, cor. Tenth st. and Duquesne Way. Crucible steel plates.
- West End Rolling Mill Company and Chain Works, Lebanon, Lebanon county. Skelp, etc.
- West Leechburg Steel and Tin Plate Company, Second National Bank Building, Pittsburgh. Works at West Leechburg, Armstrong county. Steel for stamping, blanking, and drawing.
- Wheatland Rolling Mill, The Continental Iron Company, Wheatland, Mercer county. Skelp iron and iron and steel universal plates; annual capacity, 30,000 gross tons.
- Williamsport Iron and Nail Works, Williamsport Iron and Nail Company, Williamsport, Lycoming county. Iron and steel nail plate.
- Wilkes Rolling Mill, Wilkes Rolling Mill Company, Sharon, Mercer county. Sheet iron; annual capacity, 2,500 gross tons.
- Wyoming (The) Shovel Works, Wyoming, Luzerne county. Sales offices, Scranton, Pa., and New York City. Shovel plates and light steel sheets; annual capacity, 6,000 gross tons.

DELAWARE—4.

Marshallton Iron and Steel Company, Incorporated, Marshallton, New Castle county. Sheet iron and sheet steel; annual capacity, 4,000 tons. Minquas Iron Works, McCullough Iron Company, Equitable Building, Wilmington, New Castle county. Fine sheet steel, black and galvanized, and "Harvey's patent cleaned" sheet iron; annual capacity, 8,000 gross tons.—*See Maryland, (North East Works.)*

Newport Rolling Mills, Marshall Iron Company, Newport, New Castle county. Black sheet iron and sheet steel, Nos. 18 to 28; annual capacity, 2,400 gross tons.

Wilmington Rolling Mills, The Seidel and Hastings Company, Wilmington, New Castle county. Charcoal iron boiler plates and plate iron generally; annual capacity, single turn, 5,000 tons of plate iron.

MARYLAND—4.

Cumberland Works, American Tin Plate Company, Battery Park Building, New York City. Works at Cumberland, Allegany county, Maryland; black plates for tinning; annual capacity, 8,000 gross tons.—*See Pennsylvania, West Virginia, Ohio, Indiana, Illinois, (Great Western Works,) and Michigan, (Muskegon Works.)*

Maryland Sheet and Steel Company, Cumberland, Allegany county. Black plates and sheets.

North East Works, McCullough Iron Company, Equitable Building, Wilmington, Delaware. Works at North East, Cecil county, Maryland. Sheet iron for galvanizing; annual capacity, 2,700 gross tons.—*See Delaware, (Minquas Iron Works.)*

Taylor (N. & G.) Company's Black Plate Mills, N. & G. Taylor Company, lessee, Mariner and Merchant Building, Philadelphia. Works at Cumberland, Allegany county, Md. Black plates for tinning; annual capacity, 20,000 gross tons.

VIRGINIA—1.

Old Dominion Iron and Nail Works Company, Richmond, Henrico county. Works on Belle Isle, in the city of Richmond. Nail plate.

WEST VIRGINIA—10 COMPLETED AND 1 BUILDING.

American Tin Plate Company, Battery Park Building, New York City. Two mills in West Virginia which make plates or sheets: Chester Works, Chester, Hancock county; post office address, East Liverpool, Ohio; black plates for tinning and large sheets; annual capacity, 12,000 gross tons. La Belle Works, Wheeling, Ohio county; black plates for tinning; annual capacity, 20,000 tons.—*See Pennsylvania, Maryland, (Cumberland Works,) Ohio, Indiana, Illinois, (Great Western Works,) and Michigan, (Muskegon Works.)*

Crescent Iron Works, Whitaker Iron Company, Wheeling, Ohio county.

Iron and steel sheets, black plates for tinning, and galvanized sheets; annual capacity, 20,000 gross tons.

Jackson Iron and Tin Plate Works, The Jackson Iron and Tin Plate Company, Clarksburg, Harrison county. Building works for the manufacture of black plates for tinning and sheets for galvanizing; estimated annual capacity, 15,000 gross tons.

National Tube Company, Conestoga Building, Pittsburgh. Two mills in West Virginia which make steel skelp: Riverside Bar Mill, (Riverside Department,) Wheeling, Ohio county; steel skelp; annual capacity, 22,500 gross tons. Riverside Skelp Mills, (Riverside Department,) Benwood, Marshall county; steel skelp; annual capacity, 120,500 tons.—*See Pennsylvania.*

Parkersburg Iron and Steel Company, Times Building, Pittsburgh, Pa. Works at Parkersburg, Wood county, West Virginia. Fine sheet iron and sheet steel; annual capacity, 18,000 gross tons.

Wheeling Steel and Iron Company, Wheeling. Three works in West Virginia which make nail plate, skelp, etc.: Belmont Works, Wheeling, Ohio county; nail plate and grooved skelp; annual capacity, 120,000 gross tons of skelp. Benwood Works, Benwood, Marshall county; iron and steel skelp; annual capacity, 45,000 tons. Top Mill, Wheeling, Ohio county; iron and steel sheets, nail plate, etc.; annual capacity, 8,000 tons of sheets.

Wheeling Works, La Belle Iron Works, Steubenville, Jefferson county, Ohio. Works at Wheeling, Ohio county, West Virginia. Nail and tack plate, skelp, and special plates for stamping purposes; annual capacity, 40,000 gross tons of skelp, tack plate, and stamping stock.—*See Ohio, (Steubenville Works.)*

KENTUCKY—5 COMPLETED AND 1 BUILDING.

Ashland Sheet Mill Company, Incorporated, Ashland, Boyd county. Building works for the manufacture of black and galvanized sheets of all grades.

Licking Iron Works, Licking Rolling Mill Company, Incorporated, Covington, Kenton county. Sheet iron; also black plates for tinning for their own use.

Mitchell-Tranter Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Covington, Kenton county, Kentucky. Plate iron and iron and steel boiler plate.—*See Pennsylvania, Alabama, (Birmingham Rolling Mills,) Ohio, and Illinois, (Springfield Works.)*

Newport Rolling Mill Company, Newport, Campbell county. Steel sheets for roofing, corrugating, and galvanizing purposes; annual capacity, triple turn, 26,000 gross tons.

Norton Iron Works, Incorporated, Ashland, Boyd county. Steel nail plate.

Tennessee Rolling Mills, Ewald Iron Company, 941 North Second street, St. Louis. Works at Louisville, Jefferson county, Kentucky. Plate and sheet iron, and tank, shell, and flange steel plates.

ALABAMA—4.

Alabama Tube and Iron Company, Birmingham, Jefferson county. Works at Helena, Shelby county.

Bessemer Rolling Mills, Tennessee Coal, Iron, and Railroad Company, Birmingham. Works at Bessemer, Jefferson county. Plate and sheet iron.

Birmingham Rolling Mills, (operated by the Birmingham Rolling Mill Company,) Birmingham, Jefferson county. Iron and open-hearth steel plates and sheets. Controlled by the Republic Iron and Steel Company, Stock Exchange Building, Chicago.—*See Pennsylvania, Kentucky, (Mitchell-Tranter Works,) Ohio, and Illinois, (Springfield Works.)*

Brierfield Rolling Mill, Southern Mineral Land Company, Brierfield, Bibb county. Iron nail plate.—*For sale.*

OHIO—36 COMPLETED AND 4 BUILDING.

American (The) Rolling Mill Company, Middletown, Butler county. Branch office, Cincinnati, Ohio. Black and galvanized sheets, corrugated iron, and sheet steel building materials of all kinds; annual capacity, 11,000 gross tons of sheets.

American (The) Sheet Steel Company, Battery Park Building, New York City. Eleven mills in Ohio which make black plates and sheets: Aetna-Standard Works, Bridgeport, Belmont county; black sheets and painted and formed roofing; annual capacity, triple turn, 88,400 net tons of sheets. Cambridge Works, Cambridge, Guernsey county; sheet iron and sheet steel; annual capacity, triple turn, 20,000 net tons. Canton Works, Canton, Stark county; iron and steel black sheets for stamping and roofing; annual capacity, triple turn, 14,000 net tons. Dennison Works, Dennison, Tuscarawas county; common cold-rolled sheets for stamping and black plates for tinning; annual capacity, triple turn, 11,200 net tons. Dresden Works, Dresden, Muskingum county; iron and steel sheets; annual capacity, triple turn, 11,200 net tons. Falcon Works, Niles, Trumbull county; sheet iron and sheet steel; annual capacity, triple turn, 11,200 net tons. New Philadelphia Works, New Philadelphia, Tuscarawas county; common and refined sheet iron and sheet steel; annual capacity, triple turn, 31,200 net tons. Piqua Works, Piqua, Miami county; iron and steel sheets; annual capacity, triple turn, 12,400 net tons. Reeves Works, Canal Dover, Tuscarawas county; black and galvanized and cold-rolled sheet iron and sheet steel; annual capacity, triple turn, 32,200 net tons of black sheets and 22,000 net tons of galvanized sheets. Struthers Works, Struthers, Mahoning county;

iron and steel sheets; annual capacity, triple turn, 16,800 net tons. Wellsville Works, Wellsville, Columbiana county; plate and sheet iron and steel; annual capacity, triple turn, 16,800 net tons.—*See Pennsylvania and Indiana, (Midland Works.)*

American Tin Plate Company, Battery Park Building, New York City. Seven mills in Ohio which make plates or sheets: Banfield Works, Irondale, Jefferson county; black plates for tinning; annual capacity, 8,000 gross tons. Beaver Works, Lisbon, Columbiana county; black plates for tinning; annual capacity, 14,000 tons. Cambridge Works, Cambridge, Guernsey county; black plates for tinning; annual capacity, 12,000 tons. Crescent Works, Cleveland, Cuyahoga county; black plates for tinning and stamping; annual capacity, 12,000 tons. Falcon Works, Niles, Trumbull county; black plates for tinning; annual capacity, 12,000 tons. Laughlin Works, Martins Ferry, Belmont county; black plates for tinning; annual capacity, 30,000 tons. Reeves Works, Canal Dover, Tuscarawas county; black plates for tinning and black steel sheets; annual capacity, 12,000 gross tons.—*See Pennsylvania, Maryland, (Cumberland Works,) West Virginia, Indiana, Illinois, (Great Western Works,) and Michigan, (Muskegon Works.)*

Belfont Iron Works, Belfont Iron Works Company, Ironton, Lawrence county. Nail plate.

Burgess Steel and Iron Works, Crucible Steel Company of America, Empire Building, Pittsburgh. Works at Portsmouth, Scioto county. Steel plates.—*See New York (Sanderson Brothers Steel Works) and Pennsylvania.*

Canton Crucible Steel Works, Canton, Stark county. Wire-drawing plates. A new company is being organized to operate these works. Carnahan Tin Plate and Sheet Company, Canton, Stark county. Black plates for tinning, stamping sheets, etc.; annual capacity, 16,000 gross tons.

Cleveland (The) Steel Company, Cleveland, Cuyahoga county. Light steel plates and sheets; annual capacity, 30,000 gross tons.

Curtis (The) Sheet Steel and Corrugating Company, Zanesville, Muskingum county. Black and galvanized sheets and corrugated and various styles of metal roofing sheets; annual capacity, 12,000 tons.

Dithridge Steel Car Works, Dithridge Steel Car Company, 76 Montgomery street, Jersey City, New Jersey. Building works at White City, Tuscarawas county, Ohio, for the manufacture of plates, etc.

Kelly Nail Works, Kelly Nail and Iron Company, Ironton, Lawrence county. Steel nail plate.

Laughlin Nail Company, Wheeling, West Virginia. Works at Martins Ferry, Belmont county, Ohio. Steel nail plate and sheets; annual capacity, 12,000 gross tons of sheets.

Niles (The) Iron and Sheet Company, Niles, Trumbull county. Black sheet steel; annual capacity, 12,000 gross tons.

- Otis (The) Steel Company, Limited, Cleveland. Steel plates.
- Pope (The) Tin Plate Company, 421 Wood st., Pittsburgh, Pa. Building works at Steubenville, Jefferson county, Ohio, for the manufacture of black plates for tinning.
- Republic Iron and Steel Company, Stock Exchange Building, Chicago. Three mills in Ohio which make plates, skelp, etc.: Andrews Works, Youngstown, Mahoning county; skelp. Brown Bonnell Works, Youngstown; universal mill and other plates. Mahoning Valley Works, Youngstown; tank and plate iron.—*See Pennsylvania, Kentucky, (Mitchell-Tranter Works,) Alabama, (Birmingham Rolling Mills,) and Illinois, (Springfield Works.)*
- Stark Rolling Mill, Stark Rolling Mill Company, Canton, Stark county. Black sheets, galvanized sheets, pickled and cold-rolled sheets, etc.; annual capacity, 10,000 gross tons.
- Steubenville Works, La Belle Iron Works, Steubenville, Jefferson county. Steel skelp, shovel plate, tack plate, special plates for stamping purposes, and nail plate.—*See West Virginia, (Wheeling Works.)*
- Tuscora Steel Company, Newcomerstown, Tuscarawas county. Building works for the manufacture of steel and iron sheets, black plates for tinning, and polished and galvanized sheets; estimated annual capacity, 13,000 gross tons.
- Warren Mill, American Steel Hoop Company, Carnegie Building, Pittsburgh. Works at Warren, Ohio; skelp iron, etc.—*See Pennsylvania.*
- Youngstown (The) Iron and Steel Roofing Company, Youngstown. Sheet iron and sheet steel; annual capacity, 20,000 gross tons.
- Youngstown (The) Iron Sheet and Tube Company, Youngstown. Building works for the manufacture of black and galvanized iron sheets and tubes; estimated annual capacity, 17,000 gross tons.

INDIANA—8 COMPLETED AND 1 BUILDING.

- American Tin Plate Company, Battery Park Building, New York City. Five mills in Indiana which make plates or sheets: American Works, Elwood, Madison county; black plates for tin and terne plates; annual capacity, 52,000 gross tons. Anderson Works, Anderson, Madison county; black plates for tinning; annual capacity, 14,000 tons. Atlanta Works, Atlanta, Hamilton county; black plates for tinning and light sheets up to No. 34 gauge and in sizes up to 30 x 96 inches; annual capacity, 12,000 tons. Irondale Works, Midletown, Henry county; black plates for tinning; annual capacity, 10,000 tons. Morewood Works, Gas City, Grant county; black plates for tinning; annual capacity, 16,000 tons.—*See Pennsylvania, Maryland, (Cumberland Works,) West Virginia, Ohio, Illinois, (Great Western Works,) and Michigan, (Muskegon Works.)*
- Chicago Steel Manufacturing Company, Hammond, Lake county. Shovel and nail plate.

- Elwood Works, Wright Shovel Company, Anderson. Works at Elwood, Madison county; shovel plate; annual capacity, 6,000 gross tons.
- Inland Steel Company, 1225-29 Marquette Building, Chicago. Building works at Indiana Harbor, Lake county, Indiana, for the manufacture of sheets, light plates, etc.
- Midland Works, The American Sheet Steel Company, Battery Park Building, New York City. Works at Muncie, Delaware county, Indiana. Stamping and tinning sheets; annual capacity, 22,800 net tons.—*See Pennsylvania and Ohio.*

ILLINOIS—8 COMPLETED AND 1 PROJECTED.

- Chicago Tin Plate and Can Company, Chicago, Cook county. Contemplates erecting works for the manufacture of black plates and sheets; estimated annual capacity, 22,000 gross tons.
- Granite City Rolling Mills, National Enameling and Stamping Company, 81-83 Fulton street, New York City. Works at Granite City, Madison county, Illinois. Plates and sheets for stamping, enameling, and tin and terne plates.—*See Missouri, (St. Louis Rolling Mills.)*
- Great Western Works, American Tin Plate Company, Battery Park Building, New York City. Works at Joliet, Will county, Illinois. Black plates for tinning; annual capacity, 7,000 gross tons.—*See Pennsylvania, Maryland, (Cumberland Works,) West Virginia, Ohio, Indiana, and Michigan, (Muskegon Works.)*
- Hartmann, Hay & Reis, Belleville, St. Clair county. Nail, tack, and shovel plate; annual capacity, 5,000 gross tons.
- South Works, The Illinois Steel Company, Rookery Building, Chicago. Works at South Chicago, Cook county. Steel boiler, ship, and tank plate; annual capacity, 110,000 gross tons.
- Springfield Works, Republic Iron and Steel Company, Chicago. Works at Springfield, Sangamon county. Steel plates of all sizes; annual capacity, 18,000 gross tons.—*See Pennsylvania, Kentucky, (Mitchell-Tranter Works,) Alabama, (Birmingham Rolling Mills,) and Ohio.*
- Steel Department, Simonds Manufacturing Company, Fitchburg, Worcester county, Massachusetts. Works at Western avenue, Sixteenth and Seventeenth streets, Chicago, Cook county, Illinois. Saw plate and crucible sheet steel; annual capacity, 2,000 gross tons.
- Valley Steel Works, Ernest E. Wangelin, Belleville. Steel nail plate and large flats.—*Works being dismantled in November, 1901.*
- Western Tube Company, Kewanee, Henry county. Skelp used by the company in the manufacture of wrought iron and steel pipe; annual capacity, 75,000 gross tons.

MICHIGAN—1.

- Muskegon Works, American Tin Plate Company, Battery Park Building, New York City. Works at Muskegon, Muskegon county, Michi-

gan. Iron and steel plates for tinning; annual capacity, 12,000 tons.—*See Pennsylvania, Maryland, (Cumberland Works,) West Virginia, Ohio, Indiana, and Illinois, (Great Western Works.)*

WISCONSIN—2.

Waukesha (The) Sheet Steel Company, Waukesha, Waukesha county. Black plates for tinning and galvanized sheets; annual capacity, 18,000 gross tons.

West Superior Branch, United States Cast Iron Pipe and Foundry Company, 80 Broadway, New York City. Works at West Superior, Douglas county, Wisconsin. Bessemer steel plates.—*Idle.*

MISSOURI—1.

St. Louis Rolling Mills, National Enameling and Stamping Company, 81-83 Fulton street, New York City. Works at Second and Des-trehan sts., St. Louis. Stamping sheet iron for "granite iron ware," galvanizing sheets, and black plates for tin and terne plates.—*See Illinois, (Granite City Rolling Mills.)*

COLORADO—1.

Colorado (The) Fuel and Iron Company, Boston Building, Denver. Works at Pueblo, Pueblo county. Tank plate; annual capacity, 30,000 gross tons. Adding trains of rolls for the manufacture of black plates, etc.

CALIFORNIA—1.

Judson Manufacturing Company, Oakland, Alameda county. Office and salesroom, cor. Howard and Beale sts., San Francisco. Tack plate, nail plate, etc.

UNITED STATES.

Total number of iron and steel plate, sheet, and skelp mills in the United States in November, 1901: 223 completed, 13 building, and 2 projected.

TINPLATE AND TERNE PLATE 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 on single turn in boxes of 112 plates, 14 inches by 20 inches, full weight of 100 pounds. The word "set" refers to the set of tinning pots or the "machine" used in tinning or coating the black plates. The rolling mill or black plate department of each of the tinplate works which makes its own black plates is fully described in Parts I and II.

NEW YORK.

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, coal. Buys black plates. Robert Seaman, President; E. C. Seaman, Secretary and Treasurer.

Meurer Brothers Company, 569-77 Flushing avenue, Brooklyn, Kings county. Built in 1894; first tin and terne plates made in March, 1894; 8 sets; weekly capacity, 1,800 boxes of terne plates. Fuel, coal. Brands: for tinplates, "Florida" and "Howard" for charcoal and "Albert" and "Brooklyn" for coke; for terne plates, "Excelsior," "Flushing," "Grace," "Meurer's Genuine Tinned Iron Sheets," "Meurer's Old Method," "Meurer's Roofing," "Pullman," "Liberty," and "Superior." Buys black plates.

Whitestone Works, American Can Company, Bowling Green Building, New York City. Works at Whitestone, Long Island, Queens county, New York. Built in 1896; 2 tinning sets; product, tinplates, all consumed by the company in the manufacture of tin cans; weekly capacity, 780 boxes. Buy black plates. (Formerly operated by the Norton Can Company.)—*See Maryland, (Baltimore Works,) Ohio, (Record Works,) and Illinois, (Maywood Works.)*

Number of tinplate and terne plate works in New York: 3.

PENNSYLVANIA.

Alcania (The) Company, 303 Murtland Building, Pittsburgh. Tinning plant, originally containing 3 sets, built at Youngstown, Ohio, in 1896, and operated by the Alcania Tin and Terne Plate Company; tinning sets removed to Avonmore, Westmoreland county, Pa., in 1899 and first tinplates made in September, 1899; now contains 6 Thomas & White sets, 5 for tinplates and 1 for terne plates; weekly capacity, 2,000 boxes of tinplates and 700 boxes of terne plates. Fuel, coal. Brand, "Avon." Makes black plates.—*See Rolling Mills and Steel Works in the Western Pennsylvania District for a list of officers.*

American Tin and Terne Plate Company, 22-24 Wildey st., Philadelphia. Salesrooms, 142-44 North Ninth st., Philadelphia. Built in 1891-2 and first tin and terne plates made in 1892; 10 sets, 3 for tinplates and 7 for terne plates; weekly capacity, 480 boxes of tinplates and 960 boxes of terne plates. Fuel, bituminous coal. Brands: for tinplates, "Peerless," "Arlington," and "Channing" for charcoal and "Imperial" and "Franklin" for coke; for old style terne plates, "American M. S.," "Keystone Hand-dipped," and "Black Diamond;" for charcoal terne plates, "Keystone," (extra-

coated,) "Quaker City," "Puritan," (palm oil finish,) and "I. D. B.," (palm oil finish;) for coke terne plates, "Horse-Shoe," (palm oil finish,) "Arrow," and "Hancock." Buys black plates. (M. F. Straus and H. C. Straus, owners.)

Anchor Mills, Neal Brothers, lessees, 421 Wood street, Pittsburgh, Allegheny county. Works on Nineteenth st., South Side. Tinning plant added to rolling mill in 1900 and first terne plates made November 26, 1900; 1 set; product, terne plates only; can make plates 40 inches wide by 120 inches long; weekly capacity, 600 boxes of 225 pounds each. Fuel, natural gas. Brand, "Anchor." Make black plates. (Land and buildings owned by Chess Brothers.)—*See Rolling Mills and Steel Works in Allegheny county, Pennsylvania.*

Ellwood City Works, American Tin Plate Company, Battery Park Building, New York City. Works at Ellwood City, Lawrence county, Pa.—*For description of works see pages 45-6.*

Ferguson Tin Plate Company, Limited, East Liberty, P. R. R., Pittsburgh, Allegheny county. Built in 1895; first terne plates made in July, 1895, and first tinplates in September, 1895; 3 machines for terne plates; weekly capacity, 500 boxes of 20 x 28-inch terne plates, weighing from 200 to 300 pounds per box. Fuel, coal. Brands, Ferguson's "Redipped," "Extra Coated," "Old Style," "Old Process," "U. S. Old Style," "Magnet," and "Volcano." Buys black plates. L. A. Meyran, Chairman; A. H. Geilfuss, Secretary and Treasurer; A. C. Ferguson, Superintendent.

Follansbee Brothers Company, (formerly James B. Scott & Co.,) 328-32 Second ave., Pittsburgh. Works in Allegheny City, Allegheny county. Built in 1891-2; first tin and terne plates made in January, 1892; 5 sets; product, tin and terne plates; weekly capacity, 2,200 boxes. Fuel, coal. Brands: for tinplates, "Finest" and "Clifton" for charcoal and "Furnace" for coke; for terne plates, "Scott's Extra Coated," "Triumph Old Method," "Protection Old Process," "Orbit Redipped," "Old Reliable Redipped," "Duquesne," "Neville Old Style," "Oakmont," "Sherwood," "Pittsburgh," "Raymond," "Allegheny," "Braddock Old Style," "Kenton," "Thurso," "Lionel Old Style," and "Emblem Old Style." Buys black plates. B. G. Follansbee, President; William U. Follansbee, Secretary and Treasurer.

Griffiths Charcoal Iron Mills, Washington, Washington county. Building works to contain 8 sets, 2 for tinplates and 6 for terne plates; product, tin and terne plates; estimated weekly capacity, 300 boxes of tinplates and 1,400 boxes of terne plates. Fuel, natural gas. Works will probably be completed in the spring of 1902. Will make black plates.—*See Rolling Mills and Steel Works in the Western Pennsylvania District for a list of officers.*

Griffiths (The W. H.) Company, Incorporated, Washington. Building works at Waynesburg, Greene county, to contain 8 Thomas & White

sets for tinplates; estimated weekly capacity, 4,500 boxes of coke tinplates. Fuel, natural gas. Will make black plates.—*See Rolling Mills and Steel Works in the Western Pennsylvania District for a list of officers.*

Hamilton, (John,) near Tecumseh st., (twenty-third ward,) Pittsburgh, Allegheny county. Built in 1890 and first terne plates made in April, 1890; burned in 1901 and immediately rebuilt; 3 sets; product, tin and terne plates; weekly capacity, 450 boxes, 20 x 28 inches. Fuel, natural gas. Brands: for tinplates, "Ivy" and "Pansy" for charcoal and "Pink" for coke; for terne plates, "Hamilton's Best Redipped," "Osceola Old Style," "Bonus," "Fort Pitt," "G. A. R.," "Hamilton's Excelsior Hand Coated," "Hazlewood," "Killbuck," "Lulu," "Mingo" old process, and "Hamilton's Best Charcoal Iron Redipped." Buys black plates.

