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The Development of The Steel Industry In America

Mechanical Engineering

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THE DEVELOPMENT OF THE STEEL INDUSTRY IN AMERICA

BY

Orrin Hugh Baker

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THIS IS TO CERTIFY THAT THE THESIS PREPARED UNDER MY SUPERVISION BY

ORRIN HUGH BAKER

ENTITLED THE DEVELOPMENT OF THE STEEL INDUSTRY IN AMERICA

IS APPROVED BY ME AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE DEGREE

OF Bachelor of Science in Mechanical Engineering

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HEAD OF DEPARTMENT OF Mechanical Engineering

THE DEVELOPMENT OF THE STEEL INDUSTRY

IN AMERICA.

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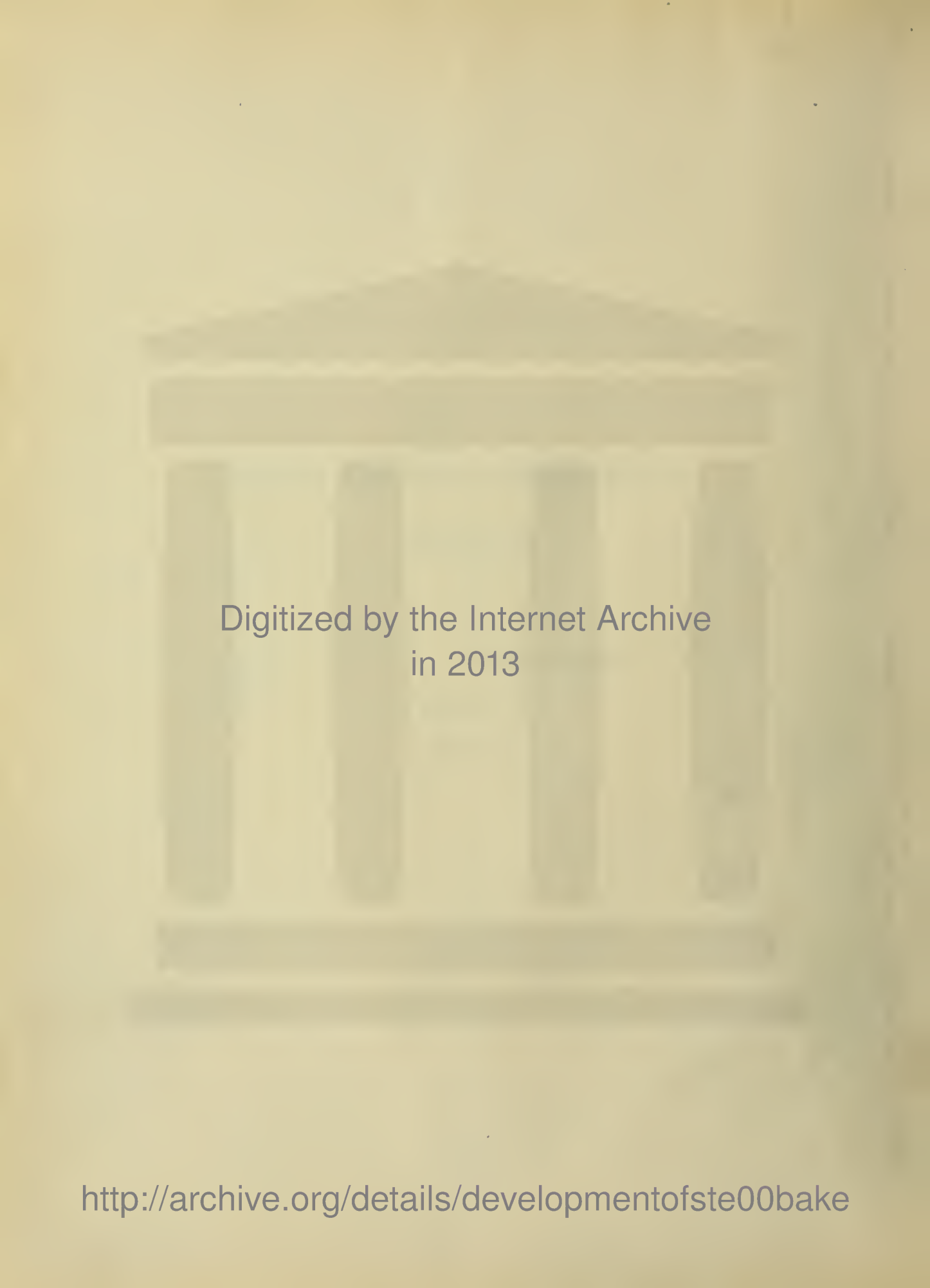

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THE UNITED STATES STEEL CORPORATION AND ITS FIVE LARGEST SUBSIDIARY COMPANIES.

CARNEGIE STEEL COMPANY(OF NEW JERSEY) .

Carnegie Steel Company(of New Jersey).

All the stock of the Carnegie Steel Company(of New Jersey) is owned by the United States Steel Corporation.

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The Carnegie Steel Company(of New Jersey) came into existence through the merger in March,1903,of the Carnegie Company, the National Steel Company, and the American Steel Hoop Company, all of New Jersey. All of the properties and other assets and all of the liabilities of the three merged companies were transferred by virtue of the merger to the books of the Carnegie Steel Company(of New Jersey).

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In addition the Carnegie Steel Company(of New Jersey) owns all the capital stock of the Carnegie Steel Company(of Pennsylvania),the Carnegie Natural Gas Company, the Bessemer and Lake Erie Railroad Company,(lessee of the Pittsburgh,Bessemer and Lake Erie Railroad Company,) the Mingo Coal Company, the Pittsburgh and Conneaut Dock Company, the Union Railroad Company, the Mount Pleasant Water Company, the Trotter Water Company, the Youghiogheny Northern Railway Company, the Youghiogehny Water Company, the Union Supply Company, the Chapin Mining Company, and the Winthrop Iron Company.

It also owns a controlling interest in the Pittsburgh,Bessemer,and Lake Erie Railroad Company, one-half of the capital stock of the Pewabic Company, five-sixths of the capital stock of the Oliver Iron Mining Company, and the Pittsburgh Steamship Company,75 per cent of the capital stock of the Pittsburgh Limestone Company, Limited,74 4/10 per cent of the capital stock of the H.C.Frick Coke Company, 25 per cent of the capital stock of the Biwabic Mining Company,66 2/3 per cent of the capital stock of the Columbus Stone Company, 25 per cent of the capital stock of the Lawrence Limestone Company, 25 per cent of the capital stock of the N.Y.,P.& O. Dock Company, 20 per cent of the capital stock of the Mahoning Ore and Steel Company, 52 per cent of the capital stock of the Pennsylvania and Lake Erie Dock Company, 50 per cent of the capital stock of the Union Ore Company, and two-thirds of the capital stock of the National Mining Company.

The Carnegie Steel Company(of New Jersey) operates the following blast furnaces,rolling mills, and steel works;

BLAST FURNACES--43 ACTIVE,1 IDLE,3 BUILDING,AND 1 REBUILDING.

Bellaire Furnaces,Bellaire,Belmont county,Ohio.Two stacks;one 75x17, built in 1873,blown in September 22,1873,and rebuilt in 1896; and one 75x18,built in 1894-5 and blown in March 7,1895; eight Massicks & Crooke stoves;fuel,Connelsville coke;ore,Lake Superior;product,Bessemer pig iron;total annual capacity,250,000 tons.

Equipped with one pig-iron casting machine. (Formerly called the Bellaire Works and operated by the National Steel Company.)-Active in 1903.

Carrie Furnaces,Rankin,Alleghany county,Pa. Five stacks,two of which were built by the Carrie Furnace Company, and three by the Carnegie Steel Company. No.1,93x19½;was removed from Ohio in 1883, blown in February 29,1884,and rebuilt in 1893 and 1901; No.2 93x19½,built in 1888-9,blown in July 19,1889, and rebuilt in 1895 and 1901-2; No.3 and No.4 each 100x23, commenced building in November,1899; Nov3 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; No.5,85x20,built in 1902-7 and blown in April 10,1903. Each furnace has four three-pass Massicks & Crooke stoves; sizes;Nos.1 and 2,85x19½;Nos.3 and 4,100x21;and Nos.5,90x21.Molten metal from these furnaces is shipped direct to the Homestead Steel Works. Fuel,Connellsville coke; ore,Lake Superior; product,basic pig iron; total annually 710,000 tons. Equipped with 3 Heyl & Patterson pig-iron casting machines.(Formerly operated by the Carnegie Steel Company.)-Active in 1903.