Humbert Works, American Tin Plate Company, Battery Park Building, New York City. Works at South Connellsville, Fayette county, Pa.—*For description of works see page 46.*

Johnstown Works, American Tin Plate Company, Battery Park Building, New York City. Works at Johnstown, Cambria county, Pa.—*For description of works see page 46.*

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; 6 sets, all for tinplates; weekly capacity, about 2,000 boxes. Fuel, bituminous coal. Brand, "L. & G." Makes black plates.—*See Rolling Mills and Steel Works in the Lower Susquehanna Valley, Pennsylvania, for a list of officers.*

Merchant & Co., (incorporated,) 517 Arch st., Philadelphia. Branch offices, 247 Water st., New York; 584 Flushing ave., Brooklyn; and 46 South Clinton st., Chicago. Works on Washington ave. above Twentieth st., Philadelphia. Eight sets; product, tin and terne plates. Fuel, coal. Brands: for tinplates, "Palma," "Florence," "Edgeware," "Pisa," "Minerva," "Violet," "Leslie," "Spa," and "Rose;" for terne plates, "Merchant's Old Method," "Merchant's Roofing," "Merchant's American Old Style," "Old Style-A," "Old Style-B," "Old Style-C," "Alaska," "Camaret," "Worcester," "Emlyn," "Crescent," "Hickory," "Empire," "Palm," "Elsie," "Kismet," "Stanley," and "Arch;" for pure iron plates, "Merchant's 'Old Fashion' Iron Roofing Plates," "Merchant's 'American Pure' Iron Roofing Plates," and "Merchant's 'Pure Iron' Bright Plates." Buy black plates. Clarke Merchant, President.

Monongahela Works, American Tin Plate Company, Battery Park Building, New York City. Works on South Fifteenth st., Pittsburgh, Allegheny county, Pa.—*For description of works see pages 46-7.*

National Works, American Tin Plate Company, Battery Park Building,

- New York City. Works at Monessen, Westmoreland county, Pa.—*For description of works see page 47.*
- New Castle Works, American Tin Plate Company, Battery Park Building, New York City. Works at New Castle, Lawrence county, Pa.—*For description of works see page 47.*
- Pennsylvania Works, American Tin Plate Company, Battery Park Building, New York City. Works at New Kensington, Westmoreland county, Pa.—*For description of works see page 47.*
- Philadelphia Iron and Tinplate 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. Fuel, bituminous coal. Brands: for tinplates, "H. & P. Best Bright," "Seminole Bright," "Mohawk Bright," and "Cherokee Bright;" for terne plates, "H. & P. Redipped Roofing," "H. & P. Best Roofing," "Delaware Roofing," "Huron Roofing," and "Oneida Roofing." Buy black plates.—*Idle. See Rolling Mills and Steel Works in Philadelphia county, Pennsylvania, (Hughes & Patterson,) for a list of officers.*
- Pittsburgh Works, American Tin Plate Company, Battery Park Building, New York City. Works at New Kensington, Westmoreland county, Pa.—*For description of works see page 47.*
- Plymouth Rolling Mills, E. Stanford, lessee, Conshohocken, Montgomery county. Building works to contain 1 set for terne plates; estimated weekly capacity, 750 boxes. Fuel, bituminous coal. Make black plates. (Owned by R. D. Wood & Co.)—*See Rolling Mills and Steel Works in the Schuylkill Valley, Pennsylvania.*
- Sharon Tin Plate Works, Sharon Tin Plate Company, Sharon, Mercer county. Built in 1900-1 and first tinplates made in July, 1901; 24 sets, 22 for tinplates and 2 for terne plates; weekly capacity, triple turn, 18,000 boxes of tinplates and 2,400 boxes of terne plates. Fuel, coal. Make black plates.—*See Rolling Mills and Steel Works in the Shenango and Beaver Valleys, Pennsylvania, for a list of officers and selling agents.*
- Shenango Works, American Tin Plate Company, Battery Park Building, New York City. Works at New Castle, Lawrence county, Pa.—*For description of works see page 48.*
- Star Works, American Tin Plate Company, Battery Park Building, New York City. Works, foot of Twelfth st., Pittsburgh, Allegheny county, Pa.—*For description of works see page 48.*
- Taylor (N. and G.) Company's Tinplate Works, N. and G. Taylor Company, Mariner and Merchant Building, southwest cor. Third and Chestnut sts., 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; 25 sets; weekly capacity, double turn, 20,000 boxes of either tin or terne plates. Fuel, coal. Principal brands: for tinplates, "Hand-Dipped," "Brilliant," "Royal," "Merion," "Linden," and "Myrtle" for charcoal, and "Almond," "Locust," and "Mint" for coke; for terne plates, "Genuine Taylor Old Style," "The Taylor Roofing Tin," "Old Method," "Columbia," "Maple," "Willow," "Knoxall," "Spruce," and "Globe." Make black plates.—*See Rolling Mills and Steel Works in Maryland.*

Washington Charcoal-Iron Tin Mills, Washington, Washington county. Built in 1899 and first tin and terne plates made January 1, 1900; 7 sets, 2 for tinplates and 5 for terne plates; also 1 redipping pot; weekly capacity, 720 boxes of tinplates and 1,800 boxes of terne plates. Fuel, natural gas. Make black plates.—*See Rolling Mills and Steel Works in the Western Pennsylvania District for a list of officers and selling agents.*

Waynesburg Forge, Sheet, and Tin Mills, Waynesburg, Greene county. Built in 1900 and first tin and terne plates made in October, 1900; 7 sets, 2 for tinplates and 5 for terne plates; weekly capacity, 1,800 boxes. Specialty, terne plates having a charcoal iron base. Fuel, natural gas. Brand, "Genuine Charcoal Iron Redipped." Make black plates.—*See Rolling Mills and Steel Works in the Western Pennsylvania District for a list of officers.*

United States Works, American Tin Plate Company, Battery Park Building, New York City. Works at Demmler, (eighth ward, McKeesport,) Allegheny county, Pa.—*For description of works see page 48.*

PURE LEAD-COATED SHEETS.

Ajax (The) Lead Coating Company, 46-52 Richmond st., Philadelphia. 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. Fuel, bituminous coal. Brand, "Ajax." Buys iron or steel sheets. J. G. Hendrickson, President; F. J. Clamer, Vice-President; J. R. Neison, Secretary and Treasurer.

ALUMINUM-COATED SHEETS.

Steel and Iron Aluminum Coating Company, Connellsville, Fayette county. Built in 1900 and first aluminum-coated sheets produced February 1, 1901; product, aluminum-coated steel sheets, wire, nails, pipe and fittings, etc.; annual capacity, 6,000 gross tons. Fuel, coal and natural gas. Expects to double capacity. George J. Humbert, President and General Manager; H. P. Snyder, Vice-President; Thomas Walkup, Secretary; W. H. Kirchhoff, Treasurer.

Number of tinplate and terne plate works in Pennsylvania: 24 completed and 3 building. In addition 1 works make pure lead-coated sheets and 1 works make aluminum-coated sheets.

MARYLAND.

Baltimore Branch, National Enameling and Stamping Company, 81-83 Fulton st., New York City. Works at Ohio ave. and Light, Winder, and Byrd sts., Baltimore, Md.—*For description of works see page 150.*

Baltimore Works, American Can Company, Bowling Green Building, New York City. Works at Boston and Hudson sts., Baltimore, Maryland. Built in 1895; 16 tinning sets; product, tinplates, all consumed by the company in the manufacture of tin cans; weekly capacity, 10,000 boxes of 14 x 20 plates. Fuel, coal. Buy black plates. (Formerly operated by the Norton Tin Plate and Can Company.)—*See New York, (Whitestone Works,) Ohio, (Record Works,) and Illinois, (Maywood Works.)*

Number of tinplate works in Maryland: 2.

VIRGINIA.

Old Dominion 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 tin and terne plates made in November, 1894; 3 sets, 1 for tinplates and 2 for terne plates; weekly capacity, 350 boxes of tinplates and 700 boxes of 20 x 28 terne plates. Fuel, bituminous coal. Brands: for tinplates, "Belle Isle" and "Belmont" for charcoal and "Bellevue" and "Belona" for coke; for terne plates, "Chesapeake," "Cherokee," "Mohawk," "Pawnee," "Potomac," "Albemarle," "Greenbrier," "Kanawha," "Rivanna," "Indian," and "York." Buy black plates. Sales made by the company.—*See Rolling Mills and Steel Works in Virginia for a list of officers.*

Number of tinplate and terne plate works in Virginia: 1.

WEST VIRGINIA.

Chester Works, American Tin Plate Company, New York City. Building works at Chester, Hancock county, West Virginia. Post office address, East Liverpool, Ohio.—*For description of works see page 45.*

Jackson Iron and Tin Plate Works, The Jackson Iron and Tin Plate Company, Clarksburg, Harrison county. Building works to contain 4 sets for the manufacture of terne plates; estimated weekly capacity, 7,680 boxes. Fuel, natural gas. Will make black plates.—*See Rolling Mills and Steel Works in West Virginia for a list of officers.*

La Belle Works, American Tin Plate Company, Battery Park Building, New York City. Works at Wheeling, Ohio county, West Virginia.—*For description of works see page 46.*

Wheeling Corrugating Company, Wheeling, Ohio county. (Controlling interest owned by the Whitaker Iron Company.) Built in 1895; first tin and terne plates made in the spring of 1895; 9 sets

for either tin or terne plates; weekly capacity, double turn, 4,000 boxes of tin and terne plates. Fuel, natural gas. Brands: for tinplates, "Ft. Henry," "Ewing," and "Wheeling" for charcoal and "Thayer" for coke; for terne plates, "Eleanor," "Helen," "Margaret," "Nelson," "Wylie," "Helen," "Pauline," "Dorcas," "Nina," and "Klea." Black plates supplied by the Whitaker Iron Company. N. E. Whitaker, President; Alex. Glass, Secretary.

Number of tinplate and terne plate works in West Virginia: 2 completed and 2 building.

KENTUCKY.

Licking Iron Works, Licking Rolling Mill Company, Incorporated, Covington, Kenton county. Tinning plant added to rolling mill in 1895; first terne plates made in March and first tinplates in June, 1895; 4 sets, 1 for tinplates and 3 for terne plates; weekly capacity, 185 boxes of 20 x 28 tinplates and 555 boxes of 20 x 28 terne plates, 200 lbs. to the box. Fuel, coal. Brands, "M. F. H. Best," "M. F. H. Extra," and "M. F. H." Make black plates.—*See Rolling Mills and Steel Works in Kentucky for a list of officers.*

Number of tinplate and terne plate works in Kentucky: 1.

OHIO.

American Galvanizing and Tin Plate Company, 816 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. Fuel, coal. Brands, "Boaz," "Queen City Old Style," and "Riverside." Buys black plates. R. M. Martin, President; James D. Richards, Secretary and Treasurer. (Formerly operated by W. T. Simpson & Co.)—*Idle since February 1, 1900.*

Banfield Works, American Tin Plate Company, Battery Park Building, New York City. Works at Irondale, Jefferson county, Ohio.—*For description of works see page 45.*

Beaver Works, American Tin Plate Company, New York City. Works at Lisbon, Columbiana county, Ohio.—*For description see page 45.*

Berger (The) Manufacturing Company, Canton, Stark county. Built in 1896; first terne plates made February 18, 1898; 1 set; product, terne plates only in 8 and 10-foot lengths, practically all of which are consumed by the company; annual capacity, 1,800 gross tons. Fuel, coke. Brand, "Berger's Special," "Berger's AA," "Berger's Empress," "Berger's Roofing," "Berger's Old Method," and "Nonpareil." Buys black plates. Joseph Biechele, President and Treasurer; Charles Lang, Vice-President; Edward Langenbach, Secretary and Manager; W. W. Irwin, Superintendent. Selling agent, Illinois Roofing and Supply Company, Chicago.

Cambridge Works, American Tin Plate Company, Battery Park Building, New York City. Works at Cambridge, Guernsey county, Ohio.—*For description of works see page 45.*

Carnahan Tin Plate and Sheet Company, Canton, Stark county. Built in 1901 and first tin and terne plates made in December, 1901; 10 sets, 8 for tinplates and 2 for terne plates; weekly capacity, 6,450 boxes of tinplates and 540 boxes of terne plates. Fuel, coal. Makes black plates.—*See Rolling Mills and Steel Works in Ohio (Interior Counties) for a list of officers.*

Crescent Works, American Tin Plate Company, Battery Park Building, New York City. Works at Cleveland, Cuyahoga county, Ohio.—*For description of works see page 45.*

Falcon Works, American Tin Plate Company, Battery Park Building, New York City. Works at Niles, Trumbull county, Ohio.—*For description of works see page 46.*

Laughlin Works, American Tin Plate Company, Battery Park Building, New York City. Works at Martins Ferry, Belmont county, Ohio.—*For description of works see page 46.*

McDonald (The James) and Sons Company, Cincinnati, Hamilton county. Built in 1894 and first terne plates made in August, 1894; 2 sets; product, redipped terne plates; weekly capacity, 300 boxes of 20 x 28 plates. Fuel, coal. Brands, "Eureka," "Special Redipped," "The James McDonald and Sons Co. Old Style," "Cadot's Old Style," "Clyde," "Reinert Redipped," and "Enders Old Style." Buys black plates, but now produces redipped terne plates only. James McDonald, Sr., President; Henry McDonald, Vice-President; Edward McDonald, Secretary; James McDonald, Jr., Treasurer.

Pope (The) Tin Plate Company, 421 Wood st., Pittsburgh, Pa. Building works at Steubenville, Jefferson county, Ohio, to be equipped with machinery for the manufacture of tin and terne plates. Will make black plates.—*See Rolling Mills and Steel Works in Ohio (Ohio River Counties) for a list of officers.*

Record Works, American Can Company, Bowling Green Building, New York City. Works at Conneaut, Ashtabula county, Ohio. Built in 1891; first tinplates made March 1, 1892; 2 sets; product, tinplates, all consumed by the company; weekly capacity, 600 boxes. Fuel, coal. Buy black plates. (Formerly operated by the Record Manufacturing Company.)—*Tinning department idle; can factory in operation. See New York, (Whitestone Works,) Maryland, (Baltimore Works,) and Illinois, (Maywood Works.)*

Reeves Works, American Tin Plate Company, Battery Park Building, New York City. Works at Canal Dover, Tuscarawas county, Ohio.—*For description of works see pages 47-8.*

Number of tinplate and terne plate works in Ohio: 12 completed and 1 building.

INDIANA.

American Works, American Tin Plate Company, Battery Park Building, New York City. Works at Elwood, Madison county, Indiana.—*For description of works see page 44.*

Anderson Works, American Tin Plate Company, Battery Park Building, New York City. Works at Anderson, Madison county, Indiana.—*For description of works see page 44.*

Atlanta Works, American Tin Plate Company, Battery Park Building, New York City. Works at Atlanta, Hamilton county, Indiana.—*For description of works see page 44.*

Morewood Works, American Tin Plate Company, Battery Park Building, New York City. Works at Gas City, Grant county, Indiana.—*For description of works see page 47.*

Number of tinplate and terne plate works in Indiana: 4.

ILLINOIS.

Great Western Works, American Tin Plate Company, Battery Park Building, New York City. Works at Joliet, Will county, Illinois.—*For description of works see page 46.*

Maywood Works, American Can Company, Bowling Green Building, New York City. Works at Maywood, Cook county, Illinois. Built in 1891; 18 Norton automatic tinning sets; product, tinplates, all consumed by the company in the manufacture of tin cans; weekly capacity, 11,000 boxes of 14 x 20 plates. Buy black plates. (Formerly operated by Norton Brothers.)—*See New York, (Whitestone Works,) Maryland, (Baltimore Works,) and Ohio, (Record Works.)*

Sturges, Cornish, and Burn Company, Harrison and Green sts., Chicago. Branch offices, 316 Robert st., St. Paul, Minnesota, and 409-11 Grand ave., Kansas City, Missouri. Original works erected in 1865; first tinplates made in January, 1894; 3 sets; product, tinplates, consumed by the company in the manufacture of milk cans, creamery supplies, sheet metal specialties, etc.; weekly capacity, 600 boxes. Fuel, oil. Buys black plates. Frank Sturges, President; Lee Sturges, Vice-President; William H. Burn, Secretary; Judson H. Cornish, Treasurer. (Formerly operated by The Chicago Stamping Company.)

PROJECTED.

Chicago Tin Plate and Can Company, Chicago, Cook county. Contemplates erecting works to contain 20 sets, 15 for tinplates and 5 for terne plates; estimated weekly capacity, 5,500 boxes of tinplates and 1,800 boxes of terne plates. Fuel, coal. Will make black plates.—*See Projected Rolling Mills in Illinois.*

Number of tinplate and terne plate works in Illinois: 3 completed and 1 projected.

MICHIGAN.

Buhl Stamping Company, Detroit, Wayne county. Tinning plant erected in 1888 and rebuilt in 1895, 1897, and 1900; first tinplates made in 1888; product, tinplates, all consumed by the company in the manufacture of milk-can stock, tubular lanterns, and other tinware. Fuel, coal and natural gas. Buys black plates. Also operates a galvanizing plant. Theo. D. Buhl, President; Charles H. Jacobs, Vice-President and Manager; D. C. Delamater, Secretary; J. M. Thurber, Treasurer; Thomas W. Forster, Superintendent.

Muskegon Works, American Tin Plate Company, Battery Park Building, New York City. Works at Muskegon, Muskegon county, Michigan.—*For description of works see page 47.*

Number of tinplate and terne plate works in Michigan: 2.

WISCONSIN.

Waukesha (The) Sheet Steel Company, Waukesha, Waukesha county. Building works to be equipped with 24 sets, 12 for tinplates and 12 for terne plates; estimated weekly capacity, single turn, 1,500 boxes of tinplates and 1,500 boxes of terne plates. Fuel, coal and oil. Makes black plates.—*See Rolling Mills and Steel Works in Wisconsin for a list of officers.*

Number of tinplate and terne plate works in Wisconsin: 1 building.

MISSOURI.

St. Louis Tinplate Works, National Enameling and Stamping Company, 81-83 Fulton st., New York City. Works at Second and Destrehan sts., St. Louis, Missouri.—*For description of works see page 150.*

Number of tinplate and terne plate works in Missouri: 1.

UNITED STATES.

Total number of tinplate and terne plate works in the United States in November, 1901: 55 completed, 7 building, and 1 projected. Of these 9 are equipped for the manufacture of tinplates only and 1 plant for the manufacture of tinplates only is being built; 5 are equipped for the manufacture of terne plates only and 2 plants for the manufacture of terne plates only are being built; and 41 are equipped for the manufacture of both tin and terne plates, 4 plants for the manufacture of tin and terne plates are being built, and 1 plant is projected. In addition 1 works is equipped for the manufacture of pure lead-coated sheets and 1 works for the manufacture of aluminum-coated sheets.

Total number of tinplate and terne plate works in the United States in April, 1898: 69 completed, 1 building, and 1 projected. In addition 1 works made pure lead-coated sheets.

IRON AND STEEL CUT-NAIL WORKS.

This list embraces works in the United States which are equipped for the manufacture of iron and steel cut nails. Almost all the establishments named make standard sizes of nails. A number of the works make cut spikes as well as cut nails; some of them also make cut tacks. Capacities are given on single turn and in kegs of 100 pounds. Works making forged spikes are not included in the list unless cut nails and cut spikes are also manufactured.

MASSACHUSETTS—6.

Anthony and Cushman Tack Company, Taunton. Sizes, 3-inch and smaller and all sizes of tacks. 78 nail and tack machines. Annual capacity, 24,000 kegs.

Bridgewater Foundry, Machine, and Rolling Mill Company, Bridgewater. 10 nail machines. Annual capacity, 5,400 kegs.

Diamond Tack and Nail Works, Raynham. Sizes, 12-penny and smaller. 5 nail machines. Annual capacity, 5,000 kegs.

Mount Hope Iron Works, Mount Hope Iron Company, Somerset. 100 nail machines. Annual capacity, 140,000 kegs.

Ripley and Bartlett, Plymouth. Tacks and small nails.

Tremont Nail Works, Tremont Nail Company, West Wareham. 150 nail machines. Annual capacity, 200,000 kegs of steel nails.

CONNECTICUT—1.

Shelton Company, Derby. Trunk, clout, finishing, hoop, barrel, and lath nails. 25 nail machines.

NEW JERSEY—1.

Cumberland Nail and Iron Works, Bridgeton. 90 nail machines. Annual capacity, 140,000 kegs.

PENNSYLVANIA—11.

Anchor Nail and Tack Works and Central Expanded Metal Company, Chess Brothers, 531 Wood st., Pittsburgh. Works on Nineteenth st., South Side. 90 nail machines. Annual capacity, 200,000 kegs.—*Idle*.

Birdsboro Nail Works, E. and G. Brooke Iron Company, Birdsboro. 118 nail machines. Annual capacity, 250,000 kegs.

Chesapeake Nail Works, Charles L. Bailey & Co., (incorporated,) lessees, Harrisburg. 103 nail machines. Annual capacity, 260,000 kegs of iron and steel nails.

- Duncannon Iron Works, The Duncannon Iron Company, Duncannon. Office, 122 Race st., Philadelphia. 50 nail machines. Annual capacity, 125,000 kegs of iron and steel nails.
- Hollidaysburg Iron and Nail Company, Hollidaysburg, Blair county. 27 nail machines. Annual capacity, 60,000 kegs of cut nails and spikes.
- Keystone Nail Works, Ellis and Lessig Steel and Iron Company, Limited, Pottstown. 105 nail machines. Annual capacity, 300,000 kegs of iron and steel nails.
- Milton Nail Works, F. A. Godcharles Company, Milton. 101 nail machines. Annual capacity, 200,000 kegs of iron and steel cut nails and spikes.
- Northumberland Iron and Nail Works, Van Alen & Co., Northumberland. 94 nail machines. Annual capacity, 250,000 kegs of iron and steel nails.
- Pottstown Iron Works, Glasgow Iron Company, lessee, Pottstown. Philadelphia office, Harrison Building. 95 nail machines. Annual capacity, 250,000 kegs.
- Sunbury Iron Works, Sunbury. 41 nail machines. Annual capacity, 120,000 kegs.—*Idle and for sale or lease.*
- Williamsport Iron and Nail Company, Williamsport. 85 nail machines. Annual capacity, 150,000 kegs of iron and steel nails.

MARYLAND—1.

- Clendenin Brothers, 111 South Gay st., Baltimore. Sizes, up to and including 6-inch spikes. 25 nail machines. Annual capacity, 35,000 kegs of nails and spikes.—*See Iron and Steel Wire-Nail Works.*

VIRGINIA—1.

- Old Dominion Nail Works, Old Dominion Iron and Nail Works Company, Richmond, Henrico county. 137 nail machines. Annual capacity, 300,000 kegs of iron and steel nails and spikes.

WEST VIRGINIA—5.

- Riverside Nail Factories, (Riverside Department,) National Tube Company, Conestoga Building, Pittsburgh. Two nail factories at Wheeling, Ohio county. 224 nail machines. Annual capacity, 550,000 kegs of steel nails.
- Wheeling Steel and Iron Company, Wheeling, Ohio county. Two nail factories: Belmont Works, at Wheeling, Ohio county; 50 nail machines; annual capacity, 120,000 kegs of steel nails. Top Mill, at Wheeling, Ohio county; 130 nail machines; annual capacity, 300,000 kegs of steel nails and spikes.
- Wheeling Works, La Belle Iron Works, Steubenville, Jefferson county, Ohio. Works at Wheeling, West Virginia. 173 nail machines. An-

nual capacity, 600,000 kegs of iron and steel nails.—*See Ohio, (Steubenville Works.)*

KENTUCKY—1.

Norton Iron Works, Incorporated, Ashland. 126 nail machines. Annual capacity, 350,000 kegs of steel cut nails and spikes; also make wrought spikes.—*See Iron and Steel Wire-Nail Works in West Virginia and Kentucky.*

ALABAMA—1.

Brierfield Rolling Mill, Southern Mineral Land Company, Brierfield, Bibb county. 72 nail machines. Iron nails.—*Idle.*

OHIO—6.

Belfont Iron Works, Belfont Iron Works Company, Ironton. 126 nail machines. Annual capacity, 300,000 kegs.—*See Iron and Steel Wire-Nail Works.*

Ironton (The) Tack Company, Ironton. Sizes, from 3-penny fine to 10-penny. 22 nail machines.

Kelly Nail and Iron Company, Ironton. 120 nail machines. Annual capacity, 250,000 kegs of steel nails and spikes.—*See Iron and Steel Wire-Nail Works.*

Laughlin Nail Company, Wheeling, W. Va. Works at Martins Ferry. 225 nail machines. Annual capacity, 625,000 kegs of steel nails and spikes.

Mahoning Valley Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Youngstown, Mahoning county, Ohio. 55 nail machines. Annual capacity, 120,000 kegs.—*See Indiana, (Terre Haute Works.)*

Steubenville Works, La Belle Iron Works, Steubenville. 128 nail machines. Annual capacity, 400,000 kegs of iron and steel nails.—*See West Virginia, (Wheeling Works.)*

INDIANA—3.

Chicago Steel Manufacturing Company, Hammond, Lake county. 102 nail machines. Annual capacity, 300,000 kegs of iron and steel nails.