Columbus Furnaces,Columbus,Franklin County,Ohio. Two stacks;one,75x17½;completed in November,1877,and rebuilt in 1892,1895,and 1900, has three Massicks & Crooke stoves,each 65x18;and one,built in 1897,80x18,first blown in August 18,1897, has three Massicks & Crookes stoves,each 75x19½;fuel,Pocahontas and New River coke;ore Lake Superior;product,Bessemer pig iron;total annual capacity, 180,000 tons. (Formerly called the Columbus Works and operated by the National Steel Company.) Active in 1903.

Donora Furnaces, Donora,Washington County,Pa. Two stacks,Nos.1 and 2 each 85x22,built in 1902-4;neither of these furnaces was blown in down to April 30,1904; four Kennedy stoves,each 100x24;fuel Connellsville coke;ore Lake Superior;product,basic open-hearth pig iron;estimated annual capacity,365,000 tons.Equipped with two Heyl & Patterson pig-iron casting machines.(The furnaces were partly built by the Union Steel Company and were completed by the Carnegie Steel Company(of New Jersey);they are owned by the Union Steel Company.)-Not blown in down to April 30,1904.

Duquesne Furnaces,Cochran,(post-office address,Duquesne)Allegheny county,Pa.Four stacks,built by the Carnegie Steel Company,Limited; Nos;1 and 3 each 100x22,and Nos.2 and 4 each 100x23;sixteen Kennedy-Cowper stoves,each 97x21;No.2 rebuilt in 1902-3; First blasts;No.1,June 8,1896;No.2,October 7,1896;No.3,May 7,1897 and No.4,June 21,1897. Molten metal from these furnaces is used in the Duquesne Steel Works. Fuel,Connellsville coke; ore,Lake Superior;product,Bessemer and basic pig-iron; total annual capacity,750,000 tons.Equipped with one Jehling pig-iron casting machine. (Formerly operated by the Carnegie Steel Company.)-Active in 1903.

Edgar Thomson Furnaces,Bessemer,(post-office address,Braddock)Allegheny county,Pa.,Eleven stacks,four built by the Edgar Thomson Steel Company,Limited,five by Carnegie Brothers & Co.,Limited, and two by the Carnegie Steel Company(of Pennsylvania). Furnace A,80x15½ has four fire-brick stoves,each 65x15,and one fire-brick stove 75x18; Furnace B,81x19½,and C,85x21,have eight fire-brick stoves,six 75x20 and two 75x21;Furnaces D and E,each 90x21,and G,90x22,have seven fire-brick stoves,each 90x21;and Furnaces K,91x22,and I,90x20,have seven fire-brick stoves,each 90x

Equipped with one pig-iron casting machine. (Formerly called the Bellaire Works and operated by the National Steel Company.)-Active in 1903.

Carrie Furnaces, Rankin, Allegheny county, Pa. Five stacks, two of which were built by the Carrie Furnace Company, and three by the Carnegie Steel Company. No.1, 85x19½; was removed from Ohio in 1885, blown in February 29, 1884, and rebuilt in 1893 and 1901; No.2 85x19½, built in 1888-9, blown in July 19, 1889, and rebuilt in 1895 and 1901-2; No.3 and No.4 each 100x83, commenced building in November, 1899; Nos.3 and 4 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; No.5, 85x80, built in 1902-3 and blown in April 24, 1903. Each furnace has four three-pass Massicks & Crooke stoves; sizes; Nos.1 and 2, 85x19½; Nos.3 and 4, 100x21; and Nos.5, 90x21. Molten metal from these furnaces is shipped direct to the Homestead Steel Works. Fuel, Connellsville coke; ore, Lake Superior; product, basic pig iron; total annually 710,000 tons. Equipped with 3 Heyl & Patterson pig-iron casting machines. (Formerly operated by the Carnegie Steel Company.)-Active in 1903.

Columbus Furnaces, Columbus, Franklin County, Ohio. Two stacks; one, 75x17½; completed in November, 1875, and rebuilt in 1892, 1895, and 1900, has three Massicks & Crooke stoves, each 65x18; and one, built in 1897, 80x18, first blown in August 17, 1897, has three Massicks & Crooke stoves, each 75x19½; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer pig iron; total annual capacity, 180,000 tons. (Formerly called the Columbus Works and operated by the National Steel Company.) Active in 1903.

Donora Furnaces, Donora, Washington County, Pa. Two stacks, Nos.1 and 2 each 85x82, built in 1901-4; neither of these furnaces was blown in down to April 30, 1904; four Kennedy stoves, each 100x84; fuel Connellsville coke; ore Lake Superior; product, basic open-hearth pig iron; estimated annual capacity, 565,000 tons. Equipped with two Heyl & Patterson pig-iron casting machines. (The furnaces were partly built by the Union Steel Company and were completed by the Carnegie Steel Company(of New Jersey); they are owned by the Union Steel Company.)-Not blown in down to April 30, 1904.

Duquesne Furnaces, Dearborn, (post-office address, Duquesne) Allegheny county, Pa. Four stacks, built by the Carnegie Steel Company, Limited; Nos.1, 2 and 3 each 100x82, and Nos.3 and 4 each 100x83; sixteen Kennedy-Cowper stoves, each 97x21; No.1 rebuilt in 1895 1903; First blasts; No.1, June 8, 1888; No.2, October 7, 1895; No.3, May 7, 1897 and No.4, June 21, 1897. Molten metal from these furnaces is used in the Duquesne Steel Works. Fuel, Connellsville coke; ore, Lake Superior; product, Bessemer and basic pig-iron; total annual capacity, 750,000 tons. Equipped with one Uehling pig-iron casting machine. (Formerly operated by the Carnegie Steel Company.)-Active in 1903.

Edgar Thomson Furnaces, Bessemer, (post-office address, Braddock) Allegheny county, Pa., Eleven stacks, four built by the Edgar Thomson Steel Company, Limited, five by Carnegie Brothers & Co., Limited, and two by the Carnegie Steel Company(of Pennsylvania). Furnace A, 80x18½ has four fire-brick stoves, each 65x18, and one fire-brick stove 75x18; Furnaces B, 81x19½, and C, 85x21, have eight fire-brick stoves, six 75x20 and two 75x21; Furnaces I and L, each 90x21, and C, 90x82, have seven fire-brick stoves, each 90x21; and Furnaces K, 91x82, and L, 90x20, have seven fire-brick stoves, each 90x

21,and Furnaces J and K,each 90x82, have eight fire-brick stoves, each 98x81.Furnaces C and K rebuilt in 1902. First blasts;A January 3,1880;B April 4,1880; C,November 4,1880; D,April 19,1886;E, June 28,1888;F,October 19,1886; G,June 21,1887; H,March 1,1890; I,August 17,1890; J,February 16,1903; and K,December 5,1902. Molten metal from these furnaces is used in the Edgar Thomson Steel Works. Fuel,Connellsville coke;ores,Lake Superior and foreign; product,Bessemer and basic pig-iron, and spiegeleisen and ferromanganese,total annual capacity,1,460,000 gross tons. Equipped with six Uehling pig-iron casting machines.(Formerly operated by the Carnegie Steel Company.)-Active in 1903.

Isabella Furnaces,Etna,Allegheny county,Pa. Three stacks,two built in 1872 and one in 1890;No.1,90x81,rebuilt in 1902,has four Kennedy stoves,each 90x81;No.2,90x79,rebuilt in 1900,has four Kennedy stoves; this furnace was out of blast in December,1903; and No.3 90x81,rebuilt in 1901-2,has four Kennedy stoves,each 90x81.Fuel, coke;ore,Lake Superior;product,Bessemer,foundry,mill,and basic pig iron; total annual capacity of Furnaces 1 and 3,290,000 tons. Brand "Isabella", Equipped with one pig-iron casting machine.(Formerly operated by the Isabella Furnace Company,Incorporated, which was owned by the American Steel Hoop Company.)-Active in 1903.