Terre Haute Works, Republic Iron and Steel Company, Stock Exchange Building, Chicago. Works at Terre Haute, Indiana. 64 nail machines.—*Idle. See Ohio, (Mahoning Valley Works.)*

Tower (The) Manufacturing Company, Cincinnati, Ohio. Works at Madison, Indiana. All sizes of iron nails. 25 nail machines. Annual capacity, about 60,000 kegs.—*See Iron and Steel Wire-Nail Works.*

ILLINOIS—4.

Belleville Tack Works, Belleville. Sizes, 30-penny and smaller. 16 nail machines. Annual capacity, 20,000 kegs.

Grand Crossing Tack Company, Grand Crossing. Sizes, 10-penny and smaller. 70 nail machines. Annual capacity, 30,000 kegs.—*See Iron and Steel Wire-Nail Works.*

Hartmann, Hay & Reis, Belleville. 85 nail machines. Annual capacity, 175,000 kegs of iron and steel nails.

Stanley (The George W.) Company, Belleville. Sizes, from $\frac{1}{2}$ to 2 inches. 21 nail machines. Annual capacity, 7,500 kegs.—*See Iron and Steel Wire-Nail Works.*

WISCONSIN—1.

Milwaukee Tack Company, Milwaukee. Works at Layton Park. Sizes, up to and including 6-penny. 7 small nail machines. Annual capacity, 6,000 kegs.—*See Iron and Steel Wire-Nail Works.*

CALIFORNIA—1.

Judson Manufacturing Company, Oakland. Office and salesroom, cor. Howard and Beale sts., San Francisco. 15 nail machines. Annual capacity, 25,000 kegs.—*See Iron and Steel Wire-Nail Works.*

UNITED STATES.

Total number of iron and steel cut-nail and cut-spike works in the United States in November, 1901: 43. Number of cut-nail and cut-spike machines with which these works are equipped: 3,385.

IRON AND STEEL WIRE-NAIL WORKS.

Some of the wire-nail works purchase the wire which they use, but a number of establishments have wire-rod mills and roll rods and draw wire. The works which roll rods are fully described in a special list beginning on page 350. Capacity is given in kegs of 100 pounds.

MASSACHUSETTS—5.

Baker (Charles F.) & Co., 50 Lincoln street, Boston. Works at 8 Thayer st., Boston. Sizes, from $\frac{3}{8}$ to $1\frac{1}{2}$ inches inclusive. Number of nail machines, 83. Annual capacity, 12,000 kegs of steel nails.

North Works, American Steel and Wire Company of New Jersey; general offices, Rookery Building, Chicago. Works at Worcester, Massachusetts. All sizes of wire nails. Number of machines, 113. Annual capacity, 200,000 kegs.—*For description of works see page 37.*

Plymouth (The) Mills, Plymouth. Sizes, from 2-penny to 20-penny. Number of nail machines, 32. Annual capacity, 20,000 kegs. Also produce rivets, tacks, trunk and clout nails, washers, staples, etc.

Taunton Tack Company Branch, or Mill No. 3, of the Atlas Tack Company, Taunton. Sizes, up to 7 inches. Number of nail machines, 57. Annual capacity, 10,000 kegs. Also produces rivets, burrs, tacks, shoe shanks, shoe eyelets, double-pointed tacks and staples, glazier points, tufting buttons, lining and saddle nails, and specialties.

Taunton Wire Nail Company, 36 Court st., Taunton. Sizes, from $\frac{1}{4}$ to 8 inches. Number of machines, 30. Annual capacity, 2,500 kegs. Also produces wire tacks, and steel and brass escutcheon pins.

RHODE ISLAND—1 COMPLETED AND 1 BUILDING.

New England Mill, American Screw Company, Providence. All sizes of wire nails. Number of nail machines, 51. Also produces wood and machine screws, stove and tire bolts, rivets, etc.

Wales (John) Wire Company, Auburn. Building a plant to make wire nails. Number of nail machines, 42. Annual capacity, 175,000 kegs.

CONNECTICUT—1 COMPLETED AND 1 REBUILDING.

National (The) Wire Corporation, New Haven. Sizes, from 2-penny to 60-penny. Number of nail machines, 75. Annual capacity, 300,000 kegs.—*Works destroyed by fire in 1901; now being rebuilt.*

Russell and Erwin Manufacturing Company, New Britain. Warehouse, 45 Chambers st., New York City. All sizes of wire nails. Number of nail machines, 22. Annual capacity, 4,900 kegs. Also produces builders' hardware, screws, bolts, nuts, squares, padlocks, etc.

NEW YORK—4.

Brooklyn Nail Works, F. M. Young, foot of Eagle st., Brooklyn. Sizes, from $\frac{1}{2}$ to 8 inches. Number of nail machines, 15. Annual capacity, 25,000 kegs of steel wire nails.

Hassall, (John,) 65 Elizabeth street, New York City. Works at Brooklyn. Sizes, from the smallest nail up to 6 inches. Specialty, small sizes of nails. Number of nail machines, 50. Annual capacity, 10,000 kegs. Also produces rivets, escutcheon pins, and fancy brass goods.

Igoe Brothers, 226-28 North Ninth st., Brooklyn. All sizes of wire nails. Number of machines, 20. Annual capacity, 30,000 kegs. Also produce wire specialties and wire for market and special purposes.

Titchener (E. H.) & Co., Binghamton. Sizes, from $\frac{1}{4}$ to 4 $\frac{1}{2}$ inches. Number of nail machines, 8. Annual capacity, 3,000 kegs. Also produce staples, double-pointed tacks, etc.

PENNSYLVANIA—16 COMPLETED AND 1 BUILDING.

American Steel and Wire Company of New Jersey; general offices, Rookery Building, Chicago. Six works in Pennsylvania: Allentown Works, at Allentown; all sizes of wire nails; number of nail machines, 166; annual capacity, 600,000 kegs. Beaver Falls Works, at Beaver Falls; all sizes of wire nails; number of nail machines, 142;

- annual capacity, 850,000 kegs. Braddock Works, at Braddock; all sizes of wire nails; number of nail machines, 112; annual capacity, 700,000 kegs. New Castle Works, at New Castle; sizes, from 2-penny fine to 60-penny common; number of nail machines, 254; annual capacity, 1,250,000 kegs. Rankin Works, at Rankin Station, Allegheny county; all sizes of wire nails; number of nail machines, 166; annual capacity, 900,000 kegs. South Side Works, at Pittsburgh; all sizes of wire nails; number of nail machines, 204; annual capacity, 960,000 kegs.—*For description of works see pages 35-8.*
- Hartman (The) Manufacturing Company, New Castle. Building.
- Marland, Neely & Co., Limited, South Twenty-second street and the Pittsburgh and Lake Erie Railroad, Pittsburgh. All sizes of steel wire nails up to 60-penny. Number of nail machines, 8. Annual capacity, 60,000 kegs. Also produce nuts, bolts, washers, etc.
- Page Woven Wire Fence Company, Monessen. Sizes, from 1½ to 4½ inches. Number of nail machines, 10. Annual capacity, 35,000 kegs. Also produces wire rods, wire, staples, woven wire fencing, etc.
- Penn Hardware Company, Reading. Works at foot of Spruce st. All sizes of wire nails. Number of nail machines, 3. Annual capacity, 5,000 kegs. Also produces builders' hardware specialties.
- Philips, Townsend & Co., North Penn Junction, Philadelphia. Works at Fourth street and Glenwood avenue. Sizes, from 6 inches to the smallest. Number of nail machines, 70. Annual capacity, 100,000 kegs. Also produce wire and rivets.
- Reading Screw Company, Norristown. Sizes, from 2-penny and larger. Number of nail machines, 10. Annual capacity, 15,000 kegs. Also produces screws, rivets, staples, double-pointed tacks, wire, etc.
- Sharon (The) Steel Company, Sharon. All sizes of steel wire nails. Number of nail machines, 200. Annual capacity, 1,000,000 kegs. Also produces rods, sheet bars, wire, etc.
- Standard (The) Wire Nail Works, Sunbury. Sizes, 60-penny and smaller. Number of nail machines, 10. Annual capacity, 30,000 kegs.
- Townsend, (C. C. & E. P.,) New Brighton. Works at Fallston. Sizes, 60-penny and smaller. Number of nail machines, 70. Annual capacity, 150,000 kegs. Also produce wire, rivets, burrs, hooks, etc.
- Union Steel Company, Empire Building, Pittsburgh. Works at Donora. All sizes of steel nails. Number of nail machines, 200. Annual capacity, 1,000,000 kegs. Also produces wire rods, wire, and barb wire.
- United States (The) Wire and Nail Company, Lewis Block, Pittsburgh. Works at Shousetown. All sizes of steel nails both common and list. Number of nail machines, 42. Annual capacity, 240,000 kegs. Also produces wire rods and all sizes of plain wire.

MARYLAND—I.

- Clendenin Brothers, 111 South Gay st., Baltimore. Sizes, up to 20-penny.

Number of nail machines, 15. Annual capacity, 27,000 kegs of steel nails.—*See Iron and Steel Cut-Nail Works in Maryland.*

WEST VIRGINIA—2.

Columbia Barb Wire and Nail Works, Norton Iron Works, Incorporated, lessees, Ashland, Kentucky. Works at Kanawha City, West Virginia. Sizes, from 2-penny fine to 6-inch spikes. Number of nail machines, 62. Annual capacity, 250,000 kegs. Also produce annealed wire, plain nail wire, barbed wire, etc. (Works owned by the Columbia Barb Wire and Nail Company.)—*See Iron and Steel Cut-Nail and Iron and Steel Wire-Nail Works in Kentucky.*

Parkersburg Wire and Nail Manufacturing Company, Parkersburg. All sizes. Number of nail machines, 6. Annual capacity, 25,000 kegs.

KENTUCKY—1.

Norton Iron Works, Incorporated, Ashland. Sizes, steel wire nails from 2-penny to 8-inch spikes. Number of machines, 50. Annual capacity, 420,000 kegs. Also produce steel cut nails and plain galvanized wire.—*See Cut-Nail Works in Kentucky and Wire-Nail Works in West Virginia.*

ALABAMA—1.

Alabama Steel and Wire Company, Birmingham. Works at Ensley. All sizes of steel wire nails. Number of nail machines, 172. Annual capacity, 1,000,000 kegs. Also produces plain wire, etc.

OHIO—8.

American Steel and Wire Company of New Jersey; general offices, Rookery Building, Chicago. Four works in Ohio: Consolidated Works, at Cleveland; sizes, from $\frac{1}{8}$ to 9 inches; number of nail machines, 264; annual capacity, 1,000,000 kegs. H. P. Nail Works, at Cleveland; all sizes; number of machines, 512; annual capacity, 1,500,000 kegs. Newburgh Wire Works, at Newburgh; all sizes; number of machines, 30; annual capacity, 240,000 kegs. Salem Works, at Salem; sizes, from $\frac{1}{4}$ to 7 inches; number of nail machines, 124; annual capacity, 650,000 kegs.—*For description of works see pages 36-8.*

Belfont Iron Works Company, Ironton. All sizes of steel wire nails. Number of nail machines, 60. Annual capacity, 500,000 kegs. Also produces plain annealed wire, galvanized wire, and steel cut nails.—*See Iron and Steel Cut-Nail Works in Ohio.*

Cuyahoga (The) Steel and Wire Company, Cuyahoga Falls. All sizes. Number of nail machines, 30. Annual capacity, 60,000 kegs.

Falls (The) Rivet and Machinery Company, Cuyahoga Falls. Sizes, from 2-penny to 40-penny. Number of nail machines, 20. Annual capacity, 65,000 kegs. Also produces rivets and washers.

Kelly Nail and Iron Company, Ironton. All sizes. Number of nail machines, 61. Annual capacity, 700,000 kegs. Also produces wire and cut nails.—*See Iron and Steel Cut-Nail Works in Ohio.*

INDIANA—5 COMPLETED AND 1 TO BE REBUILT.

Anderson Works, American Steel and Wire Company of New Jersey; general offices, Rookery Building, Chicago. Works at Anderson. All sizes of wire nails. Number of nail machines, 186. Annual capacity, 1,000,000 kegs.—*For description of works see pages 35-6.*

Arrow (The) Company, Anderson. Sizes, from $\frac{1}{4}$ to 12 inches. Number of nail machines, 75. Annual capacity, 100,000 kegs.

Crawfordsville Wire and Nail Company, Crawfordsville. All sizes.—*Destroyed by fire in 1901; to be rebuilt.*

Indiana Steel and Wire Company, Muncie. Sizes, from 3-penny fine to 40-penny. Number of machines, 12. Annual capacity, 100,000 kegs.

Kokomo Wire and Nail Company, Kokomo. All sizes. Number of machines, 21. Annual capacity, 200,000 kegs. Also produces wire, etc.

Tower (The) Manufacturing Company, Cincinnati, Ohio. Works at Madison, Indiana. Sizes, up to 30-penny. Number of nail machines, 13. Annual capacity, about 30,000 kegs. Also produces tacks, staples, rivets, etc.—*See Iron and Steel Cut-Nail Works in Indiana.*

ILLINOIS—11.

American Steel and Wire Company of New Jersey; general offices, Rookery Building, Chicago. Three works in Illinois: De Kalb Works, at De Kalb; standard sizes; number of nail machines, 152; annual capacity, 840,000 kegs. Granite City Works, at Granite City; sizes, from 3 to 40-penny; number of nail machines, 32; annual capacity, 75,000 kegs. Joliet, Illinois, Scott Street Works, at Joliet; standard sizes; number of nail machines, 266; annual capacity, 1,500,000 kegs.—*For description of works see pages 36-7.*

Dillon-Griswold Wire Company, Sterling. All sizes of wire nails. Number of nail machines, 60. Annual capacity, 315,000 kegs. Also makes woven wire fencing, wire rods, barbed wire, fence staples, etc. Grand Crossing Tack Company, Grand Crossing. All sizes. Number of nail machines, 82. Annual capacity, 400,000 kegs. Also produces rods, wire, rivets, etc.—*See Iron and Steel Cut-Nail Works in Illinois.*

Illinois (The) Nail Company, No. 1-3 Dix st., Chicago. All sizes. Number of nail machines, 25. Annual capacity, 60,000 kegs.

Lawrence Brothers, Sterling. Works at Rock Falls. Sizes, from 2-penny to 40-penny. Number of nail machines, 14. Annual capacity, 30,000 kegs. Also produce door hangers, hinges, etc.

North Western Barb Wire Company, Sterling. Standard sizes. Number of nail machines, 18. Annual capacity, 150,000 kegs. Also produces field fencing.

Quincy Hardware Manufacturing Company, Quincy. Sizes, from 2-penny to 40-penny. Number of machines, 14. Annual capacity, 90,000 kegs.

Stanley (The George W.) Company, Belleville. Sizes, from $\frac{1}{4}$ to 3 inches. Number of nail machines, 14. Annual capacity, 2,500 kegs.

Also produces double-pointed tacks, cut nails, and staples.—*See Iron and Steel Cut-Nail Works in Illinois.*

Thomas (The) Brass and Iron Company, Waukegan. Sizes, from 2-penny to 30-penny inclusive. Number of machines, 9. Annual capacity, 60,000 kegs. Also produces brass and iron goods for plumbers, etc.

MICHIGAN—1.

Crescent Machine Company, 101 Adams ave., West Detroit. Cigar box nails only. Number of nail machines, 10. Annual capacity, 1,000 kegs.

WISCONSIN—4.

Badger (The) Nail Company, Milwaukee. Sizes, from the finest to 60-penny inclusive. Number of nail machines, 17. Annual capacity, 60,000 kegs. Also draws wire.

Cedarburg Wire, Wire Nail, and Screw Company, Cedarburg. Sizes, from $\frac{3}{8}$ of an inch to 60-penny. Number of nail machines, 14. Annual capacity, 30,000 kegs.

Janesville Barb Wire Company, Janesville. Sizes, from 2-penny to 60-penny. Number of nail machines, 11. Annual capacity, 60,000 kegs. Also produces barb wire, fence staples, and woven wire fencing.

Milwaukee Tack Company, Milwaukee. Works at Layton Park. Sizes, from 4 inches and smaller. Number of machines, 22. Annual capacity, 13,000 kegs.—*See Iron and Steel Cut-Nail Works in Wisconsin.*

COLORADO—1 BUILDING.

Colorado (The) Fuel and Iron Company, Boston Building, Denver. Building wire-nail works at Pueblo to contain 280 machines; estimated annual capacity, 1,250,000 kegs.

CALIFORNIA—3.

Judson Manufacturing Company, Oakland. Office and salesroom, San Francisco. Sizes, from 2-penny to 7-inch spikes. Number of nail machines, 20. Annual capacity, 36,000 kegs. Also produces cut nails, tacks, bolts, spikes, etc.—*See Iron and Steel Cut-Nail Works in California.*

Pacific Iron and Nail Works, 132 Market st., San Francisco. Works at Oakland. All sizes of wire nails. Number of nail machines, 50. Annual capacity, 60,000 kegs. Also produce barb wire, fence wire, etc.

Pacific Works, American Steel and Wire Company of New Jersey; general offices, Rookery Building, Chicago. Works at San Francisco. Sizes, from 2-penny to 12-inch spikes. Number of nail machines, 27. Annual capacity, 46,500 kegs.—*For description of works see page 37.*

UNITED STATES.

Total number of iron and steel wire-nail works in the United States in November, 1901: 64 completed, 3 building, 1 rebuilding, and 1 to be rebuilt.

THE IRON AND STEEL WORKS

OF

THE UNITED STATES.

PART IV—LATEST INFORMATION.

CORRECTED TO DECEMBER 31, 1901.

The information given below comprises changes in equipment of plants and in officers, etc., which were made while the Directory was going through the press, the whole brought down to December 31, 1901.

PART I—CHIEFLY CONSOLIDATIONS.

American Bridge Company of New Jersey, Jersey City, New Jersey. *New Plant.*—Company has acquired the bridgebuilding plant at Detroit formerly operated by the Detroit Bridge and Iron Works, which will be known as the Detroit Plant and will erect railroad and highway bridges; annual capacity, 16,800 gross tons.—*See pages 58-62.*

American Bridge Company of New York, New York City. *Change in Directors:* Elbert H. Gary, *vice* J. P. Kennedy, deceased.—*See page 58.*

American Car and Foundry Company, St. Louis, Missouri. *Changes in officers:* William McMillan, formerly Chairman of Executive Committee, deceased; position not filled; W. K. Bixby, formerly Vice-Chairman of Executive Committee, now Chairman of Board of Directors; position of Vice-Chairman of Executive Committee abolished. *Board of Directors:* William N. McMillan succeeds William McMillan, deceased. *Executive Committee:* Successor to William McMillan, deceased, not appointed. *Superintendent:* Joseph H. Catterall is Superintendent of the Jackson and Woodin Works, at Berwick, Pa., not James H. Catterall. *Bolt and Nut Works:* Company operates 14 plants for the manufacture of bolts or nuts. *Carbuilding Works.*—Jackson and Sharp Works, Wilmington, Del.; annual capacity, 400 passenger and 200 electric cars.—*See pages 145-9.*

American Iron and Steel Manufacturing Company, Lebanon, Pa. *Re-*

removal.—North Reading Works, at Reading; real estate and buildings sold; machinery to be removed to Lebanon.—*See pages 91-3.*

American Steel and Wire Company of New Jersey, Chicago. *Changes in officers at works:* M. McMurray is General Superintendent of the Newburgh Steel Works and the Newburgh Wire Works, at Newburgh, Ohio; also of the Newburgh, Emma, and Central Furnaces, at Cleveland; E. B. Tenney is Superintendent of these furnaces; H. A. Barren is Superintendent of the Newburgh Steel Works and C. R. Putnam is Superintendent of the Newburgh Wire Works; S. S. Hartranft is Superintendent of the Neville Island Furnace, at Neville Island, Pa. *Sales Agents:* Thomas J. Farrell succeeds A. Holland as Sales Agent at London, England.—*See pages 29-38.*

American Steel Casting Company, Thurlow Station, Chester, Pa. *Changes in officers:* A. H. Melton is Secretary, *vice* R. C. Foster. *Abandoned plant:* Syracuse Works, Geddes, New York; works sold; open-hearth furnaces abandoned.—*See pages 96-7.*

American Steel Hoop Company, Pittsburgh. *Changes in officers at works:* C. F. Albrecht is now Superintendent of the Painter Mill, at Pittsburgh, *vice* T. L. Harper, resigned; L. T. Brown is General Superintendent of the Painter and Clark Mills, at Pittsburgh, and of the McCutcheon Mill, at Allegheny, Pa.; H. A. Zellers is no longer Superintendent of the Pomeroy Mill, at Pomeroy, Ohio; S. A. Clark is Superintendent of the Mingo Mill, at Mingo Junction, Ohio, *vice* H. K. Williams; E. R. Davis, Sr., is Superintendent of the Portage Mill, at Duncansville, Pa.—*See pages 48-52.*

American (The) Sheet Steel Company, New York. *Works dismantled:* The Chartiers Works, at Carnegie, Pa., were dismantled in 1901. *Change in Superintendent:* Charles L. Suessman is Superintendent of the Piqua Works, at Piqua, Ohio, *vice* J. H. Frantz.—*See pages 52-8.*

American Tin Plate Company, New York City. *Changes in officers:* W. T. Graham is President, *vice* Daniel G. Reid; Warner M. Leeds is 1st Vice-President, *vice* W. T. Graham; Frank Dickerson is 2d Vice-President, *vice* Warner Arms; there is no 3d Vice-President; E. G. Applegate is Secretary and Assistant Treasurer. *Board of Directors:* C. M. Schwab, E. H. Gary, W. T. Graham, Wm. P. Beaver, F. S. Wheeler, E. G. Applegate, James B. Dill, George Greer, Warner M. Leeds, C. A. Robinson, and Frank Dickerson. *Completed Rolling Mill:* Machinery for the manufacture of black plates was installed in the Chester Works, at Chester, West Virginia, late in 1901, and put in operation on December 1. The tinning department will probably be running in February, 1902. *Reeves Works, Canal Dover, Ohio:* The black plate and tinning departments have been dismantled. *Laughlin Works, Martins Ferry, Ohio:* These works are now equipped with 23 sheet and 23 pair furnaces and 23 hot mills.—*See pages 39-48.*

Buffalo (The) Union Furnace Company, Buffalo, New York. *Change*

in *General Superintendent*: B. Marron is now General Superintendent, vice F. E. Bachman, resigned.—See pages 118-19.

Cambria Steel Company, Philadelphia. *Change in address of Philadelphia office*: On April 1, 1902, office will be changed from Harrison Building, southwest cor. Fifteenth and Market sts., to Arcade Building, southeast cor. Fifteenth and Market sts. *Officers*: J. Lowber Welsh has resigned as Second Vice-President; position not filled. *Board of Directors*: Mr. Welsh has also resigned as a member of the Board of Directors; R. Francis Wood is a new member. *Executive Committee*: Effingham B. Morris, Frank J. Firth, Theodore N. Ely, and L. C. Hanna. *Sales Offices*: Baltimore, Maryland, Jameson, McKenzie & Evans, 310 North st., no longer selling agents. *Steel Carbuilding Plant at Johnstown*: Company now builds structural and other forms of steel cars; annual capacity, from 3,000 to 4,500 cars.—See pages 103-6.

Carnegie Steel Company, Pittsburgh. *Changes in furnaces*: Carrie Furnaces: Furnaces Nos. 1 and 2 rebuilt in 1901; total annual capacity of the four Carrie stacks, 685,000 gross tons. Edgar Thomson Furnaces: The size of Furnace D was increased in 1901 from 80 x 20 to 90 x 22; total annual capacity of the nine Edgar Thomson stacks, 1,325,000 gross tons. Total annual capacity of the nineteen stacks operated by the Carnegie Steel Company, 3,000,000 gross tons. *Furnace Superintendent*: Duquesne Furnaces: A. N. Diehl, Superintendent, vice Guy R. Johnson, resigned.—See pages 4-8.

Colorado (The) Fuel and Iron Company, Denver, Colorado. *Changes in officers*: J. B. McKennan is Manager of the Minnequa Rolling Mills and Steel Works, at Pueblo, Colorado, and E. G. Rust is General Superintendent. *Railroads*: The new line to the coal fields in Las Animas county, Colorado, is completed and in operation; its length is 22 miles. The road is now being extended for 14 miles. *Coal Lands*: The company now owns approximately 350,000 acres of coal lands in Colorado and New Mexico. *Building Blast Furnaces*: Furnace D will probably be completed in July and Furnace E in October, 1902. *Open-Hearth Steel Plant*: Six 50-gross-ton basic furnaces are now being erected. *Black Plate Mills*: Ten hot and 10 cold mills are being built. *Additional Mills*: One 40-inch blooming mill, one 24-inch reversing mill, one 12 and one 14-inch continuous mill, and small merchant and hoop mills are now being added. *Wire-Rod Mill*: Annual capacity of building rod mill, 200,000 gross tons. *Wire Department*: Annual capacity of building plant, about 200,000 tons. *Wire-Nail Department*: Number of machines being installed, 280; annual capacity, 1,250,000 kegs of nails.—See pages 122-5.

Crucible Steel Company of America, Pittsburgh. *Change in office address*: After April 1, 1902, the general offices of the company will be located in the Frick Building, Pittsburgh. *Changes in officers*: James H. Park is General Manager as well as Third Vice-President; Julius

Bieler is Auditor pro tem. as well as Assistant Treasurer; Charles E. Clapp, Fourth Vice-President, is also General Sales Agent at Pittsburgh; and C. C. Ramsey is Assistant General Sales Agent at New York. *Board of Directors*: L. D. York is no longer a member; Alexander W. Black and Wm. P. Snyder are new members. *Works sold*: The Cumberland Steel and Tin Plate Works, at Cumberland, Maryland, have been sold to the Maryland Sheet and Steel Company; the crucible furnace has been dismantled.—See pages 109-14.

Empire Steel and Iron Company, Catsauqua, Pa. *Changes in officers*: S. B. Patterson is now Treasurer, vice W. L. Sims, General Manager and Treasurer; E. R. Griffith is now Purchasing Agent, vice W. A. Major. *Board of Directors*: David B. Gamble, Mark T. Cox, and Charles H. Zehnder are now members, vice W. E. Scarrett, W. L. Sims, and E. K. Summerwell. *Executive Committee*: Charles H. Zehnder is now a member, vice W. L. Sims.—See pages 84-6.

Illinois (The) Steel Company, Chicago. *Changes in officers*: T. W. Robinson, formerly General Manager, is now First Vice-President; the office of General Manager has been abolished; F. H. Foote, formerly Manager of Blast Furnaces, is now Second Vice-President; the office of Manager of Blast Furnaces has also been abolished. *Board of Directors*: F. H. Foote succeeds C. H. Foote. *Executive Committee*: T. W. Robinson succeeds C. H. Foote. *South Works*: Furnace No. 10 was completed late in 1901 and blown in on December 13, the first cast of pig iron being made on December 14. *Furnace Superintendents*: Guy R. Johnson is now Furnace Superintendent of the Joliet Works, vice O. O. Laudig; O. O. Laudig is Furnace Superintendent of the South Works, vice Barney Marron.—See pages 12-17.

Jones & Laughlins, Limited, Pittsburgh. *Additions to equipment of the American Iron and Steel Works*: One 400-gross-ton Talbot furnace is being added to the open-hearth steel department; daily capacity, 400 gross tons; will be completed about April 1; when the Talbot furnace is completed open-hearth department will have an annual capacity of 300,000 gross tons of ingots. The 40-inch blooming mill now in course of erection will be ready for operation about April 1. When it is completed the works will have an annual capacity of finished rolled products of about 825,000 gross tons.—See pages 106-9.

Lackawanna (The) Iron and Steel Company. *Change in address*: General offices removed from Scranton, Pa., to Buffalo, N. Y.; all communications for executive officers should be addressed to 100 Broadway, New York.—See pages 86-8.

Lukens Iron and Steel Company, Coatesville, Pa. *Change in equipment*: New slabbing mill is now in operation; new 3-high plate mill (described on page 96) will be equipped with 3 continuous heating furnaces instead of 2; furnaces will be 50 feet long instead of 40 and 2 large pit furnaces will be installed instead of 1; the 3 high 48-inch

universal plate mill will roll plates 48 inches wide instead of 42; the 3 gas heating furnaces for the 134-inch plate train have hearths 28 feet by 7 instead of 27 feet by 7.—*See pages 95-6.*

National Enameling and Stamping Company, New York City. *Works destroyed by fire:* Brooklyn H Branch, (leased,) Metropolitan avenue, Brooklyn; destroyed by fire; not being rebuilt.—*See pages 149-51.*

National Mining Company, Carnegie Building, Pittsburgh. Controlled by The United States Steel Corporation. Company owns 8,000 acres of coal lands in Allegheny and Washington counties, Pa. *Officers:* Thomas Lynch, President; J. L. Lowther, Secretary and Treasurer. *Board of Directors:* Thomas Lynch, D. M. Clemson, D. G. Kerr, Thomas Morrison, and W. W. Blackburn.—*Not described in the Directory.*

National Steel Company, Pittsburgh. *Change in size of Furnace:* New Castle Works: Furnace No. 2 is now 76 x 18. *Rolling Mill and Steel Works:* New Castle Works: Bessemer converters were not enlarged to 10-gross-tons in 1901; will be enlarged in 1902.—*See pages 19-23.*

National Tube Company, Pittsburgh. *Change in office address:* General office in Pittsburgh will be removed about April 1, 1902, from the Conestoga Building to the Frick Building. *Building Blast Furnace:* The new furnace at Benwood, West Virginia, being erected by the Tube Steel Company, will not be completed before the summer of 1902. *Change in Superintendent:* James Cooper has resigned as Superintendent of the Youngstown Department, (tube works,) at Youngstown, and is succeeded by John A. Hock.—*See pages 23-9.*

Pennsylvania Steel Company of New Jersey, Philadelphia. *Change in Directors:* Frank W. Hunnewell and John Lowber Welsh are no longer members; George F. Baer, Theodore N. Ely, F. C. Smink, and Frank J. Firth are new members. *Executive Committee:* John Lowber Welsh, Luther S. Bent, and Edward T. Stotesbury are no longer members; Theodore N. Ely, F. C. Smink, and Frank J. Firth are new members. *Capital Stock:* The capital stock is divided into 250,000 shares of common (of which 107,500 shares have been issued) and 250,000 shares of 7 per cent. non-cumulative preferred (of which 165,000 shares have been issued).—*See page 99.*

Pennsylvania (The) Steel Company, Philadelphia. *Changes in officers at Philadelphia:* The title of H. F. Martin has been changed from General Sales Agent to General Manager of Sales. *Changes in officers at Steelton:* H. H. Campbell is now General Manager instead of Superintendent and General Manager; John W. Dougherty, formerly Assistant Superintendent, is now Superintendent; and Frank D. Carney is Assistant Superintendent. *Lebanon Furnaces:* B. Dawson Coleman is Managing Director.—*See pages 100-2.*

Pressed Steel Car Company, Pittsburgh. *Changes in offices and officers:* Philadelphia office abandoned. *Officers at New York:* F. N. Hoffstot, President, and A. H. Larkin, Secretary. *Officers at Pittsburgh:* W. H.

Schoen, First Vice-President, resigned; J. W. Friend is now Vice-President, instead of Second Vice-President; A. R. Fraser, Secretary and Treasurer, resigned; position not filled; P. G. Jenks is Assistant Treasurer; S. E. Moore, Auditor, *vice* H. J. Gearhart. *Additional officers in Allegheny*: G. H. Goodell, Chief Engineer, *vice* J. M. Hansen, formerly located in Pittsburgh. *Board of Directors*: F. N. Hoffstot, H. E. Moller, and F. G. Ely, of New York; J. W. Friend, J. H. Reed, T. Hart Given, Henry Phipps, and G. E. Macklin, of Pittsburgh; and A. H. Larkin, of Jersey City, *vice* old board.—*See pages 116-17.*

Republic Iron and Steel Company, Chicago. *Changes in officers*: W. H. Hassinger is now Vice-President, *vice* Wm. Barret Ridgely, resigned; Wm. E. Taylor has resigned as Vice-President and General Manager; W. L. Simonton is Manager of Rolling Mills, H. L. Rownd is Assistant Treasurer, Chas. E. Graves is Assistant Secretary, Ralph P. Zint is Assistant General Sales Agent, and W. L. Lee is Purchasing Agent. *Valley District*: Thomas Parrock is General Superintendent of the Brown Bonnell, Andrews, and Mahoning Valley Works. *Ohio River District*: Abolished. *Valley Furnaces*: Charles Hart is now Manager. *Selling Agent*: Fred J. Rowlands, Butte City, Montana, is no longer a selling agent. *Board of Directors*: L. C. Hanna succeeds William Barret Ridgely; William E. Taylor has resigned. *Furnace Superintendents*: J. W. Deetrick is now Superintendent of Hannah Furnace, at Youngstown, *vice* Bert Deetrick; G. B. LeVan is Superintendent of Haselton Furnace, at Youngstown, *vice* Charles Hart; and Martin Welch is Superintendent of Hall Furnace, at Sharon, Pa., *vice* G. B. LeVan. *Rolling Mills to be dismantled*: The Cleveland Works, at Cleveland, Ohio, the Marion and Westerman Works, at Marion, Indiana, the Wetherald Works, at Frankton, Indiana, and the New Albany Works, at New Albany, Indiana, will probably be dismantled in the spring of 1902.—*See pages 69-77.*

Sharon (The) Steel Company, Sharon, Pa. *Changes in officers*: W. H. Lewis is now General Superintendent, *vice* N. McConnell. *Board of Directors*: W. H. Lewis, Peter Shields, and John K. Bryden are new members; F. H. Buhl, N. McConnell, and David Adams are no longer members. *Projected Blast Furnaces*: Two new furnaces are to be erected in 1902; each will be 80 x 19 feet and each will have an annual capacity of 110,000 gross tons. *Superintendent of Furnace*: Warren R. Clifton is now Superintendent. *Open-Hearth Steel Works*: When the 5 building furnaces are completed the total annual capacity of open-hearth steel ingots will be 480,000 gross tons. *New equipment*: One 30-inch universal mill and three 26-inch bull-head trains are now being added for the manufacture of steel skelp; also a plant for the manufacture of wrought steel pipe; butt-welded pipe from $\frac{1}{2}$ of an inch to 2 inches and lap-welded pipe from 2 to 14 inches will be produced; plant will probably be completed in July, 1902. *New*

- Plant:* The company has acquired a plant at Kansas City, Missouri, for the manufacture of wire fencing.—*See pages 117-18.*
- Shelby Steel Tube Company, Pittsburgh.** *Change in office address:* General office in Pittsburgh will be removed after April 1, 1902, from the Conestoga Building to the Frick Building; the general office in the American Trust Building, Cleveland, Ohio, the New York office at No. 258 Broadway, and the Western office in the Rookery Building, Chicago, have been abandoned. *Officers:* The present officers are as follows, all located at Pittsburgh: F. J. Hearne, President; W. B. Schiller, First Vice-President; William H. Latshaw, Second Vice-President; J. D. Culbertson, Secretary and Treasurer; J. H. Nicholson, Assistant to First Vice-President; J. W. Phillips, Assistant Treasurer; C. I. O'Connor, General Purchasing Agent; and J. F. Townsend, Traffic Manager. *Board of Directors:* E. C. Converse, J. D. Culbertson, W. J. Curtis, E. H. Gary, F. J. Hearne, Wm. H. Latshaw, A. S. Matheson, W. B. Schiller, and C. M. Schwab.—*See pages 62-4.*
- Sloss Sheffield Steel and Iron Company, Birmingham.** *Changes in sales agents:* David Evans is now Sales Agent at Chicago; the Pittsburgh office of J. K. Dimmick & Co. is now located in the Fitzsimons Building; the sales office at Columbus, Ohio, has been abandoned; Robert Field, sales agent, is now located in the Mitchell Building, Cincinnati. *Capital Stock:* Omit (page 135) the following: "of which \$1,835,000 is now outstanding and the balance is in the Treasury." *Furnaces Rebuilt:* Sloss Furnaces Nos. 1, 3, and 4 were practically rebuilt in 1901; Furnace No. 2 is now being rebuilt.—*See pages 134-6.*
- Southern Car and Foundry Company, Birmingham, Alabama.** *Additional products in Rolling Mill:* Channel bars for cars and structural work are now rolled at the mill at Anniston.—*See pages 143-4.*
- Tennessee Coal, Iron, and Railroad Company, Birmingham.** *Changes in officers:* N. Baxter, Jr., has resigned as President; position not filled; James Belden is no longer Assistant to Chairman; L. Hoover is Auditor, *vice* J. R. Vail; J. L. Gaines, formerly Assistant General Manager, is now Manager; and W. A. Major is Purchasing Agent. *Board of Directors:* Fred H. Benedict, of New York, and N. Baxter, Jr., of Nashville, Tennessee, are no longer members; vacancies not filled. *Executive Committee:* Fred H. Benedict is no longer a member; vacancy not filled. *Superintendent:* J. F. Kent is Superintendent of the Bessemer Rolling Mills, at Bessemer, *vice* R. H. Pritchard. *Capital Stock:* Common, \$22,552,800; preferred, \$248,300. *Transfer Agents:* Hanover National Bank of New York, *vice* Central Trust Company. *Equipment:* The 27-inch rail train (see page 133) has been completed. A plant for the manufacture of hoops and cotton-ties will be added in 1902; annual capacity, from 30,000 to 40,000 gross tons. *Steel-Casting Department:* Coal is used for fuel.—*See pages 130-4.*
- Thomas (The) Iron Company, Easton, Pa.** *New officer:* Fletcher H.

- Knight, formerly Superintendent of Keystone Furnace, is now Assistant General Manager. *Change in Furnace Superintendent*: Keystone Furnace: Charles E. Hulick, Superintendent, *vice* Fletcher H. Knight; furnace active in 1901. *Annual capacity*: The annual capacity of the ten stacks is now 260,000 gross tons.—*See pages 80-1.*
- Troy (The) Steel Company, Troy, New York. *Sale of works*: Works advertised to be sold at auction on February 6, 1902.—*See pages 79-80.*
- United States (The) Steel Corporation, New York. *Change in officers*: Richard Trimble is now Secretary and Treasurer, *vice* Arthur F. Luke, Treasurer; George W. Perkins, Chairman of Finance Committee, *vice* Robert Bacon; Mr. Perkins also succeeds Mr. Bacon on the Board of Directors.—*See page 2; also page 393, (National Mining Company.)*
- Virginia Iron, Coal, and Coke Company, Bristol, Tennessee. *Change in address*: G. B. Schley, President, should be addressed at New York and not at Bristol, Tennessee. *Changes in officers*: F. M. Eaton is now General Sales Agent; Wm. N. Morgan is Purchasing Agent, *vice* John Warwick. *Furnaces Leased*: Graham Furnace, at Graham, Virginia, has been leased to the Graham Iron Company, and the Carnegie Furnace, at Johnson City, Tennessee, to the Cranberry Furnace Company. The latter is now known as the Johnson City Furnace. *Selling Agents*: Hickman, Williams & Co. are selling agents at St. Louis as well as at Chicago and Louisville.—*See pages 126-30.*
- Wheeling Steel and Iron Company, Wheeling, West Virginia. *Building Tube Mill*: New tube mill at Benwood will not be completed and in operation until about April 1, 1902.—*See pages 119-21.*

PART II.—BY STATES AND DISTRICTS.

MASSACHUSETTS.

- Danvers Iron Works, 70 Kilby st., Boston. Now operated by the Sylvester Company. B. F. Sylvester, President; John P. Sylvester, Treasurer; H. W. Sylvester, Superintendent.—*See page 154.*
- Richmond Iron Works, Richmond Furnace P. O. Now operated by The Richmond Iron Company.—*See page 154.*

CONNECTICUT.

- New Haven Rolling Mill, New Haven. Three heating furnaces, 1 break-down train, and 1 finishing train added and put in operation in January, 1902; annual capacity, 28,000 gross tons.—*See pages 158-9.*
- Wilmot and Hobbs (The) Manufacturing Company, Bridgeport. Plant owned by the American Tube and Stamping Company.—*See page 159.*

NEW YORK.

- Cedar Point Furnace, Port Henry, New York. Leased by Pilling & Crane, Girard Building, Philadelphia. Furnace will be remodeled

and the annual capacity increased to about 60,000 gross tons; basic, forge, and foundry pig iron will be produced; a new company will be formed; Frank E. Bachman is Superintendent.—*See page 159.*

Salisbury Carbonate Iron Company, Millerton. Copake Iron Works, at Copake Iron Works P. O.; furnace no longer leased; now owned by W. A. Miles and estate of F. P. Miles.—*See page 161.*

NEW JERSEY.

Andover Iron Works, Phillipsburg. Joseph Wharton is owner; also President, *vice* H. M. Howe; Edward Kelly is Superintendent, *vice* S. B. Patterson. Furnace will be rebuilt in 1902 and size changed to 85 x 18; the 4 hot-blast stoves will be increased in size; estimated annual capacity, 80,000 gross tons.—*See pages 165-6.*

Cumberland Nail and Iron Works, Bridgeton. Tube department now owned by the West Jersey Tube Works.—*See page 168.*

Secaucus Iron Company, Secaucus. Furnace at Secaucus now owned by the Hackensack Meadows Company, 25 Broad st., New York City; furnace for sale or lease.—*See page 302.*

PENNSYLVANIA.

Alice Furnace, Sharpsville. Now owned by the Youngstown Iron Sheet and Tube Company, Youngstown, Ohio. Company will not secure possession of the furnace until about June 1, 1902.—*See page 216; also page 400 of Part IV, (Ohio.)*

Bellefonte Furnace Company, Bellefonte. Rogers, Brown & Co. are selling agents for Buffalo, Boston, Pittsburgh, and Chicago, as well as for New York and Cincinnati; also Rogers, Brown & Warner for Philadelphia.—*See page 198.*

Carnegie Tube Works, Carnegie. Tube mill completed and put in operation January 9, 1902; rolling mill to be put in operation in February, 1902.—*See pages 206-7.*

Durham Iron Works, (blast furnace,) Riegelsville. Now owned by the Durham Iron Company, 421 Chestnut st., Philadelphia. Jerome Keeley, President; John Jameson, Vice-President; A. F. Baker, Secretary and Treasurer; Jerome Keeley, Jr., Superintendent; selling agents, Jerome Keeley & Co., 421 Chestnut st., Philadelphia. Reference to Pequest Furnace in New Jersey should be omitted.—*See page 175.*

Etna Iron and Tube Works, Spang, Chalfant & Co., Incorporated, Pittsburgh. Henry Chalfant is now President, *vice* George A. Chalfant, resigned; C. W. Hanford is Vice-President and Treasurer, *vice* Henry Chalfant; and E. W. Wright is Secretary and Assistant Treasurer, *vice* C. W. Hanford.—*See pages 207-8.*

Fannie Furnace, The Cherry Valley Iron Company, Murtland Building, Pittsburgh. Furnace at West Middlesex. Robert W. Flenniken is Secretary and Treasurer, *vice* Ledlie W. Young, former Treasurer, deceased.—*See page 215; also Cherry Valley Furnace in Ohio, page 256.*

- Glen Iron Furnace, The Glen Iron Furnace Company, 14 South Broad st., Philadelphia. Furnace at Glen Iron, Union county. Ores, local fossil; fuel, charcoal; product, cold-blast pig iron; annual capacity, 2,500 gross tons. The furnace has been idle for several years but is now being repaired and will probably be ready for blast in February, 1902.—*See page 303, (Jackson Iron Company.)*
- Glendon Rolling Mill, Dilworth, Porter & Co., Limited, Pittsburgh. Destroyed by fire in November, 1901; being rebuilt; will be in operation in temporary buildings in February or March.—*See page 209.*
- Hartman (The) Manufacturing Company, New Castle, The Union Trust Company of Pittsburgh, Receiver, Pittsburgh. Address communications to J. D. Kelvie, Manager for Receiver, New Castle.—*See page 218.*
- Ivy Rock Steel Works, The Alan Wood Iron and Steel Company, 519 Arch st., Philadelphia. Building five 50-gross-ton basic open-hearth steel furnaces at Ivy Rock, about one mile north of Conshohocken. Howard Wood, President; Alan Wood, Jr., Vice-President; Jonathan R. Jones, Secretary and Treasurer. Plant referred to in the description of the Schuylkill Iron Works.—*See page 185.*
- Jessop Steel Company, 91 John st., New York City. Building works at Washington, Washington county. Crucible steel department will contain 3 steel-melting furnaces with an annual capacity of 5,000 gross tons of ingots; number of steel-melting holes, 18; total number of pots, 108. Rolling mill will contain 6 regenerative heating furnaces, 2 annealing furnaces, 2 forge fires, and 2 trains of rolls (one 20 and one 24-inch); product, to be sheet and band saw steel; estimated annual capacity, 5,000 gross tons. Fuel to be used, natural gas. Works will probably be completed in June, 1902. William Jessop, President; Sidney J. Robinson, Vice-President and Manager; James Jessop, Treasurer; W. F. Wagner, Secretary and Selling Agent, 91 John st., New York.—*See page 229, (William Jessop & Sons, Limited.)*
- Monessen Works, Pittsburgh Steel Company, Pittsburgh. Building works at Monessen. Present address, Peoples Savings Bank Building, Pittsburgh, instead of 305 Ferguson Block.—*See pages 226-7.*
- Penn Steel Casting and Machine Company, Chester. G. M. Booth is now Secretary and Treasurer, *vice* John T. Dickson, Secretary, and Charles W. Andrew, Treasurer.—*See page 188.*
- Spearman Furnace, Sharpsville. Now owned and operated by the Shennango Furnace Company, Pittsburgh; will be known as stack No. 3; Bessemer and basic pig iron will be produced.—*See pages 216-17.*
- Union Steel Company, Pittsburgh. After April 1 the office address will be Frick Building instead of Empire Building. Ground will be broken in February or March for two new blast furnaces, each to be 90 x 22, not 85 x 22. Twelve 50-gross-ton basic open-hearth steel furnaces are now being added to the rolling mill department. S. H. Waddell will not be Secretary after February 1. Nevin McCon-

nell is Superintendent of the steel department.—*See pages 223 and 227-8.*

Valentine (The) Iron Company, Bellefonte. Blast furnace and rolling mill now owned by the Commonwealth Trust Company, of Harrisburg; for sale.—*See pages 199 and 203.*

Valley Iron Works, Coatesville. Plant acquired by the Coatesville Iron and Steel Company, Bullitt Building, Philadelphia. W. W. Kurtz, President; H. K. Kurtz, Secretary and Treasurer.—*See page 307.*

West End Rolling Mill Company and Chain Works, Lebanon. C. Shenk, President, *vice* J. Henry Miller; plant now equipped with 4 double puddling furnaces.—*See pages 197-8.*

Wheatland Rolling Mill, Wheatland. Ephraim Truxall, Superintendent.—*See page 221.*

DELAWARE.

Diamond State Steel Company, Wilmington. George Thomas, 3d, is now Superintendent of Steel Department, *vice* E. H. Martin, General Superintendent, resigned.—*See pages 229-30.*

MARYLAND.

Muirkirk Furnace, Muirkirk. George T. Johnson & Co., successors to Howe, Johnson & Co., Drexel Building, Philadelphia, are now selling agents.—*See pages 231-2.*

VIRGINIA.

Graham Furnace, The Graham Iron Company, lessee, Graham. Philadelphia office, Harrison Building. Product, foundry and basic open-hearth pig iron. Frank P. Howe, President, Drexel Building, Philadelphia; Frank Samuel, Secretary and Treasurer, Harrison Building, Philadelphia; Walter Graham, Vice-President and General Manager, Graham, Virginia. Furnace will probably be blown in in February. (Owned by the Virginia Iron, Coal, and Coke Company.)—*See page 127.*

Princess Furnace, Glen Wilton. Selling agents for New England and the Middle States, George T. Johnson & Co., successors to Howe, Johnson & Co., Drexel Building, Philadelphia.—*See page 235.*

WEST VIRGINIA.

Parkersburg Iron and Steel Company, Times Building, Pittsburgh, Pa. Works at Parkersburg, West Virginia. Rolling mill first put in operation on December 18, 1901.—*See page 239.*

KENTUCKY.

Ashland Furnaces, Ashland. Ashland Coal and Iron Railway Company succeeded by the Ashland Iron and Mining Company, (Incorporated.) Douglas Putnam, President; John Means, Vice-President; Robert Peebles, Secretary and Treasurer; D. G. Putnam, General Manager. Additional selling agent, H. R. Durkee, Rookery Building, Chicago.—*See pages 240-1.*

TENNESSEE.

Buffalo Iron Company, Nashville. Will hereafter use coke for fuel in its furnaces and not mixed charcoal and coke.—*See pages 245-6.*

Knoxville Iron Company, Knoxville. New plant will be located at Lonsdale, which is outside of the corporate limits of Knoxville.—*See page 247.*

ALABAMA.

Central Iron and Coal Company, 116 Nassau st., New York City. Building a blast furnace at Tuscaloosa, Alabama, to be 85 x 18 feet; product, to be foundry pig iron; annual capacity, 60,000 gross tons; fuel, coke; ores, brown from the Woodstock district and red from Red Mountain; furnace will probably be completed in January, 1903.—*See page 249.*

Woodstock Furnaces, The Woodstock Iron Works, Anniston. Rebuilding one furnace; size to be 82 x 20; will probably be ready for operation in June, 1902.—*See pages 251-2.*

OHIO.