Lucy Furnaces,Fifty-first st.,Pittsburgh,on the Allegheny Valley Railway. Built by the Lucy Furnace Company and enlarged by the Carnegie Phipps & Co.,Limited. Two stacks,Nos.1 and 2,each 85x80;No. 2 rebuilt in 1898;eight fire-brick stoves,each 75x81. First blasts No.1,May 18,1872,and No.2,September 27,1877.Fuel,Connellsville coke; ores,Lake Superior and foreign;product,Bessemer,basic, forge,low-phosphorus,and foundry pig-iron and spiegeleisen and ferromanganese;total annual capacity,240,000 tons.Equipped with one Uehling pig-iron casting machine.(Formerly operated by the Carnegie Steel Company.)-Active in 1903.

Mingo Furnaces,Mingo Junction,Jefferson County,Ohio. Three stacks, No.1(Formerly known as No.2) 75x17,built in 1878 and rebuilt in 1886;four Gordon-Whitwell-Cowper stoves. No.2,106½x87,built in 1900-1 and blown in in June,1901;four Massicks and Crookes stoves, each 85x81. No.3,106½x83,built in 1900-1 and first blown in April 28,1901; four Massicks & Crookes stoves,each 85x81.Fuel,Connellsville coke;ore,Lake Superior;product,bessemer pig-iron;total annual capacity,425,000 tons. Equipped with one pig-iron casting machine.(Formerly called the Mingo Works and operated by the National Steel Company.)-Active in 1903.

New Castle Furnaces,New Castle Pa. Four stacks(two completed,one rebuilding,and one building).Furnace No.1(formerly called Rosens) one stack,87x80,built in 1872,first put in blast in June,1876, and rebuilt in 1897; old furnace torn down in 1897 and rebuilt and blown in in the same year; five Massicks & Crookes stoves, four 18x65,and ore 85x81. Furnace No.2,(formerly called Meshannock) dismantled in 1903;a modern furnace 94½x80 is being erected on the site of the old stack; will be equipped with four Massicks & Crooke stoves,each 85x81;to be completed about July 15,1904. Furnace No.3(Formerly called Shenango) dismantled in 1903;now replaced by a new No.3 furnace,94½x80;equipped with four Massicks & Crookes stoves,each 85x80;completed about May 15,1904.Furnace No.4,106½x81,built in 1900-1,and first put in blast in July, 1901; four Cowper-Kennedy stoves,each 85x80,and ore Massicks & Crooke stove,85x81. Fuel,coke;ore,Lake Superior;product,Bessemer

pig iron .Annual capacities,No.1 150,000 tons;No.2,160,000 tons; No.3,160,000 tons; and No.4,160,000 tons;total,630,000 tons. Equipped with two Heyl & Patterson pig-iron casting machines. (The furnaces were formerly called the New Castle Works and were operated by the National Steel Company.)-Four furnaces active in 1903.

Niles Furnace,Niles,Ohio. One stack,76x18½; 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 tons.(Formerly called the Niles Works and operated by the National Steel Company.)-Active in 1903.

Ohio Furnaces,Youngstown,Ohio. Four stacks;three each 106½x23,one 90x23;Nos.1 and 2,built in 1899-1900,have each four Cowper-Kennedy-Roberts stoves,each 118x21.No.3,built in 1900-1,has four Massicks & Crooke stoves,each 118x21;No.3 remodelled and size changed from 106½x23 to 90x23. No.4 equipped with four Cowper-Kennedy-Roberts stoves,each 118x21. First blasts;No.1,February 15,1900;No.2,June 7,1900;No.3,March 29,1901,No.4,June 1904. Fuel,Connellsville coke;ore,Lake Superior;product,Bessemer pig iron;total annual capacity 800,000 tons.Equipped with two pig-iron casting machines.(Formerly called the Ohio works and operated by the National Steel Company.)-Active 1903.

Sharon Furnace,Sharon,Pa. One stack,75x11,built in 1866 and rebuilt in 1883;one Kennedy and three Whitwell stoves;fuel,coke;ore, Lake Superior;specialty,basic,open-hearth pig iron;annual capacity,91,000 tons. (One alternate stack,built in 1865,dismantled in 1901. Formerly called the Sharon Works and operated by the National Steel Company.)-Active in 1903.