Belfont Iron Works, Ironton. Wire-nail department now contains 60 machines instead of 50. B. H. Burr is now President and General Manager, *vice* John G. Peebles, President, deceased; Robert Peebles is Vice-President, *vice* B. H. Burr.—*See page 266.*

Canton Crucible Steel Works, Canton. Works now operated by the Canton Crucible Steel Company; 2 heating furnaces and one 600-lb. hammer have been added; steel castings will not hereafter be produced; works owned by James B. Baird, Edward Langenbach, A. B. Titworth, Charles McNight, William C. Fownes, Jr., and J. Ramsey Speer.—*See page 269.*

Cuyahoga (The) Steel and Wire Company, Cuyahoga Falls. Edward A. Henry, President, *vice* Frank A. Umsted; Samuel H. Miller, Vice-President, *vice* Willis Elton; Harry B. Hamlen, Treasurer, *vice* William L. Kiefer; Fred J. Miller, Secretary, *vice* William L. Kiefer. Annual capacity of wire rods is 25,000 gross tons, not 15,000 tons.—*See pages 270-1.*

La Belle Furnace, La Belle Iron Works, Steubenville. Capacity of the rebuilt furnace will be 146,000 gross tons.—*See page 274.*

Mary Furnace, The Ohio Iron and Steel Company, Lowellville. Selling agents in Philadelphia, George T. Johnson & Co., Drexel Building, successors to Howe, Johnson & Co.—*See page 257.*

Tuscara Steel Company, Newcomerstown. A galvanizing and roofing plant is being added; J. H. Eller, Vice-President; A. T. Stone, Secretary, *vice* Lakin C. Taylor.—*See page 273.*

Youngstown (The) Iron Sheet and Tube Company, Youngstown. Works first put in operation in January, 1902; basic open-hearth furnaces will be added; company now owns and operates the plant

of the New Process Galvanizing Company, at Niles, Ohio, which is known as the New Process Works. Richard Garlick is Treasurer.—*See page 259; also Alice Furnace, page 397 of Part IV, (Pennsylvania.)*
 Youngstown (The) Steel Casting Company, Youngstown. Building one 15-gross-ton Smythe acid open-hearth steel furnace; product, to be steel castings; estimated annual capacity, 2,500 gross tons. Works will probably be in operation in June, 1902. E. B. Lawrence, President; T. B. Van Alstine, Vice-President; J. W. Rogers, Secretary and Treasurer; William R. Palmer, Manager.—*Not described in the Directory.*

INDIANA.

Emlyn Iron Works, Western Union Building, Chicago. Works at East Chicago, Indiana. W. L. Simonton, Manager, resigned; George Stewart, now President, will also act as General Manager.—*See page 277.*
 Highland (The) Iron and Steel Company, Terre Haute. Thomas J. Hanley is Superintendent.—*See pages 277-8.*

Muncie Rolling Mill, Muncie. Now owned by the American Rolling Mill Corporation, Rookery Building, Chicago, which also operates rolling mills at Sandwich, Ill., and Muskegon, Mich. L. S. Straight, President; F. W. Peck, Jr., Secretary and Treasurer; W. I. Moody, General Manager.—*See page 279; also pages 285 (Sandwich Iron and Steel Company) and 289 (American Rolling Mill Company); also this page of Part IV.*

National Rolling Mill Company, Hartford City. Address of General Sales Agent changed from 36 La Salle street, Chicago, to Marquette Building, Chicago.—*See page 279.*

Ohio Falls Iron Company, New Albany. Adding 8 scrap furnaces, 1 squeezer, and one 20-inch muck train; may add a rail train; annual capacity will be increased from 36,000 gross tons to 50,000 tons.—*See page 280.*

ILLINOIS.

Iroquois Iron Company, Chicago. Furnace B, at South Chicago, first blown in on January 27, 1902.—*See page 281.*

Sandwich Iron and Steel Company, Sandwich. Rolling mill now owned by the American Rolling Mill Corporation, Rookery Building, Chicago.—*See page 285; also this page of Part IV, (Muncie Rolling Mill in Indiana and American Rolling Mill Company in Michigan.)*

MICHIGAN.

American Rolling Mill Company, Muskegon. Rolling mill now owned by the American Rolling Mill Corporation, Rookery Building, Chicago.—*See page 289; also this page of Part IV, (Muncie Rolling Mill in Indiana and Sandwich Iron and Steel Company in Illinois.)*

Gaylord Iron Company, Detroit. Blast furnace being dismantled.—*See pages 287-8.*

THE IRON AND STEEL WORKS

OF THE

DOMINION OF CANADA.

CORRECTED TO DECEMBER 31, 1901.

NOVA SCOTIA.

BLAST FURNACES—8 COMPLETED AND 2 PROJECTED.

Bridgeville Furnace, Pictou Charcoal Iron Company, Limited, Bridgeville, Pictou county. One stack, 55 x 11, built in 1892 and first blown in in December, 1892, with charcoal as fuel; fuel changed to coke and charcoal in 1897; two Cooper-Durham stoves; annual capacity, 7,300 gross tons. (Formerly operated by The Mineral Products Company.)—*Active in 1899. See Pictou Rolling Mill in this Province.*

Dominion Iron and Steel Company, Limited, 25 Street Railway Chambers, Montreal, Quebec. Four furnaces at Sydney, Cape Breton county, Nova Scotia, each 85 x 20, and each equipped with four Cowper-Kennedy stoves. Construction commenced in 1899; No. 1 blown in February 4, 1901; No. 2 May 9, 1901; No. 3 October 21, 1901; and No. 4 January 18, 1902. Fuel, coke, obtained from the company's ovens; ore, Wabana red hematite from Belle Island, Newfoundland; product, basic and foundry pig iron; total annual capacity, 500,000 gross tons. A coke plant containing 400 Otto-Hoffman by-product ovens is connected with the works. J. H. Means, Furnace Superintendent.—*Active in 1901. See Rolling Mills and Steel Works in this Province.*

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; total annual capacity, 40,000 gross tons. Brand, "Siemens." A cast-iron pipe foundry is connected with the works. In liquidation. Address all communications to J. P. Edwards, Londonderry, or to A. Montizambert, Amherst.—*Idle since 1896 and for sale or lease.*

Nova Scotia Steel and Coal Company, Limited, New Glasgow, Pictou county. 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 and Wabana from Newfoundland; product, foundry and basic pig iron; annual capacity, 33,000 gross tons. Brand, "Ferrona." Equipped with one pig-iron casting machine. Joseph D. Fraser, Superintendent. Sales made by the company. Contemplates erecting 2 new furnaces, each 75 x 18 feet, at Sydney, Cape Breton. Now produces coke by the Bauer process. (Formerly operated by the Nova Scotia Steel Company, Limited.)—*Active in 1901. See Rolling Mills and Steel Works in this Province.*

Number of coke and charcoal and coke furnaces in Nova Scotia: 8 completed stacks and 2 stacks projected.

ROLLING MILLS AND STEEL WORKS—5.

Dartmouth Rolling Mills, Limited, Dartmouth, Halifax county. Built in 1896 and put in operation in that year; 1 heating furnace, 3 forge fires, one 10-inch train of rolls, and 1 hammer; product, bar iron; annual capacity, 3,600 gross tons. Fuel, coal. James Simmonds, President; C. H. Lessemore, Vice-President; H. E. Hill, Secretary-Treasurer.

Dominion Iron and Steel Company, Limited, Sydney, Cape Breton county. Built in 1900-1; 4 pit heating furnaces, ten 50-gross-ton Campbell open-hearth tilting furnaces, (3 acid and 7 basic,) and one 34-inch reversing blooming and billet mill; first steel made December 31, 1901; product, open-hearth steel ingots, blooms, billets, and slabs; estimated annual capacity, 425,000 gross tons of ingots and 400,000 tons of rolled products. Fuel, gas from company's by-product coke ovens. One continuous 28-inch rail train is being added; annual capacity, 400,000 tons. H. M. Whitney, President; A. J. Moxham, Vice-President and General Manager; H. M. Davies, Treasurer; David Baker, General Superintendent.—*See Furnaces in this Province.*

Halifax Rolling Mills Company, Halifax, Halifax county. Works on the harbor, 3 miles from the city. Built in 1878; 2 heating furnaces, 2 trains of rolls, and 20 cut-nail machines. Fuel, Nova Scotia soft coal. E. D. Adams, Agent, Halifax.—*For sale or lease.*

Nova Scotia Steel and Coal Company, Limited, New Glasgow, Pictou county. 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, (4 upright, from 10 cwt. to 5 tons, and 1 helve,) and 4 open-hearth steel furnaces (one 20 and one 25-gross-ton acid, one 30-gross-ton basic, and one 50-gross-ton tilting basic); first steel made in 1883; product, railway, marine, and engine forgings, car axles, mine rails, machinery, spring, and agricultural-implement steel, steel plates, angles, and iron and steel mer-

chant bars; annual capacity, 60,000 gross tons of open-hearth steel ingots and 50,000 tons of finished iron and steel products. Fuel, bituminous coal and producer gas. John F. Stairs, President; Graham Fraser, Vice-President; Thomas Green, Secretary; H. Ritchie, Cashier; Thomas Cantley, General Manager. (Formerly operated by the Nova Scotia Steel Company, Limited.)—*See Furnaces in this Province.*

Pictou Rolling Mill, Pictou Charcoal Iron Company, Limited, Bridgeville, Pictou county. Built and put in operation in 1892; 2 double puddling furnaces, 2 single puddling furnaces, 4 heating furnaces, 3 forge fires, 5 trains of rolls, (three 18-inch hot and two 18-inch cold,) and one 20-ton hammer; product, muck bar and billets; annual capacity, 4,000 gross tons. Fuel, bituminous coal and charcoal. Brand, "Bridgeville." M. H. Fitzpatrick, President, New Glasgow; A. C. MacDonald, Secretary and Treasurer, Pictou; W. B. Moore, General Manager, Bridgeville.—*See Bridgeville Furnace in this Province.*

Number of rolling mills and steel works in Nova Scotia: 5. Of these 2 make open-hearth steel.

QUEBEC.

BLAST FURNACES—3.

Canada Iron Furnace Company, Limited, Canada Life Building, Montreal. Furnace at Radnor Forges P. O., Champlain county. One stack, 40 x 9, built and blown in in 1891; steam and water power; one Drummond pipe stove; warm blast; fuel, charcoal; ores, lake and bog from the company's mines in the Three Rivers district and Lac-a-la-Tortue; product, special charcoal pig iron for car wheels, chilled rolls, etc.; annual capacity, 10,000 gross tons. Brand, "C. I. F." (The present stack takes the place of the old Radnor Furnace.) George E. Drummond, Managing Director and Treasurer, and Thomas J. Drummond, Secretary, Montreal; John J. Drummond, General Superintendent. Selling agents, Drummond, McCall & Co., Montreal.—*Active in 1901. See Midland Furnace No. 1 in Ontario.*

McDougall (John) & Co., 597 William st., Montreal. Furnaces at Drummondville, Drummond county. Two stacks: Grantham Furnace, 35 x 10, built and blown in in 1880; St. Francis Furnace, 32 x 9, built and blown in in 1881 and rebuilt in 1897; warm blast; water-power; fuel, charcoal; ore, local limonite; product, car-wheel pig iron; total annual capacity, 4,000 gross tons. George McDougall, Manager.—*Active in 1901.* Number of furnaces in Quebec, all charcoal: 3 stacks.

ROLLING MILLS AND STEEL WORKS—5.

Canada Rolling Mills, Nail, Cut Tack, and Spike Works, Peck, Benny & Co., 319-21 Board of Trade Building, Montreal. Works on Mill st. Built about 1828; destroyed by fire August 3, 1898; rebuilt in 1899; water-power; equipped with heating furnaces, trains of rolls, cut-nail machines, and wire-nail machines; product, iron and steel cut nails,

clinch and patent pressed nails, tacks, brads, shoe and wire nails, horse nails, Rhode Island horseshoes, ship and railway spikes, and bar iron and steel. Fuel, bituminous coal.

Canada Switch and Spring Company, Limited, Canal Bank, Point St. Charles, Montreal. Built in 1883; one 3,000-pound modified acid Bessemer converter added in 1897 and first steel made in that year; one 15-gross-ton acid open-hearth steel furnace added in 1901; product, steel castings for railway, mining, and other purposes; annual capacity, 1,000 gross tons of Bessemer and 4,000 tons of open-hearth castings. Fuel, coke. K. W. Blackwell, President; Charles Scott, Vice-President; C. H. Godfrey, Secretary and Treasurer; G. D. Smith, Superintendent. Grand Trunk Railway Rolling Mill, Point St. Charles, Montreal. Built in 1891-2 and put in operation May 9, 1892; 2 heating furnaces and one 3-high 12-inch train of rolls; product, bars, angles, and tees; annual capacity, 7,000 gross tons of rolled products. Fuel, bituminous coal.

Montreal (The) Rolling Mills Company, Montreal. Works at Ste. Cune-gonde, Lachine Canal, Hochelaga county. Built about 1857; destroyed by fire March 24, 1900, but immediately rebuilt; 6 coal and 3 gas heating furnaces, 3 trains of rolls, (9-inch, 12-inch, and 18-inch,) and 75 cut-nail and 65 wire-nail machines; product, bar and horseshoe iron, nail plate, skelp, horseshoes, horseshoe nails, cut nails, iron and steel wire nails, tacks, and wire; annual capacity, 16,000 gross tons of bar and horseshoe iron, 10,000 tons of skelp, 5,000 tons of nail plate, 30,000 kegs of horseshoes, 25,000 boxes of horseshoe nails, 100,000 kegs of cut nails, 7,500 tons of wire, and 100,000 kegs of wire nails. Sole manufacturers in Canada of the "Bonzano" rail joint. Fuel, producer gas and bituminous coal. Brand, "M. R. M. Co.," inclosed in a semi-circle; trade-mark for steel horseshoes, "XL." A galvanizing plant and a plant for the manufacture of wrought-iron pipe are connected with the works; annual capacity, 12,000 tons. E. S. Clouston, President, Wm. McMaster, Vice-President and General Manager, James L. Waldie, Secretary and Treasurer, and J. R. Kinghorn, General Sales Agent, Montreal; M. F. Derrick, Superintendent of works, Ste. Cune-gonde. Selling agents, W. D. Taylor, Winnipeg; James Crawford, Vancouver and Victoria, B. C.; John Peters & Co., Halifax.

Pillow and Hersey Manufacturing Company, Limited, Canadian Pacific Railway Telegraph Company's Building, cor. Hospital and St. Francois Xavier sts., Montreal. Rolling mills, cut-nail, spike, and horseshoe works, 104 St. Patrick st.; tack, bolt, wire, and wire-nail works, 105 Mill st. Built in 1859; 8 heating furnaces, 4 trains of rolls, and 96 cut and 36 wire-nail machines; product, cut nails, wire, wire nails, bar iron, railway and pressed spikes, horseshoes, tacks, bolts, nuts, rivets, and washers; annual capacity, single turn, for cut nails, 118,000 kegs; for wire nails, 75,000 kegs. Fuel, coal. Brand, "Blue Hoop." John A. Pillow, President; Milton L. Hersey, Vice-President; W. W. Near,

Secretary. Selling agents, J. H. Webber, Toronto; Charles Stimson, Vancouver, British Columbia; J. G. T. Cleghorn, Winnipeg; Grant, Oxley & Co., Halifax; George S. Carr, 13 William st., New York; R. D. Galbraith & Co., 11 Billiter Square, London, E. C., England.

Number of rolling mills and steel works in Quebec: 5. Of these 1 makes open-hearth and special Bessemer steel castings.

ONTARIO.

BLAST FURNACES—3 COMPLETED, 4 BUILDING, AND
2 PROJECTED.

Algoma (The) Steel Company, Limited, Sault Ste. Marie, Algoma district. Building four stacks, two charcoal and two coke. Charcoal stacks will each be 70 x 14 and will be equipped with 7 Foote fire-brick stoves; product, charcoal pig iron at first, but coke iron may be made later on; estimated total annual capacity, 100,000 gross tons; furnaces will probably be completed in the spring of 1902. The two coke furnaces will be 90 x 21 and will be equipped with 8 fire-brick stoves; product, to be pig iron for use in the Bessemer steel plant of the company; estimated total annual capacity, 280,000 gross tons; furnaces will probably be completed in the autumn of 1902. Ore to be used, hematite from Michipicoten district. Brand, "Algoma." A plant for the manufacture of charcoal, to contain 20 retorts, with a daily capacity of 160 cords of wood, and 56 bee-hive kilns, with a daily capacity of 150 cords, will be connected with the charcoal furnaces; also wood alcohol and acetate of lime plants. Connected with the two coke furnaces will be an Otto-Hoffman by-product coke plant of 168 ovens; estimated annual capacity, 245,000 net tons of coke.—*See Rolling Mills and Steel Works in this Province for a list of officers.*

Cramp (The) Steel Company, Limited, 608 Temple Building, Toronto, Canada. New York office, Vanderbilt avenue and Forty-fourth street. Contemplates erecting, at Collingwood, Simcoe county, in the spring of 1902, two coke furnaces with a daily capacity of 250 gross tons each. Canadian hematite and magnetic ores will be used and Bessemer pig iron will be made. Coke will be obtained from the United States.—*See Rolling Mills and Steel Works in this Province.*

Deseronto Furnace, Deseronto Iron Company, Limited, Deseronto, Hastings county. One stack, 61 x 9½, built in 1898 and blown in January 25, 1899; fuel, charcoal; ores, American, from the Lake Superior region, and local; product, malleable and car-wheel pig iron; annual capacity, 11,000 gross tons. Brand, "Deseronto." William Gerbauser, President; F. A. Goodrich, Vice-President; F. B. Gaylord, Secretary, Treasurer, and Manager. Selling agents, F. A. Goodrich & Co., Detroit, Michigan.—*Active in 1901.*

Hamilton Furnace, The Hamilton Steel and Iron Company, Limited, Hamilton, Wentworth county. One stack, 75 x 16, built in 1894-5;

blown in December 30, 1895; one Roberts and three Gordon-Whitwell stoves; fuel, Reynoldsville coke; ores, Lake Superior hematite and Ontario hematite and magnetic; product, foundry and basic pig iron; annual capacity, 60,000 gross tons. Brand, "Hamilton." (Formerly operated by The Hamilton Blast Furnace Company, Limited.)—*Active in 1901. See Rolling Mills and Steel Works in this Province.*

Midland Furnace No. 1, Canada Iron Furnace Company, Limited, Montreal. Furnace at Midland, Simcoe county. One stack, 64 x 13, built in 1900 and blown in December 4, 1900; three two-pass fire-brick stoves; fuel, Connellsville coke; ore, Michipicoten; product, foundry pig iron; annual capacity, 45,000 gross tons. Brand, "Midland." John J. Drummond, General Superintendent.—*Active in 1901. See Furnaces in Quebec for a list of officers and selling agents.*

Number of coke and charcoal furnaces in Ontario: 3 completed, (2 coke and 1 charcoal,) 4 building, and 2 projected.

ROLLING MILLS AND STEEL WORKS—7 COMPLETED AND 2 BUILDING.

- Abbott-Mitchell (The) Iron and Steel Company of Ontario, Limited, Belleville, Hastings county. Built in 1899 and first put in operation in January, 1900; equipped with machinery from the dismantled plants of The Thames Iron Works, of Norwich, Conn., the Nashua Iron and Steel Company, of Nashua, N. H., and the Metropolitan Rolling Mills, of Montreal, Canada; 7 heating furnaces, 3 annealing furnaces, 3 trains of rolls, (one 9, one 12, and one 18-inch,) and 36 cut-nail machines; product, bar iron, bar steel, cut nails, horseshoes, railroad spikes, track bolts, washers, etc.; annual capacity, 12,000 gross tons. Property in the hands of The Trusts and Guarantee Company, Limited, Toronto, Trustee for bondholders.—*Idle and for sale.*
- Algoma (The) Steel Company, Limited, Sault Ste. Marie, Algoma district. Building a rolling mill and steel plant at Sault Ste. Marie, to be equipped with 3 Siemens regenerative gas heating furnaces, one 23-inch combined rail and structural train, and two 6-gross-ton Bessemer steel converters; product, to be steel ingots, rails, beams, angles, channels, and other structural shapes; annual capacity, 200,000 gross tons of ingots and 180,000 tons of finished products. Steam and electric transmission from water power. Fuel, bituminous coal for boilers and gas producers and coke for cupolas. Works will be completed in the spring of 1902. F. H. Clergue, President; E. V. Douglas, Vice-President; W. P. Douglas, Secretary; F. S. Lewis, Treasurer; D. D. Lewis, General Superintendent.—*See Furnaces in this Province.*
- Cramp (The) Steel Company, Limited, 608 Temple Building, Toronto, Canada. New York office, Vanderbilt avenue and Forty-fourth street. Building works at Collingwood, Simcoe county, Ontario, for the manufacture of Bessemer and open-hearth steel and rolled iron and steel.

The rolling mill will be equipped with trains of rolls for the production of steel rails, beams, plates, merchant bar iron, rods, and shafting; estimated annual capacity, 200,000 gross tons. Bessemer steel department will be equipped with two 5-gross-ton acid Bessemer steel converters, 4 soaking pits, and one 36-inch blooming mill; product, steel ingots, blooms, etc.; annual capacity, 100,000 gross tons of ingots. Open-hearth department will be equipped with two 15-gross-ton Siemens furnaces (1 acid and 1 basic) with an estimated annual capacity of 30,000 gross tons of ingots. Fuel, producer gas. C. D. Cramp, President; J. W. Allison, Vice-President; J. A. Currie, Secretary and Treasurer; F. S. Evans, Manager.—*See Furnaces in this Province.*

Guelph Iron and Steel Company, Limited, Guelph, Wellington county.

Built in 1895 and first put in operation January 6, 1896; remodeled in 1899; 1 scrap furnace, 2 busheling furnaces, 2 heating furnaces, 2 trains of rolls, 1 squeezer, and 1 hammer; product, bar iron and steel; annual capacity, 12,000 gross tons. Fuel, bituminous coal. C. Kloepper, President; J. F. White, Vice-President; C. H. White, Manager. (Formerly operated by The Guelph-Norway Iron and Steel Works.)

Hamilton (The) Steel and Iron Company, Hamilton. Three mills, two at Hamilton, Wentworth county, and one at East Hamilton, Wentworth county. Hamilton Mills, built in 1861; 2 busheling furnaces, (1 single and 1 double,) 4 double puddling 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 1 helve,) and 45 cut-nail machines; product, bar and band iron and steel, fish-plates, nail plates, forgings, cut nails, rivets, and washers; annual capacity, 100,000 kegs of cut nails and 27,000 gross tons of other finished products. (Swansea Mill, at Swansea, dismantled. Formerly operated by the Ontario Rolling Mill Company.) East Hamilton Mill, built in 1900; 1 coal heating furnace and 2 trains of rolls (one 10 and one 14-inch); product, steel bars; annual capacity, 12,000 gross tons. Open-hearth steel plant added in 1900; two 15-gross-ton basic furnaces; first steel made May 15, 1900; product, ingots; annual capacity, 18,000 gross tons. Fuel, Pennsylvania bituminous coal. Brand, "Hamilton." A. T. Wood, President; Charles E. Doolittle and A. E. Carpenter, Vice-Presidents; Robert Hobson, Secretary and Assistant General Manager; W. A. Child, Treasurer; C. S. Wilcox, General Manager.—*See Hamilton Furnace in this Province.*

Kennedy (The Wm.) & Sons, Limited, Owen Sound, Grey county. Built in 1899-1900 and first put in operation in May, 1900; one 2-gross-ton Tropenas steel converter; product, steel castings from 1 to 6,000 pounds; annual capacity, 400 gross tons. Fuel, coke. M. Kennedy, Sr., President and Manager; William Kennedy, Jr., Vice-President; Ewing Cameron, Secretary and Treasurer.

McDonnell (The) Rolling Mills Company of Toronto, Limited, Sunny-

side, Toronto. Built in 1893 and put in operation in the same year; 3 coal heating furnaces, 1 double busheling furnace, and 3 trains of rolls (12-inch roughing and 9 and 22-inch finishing); product, merchant bar iron, agricultural implement and carriage iron, channels, angles, beveled-edge flats, etc.; annual capacity, 6,000 gross tons. Fuel, United States bituminous coal. M. McDonell, President; R. McDonell, Secretary and Treasurer. (Formerly operated by the McDonell Rolling Mill Company.)

Number of rolling mills and steel works in Ontario: 7 completed and 2 building. Of these 1 makes Tropenas steel, 1 makes open-hearth steel, and 1 open-hearth steel plant and 2 Bessemer steel plants are being built.

NEW BRUNSWICK.

ROLLING MILLS—1.

Portland Rolling Mills, The Portland Rolling Mills, Limited, Strait Shore, St. John, St. John county. Works built in 1856 and rolling mill added in 1860; burned and rebuilt in 1889; 1 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; also a complete set of horseshoe machinery; 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, horseshoes, etc.; annual capacity, 10,000 gross tons of finished products, 150 tons of shoe nails and tacks, 45,000 kegs of cut nails and spikes, and 4,000 kegs of horseshoes. Fuel, coal. James Manchester, President; D. J. Purdy, Vice-President; R. C. Elkin, Treasurer.

Number of rolling mills in New Brunswick: 1. There are no blast furnaces in this Province.

Number of blast furnaces in Canada: 14 completed, 4 building, and 4 projected. Of the completed furnaces 9 use coke, 1 uses coke and charcoal, and 4 use charcoal for fuel. Two of the 4 building furnaces will use coke and 2 will use charcoal. Annual capacity of built and building furnaces, 958,000 gross tons of coke pig iron, 7,300 tons of charcoal and coke pig iron, and 125,000 tons of charcoal pig iron: total, 1,090,300 tons.

Number of rolling mills and steel works in Canada: 18 completed and 2 building. Of these 1 makes steel in a special Bessemer converter, 1 makes Tropenas steel, and 2 standard Bessemer steel plants are being built, and 4 make open-hearth steel and 1 open-hearth steel plant is being built. Annual capacity of built and building plants: Standard Bessemer, Tropenas, and special Bessemer ingots and castings, 301,400 gross tons; open-hearth ingots and castings, 537,000 tons: total ingots and castings, 838,400 tons; rolled products, 981,900 tons.

INDEX TO NAMES OF WORKS.

This index includes the names of all the blast furnaces, rolling mills, steel works, tinplate works, and forges and bloomeries in the United States which are described in the Directory; also all blast furnaces and rolling mills and steel works in the Dominion of Canada.

BLAST FURNACES.

A.	PAGE	C.	PAGE	D.	PAGE
Aetna,	245	Calumet,	282	Dayton,	243
A Furnace,	119, 159	Cambria,	104, 221	Danville Bessemer, . .	190
Algoma,	407	Cameron,	222	Deborah,	231
Alice, . . 131, 216, 249, 263, 397		Canaan,	78, 157	Deseronto,	407
Alleghany,	233	Canada,	405	Dominion,	403
Allen's Creek,	246	Carbon,	175	Dora,	127, 234
Allentown,	174	Carnegie, . . 126, 244, 396		Douglas,	216
Andover,	165, 397	Carolina,	84	Dover,	267
Anna,	256	Carp,	288	Dunbar,	222
Antrim,	287	Carrie, 4, 204, 391		Duquesne, 5, 204, 391	
Anvil,	90, 178	Cedar Point,	159, 396	Durham,	175, 397
Ashland,	240, 399	Cedar Run,	236		
Atlantic,	70, 215	Central, 30, 249, 260, 390, 400			
Attalla,	246, 252	Centre,	265		
Aurora,	98, 194	C Furnace,	119, 161	E.	
		Charlotte, . . 140, 159, 221		Eagle,	200, 291
		Chatham,	161	Edgar Thomson, 5, 204, 391	
B.		Chattanooga,	243	Edith,	31, 204
Bay View,	13, 290	Cherokee, . . 84, 138, 247, 248		Eliza,	106, 204
Bear Spring,	246	Cherry Valley,	256	Elk Rapids,	287
Beckley,	161	Cheshire,	154	Ella,	216, 250
Belfont,	262	Chester,	186	Emaus,	93
Bellaire, 19, 20, 274		Chickies,	194	Emberville,	127, 244
Bellefonte,	198, 397	Citico,	243	Emma,	31, 260, 390
Belmont,	119, 238	Claire,	215	Emporium,	222
Berlin,	303, 398	Clara,	251	Ensley,	131, 250
Bessemer,	131, 249	Clifton,	137, 250	Etna,	70, 248, 263
Bessie,	267	Clinton,	204	Eureka,	132
Bethlehem,	82, 174	Colebrook,	87, 194	Everett,	199
B Furnace,	119, 159	Colonial,	198		
Bibb,	252	Columbia,	236	F.	
Bingen,	82	Columbus, 20, 267		Fannie, 215, 291, 397	
Bird Coleman,	86, 194	Copake,	161, 397	Franklin, . . . 20, 87, 160, 166	
Blanche,	263	Covington,	235	Fruitport,	287
Blood,	241	Cramp,	407	Fulton,	263
Bloom,	265	Cranberry,	247		
Bridgeville,	403	Crane,	84, 175	G.	
Bristol,	126, 233	Crown Point,	31, 160	Gadsden-Alabama, 137, 250	
Buckhorn,	266	Crozer,	127, 234	Gaylord,	287, 401
Buena Vista,	126, 233	Crumwold,	93, 175	Gem,	84, 234
Buffalo, 119, 159, 400		Cumberland,	245, 246	Girard,	257
Burden,	159			Glen Iron,	398
				Grace,	256

PAGE		PAGE		PAGE	
Graham,	127, 234, 396, 399	Lucy,	5, 204	Peninsular,	238
Grand Rivers,	241	Lucy Selina,	234	Pequest,	167
Grantham,	405			Philadelphia,	135, 250
Greenwood,	200			Pioneer,	70, 178, 250, 288
				Polly,	234
H.		M.		Port Oram,	167
Hackettstown,	166	Mabel,	215	Poughkeepsie,	160
Hall,	70, 215, 394	Macungie,	85, 175	Princess,	235, 399
Hamilton,	263, 407	Madison,	265	Pulaski,	235
Hannah,	70, 256, 394	Manistique,	288	Punxy,	222
Haselton,	70, 256, 394	Mannie,	246		
Hattie Ensley,	135, 250	Marshall,	199		
Hecla,	200, 265	Martins Ferry,	119, 274		
Helen,	244	Mary,	257, 400		
Henry Clay,	85, 178	Maryland Steel,	102, 231	R.	
Hinkle,	291	Mary Pratt,	137, 250	Radford,	235
Hokendauqua,	80	Mattie,	257	Radford-Crane,	127, 236
Hubbard,	256	Max Meadows,	127, 235	Radnor,	405
Hudson County,	166	Mayville,	290	Rebecca,	222
		Michigan,	288	Reed Island,	128, 236
I.		Midland,	408	Richmond,	154, 396
Irondale,	297	Milton,	264	Rising Fawn,	248
Ironton,	264	Milwaukee,	13, 290	River,	260
Iroquois,	281, 401	Minerva,	290	Riverside,	25, 238
Isabella,	49, 186, 204	Mingo,	20, 274	Roanoke,	236
Ivanhoe,	234	Minnequa,	123, 296, 391	Robesonia,	178, 179
		Missouri,	294	Rockbridge,	85
J.		Monongahela,	24, 204	Rock Run,	252
Jefferson,	255, 265, 274	Muirkirk,	231, 399	Rockwood,	244
Jenifer,	250	Musconetcong,	166	Rome,	248
Jennie,	234			Rosena,	20
Johnson City,	244, 396			Round Mountain,	253
Joliet,	13, 281, 392	N.			
Juniata,	199	Napier,	244	S.	
		Neshannock,	20	St. Clair,	114, 204
K.		Neville Island,	31, 204, 390	St. Francis,	405
Kemble,	199	Newark,	166	Sarah,	264
Keystone, 80, 93, 94, 178, 396		Newburgh,	31, 260, 390	Saucon,	81
		New Castle, 20, 22, 216, 393		Saxton,	199
L.		New Jersey Zinc,	175	Searies,	245
La Belle,	274, 400	New York,	268	Secaucus,	397
Lackawanna,	87, 160, 190	Niagara,	160	Seneca,	257
Lady Ensley,	135, 250	Niles,	21, 257	Sewanee,	132
Lawrence,	241, 263	North Branch,	190	Sharon,	21, 70, 117, 216, 394
Lebanon,	100, 194, 393	North Cornwall,	87, 194	Sharon Valley,	78, 157
Lebanon Valley,	194	North Works,	14, 282	Sharpsville,	216
Leesport,	178	Nova Scotia,	404	Sheffield,	132, 251
Lehigh,	175			Shelby,	253
Liberty,	236	O.		Shenango,	20, 21, 216
Lime Rock,	78, 157	Ohio,	21, 257	Sheridan,	179
Little Belle,	131	Old Alcalde,	255	Shoenberger,	31, 205
Lochiel,	100, 194	Old Hecla,	200	Sligo,	294
Lock Ridge,	80	Olive,	266	Sloss,	135, 251, 395
Londonderry,	403	Oswego,	298	Soho,	107, 205
Longdale,	234	Oxford,	85, 167	South Chicago,	282
Lorain,	17, 260	Oxmoor,	132, 250	South Pittsburg,	132, 245
Low Moor,	235			South Works,	14, 282, 392
		P.		Spathite,	251
		Paducah,	241	Spearman,	216, 398
		Paxton,	195	Spring Valley,	291

	PAGE		PAGE		PAGE
Standard,	246	Top Mill,	120, 238	Waldorf,	263
Star,	264	Topton,	85, 179	Warner,	245
Star and Crescent,	255	Troy,	79, 160, 396	Warren,	166
Steeltown,	20, 100, 195	Trussville,	250	Warwick,	180
Steubenville,	25, 274	Tube Steel,	25, 238, 393	Watts,	128, 241
Stewart,	217	U.		Wellman,	186
Swatara,	195	Union,	14, 119,	Wellston,	264
Swede,	179		159, 223, 264, 282, 398	West Duluth,	293
T.		V.		Weston,	288
Talladega,	251	Valentine,	199, 399	Wharton,	167
Tallapoosa,	249	Valley,	217	White Rock,	236
Tassie Belle,	255	Vanderbilt,	251	Williamson,	251
Temple,	179	Van Deusenville,	154	Woodstock,	251, 400
Thomas,	21, 80, 176	Vesta,	98, 195	Woodward,	252
Tidewater,	186	Vesuvius,	266	Z.	
Tod,	258	Victoria,	85, 236	Zanesville,	21, 268

ROLLING MILLS AND STEEL WORKS.

A.	Benwood, 120, 239	Carteret, 168
Abbott-Mitchell, . . . 408	Bessemer, 79, 133, 254, 395	Catasauqua, 177
Aetna, 53, 157	Bethlehem, 82, 176	Central,
Aetna-Standard, . . . 53, 274	Birdsboro, 180	72, 91, 195, 196, 276, 277
Alabama, 71, 253	Birmingham, . . 71, 211, 254	Central Pacific, . . . 299
Albany, 79, 161	Black Diamond, . . 110, 206	Chartiers, 54, 207, 390
Alcania, 223	Blandon, 180	Chesapeake, 195, 196
Alexandria, 71, 72, 276	Boonton, 168	Chester, 40, 187, 239, 390
Algoma, 408	Boston, 25, 206	Chicago, 277, 282, 284, 287
Aliquippa, 110, 217	Braddock, 32, 206	Chicago Heights, . . . 285
Allegheny, 205, 211	Braeburn, 223	Chrome, 162
Allentown, 31, 176	Brandywine, 186	Clark, 49, 207, 390
Alliance, 97, 268	Bridgeport, 49, 274	Cleveland, 72, 260, 261, 394
Altoona, 200, 201	Bridgewater, 154, 218	Clinton, 207
American, 32, 39	Brierfield, 254	Cohoes, 162
. 107, 167, 205, 260, 268	Bristol, 176	Cold Rolled, 225
. 276, 282, 289, 293, 392, 401	Brown Bonnell, . . .	Collins, 157
Anchor, 205	. . . . . 71, 72, 75, 258, 394	Colonial, 223
Anderson, 32, 39, 276, 281	Bryden, 176	Columbia, 98, 196, 207
Andrews, 71, 258, 394	Brylgon Foundry, . . 181	Columbus, 22, 115, 270
Anniston, 144, 254, 395	Buckeye, 268	Conshohocken, 181
Anniston Roll. Mills, . 253	Buffalo, 161, 162	Consolidated, 32, 261
Apollo, 53, 57, 223	Burden, 162	Continental Pipe, . . . 25
Ashland, 241	Burgess, 111, 266	Co-operative, 190
Atha, 110, 168	Byers, 206	Corliss, 181
Atlanta, 40, 49, 249, 276		Corn, 73, 270
Atlantic, 71, 217	C.	Coxey, Jacob S., . . . 270
Auburn, 63, 161, 180	Cambria, 104, 223, 391	Cramp, 408
B.	Cambridge, 40, 53, 269	Crescent, 41, 111
Banfield, 40, 274	Canada, 405, 406	. . . . . 128, 207, 237, 239, 261, 283
Beaver, 40, 274	Canonsburg, 40, 223	Crucible, 291
Beaver Falls, 32, 110, 217	Canton, 54, 269, 400	Crum Lynne, 187
Belfont, 266, 400	Carbon, 206	Cumberland,
Bellaire, 21, 274	Carnahan, 270	. . . . . 41, 111, 168, 232, 392, 397
Belmont, 120, 239	Carnegie, 206, 397	Curtis, 270
	Carpenter, 181	Cuyahoga, 270, 400

	PAGE		PAGE		PAGE
Cyclops,	224	G.		Ironton,	73, 294
D.		Gas City,	42	Ivins, Ellwood,	182
Danvers,	154, 396	Gibraltar,	182	Ivy Rock,	398
Danville,	191	Girard,	50, 258	J.	
Danville Bessemer,	190	Glasgow,	90, 182	Jackson,	239
Dartmouth,	404	Glassport,	208	Jackson & Woodin, 145, 191	
Davis Brothers,	172	Glen,	176	Janson,	169
Delaware,	167, 172	Glendale,	182	Jefferson,	254, 275
Dennison,	54, 271	Glendon,	209, 398	Jersey City,	169
Detroit,	289	Gould,	277	Jessop,	229, 398
Diamond, 181, 182, 229, 399		Grand Crossing,	283	Johnson,	18, 225, 230
Dillon-Griswold,	283	Grand Trunk,	406	Johnson (I. G.) & Co., 163	
Dithridge,	271	Granite City,	150, 283	Johnstown,	42, 225
Dominion,	389, 404	Granite Iron,	150	Joliet,	15, 41, 284
Douglassville,	182	Graphite Metal,	169	Judson,	298
Dover,	168	Great Western,	41, 283	Junction,	22, 51
Dresden,	54, 271	Greenfield,	281	Juniata,	34, 201
Driggs-Seabury,	158	Green Ridge,	191	Jupiter,	209
Duluth,	293	Greenville,	50, 63, 218	K.	
Duncannon,	191	Griffiths,	224	Kansas City,	295, 296
Duquesne,	6, 207	Guelph,	409	Kelly,	266
Dutcher,	291	H.		Kennedy,	409
E.		Hager,	283	Kentucky,	242
Eagle,	73, 266, 292	Halifax,	404	Keystone, 173, 183, 209, 218	
East End,	98, 196	Hamilton,	409	Kidd Bros. & Burgher, 219	
East Hamilton,	409	Harriman,	247	Kinsley,	154
Easton,	177	Harrisburg,	196	Kirkpatrick,	55, 225
East Works,	92, 196	Harrison,	110	Kittanning,	225
Eckel Brothers,	162	Harrow,	290	Knoxville,	247, 400
Eddystone Engineer'g, 189		Hartman,	218, 398	Kokomo,	278
Edgar Thomson,	6, 207	Hartmann, Hay & Reis, 283		L.	
Elba,	25, 207	Haselton,	71	La Belle,	42, 112, 209, 239
Eleanor,	224	Heckert-Baltzley,	271	Lackawanna,	163
Ellwood City,	41, 218	Heller Brothers,	169	Lake Erie,	73, 261
Ellwood Ivins,	182	Helmacher,	295	Lalace & Grosjean,	196
Ellwood Works,	63, 218	Highland,	277, 401	Laramie,	124, 297
Elmira,	168	Hirsch,	295	Latrobe,	226
Elwood,	39, 281	Holidaysburg,	201	Laughlin,	42, 275, 390
Emlyn,	277, 401	Holidaysburg & Gap, 201		Lebanon,	197
Empire,	261	Homestead,	4, 6, 209	Leechburg,	55
Etna,	207, 397	Hoopes & Townsend,	183	Licking,	242
Exeter,	182	Howard,	201	Liggett,	210
F.		Howard Axle,	7, 209	Lima,	272
Fair Hill,	172	Howe, Brown & Co., 112, 209		Logan,	183, 201
Fairmount,	172	Howe & Polk,	191	Longmead,	183
Falcon,	41, 54, 55, 258	H. P.,	33, 261	Lorain,	17, 261
Falk,	292	Humbert,	41, 225	Louisville,	242
Falls Hollow,	271	Hussey, Binns & Co.,	225	Lower Union, 7, 50, 210, 258	
Farist,	158	Hussey Steel,	225	Ludlum,	169
Fifty-ninth & Wallace, 285		Hyde Park,	55, 225	Lukens,	95, 188, 392
Firth-Sterling,	208	I.		Lynn,	155
Fort Pitt,	208	Indiana,	73, 278	M.	
Franklin,	224	Inland,	73, 278, 284	McConway & Torley, 210	
Fullerton,	177	Irondale,	40, 41, 278	McCutcheon,	50, 210
		Iron Gate,	237		

	PAGE
McDonell,	409
McInnes,	226
McKeesport,	55, 210
Mahoning,	191
Mahoning Val., 73, 258, 394	
Malleable Iron Fittings, 158	
Manchester,	237, 394
Manhattan,	163
Marion,	74, 272, 278, 394
Marshallton,	230
Maryland,	103, 232
Massillon,	73
Maumee,	76
Melrose Park,	284
Mesta,	210
Michigan-Peninsular,	145, 290
Midland,	55, 279
Midvale,	173
Midway,	254
Milesburg,	202
Mill B,	177
Mill C,	177
Milton,	191, 192
Milwaukee,	15, 292
Mingo,	22, 50, 275, 390
Minneapolis,	74
Minnequa,	123, 296, 391
Minnesota,	74, 294
Minquas,	230
Mitchell-Tranter,	74, 242
Monessen,	51, 226, 398
Monongahela,	25, 42, 210, 211
Montour,	94, 192
Montpelier,	39
Montreal,	406
Morewood,	42, 279
Mount Hope,	155
Muncie,	74, 279, 401
Muskegon,	42, 43, 289, 290
Myers,	219
N.	
National,	26, 43, 158
.	211, 219, 227, 279, 401
New Albany,	75, 280, 394
Newark,	168, 272
New Brighton,	219
Newburgh,	33, 261, 390
New Castle,	22, 33, 34, 43, 219, 393
New Haven,	158, 396
New Philadelphia,	56, 272
Newport,	230, 242
New York,	163
New York City,	163

	PAGE
Nickel,	211
Niles,	258
Ninth Street,	94, 184
Norristown,	97, 184
North Branch,	190
North East,	232
Northumberland,	192
North Works,	15, 87, 192
Norton,	243
Norway,	197
Nova Scotia,	404

O.

Ohio,	22, 259, 272, 280, 401
Old Dominion,	237
Old Ferry,	229
Old Meadow,	56, 227
Oley Street,	94, 184
Oliphant,	170
Oliver,	211, 280
Onondaga,	163
Osborne,	164
Otis,	262
Oxford,	169, 173

P.

Pacific,	298
Painter,	51, 211, 390
Pardee,	170
Parkersburg,	239, 399
Parkesburg,	188
Passaic,	170
Paxton,	195
Pencoyd,	59, 184
Penn,	188, 197, 398
Pennsylvania,	43, 101, 181, 197, 227, 393
Peru,	280
Philadelphia,	172
Phoenix,	164, 284
Phoenix,	89, 184
Pictou,	405
Pillow and Hersey,	406
Pine,	183
Piqua,	56, 273, 390
Pittsburgh,	34, 43, 113, 211, 212, 227
Plymouth,	184
Pomeroy,	51, 275, 390
Pope,	275
Portage,	51, 202, 390
Portland,	153, 298, 410
Pottsgrove,	184
Pottstown,	91, 184
Pottsville,	184
Pullman,	284

Q.

Quinsigamond,	35
-------------------------	----

R.

Rankin,	34, 212
Reading,	92, 94, 185
Reeves,	43, 56, 273, 390
Reliance,	212
Rensselaer,	79
Republic,	26, 212
Rhode Island,	156
Riverside,	26, 27, 240
Roanoke,	238, 254
Rockaway,	170
Roebbing's,	170
Roll Mill Co. of Amer.,	229
Rome Merchant,	164
Russel (J. C.) Shovel,	219

S.

St. Clair,	114, 213
St. Louis,	150, 296
Sable,	212
Saltsburg,	56, 57, 227
Sanderson Bros.,	113, 164
Sandwich,	285, 401
Sargent,	285
Schuylkill Haven,	185
Schuylkill Iron,	185, 398
Scottdale,	57, 227
Scranton,	192
Scullin-Gallagher,	296
Seaboard,	188
Seamless,	290
Seyfert,	185
Sharon, 23, 75, 97, 117, 220, 394	
Shaw,	292
Sheet Mill Dept.,	94, 185
Sheffield,	254
Shelby,	63, 253, 273
Shenango,	43, 220
Shenango Valley,	22
Shickle, Har., & How.,	285
Shoenberger,	34, 213
Singer, Nimick & Co.,	113, 213
Slatington,	177
Sligo,	213
Smith,	292
Soho,	107, 213
Solar,	50
Solid,	188
South Connellsville,	41
Southern,	247
Southern Pacific,	299
South Side,	34, 213

A.	B.	I.
Ajax, 373	Ellwood, 46	Iron Clad, 369
Alcania, 369	Ellwood City, . . . 45, 370	Irondale, 45
American, 44, 369, 375, 377	Elwood, 370	
Anchor, 370		J.
Anderson, 44, 377	F.	Jackson, 374
Atlanta, 44, 377	Falcon, 46, 376	Johnstown, 46, 371
	Ferguson, 370	
B.	Follansbee, 370	L.
Baltimore, 150, 374		La Belle, 46, 374
Banfield, 45, 375	G.	Lalanc and Grosjean, 371
Beaver, 45, 375	Gas City, 47	Laughlin, 46, 376
Berger, 375	Granite, 150	Licking, 375
Buhl, 378	Great Western, . . . 46, 377	
	Griffiths Charcoal, . . 370	M.
C.	Griffiths, W. H., . . . 370	McDonald, 376
Cambridge, 45, 376		Maywood, 377
Carnahan, 376	H.	Merchant & Co., . . . 371
Chester, 45, 374, 390	Hamilton, 371	Meurer Brothers, . . . 369
Chicago, 377	Humbert, 46, 371	Monongahela, 46, 371
Crescent, 45, 376		

	PAGE		PAGE		PAGE
Morewood,	47, 377	Plymouth,	372	Sturges, Cornish, &	
Morton,	45	Pope,	376	Burn,	377
Muskegon, . . .	47, 378				
N.		R.		T.	
National,	47, 371	Record,	376	Taylor,	372
New Castle, . . .	47, 372	Reeves,	47, 376		
O.		S.		U.	
Old Dominion,	374	St. Louis,	150, 378	United States, . . .	48, 373
P.		Sharon,	372		
Pennsylvania, . .	47, 372	Shenango,	48, 372	W.	
Philadelphia, . . .	372	South Connellsville, .	46	Washington,	373
Pittsburgh,	47, 372	Star,	48, 372	Waukesha,	378
		S. and I. Aluminum, .	373	Waynesburg,	373
				Wheeling,	374
				Whitestone,	369

FORGES AND BLOOMARIES.

	E.		H.		P.
Eagle,	203	Helton,	248	Perry,	194
Exeter,	186			Principio,	233
		L.			
F.		Lucknow,	198	S.	
French Creek, . .	189	M.		Spring City,	186
		Milesburg,	203	Standish,	165

INDEX TO NAMES OF COMPANIES.

This index includes the names of all firms, companies, or individuals owning or operating blast furnaces, rolling mills, steel works, tin-plate or terne plate works, forges and bloomaries, cut-nail works, wire-nail works, iron-ore mines, coal mines, limestone quarries, railroads, lake vessels, etc., in the United States which are described or mentioned in the present edition of the Directory; also all blast furnaces, rolling mills, and steel works in Canada.

	PAGE		PAGE		PAGE
A.		American Car and		American T. & T. P.,	369
Abbott-Mitchell, . . .	408	Fdy., . . .	145, 191, 290, 389	American Tin Plate,	
Addyston P. & S., . .	140, 141	American Coke, . .	38, 68	. . . . .	2, 39, 40
Aetna Nut,	157	American Gal. & T. P.,	375	44, 48, 210, 213, 214, 218	
Aetna-Standard, . . .		American Hoist & D.,	293	219, 230, 223, 225, 227, 232	
.	20, 22, 49, 51, 53	American Horse Shoe,	167	239, 240, 258, 261, 269, 273	
Aird, Don & Curtis, . .	27	American Iron & S.		274, 275, 276, 278, 279, 283	
Ajax Lead Coating, . .	373	Mfg., . . .	91, 185, 196, 198, 389	289, 290, 370, 371, 372, 373	
Alabama & Georgia		American McKenna		374, 375, 376, 377, 378, 390	
Iron,	138, 248	Process, . . .	171, 284, 296	American T. P. Mach.,	48
Alabama Consol. Coal		American Pipe and		American Weldless, 63, 64	
and Iron,	136, 250	Foundry,	140, 141	American Wire, . . .	32
Alabama I. & S., . . .	254	American Roll. Mill,		American Wire Nail, . .	32
Alabama Pipe,	142	. . . . .	43, 268, 279, 289, 401	Ames (W.) & Co., . .	169
Alabama Roll. Mill, . .	71	American R. M. Corp.,	401	Anchor Nail and Tack,	
Alabama S. & Ship., . .	133	American Sheet Iron,	167	. . . . .	205, 379
Alabama S. & W., 253, 385		American Sheet Steel, 2, 40		Anderson, DuP. & Co.,	113
Alabama Tube & Iron, . .	253	. . . . .	52, 207, 210, 223, 225	Andover Iron, . . .	165, 397
Alan Wood Co.,	185	227, 228, 258, 259, 260, 271		Andrews & Hitchcock,	286
Alan Wood I. & Steel, . .	398	272, 273, 274, 276, 279, 390		Andrews Bros. Co., . .	70, 71
Albany Mfg.,	64	American Ship Build-		Anniston Rolling Mill,	253
Alcania Company, 223, 369		ing,	121, 122	Anthony & Cushman,	379
Alcania T. & T. P., . .	369	American Stamping, .	151	Antrim Iron,	287
Algoma Steel,	407, 408	American Steel Barge,	121	Apollo Iron & Steel, 53, 57	
Aliquippa Steel, . . .	110	American Steel & Wire,	2	Arrow Company, . . .	386
Alleghany Iron,	126, 233	29, 32, 33, 34, 35, 36, 37		Aschman Steel Cast., .	219
Alleghany I. & Steel, . .	233	38, 65, 67, 68, 116, 155		Ashland C. & I. Rail-	
Allegheny Bessemer, . .	6	160, 176, 204, 205, 206, 212		way,	240, 399
Allegheny Furnace, . .	31	213, 217, 219, 260, 261, 276		Ashland I. & M., . . .	399
Allegheny Steel & I., . .	205	286, 382, 385, 386, 387, 390		Ashland Iron & Steel,	291
Allentown Iron,	174	American Steel Cast-		Ashland Sheet Mill, . .	241
Allentown R. M., . . .	174, 176	ing,	96, 165, 184	Ashland Steel,	241
Allison Mfg.,	27	. . . . .	189, 220, 268, 390	Atha (Benjamin) & Co.,	168
Altoona Fdy. & Mch., . .	200	American Steel Fdy.,	282	Atha (Benjamin) & Il-	
Altoona Iron,	201	American Steel Hoop,		lingworth,	110, 168
American Bridge, . . .		. . . . .	2, 48, 202	Atha Steel,	110, 168
.	2, 58, 59, 60, 184, 389	204, 207, 210, 211, 218, 226		Atlanta S. & T. P., . .	40, 44
American B. & T., . . .	200, 203	249, 258, 259, 274, 275, 390		Atlanta Steel Hoop, . .	249
American Can,		American T. & I., . .	27, 28	Atlantic Iron & Steel,	
.	369, 374, 376, 377	American T. & S., . .	396	. . . . .	70, 71, 215, 217

	PAGE
Atlantic Tube,	217
Auburn Bolt & N.,	63, 64
Augusta M. & Inv.,	139
Ayer (N. E.) & Co.,	298

B.

Baackes Wire Nail,	32
Badger Nail,	387
Bailey (C. L.) & Co.,	195, 196, 379
Baird, James B.,	269, 400
Baker, A. F.,	175
Baker (Chas. F.) & Co.,	382
Baker C. & W. I. Mfg.,	116
Baldrige, Thomas J.,	201
Balt. & Ohio R. R.,	232
Barnum Richardson,	78, 157
Bass Foundry & Mch.,	252
Beatty, George D., Receiver,	294
Beaver Falls Steel,	110
Beaver Tin Plate,	40, 45
Belfont Iron Works,	262, 266, 381, 385, 400
Bellaire Steel,	20, 22
Bell-Armistead Mfg.,	143
Bellefonte Furnace,	198, 397
Belleville Tack Wks.,	381
Bell Mfg.,	143
Belmont Nail,	120
Berger Mfg.,	375
Berlin Construction,	185
Berlin Iron Bridge,	60
Bessemer & Lake Erie R. R.,	3, 10
Bessemer Limestone,	121
Bessemer Rolling,	133
Bessemer Steamship,	66, 67
Bethlehem Iron,	82, 83
Bethlehem Steel,	81, 83, 174, 176
Big Stone Gap Iron,	234
Birmingham Rolling Mill,	71, 254
Blair Limestone,	109
Blandon Iron & Steel,	180
Blue Mountain I. & S.,	231
Boonton Iron & Steel,	168
Bower & Mallery,	115
Braddock Wire,	34
Braeburn Steel,	223
Bridgewater F. M., & Rolling Mill,	154, 379
Bridgewater Iron,	154
Bridgewater Steel,	218

Brier Hill Iron and Coal,	256, 258
Bristol Furnace,	126
Britton Iron & Steel,	261
Brooke (E. & G.) Iron,	178, 180, 379
Brown & Co., Inc.,	214
Brown Bonnell Iron,	72, 77, 256
Bryden Horse Shoe,	176
Brylgon Fdy.,	181
Bryson, Andrew,	181
Buckeye Mall. I. & C.,	268
Buek (C. E.) & Co.,	250
Buffalo Bridge & I.,	60
Buffalo Car Mfg.,	148
Buffalo Cast Iron P.,	140
Buffalo Dry Dock,	121
Buffalo Furnace,	119
Buffalo Iron,	245, 246, 400
Buffalo Steel,	161
Buffalo Union Furnace,	118, 159, 161, 390
Buhl Stamping,	378
Buhl Steel,	23
Burden Iron,	159, 162
Burgess, Charles,	224
Burgess Steel and Iron,	111
Byers (A. M.) & Co.,	206

C.

Cambria Iron,	104, 105
Cambria Steel,	103, 105, 221, 223, 391
Cambridge Iron & S.,	54
Cambridge Roll. M.,	269
Canada Iron Furnace,	405, 408
Canada Switch & S.,	406
Canonsburg Iron & S.,	40
Canton Crucible S.,	269, 400
Canton Rolling Mill,	54
Canton Saw,	269
Canton Steel,	269
Carbon Iron & Steel,	175
Carbon Steel,	206
Carnahan Tin Plate & Sheet,	270, 376
Carnegie Bros. & Co., 5, 6, 7	
Carnegie Company,	2, 3, 4, 12, 65
Carnegie Furnace,	126, 127
Carnegie Iron,	126
Carnegie, Kloman & Co.,	7
Carnegie Natural Gas, 3, 8	

Carnegie, Phipps & Co.,	5, 6, 7, 8, 32
Carnegie Steel, 3, 4, 6, 7, 9, 60	
204, 207, 209, 210, 214, 391	
Carnegie Tube,	205, 397
Carpenter Steel,	181
Carrie Furnace,	4
Carteret Steel,	166, 168
Catasauqua & F. R. R.,	81
Catasauqua Mfg.,	177
Catasauqua Roll. M.,	177
Cedarburg Wire, Wire Nail, & Screw,	387
Central Expanded,	205, 379
Central Foundry,	142
Central Iron & Coal, 249, 400	
Central Iron & Steel,	72, 77, 195, 196
Central Steel,	276
Champion Iron & Steel,	43, 47, 289
Chapin Mining,	23
Charlotte Iron Works,	159
Chartiers Iron & Steel,	54
Chattanooga Foundry and Pipe,	140, 141
Chattanooga Furnace,	243
Chat. Ore and Iron,	165
Cherokee Iron,	138
Cherry, Page,	291
Cherry Valley Iron,	215, 256, 397
Chess Brothers,	205, 370, 379
Chester I. & S.,	187
Chester Pipe & Tube,	27
Chester Roll. Mill,	40
Chester Steel Castings,	187
Chicago Horse Shoe,	277
Chicago, L. S., & East,	16
Chicago Mail. Cast.,	282
Chicago Ship Build.,	121
Chicago Stamping,	377
Chicago Steel Mfg.,	277, 381
Chicago Steel Works,	284
Chicago Tin Plate & Can,	287, 377
Chickies Iron,	194
Chrome Steel Works,	162
Citico Furnace,	243
Claire Furnace,	215
Clare, Duduit & Co.,	265
Clare Iron,	265
Clark (Wm.) Sons,	50
Clement (F. H.) & Co.,	185
Clendenin Bros.,	380
Cleveland-Cliffs Iron,	288
Cleveland Hardware,	260

PAGE	PAGE	PAGE
Cleveland Iron, . . . 260	Crescent Sheet & Tin Plate, . . . 41, 45	Driggs-Seabury Gun & Ammunition, . . 158
Cleveland Roll. Mill, . . . 30, 31, 33, 37	Crescent Steel, . . . 111	Dry Dock Engine, . . 122
Cleveland Ship Building, . . . 122	Crown Point Iron, . . 31	Duluth & I. R. R. R., . . 18
Cleveland Steel, . . . 261	Crozer Iron, . . . 127	Duluth Furnace, . . . 293
Cleveland Steel Cast., . . 260	Crucible Steel, . . 109, 114	Duluth, Missabe, & Northern, . . . 65
Clifton Iron, . . . 137	164, 168, 172, 206, 207, 209	Dunbar Furnace, . . 222
Clinton Iron & S., . . 204, 207	212, 213, 217, 232, 266, 391	Duncannon Iron, . . 191, 380
Coatesville I. & S., . . 399	Crucible Steel Cast., . . 291	Duquesne Steel Fdy., . . 207
Coatesville Roll. M., . . 189	Crum Creek I. & S., . . 188	Durham Iron, . . . 397
Coe, Powers & Co., . . 272	Crum Lynne I. & S., . . 187	Dutcher (J. A. & P. E.) Co., . . . 291
Coffin, Charles E., . . 231	Cuban Steel Ore, . . . 99	
Cohoes Rolling Mill, . . 162	Cumberland Nail and Iron, . . . 168, 379, 397	E.
Colbert Furnace, . . . 135	Cumberland River Est., . . 246	Eagle Crucible Steel, . . 269
Coleman, B. D. & E. R., . . 100	Cumberland Steel & Tin Plate, . . 41, 112, 232	Eagle Horse Shoe, . . 292
Coleman, Richard L., . . 255	Curtins & Co., . . . 200, 203	Eagle Iron, . . . 200, 246, 252
Collins Company, . . . 157	Curtis Sheet Steel, . . 270	Eagle Iron & Steel, . . 73
Colonial Iron, . . . 198	Cuyahoga Iron & S., . . 271	Eagle, S. Frank, . . . 241
Colonial Steel, . . . 223	Cuyahoga Steel and Wire, . . . 270, 385, 400	Eastern Tinware, . . 151
Colorado Fuel & Iron, . . 122	Cyclops Iron, . . . 7	East Lebanon Iron, . . 92
124, 125, 296, 297, 387, 391		Eckel Brothers Steel, . . 162
Columbia B. W. & N., . . 385	D.	Eckert & Brother, . . . 85
Columbia Iron, . . . 99	Daniels, Frank A., . . . 255	Eckert (Isaac) & Co., . . 85
Columbia Iron & Steel Foundry, . . . 207	Danville Bessemer, . . 190	Edgar Thomson, . . . 5, 6
Columbia Roll. Mill, . . 98	Danville Roll. Mill, . . 191	Edge Moor Bridge, . . 60, 62
Col. & Hock. C. & I., . . 267	Dartmouth Roll. M., . . 404	Edwards, J. P., . . . 403
Columbus Iron & Steel, . . 267	Davis Brothers, . . . 172	Eleanor Iron, . . . 201
Columbus Mall. Iron, . . 270	Dayton Coal & Iron, . . 243	Eleanor Iron & S., . . 224
Combination S. & I., . . 187	Delaware Iron, . . . 28	Elgin, Joliet, & Eastern Railroad, . . . 18
Commonwealth Trust, . . 399	Dempsey, M. J., . . . 164	Elk Rapids Iron, . . . 287
Consolidated Barb W., . . 37	Dennison Roll. Mill, . . 54	Ellis & Lessig Steel and Iron, . . . 183, 380
Consolidated Coal, I., and Land, . . . 128	Denver Roll. M. & I., . . 297	Ellwood Ivins' Tube, . . 182
Consolidated I. & S., . . 176	Deseronto Iron, . . . 407	Ellwood Tin Plate, . . 41, 46
Consolidated Steel & Wire, . . . 32	Detroit Bridge & I., . . 389	Ellwood Weldless T., . . . 63, 64
Continental Coke, . . 23, 68	Detroit Dry Dock, . . 122	Elmira Bridge, . . . 60, 62
Continental Iron, . . . 221	Detroit Ship Build., . . 122	Elmira Roll. Mill, . . . 163
Continental Wire, . . . 36	Detroit Steel & Spg., . . 289	Elmira Steel, . . . 163
Continuous Rail Joint, . . . 79, 161	Diamond Drill & Mch., . . 181	Embreville Iron, . . . 127
Converse, E. C., . . . 27	Diamond State Steel, . . . 229, 399	Emlyn Iron Works, . . . 277, 401
Cooper & Hewitt, . . 167, 175	Diamond Tack & N., . . 379	Empire Roll. Mill, . . . 261
Corns Iron and Steel, . . 73	Dillon-Griswold Wire, . . . 283, 386	Empire Steel & Iron, . . . 84, 167, 175, 178, 179
Cornwall Iron, . . . 87	Dilworth, Porter & Co., . . . 209, 398	200, 203, 234, 235, 247, 392
Corrigan, McKinney & Co., . . . 140, 221	Disston (H.) & Sons, . . 173	Emporium Iron, . . . 222
Coxey, Jacob S., . . . 270	Dithridge Steel Car, . . 271	Ensign Mfg., . . . 146, 148
Cramp Steel, . . . 407, 408	Dominion I. & S., . . 403, 404	Etna Iron, . . . 71
Cranberry Fur., . . . 244, 396	Dora Fdy., Car Wheel, & Machine, . . . 129	Etna Manufacturing, . . 248
Cranberry Iron & Coal, . . 247	Dora Furnace, . . . 127	Etowah Furnace, . . . 137
Crane Iron Works, . . 84, 175	Douglassville Iron, . . 182	Eureka Cast Steel, . . 188
Crawfordsville Wire & Nail, . . . 386	Dover Iron, . . . 168, 246	Ewald Iron, . . . 242
Crescent Machine, . . 387	Dresden I. & S. Sheet, . . 54	Exeter Iron, . . . 182

PAGE		PAGE		PAGE	
F.					
Falcon Iron & Nail, . . .	55	Green Ridge Iron W., . . .	191	Howard, K. M. & C. R., . . .	241
Falcon T. P. & S., . . .	41, 46	Greensboro Furnace, . . .	84	Howe & Polk,	191
Falk Company,	292	Greensburg Steel,	229	Howe, Brown & Co., . . .	112
Falls Hollow Staybolt, . .	271	Greenville Tube, . . . 63, 64		H. P. Nail,	33
Falls Rivet & Machy., . .	385	Griffiths Char. Iron		Hughes & Patterson, . .	172
Farist Steel,	158	Mills,	224, 370	Hughes & Patterson,	
Federal Steel, . . 2, 12, 19, 68		Griffiths (The W. H.)		Incorporated,	173, 372
Ferguson Tin Plate, . . .	370	Co.,	224, 370	Humbert Tin Plate, . . .	41, 46
Fieser, Wagoner &		Groton Bridge & Mfg., . .	60	Hussey, Binns & Co., . .	225
Bentley,	267	Guelph Iron & S.,	409	Hussey Steel,	225
Firth-Sterling Steel, . . .	208	Guelph-Norway I. & S., . .	409	Hyde Brothers & Co., . .	237
Florence Cotton & I., . .	135			Hyde Park Iron & S., . .	55
Follansbee Bros.,	370	H.			
Fort Pitt Iron & S., . . .	209	Haberman Mfg.,	151	I.	
Foster (Alex.) & Co., . . .	172	Hackensack Meadows, . .	397	Illinois Car & Equip., . .	144
Fownes, Jr., Wm. C., . . .	400	Hager Steel & Iron, . . .	283	Illinois Nail,	386
Fox Pressed Steel		Halifax Rolling Mills, . .	404	Illinois Steel,	
Equipment,	117	Hamilton Blast Fur., . . .	408	. . . . . 12, 13, 16, 281, 282	
Franklin Iron,	87	Hamilton, John,	371	. . . . . 284, 285, 286, 290, 292, 392	
Franklin Iron Mfg., . . .	160	Hamilton S. & I.,	407, 409	Indiana C. & Fdy., . . .	146, 148
Franklin Steel Cast., . . .	224	Hanging Rock Iron, . . .	263	Indiana Forge and	
Franz Krein Chain,	115	Hanley, John F.,	163	Rolling Mill,	75, 77
Franz Krein Mfg.,	115	Harrisburg Nail Works, . .	196	Indiana Iron,	73, 77
Frick (H. C.) Coke, . . 3, 8, 68		Harrisburg Roll. Mill, . .	196	Indiana Steel & W., . . .	386
Fullerton Roll. M., . . .	177	Harrison, J. W.,	241	Indiana Steel,	277, 278
G.		Harrow Spring,	290	Indiana Steel Castings, . .	279
Garland Chain,	116	Hartman Manufactur-		Inland Iron & F.,	73
Gaulbert & Caskey, . . .	172	ing,	218, 398	Inland Steel,	278, 284
Gaylord Iron,	287, 401	Hartman Steel,	32	Iowa Barb Wire,	31
General Electric,	155	Hartmann, Hay & Reis,		Iron Clad Mfg.,	369
Georgia Iron & Coal, . . .	248	. . . . . 283, 382		Irondale Steel & L., . .	41, 42
Georgia M., M., & I., . . .	248	Hayden (P.) Saddlery		Iron Gate Roll. M., . . .	237
Georgia Vineyard,	249	Hardware,	115, 116	Ironton Coal & Iron, . .	266
Gillette-Herzog Mfg., . . .	60	Heckert-Baltzley Bil-		Ironton Railroad,	81
Ginsburg, H. H.,	163	let,	271	Ironton Structural, . . .	294
Girard Iron,	257	Heckscher (R.) & Sons, . .	179	Ironton Tack,	381
Glamorgan P. & Fdy., . .	129	Hecia Iron & Mng., . . .	265	Iroquois Iron,	281, 401
Glasgow Iron,		Heller Brothers Co., . . .	169	Isabella Furnace, . . . 49, 204	
. 90, 178, 182, 184, 380		Helmbacher Forge, . . .	295	Ivins, Ellwood,	182
Glen Iron Furnace,	398	Henry (E. A.) Wire, . . .	271	J.	
Globe Iron,	263	Highland Iron & Steel,		Jackson & Sharp,	148
Globe Iron Works,	122	. . . . . 277, 401		Jackson & Woodin, . . .	
Godcharles (F. A.) Co., . .		Hillman Land & Iron, . .	241	. . . . . 145, 146, 147, 148	
. 192, 380		Hilton Bridge Con., . . .	60	Jackson Iron & Tin	
Gould Steel,	277	Hinson & Hurford Steel		Plate,	239, 374
Gracey-Woodward I., . . .	244	Casting,	279	Jameson, John,	175
Graham & Robinson, . . .	236	Hirsch Roll. Mill,	296	Janesville Barb Wire, . .	387
Graham Furnace,	127	Hoffmann, B., & W.		Janson Iron,	98
Graham Iron,	396, 399	Mfg.,	143	Janson S. & Iron, . . . 98, 169	
Grand Crossing Tack,		Holcomb-Brown Iron, . .	297	Jefferson Iron, . . . 255, 265, 275	
. 283, 382, 386		Holidaysburg I. & G., . .	201	Jefferson Steel & Mfg., . .	254
Grand Trunk,	406	Holidaysburg Iron &		Jeffer Furnace,	250
Granite City Steel,	150	Nail,	201, 380	Jenkins Iron & Tool, . .	201
Graphite Metal,	169	Home Iron,	126	Jessop Steel,	398
Great West. T. P.,	41, 46	Hoopes & Townsend, . .	183	Jessop (William) &	
		Horseheads Bridge, . . .	60	Sons,	229, 398
		Howard-Harrison Iron, . .	140	Johnson Company, . . .	18

PAGE	PAGE	PAGE
Johnson Forge, 230	Laidlaw Bale Tie, . . . 37	M.
Johnson, George, . . . 177	Langenbach, Edward, . . . 269, 400	McConway & Torley, . . 210
Johnson (I. G.) & Co., . . 163	Lake Erie Iron, 73, 77, 261	McCook, John J., . . . 277
Johnstown Tin Plate, 42, 46	Lake Shore Fdy., . . 141	McCormick Estate, . . 195
Jones & Laughlins, . . . 106, 107, 204, 205, 213, 392	Lakeside Nail, . . . 277	McCoy & Linn, 200, 202, 203
Jones Valley Iron, . . . 251	Lake Superior Con. Iron Mines, . . 2, 64, 65	McCullough Iron, 230, 232
Judson Mfg., . . 298, 382, 387	Lance & Gros., . . 196, 371	McCutcheon, Estate of James, 209
Junction Iron, 50	Lancaster Iron, . . . 73	McDonald (J. & Sons), 376
Juniata Coke, 38	Laramie Iron & S., 124, 297	McDonell Roll M., 409, 410
Juniata Fur. & Fdy., . . 199	Latrobe Steel, . . 226, 284	McDougall (J.) & Co., . . 405
Juniata Limestone, . . 106	Laufman (P. H.) & Co., 57	McElligott, Henry R., 181
Jupiter Steel & Coal, . . 209	Laughlin & Co., . . . 107	McGugin & Co., . . . 266
Juragua Iron, 83, 99	Laughlin & Junc. S., 22, 50	McInnes Steel, 226
K.	Laughlin Nail, 42, 46, 275, 381	McKeefrey, W. D., . . . 221
Kansas City B. & N., . . 295	Lawrence Bros., . . . 386	McKenna Steel Wkg., 284
Keen & Hagerty Mfg., 151	Lawrence Furnace, . . 263	McNeal P. & Fdy., . . 141
Kelly, Lindsey, 265	Lebanon Chain, . . . 115	McNight, Charles, . . . 400
Kelly, Mrs. Lindsey, . . 265	Lebanon Iron, 92	McShane (Henry) Mfg., 142
Kelly Nail & Iron, 264, 266, 381, 385	Lebanon Roll. Mill, . . 197	Mackintosh, Hemphill & Co., 208
Kennedy (Wm.) & Sons, 409	Leesport Iron, . . . 178	Macungie Iron, 85
Kentucky Furnace, . . . 241	Lehigh Steel & Iron, . . 175	Mahoning Ore and Steel, 52, 77, 106
Keystone Axle, 218	Lehigh Zinc & Iron, . . 176	Mahoning Valley Iron, 70, 74
Kidd Brothers & Burgher, 219	Leighton (J.) & Sons, 247	Malleable Iron Fit., . . 158
Kieckhefer Bros. Co., . . 151	Leonard & Kinsley, . . 154	Manfield, B., 285
Kimberly (P. L.) & Co., 50	Lessig Bridge & L., . . 61, 62	Manhattan Roll. Mill, 163
King, Gilbert, & Warner, 20, 22	Liberty Furnace, . . . 236	Manistique Iron, . . . 288
Kinsley Iron & M., . . . 154	Licking Roll. Mill, 242, 375	Mfrs' Water, 106
Kirkpatrick & Co., . . . 55	Liggett Spring & A., . . 210	Marion Steam Shovel, 272
Kittanning I. & S., 222, 225	Lima Loco. & Mach., . . 272	Marion Steel & Iron, . . 74
Kloman & Phipps, . . . 7	Lima Steel Casting, . . 272	Marshall Iron, 230
Knauer, D. J., 189	Lime Rock Iron, . . . 78	Marshallton Iron & S., 230
Knoxville Iron, 247, 400	Lindsay & McCutcheon, 50	Marshallton Iron Wks., 230
Kokomo W. & N., . . . 278, 386	Lobdell Car Wheel, . . 236	Marting Iron & Steel, 263
Krein (Franz) Chain, . . 115	Lochiel Furnace, . . . 100	Maryland Steel, 99, 102, 103, 231, 232
Krein (Franz) Mfg., . . 115	Lockhart Iron & S., . . 214	Maryland S. & S., . . . 232, 392
L.	Logan Iron & S., . . . 200, 201	Maryland Tin Plate, . . 233
La Belle Iron W., . . . 42, 46	Logan Mfg., 183	Mary Pratt Furnace, . . 137
240, 274, 275, 380, 381, 400	Londonderry Iron, . . 403	Matthai, Ingram & Co., 150, 151
La Belle Steel, 112	Long (Dennis) & Co., . . 141	Max Meadows Iron, . . 127
Lacey-Bueck Iron, . . . 250	Longdale Iron, 234	Melly, J. & R., 194
Lackawanna I. & C., . . . 87	Longmead Iron, . . . 183	Menominee Transit, . . 23
Lackawanna I. & S., 86, 88, 160, 163	Lorain Steel, 17, 225, 250, 261	Merchant & Co., (inc.), 371
166, 190, 192, 193, 194, 392	Lord, Estate of J. C., . . 168	Merchants W. & N., . . 36
Lackland, E. C., 241	Louisville Bolt & L., . . 242	Mesta Machine, 210
Lackland, R. J., 241	Low Moor Iron, . . . 235	Metropolitan Life Ins., 293
Lady Ensley Coal, 136	Lucknow Forge, . . . 198	Metropolitan Roll M., 408
Iron, & R. R., 136	Lucknow I. & S., . . 182, 198	Meurer Brothers, . . . 369
Lady Ensley Furnace, 135	Lucy Furnace, 5	Michigan Iron, 288
Lafayette Bridge, . . . 60	Ludlum Steel & S., . . 169	Michigan-Peninsular Car, 146, 147, 148
LaFollette C., I., & Ry., 245	Lukens Iron and Steel, 95, 188, 392	Midland Steel, 56

	PAGE
Midvale Steel,	178
Miles, Estate of F. P.,	397
Miles, Estate of Fred.,	161
Miles, W. A.,	397
Milton Iron,	192
Milton Manufacturing,	191
Milwaukee Dry Dock,	122
Milwaukee S. Cast., .	292
Milwaukee Tack, . . .	382, 387
Mineral Products, . .	403
Minnesota Dock, . . .	18
Minnesota Iron, . . .	18
Minnesota Iron and Steel,	74, 294
Minnesota Steamship,	18, 66, 67
Missouri Car and Foundry,	147, 148, 149
Mitchell, Tranter & Co.,	74
Monessen Steel, . . .	51
Monitor Iron Works, .	143
Monongahela I. & S.,	210
Monongahela Tin Plate,	42, 47
Montizambert, A., . .	403
Montreal Roll. Mill, .	406
Moorhead, Bro. & Co.,	214
Morewood Co., . . .	42, 47
Morrison, Colwell & Page,	162
Morton Tin Plate, . .	40, 45
Mount Hope Iron, . . .	155, 379
Mount Hope Mineral Railroad,	81
Mount Hope Mining, .	85
Mount Pleasant Water,	3, 10
Mulligan, C. R., . . .	169
Muncie Iron & Steel, .	74
Murray, Dougal & Co.,	147, 148
Musconetcong I. Works,	166
Mutual Transportation,	23
Myers (H. M.) Co., . .	219
N.	
Nagney Quarry, . . .	106
Napier Iron Works, . .	244
Nashua Iron & Steel, .	408
National B., N., & R.,	92
National Car Coupler,	279
National Enameling & Stamping,	149, 283
National Fdy. & Pipe Works,	295, 374, 378, 393
National Fdy. & Pipe Works,	140, 141

	PAGE
National Malleable Castings,	219
Nat. Mining,	52, 393, 396
National Rolling Mill,	279, 401
National Steel,	2, 19
68, 216, 219, 220, 257, 259	
267, 268, 270, 274, 275, 393	
National Steel Cast., .	279
National Steel Ref., .	211
National Tin Plate,	39, 43, 44, 47
National Tube,	2, 23, 25, 26, 28
29, 204, 206, 207, 210, 211	
212, 238, 240, 274, 380, 393	
National Wire Cor., .	158
Neal Brothers,	205, 370
Nes Chain Mfg., . . .	116
New Albany Rail Mill,	71
Newark Iron & Steel,	272
Newberry Furnace, . .	288
New Brighton Steel, .	219
New Castle S. & T. P.,	43, 47
New Castle Tube, . . .	218
New Columbus Bridge,	61
New Haven,	158, 396
New Jersey Steel & Iron,	61, 62
New Jersey Zinc, . . .	166, 175
New Phila. Iron & S.,	56
Newport Roll. Mill, .	242
New Process Galv., . .	401
New River Mineral, .	234
New York, Pa., & Ohio Dock,	9
New York Steel & W.,	163
Niagara Car Wheel, .	147
Nickel Steel & Forge,	211, 229
Nicoll, Benjamin, . . .	168
Niles Iron & Sheet, . .	258
Norristown Iron, . . .	184
Norristown Steel, . . .	97
North Alabama Furnace,	135, 136, 250
Northern Ala. Coal, Iron, & Ry.,	251
North Western B. W., .	386
Northwestern Iron, . .	290
Norton Brothers, . . .	377
Norton Can,	369
Norton Iron Works,	240, 243, 381, 385
Norton T. P. & Can, .	374
Norway Iron & Steel, .	197

	PAGE
Nova Scotia Steel, . . .	404, 405
Nova Scotia S. & C., .	404
O.	
Ohio Falls Car Manufacturing,	147, 149
Ohio Falls Iron, . . .	280
Ohio Falls Iron Wks.,	280, 401
Ohio Iron,	21, 273
Ohio Iron & Steel, . . .	257, 400
Ohio Mining & Mfg., .	268
Ohio Pipe,	141
Ohio Rolling Mill, . .	272
Ohio Steel,	21, 22
Ohio Steel & Iron Sp.,	272
Ohio Tube,	28
Oil City Tube,	28
Oil Well Supply, . . .	25, 27
Old Dom. Iron and Nail,	237, 374, 380
Old Meadow Roll. M.,	56
Oliphant Steel & I., .	170
Oliver & Snyder, . . .	20, 31, 35
Oliver Chilled Plow W.,	280
Oliver Iron & Steel, .	211
Oliver Iron Mining,	2, 3, 11
Oliver, Theodore, . . .	177
Oliver Wire,	34, 38
Onondaga Iron & N., .	71
Ontario Rolling Mill,	409
Oregon Iron & Steel, .	298
Osborne (D. M.) & Co.,	164
Otis Steel,	262
Oxford Iron & Nail, .	169
Oxford Iron Works, . .	85
P.	
Pacific Iron & Nail, .	387
Pacific Steel,	297, 298
Page Woven Wire Fence,	226
Painter (J.) & Sons, .	51
Palmer Steel & Iron, .	279
Pardee (A.) & Co., . .	166
Pardee (The C.) Works,	170
Park, Brother & Co., .	111
Parkersburg Iron and Steel,	239, 399
Parkersburg W. & N., .	385
Parkeburg Iron, . . .	188
Park Steel,	110, 206
Pasley, W. J.,	248
Passaic Rolling Mill, .	170
Paxton Iron & S., . .	195, 196

PAGE	PAGE	PAGE
Peck, Benny & Co., . . . 405	Pomeroy Iron & Steel, . . . 51	River Furnace & Dock, 260
Peninsular Iron, . . . 288	Pompton Steel & Iron, . . . 170	Riverside Iron, 25, 26, 27, 28
Penn Iron, 197	Pope Tin Plate, . . . 275, 376	Roane Iron, 244
Penn Iron & Coal, . . . 267	Pope Tube, 64	Roanoke Furnace, . . . 236
Penn Iron Mining, . . . 105	Portage Iron, 51	Roberts (A. & P.) Co., 59, 61, 62, 184
Penn Steel Casting and Machine, . . . 188, 398	Portland Iron & S., . . . 153	Robeson Iron, 178
Pennock Brothers, . . . 148	Portland Roll. M., . . . 298, 410	Rochester Bridge & L., . . 61
Penna. Bolt & Nut, . . . 92	Post & McCord, 61	Rockaway Iron & S., . . . 170
Penna. Furnace, 179	Potomac Steel, 232	Roebbing's (J. A.) Sons, 170
Penna. Steel, 99, 100 102, 194, 195, 197, 393	Potts Bros. Iron, 184	Rolling Mill Co. of America, 229
Penna. Tin Plate, . . . 43, 47	Pottsville I. & S., . . . 178, 185	Rome Furnace, 248
Penna. Trust, 217	Poughkeepsie Iron, . . . 160	Rome Merchant I. Mill, 164
Penna. Tube, 28	Pratt & Letchworth, . . . 162	Round Mountain, . . . 253
Penna. & Lake Erie Dock, 9	Pratt (Mary) Furnace, . . . 137	Rowland, W. & H., . . . 173
Perkins & Co., 215	Premier Steel, 277	Rupley Iron, 294
Peru Steel Casting, . . . 280	Pressed Steel Car, . . . 116, 117, 393	Russel (J. C.) Shovel, . . 219
Pewabic Company, 4	Princess Iron, 235	
Philadelphia Steel, . . . 182	Principio Forge, 233	S.
Phillips, Nimick & Co., . . 213	Pulaski Iron, 235	St. Charles Car, . . . 147, 149
Phoenix Fdy. & Mfg., . . 143	Pullman Company, . . . 284	St. Clair Furnace, . . . 114, 204
Phoenix Horse Shoe, . . . 164, 284	Pullman Iron & S., . . . 285	St. Clair Steel, . . . 114, 213
Phoenix Iron, 88, 184	Punxsutawney Iron, . . . 222	St. Louis Blast Fur., . . . 294
Pickands, Math. & Co., . . 216		St. Louis Iron & S. F., . . . 295
Pictou Char. Iron, 403, 405	Q.	St. Louis S. F. & I. W., . . 295
Pilling & Crane, 178, 184, 396	Quincy Hard. Mfg., . . . 386	St. Louis Stamp, . . . 150, 151
Pillow & Hersey Mfg., . . . 406		St. Louis Tinplate, . . . 150
Pine Iron Works, 183	R.	Salem Iron, 257
Pioneer Iron, 40, 288	Radford-Crane Iron, . . . 127	Salisbury Carbonate, . . 161, 397
Pioneer Mining and Manufacturing, . . . 70, 250	Radford Furnace, 235	Sanderson Bros. Steel, . . 113
Piqua Rolling Mill, 56	Radford Pipe & Fdy., . . . 129	Sandwich Iron & Steel, 285, 401
Pittsburgh & Conneaut Dock, 3, 9	Reading Iron, 93, 95, 175, 178, 184, 185, 192	Sargent Company, 285
Pittsburgh Bessemer, 6	Record Manufacturing, 376	Saucon Valley R. R., . . . 81
Pittsburgh, Bessemer, & Lake Erie R. R., . . . 3, 10	Red River Furnace, . . . 244	Saxon Furnace, 199
Pittsburgh Bridge, 61	Reed Furnace, 215	Schmidt (John C.) & Co., 116
Pittsburgh Forge & I., . . . 211	Reed Island Iron, 128	Schoen Pressed Steel, . . . 117
Pittsburgh Limestone, 3, 12	Reeves Iron, 43, 56	Schonthal Iron & Steel, . . 232
Pittsburgh, McKeespt., & Youghiogheny, . . . 10	Reeves (John M.) & Co., . . 168	Schultz Bridge Iron, . . . 61
Pittsburgh Seamless T., . . . 217	Regent Iron, 11	Scott (J. B.) & Co., . . . 370
Pittsburgh Steamship, 2, 3, 11, 65, 66, 67	Reliance Steel, 212	Scottdale Iron & S., . . . 57
Pittsburgh Steel, 208, 226, 398	Rennie Iron, 236	Scranton Bolt & Nut, . . . 192
Pittsburgh Steel Fdy., . . . 212	Republic Iron & Steel, 69, 215, 217, 220, 242 251, 253, 254, 256, 258, 261 262, 266, 270, 276, 277, 278 279, 280, 286, 294, 381, 394	Scranton Steel, 88
Pittsburgh Steel Hoop, . . . 209	Rhode Island Perkins, . . . 396	Scullin-Gallagher Iron and Steel, 296
Pittsburgh Tin P., 43, 47	Richmond Iron Co., . . . 156	Seaboard Steel Cast., . . . 188
Pittsburgh Tool Steel, . . . 229	Richmond Iron Works, 154, 396	Seamless S. Tubes, 290
Pittsburgh Tube, 28	Richmond Standard S., S., & I., 237	Searles, Estate of John E., 294
Pittsburgh Wire, 32, 36	Riley, Frank M., 168	Secaucus Iron, 397
Plymouth Mills, 382	Ripley & Bartlett, . . . 379	Security Land and Ex- ploration, 11
		Seidel & Hastings, . . . 231
		Seidel Brothers, 194

PAGE	PAGE	PAGE
Seidel, H. C., 186	Southern Pacific, 299	T.
Sellers Mfg., 282	Southern Pipe, 140	Taylor Iron & Steel, . . 171
Semet-Solvay, 29	South Sharon Steel, . . 221	Taylor (N. & G.) Co., .
Seyfert, Simon, . . 180, 182	Southwest Connells-	. . . . . 233, 372
Seyfert (S. R.) & Bro., . 185	ville Coke, 17, 68	Temple Iron, 179
Sharon Iron, . . . 21, 70, 75	Spang, Chalfant & Co.,	Tenn. C. I., & R. R., .
Sharon Sheet Steel, . 220	. . . . . 207, 397	. . . 130, 131, 132, 133, 245
Sharon Steel,	Spanish-American I., . 99	249, 250, 251, 254, 255, 395
. 117, 216, 220, 394	Spaulding & Jennings,	Terre Haute Car and
Sharon Steel Casting, . 97	. . . . . 113, 172	Manufacturing, . 147, 149
Sharon Steel Hoop, . 220	Spearman Iron, . . . 216	Terre Haute Iron & S., . 76
Sharon Tin Plate, 220, 372	Speer, J. Ramsey, . . 400	Texas, State of, . . . 255
Sharon Valley Iron, . 78	Spring City Bloom, . 186	Thames Iron Works, . 408
Sharpville Furnace, . 216	Springfield Iron, . . 75	Thomas Brass & Iron, 387
Shaw Steel Casting, . 292	Spring Lake Iron, . . 287	Thomas Furnace, . 21, 290
Sheffield Coal, Iron	Standard Chain, . . .	Thomas Iron, 80, 81, 176, 395
and Steel, 132	. . . . . 115, 116, 270	Thomson-Houston, . . 155
Sheffield Rolling Mill, 254	Standard Coal, . . . 137	Thropp, Joseph E., . . 199
Shelby Iron, 253	Standard Conn. Coke, 23	Tidewater Steel, . 186, 189
Shelby Steel Tube, 2, 62, 63	Standard Seam. Tube, 29	Timmes & Hecht, . . 193
64, 180, 218, 262, 273, 395	Standard Steel Cast., . 97	Tindel-Morris Co., . . 189
Shelton Co., 379	Standard Steel Works, 202	Titworth, A. B., . 269, 400
Shenandoah Furnace, . 85	Stanford, E., . . . 184, 372	Toledo Bridge, 61
Shenango Fur., 216, 217, 398	Stanley (Geo. W.) Co.,	Toledo Rolling Mill, . 76
Shenango Valley S., .	. . . . . 382, 386	Tonawanda Iron and
. 20, 22, 34, 37, 44, 48	Stanley Works, . . . 154	Steel, 160
Sheridan Iron Works, 179	Star Furnace, . . . 264	Tower Mfg., . . . 381, 386
Shickle, Harrison, &	Star Tin Plate, . . . 44, 48	Tredegar Company, . 238
Howard, 285	Stark Rolling Mill, . . 273	Tremont Nail, . . 155, 379
Shiffler Bridge, 61	Stacy & Denney, . . 98, 99	Trenton Iron, 171
Ship Owners' Dry	Steel & Iron Alum., . 373	Trotter (Nathan) & Co.,
Dock, 122	Sterling Steel, . . . 208	Trotter Water, 3, 9
Shoenberger Steel, . 31, 34	Sterlingworth Ry. Sup., 177	Troy Steel,
Shuster Foundry, . . 143	Sternbergh (J. H.) &	. . . 79, 160, 161, 165, 396
Simonds Mfg., 286	Son, 92	Troy Steel & Iron, . 79, 80
Simpson (W. T.) & Co., 375	Stewart Enamel, . . . 151	Trusts & Guarantee, . 408
Singer, Nimick & Co., 113	Stewart Iron, . . . 217, 220	Tube Steel, . . . 25, 238, 393
Sinnemahoning I. & C., 222	Struthers Furnace, . . 256	Tudor Iron Works, . 76, 77
Slatington Roll. Mill, 177	Struthers Iron & S., . 57	Tuscora Steel, . . 273, 400
Sligo Furnace, 294	Sturges, Cornish, &	Tuttle (C. W.) & Co., . 161
Sloss Iron & Steel, . . 136	Burn, 377	Tutwiler Coal, Coke, &
Sloss Sheffield S. & I.,	Summit Wire, 271	Iron, 251
134, 135, 136, 250, 251, 395	Sunbury Iron Works,	Tyler (Ed. L.) & Co., . 142
Smith (Geo. H.) S. C., 292	. . . . . 193, 380	Tyler Tube & P., . 227, 233
Solid Steel, 97	Superior Shipbuilding, 121	Tyrone Iron, 203
Solid Steel Casting, . 188	Superior Steel, . . . 213	U.
South Chicago Fur-	Susquehanna Iron, . . 98	Uniform Steel, 171
nace, 282	Susquehanna I. & S.,	Union Bridge, 61
South Harrisburg	97, 194, 195, 196, 197, 198	Union Car, 147, 149
Chain, 116	Swett (A. L.) Iron W., . 143	Union Dry Dock, . . . 121
South Pittsburg P. W., 141	Sweet's Manufacturing, 164	Union Iron, 119
Southern Car & Fdy.,	Sweet's Steel, 163	Union Iron & Steel,
. 143, 254, 395	Sylvan Steel, 75	. . . . . 50, 51, 52, 264
Southern Iron, 249	Sylvester & Co., . . . 154	Union Iron Works, . . 299
Southern Mfg., 49	Sylvester Co., 396	Union Ore, 52, 77
Southern Mineral	Syracuse Steel Fdy., . 97	Union Railroad, 3, 9
Land, 252, 254, 381	Syracuse Tube, 28	

	PAGE		PAGE		PAGE
Union Rolling Mill, 31, 262		Warner Iron, . . . 245, 246		Williamson Iron, . . . 251	
Union Roll. M. & F., . . 296		Warwick I. & S., . . . 180		Williamsport I. & N.,	
Union Steel, 71, 223, 227, 398		Washburn & Moen, .		193, 380	
Union Steel & Chain,		35, 37, 38		Wilmot & Hobbs Mfg.,	
161, 254, 297		Washburn Wire, . . . 156		159, 396	
Union Steel Casting, . 214		Washington Charcoal-		Wilson, Walker & Co., 7	
Union Trust, . . . 398		Iron T. M., . . . 228, 373		Winthrop Iron, . . . 23	
United States Steel, . 156		Watts Steel & Iron, . 128		Wisconsin Steel, . 140, 141	
United States Steel		Waukesha Sheet Steel,		Witherbee, Sher. & Co., 159	
Corp., . . . 2, 3, 8, 11, 12		293, 378		Wood (Alan) Co., . . . 185	
19, 23, 29, 39, 48, 52, 58		Waynesburg Forge, S.,		Wood (Alan) I. & S., . 398	
62, 64, 65, 67, 68, 393, 396		& T. M., . . . 228, 373		Wood (J.) & Bros. Co., 181	
United States W. & N., 214		Wells & French, . 147, 149		Wood (R. D.) & Co., .	
Universal Con., . . . 16		Wellston Iron & S., 264, 265		184, 372	
U. S. Cast Iron Pipe		Wellsville P. & S. I., . 57		Wood, Richard, . . . 235	
& Fdy., . . . 139, 222, 293		West Bay City Ship		Wood (W. B.) Furnace, 135	
U. S. I. & T. P. Mfg., . 44, 48		Building, 122		Wood (W. Dewees) Co., 55	
U. S. Navy Yard, . . 155		West End Roll. M., 197, 399		Woodstock Iron, . . 251, 400	
		Westerman & Co., . . 165		Woodward Iron, . . . 252	
V.		Westerman-Stewart, . 76		Worcester Wire, . . . 36	
Va. & Southern Rail-		Western Iron & S., . . 297		Worth Brothers, . . . 186	
way, 129, 130		Western Tube, . . . 286		Wright Shovel, . . . 281	
Va. and Southwestern, 129		West Jersey Tube, . . 397		Wrought Iron Bridge, 61	
Va., Tenn., & Carolina		West Leechburg, . . . 228		Wurster (F. W.) & Co., 165	
Steel and Iron, . . . 130		Westmoreland Steel, . 228		Wyoming Shovel, . . . 193	
Valentine Iron, 199, 203, 399		Westmoreland Steel &			
Valley Steel, . . . 71, 286		Mfg., 229		Y.	
Van Alen & Co., . . 192, 380		Wethersald Roll. M., . 76		Yard, H. H., 236	
Vesta Coal, 109		Wharton, Joseph, . .		Youghiogheny North-	
Vesuvius Charcoal I., 266		166, 167, 397		ern Ry., 8, 9, 10	
Victoria C. & C., . . . 86		Wharton, Jr., (Wm.) &		Youghiogheny Water,	
Victoria Furnace, . . 85		Co., 174		3, 10	
Virginia Iron, C., & C.,		Wheeler Furnace, . . 216		Youngstown Bridge, . 62	
126, 129, 233, 234, 235, 236		Wheeler (F. W.) & Co., 122		Youngstown Engineer-	
237, 241, 243, 244, 396, 399		Wheeling Corrugating, 374		ing, 259	
Virginia Mining, . . . 235		Wheeling Iron & N., . 120		Youngstown I. & S. R., 259	
Virginia Rolling Mill, 238		Wheeling S. & I., . 119, 120		Youngstown I. S. &	
		238, 239, 240, 274, 380, 396		Tube, 259, 397, 400	
W.		Whitaker Iron, 233, 239, 374		Youngstown Steel, . . 258	
Wabash Iron, 76		Whiteley Mall. S. C., 280		Youngstown S. Cast., . 401	
Wagner (J. G.) Co., . . 61		Whiteley Steel, . . 280, 281			
Wales (John) Wire, . . 156		Wickwire Bros., . . . 165		Z.	
Wallace, Ban. & Co., 40, 45		Wilkes Rolling Mill, . 221		Zanesville Iron, . . . 273	
Wangelin, Ernest E., . 286		Williams Co., Ltd., . . 211		Zug & Co., 212	

INDEX TO PIG IRON BRANDS.

This list comprises the names of all the brands of pig iron so far as they were reported to us by the furnace operators.

	PAGE		PAGE		PAGE
A.		Cedar Point,	159	F.	
Aetna,	245	Champion,	288	Fannie,	215
Algoma,	407	Charlotte,	160, 221	Ferrona,	404
Alice,	131, 216	Chattanooga,	243	Florence,	135
Alleghany,	233	Cherokee,	84, 138	Franklin,	160
Allegheny,	257	Cherry Valley,	256		
Allentown,	174	Chickies,	194	G.	
American-Scotch,	217, 256, 268	C. I. F.,	405	Gertrude,	13, 290
Anchor,	265	Citico,	243	G. I. Co. DET.,	288
Andover,	166	Clifton,	137	Girard,	257
Antrim,	287	Climax,	257	Globe,	263
Anvil,	90	Clinton,	204	Grafton,	257
A. R. Mills,	174	Colonial,	199	Graham,	127
Ashland,	240	Columbia,	244	Grand Rivers,	241
Atlantic,	70	Colyar,	248	Greenwood,	200
Aurora,	98	Covington,	235		
		Cranberry,	244, 247	H.	
B.		Crane,	84	Hall,	70
Bay View, Nos. 1, 2, 3,	13	Crane L. P.,	84	Hamilton,	263, 408
Belfont,	263	Crown Point,	31	Hannah,	70
Bellefonte,	198	Crozer,	127	Haselton,	70
Bellefonte-Nittany,	198			Hecla,	265
Belmont,	119	D.		Hector,	204
Bessemer,	131	Danville,	190	Henry Clay,	85
Bessie,	267	Dayton,	244	Hinkle,	291
Bibb,	252	DeBardeleben,	131	Hocking,	268
Big Stone Gap,	234	Deseronto,	407	Hubbard Scotch,	257
Bloom,	265	Dora,	127		
Blue Mountain,	231	Douglas,	260	I.	
Brier Hill,	256	Dover,	246, 267	Iroquois,	281
Bristol,	126	Durham,	175	Isabella,	49
Brooke,	178			Ivanhoe,	234
Buckeye,	267	E.		J.	
Buckhorn,	266	Eliza,	106	Jefferson,	255
Buena Vista,	126	Elk Rapids,	287	Jenifer,	250
Buffalo,	119	Ella Foundry,	216		
Buffalo charcoal,	119	Ella Malleable,	216	K.	
		Embsville,	127	Kemble,	199
C.		Emma,	31	Keystone,	199
Carbon,	175	Ensley,	131, 132	Kittanning,	222
Carbonate,	161	Etna,	248		
Carnegie,	127	Etowah,	137	L.	
Carondelet,	294	Eureka,	131, 132	Lackawanna,	87
Catoctin,	231	Everett,	199	Lady Ensley,	135
		Excelsior,	269	Lawrence,	264

	PAGE		PAGE		PAGE
Lebanon Valley, . . .	194	Paxton,	195	South Pittsburg, . .	131, 132
Leesport,	178	Peerless,	281	Spearman,	217
Leetonia,	256	Pencost,	264, 267	Spring Lake,	287
Lehigh,	175	Pequest,	167	Spring Valley Iron, .	291
Liberty,	236	P. I. Co., Det., . . .	288	Standard,	246
Lincoln,	260	Pioneer,	70, 178, 288	Star,	254
Longdale,	234	Poughkeepsie, . . .	160	Star and Crescent, .	255
Lorain,	17	Princess,	235	Sterling Scotch, . .	281
Low Moor,	235	Punxy,	222	Stewart,	217
M.		R.		T.	
Mabel,	215	Radford,	127	Tallapoosa,	249
Macungie,	85	Rebecca,	222	Tassie Belle,	255
Madison,	265	Reed Island,	128	Temple,	179
Malleable,	281	Red River,	244	Tidewater,	186
Mannie,	246	Richmond,	154	Thomas,	81, 293
Marshall,	199	Rising Fawn,	248	Tonawanda Scotch, .	160
Martins Ferry, . . .	120	River,	260	Top Mill,	120
Mary Pratt,	137	Roanoke,	236	Topton,	85
Mary (The),	257	Robeson,	179	Trussville,	250
Mary (The) Ohio		Rock Run,	252	Tuscarawas,	267
Scotch,	257	Rockwood,	245		
Max Meadows, . . .	127	Rome,	248, 252	U.	
Midland,	408	Round Mountain, . .	253	Union,	264
Milwaukee Scotch, .	13	S.		V.	
Minerva,	291	Salisbury,	78, 161	Vanderbilt,	251
Missouri,	294	Sarah,	264	Vesta,	98
Muirkirk,	231	Saxton,	199	Vesuvius,	266
N.		Seneca,	257	Victoria,	85
Nellie,	263	Sewanee,	131	Viking,	175
Niagara,	160	Sharpville,	216	Vulcan,	179, 288
Nittany,	200	Sheffield,	131, 132, 135	W.	
Norway,	199	Shelby,	253	Warner,	245, 246
O.		Shenandoah,	85	Warwick,	180
Old Alcalde,	255	Shenango,	216	Watts,	128
Olive,	266	Sheridan,	179	Wharton,	167
Oregon,	298	Sidney,	290	White Rock,	236
Oxford,	85	Siemens,	403	Williamson,	251
Oxmoor,	131	Silver Spring,	195	Woodstock, (W. I. W.,)	252
P.		Sligo,	294	Woodward,	252
Parry,	175	Sloss,	136	Wyebrooke,	186
		Soho,	107		



3 1812 04247 4818