South Sharon Furnaces,Sharon,Pa. Three stacks;No.1,100x22,built in 1900-1 and blown in in September 1901; No.2 and No.3,each 85x19,built in 1902-4,not blown in to April 30,1904;No.1 has four Cowper-Kennedy stoves,each 100x22,and Nos.2 and 3 have each four Cowper-Kennedy stoves,each 90x21. Fuel,coke;ore,Lake Superior;product,basic pig-iron;total annual capacity,440,000 tons. Equipped with two single strand Heyl & Patterson pig-iron casting machines.(Furnace No.1 was built and formerly operated by the Sharon Steel Company;it was also operated later by the National Steel Company. Furnaces No.2 and 3 were partly built by the Sharon Steel Company and the National Steel Company;Nos. 2 and 3 were completed by the Carnegie Steel Company(of New Jersey). Owned by the Union Steel Company.)-No.1 active in 1903 Nos.2 and 3 not blown in to April 30,1904.

Zanesville Furnace,Zanesville,Muskingum county,Ohio. One stack,75x16 built in 1870-1,blown in September 7,1871,and rebuilt in 1883; three Whitwell stoves,each 65x17;fuel,Connellsville coke;ore, Lake Superior;product,Bessemer pig iron;annual capacity,65,000 tons.(Formerly called the Zanesville Works and operated by the National Steel Company.)-Active in 1903.

Total annual capacity of furnaces active, not including idle Isabella No.2, 6,786,000 tons.

Rolling Mills and Steel Works-24.

Bellaire Steel Works,Bellaire,Belmont county,Ohio. Rolling mill built

in 1867 and put in operation in February,1868,remodeled in 1893, and rebuilt in 1895, three trains ofn24-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-incl blooming mill; first blow made April 28,1884; annual capacity,300,000 tons of ingots. Product, soft steel blooms,billets,slabs,and sheet and tinplate bars;annualcapacity,285,000 tons. Fuel,coal and manufactured gas. (Formerly called the Bellaire Works and operated by the National Steel Company).

Clark Mill,Thirty-fifth street,A.V.Railway,and Allegheny River,Pittsburgh,Pa. Built in 1869;7 heating furnaces and six trains of rolls(two 8,one 9,one 10,one 12,and one 20-inch);product,hoop, band,box and scroll steel,cotton-ties,steel tire,and skelp;annual capacity,60,000 tons. Fuel,natural and manufactured gas. Brands,Delta for cotton-ties and "*Ashco*" for other products. (Two 12-gross-ton acid open-hearth steel furnaces built in 1889-90,dismantled in 1901. Works formerly operated by the American Steel Hoop Company.)

Columbus Steel Works,Columbus,Franklin County,Ohio. Built in 1894-5, and put in operation May 2,1895;two 4½-gross-tons Bessemer steel converters with an annual capacity of 200,000 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,160,000 tons. Fuel,coal and producer gas. (Formerly called the Columbus Works and operated by the National Steel Company)

Donora Steel Works,Donora,Washington County,Pa. Built in 1902-3;twelve 50-gross-ton Siemens basic open-hearth steel furnaces, with an annual capacity of 300,000 tons of ingots,four 4-hole soaking pits, and one 40-inch blooming mill; product,billets,blooms and slabs; annual capacity,240,000 tons. Fuel,natural gas. (Owned by the Union Steel Company.) Not put in operation down to April 30, 1904; time of starting indefinite.

Duncansville 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 tons. Fuel,producer gas and coal. Brands,"Portage2 and "*Ashco*" (Formerly called the Portage Mill and operated by the American Steel Hoop Company.)-Idle and may be dismantled.

Edgar Thomson Steel Works,Bessemer(Allegheny county,Pa. Built in 1873-5 by the Edgar Thomson Steel Company,Limited,and enlarged by Carnegie Bros. & 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,one 50-ton metal mixer,(molten Bessemer pig iron is taken from the Edgar Thomson Furnaces to the metal mixer 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 foundaries, a forge connected with the works contains one 6-ton

hammer and 2 heating furnaces. Product,Bessemer steel rails,billets,sheet bars, and 50,000 tons of iron and brass castings;annual capacity,1,000,000 tons of steel ingots,650,000 tons of steel rails, billets, and sheet bars, and 50,000 tons of iron and brass castings. Fuel,Natural gas. (Formerly operated by the Carnegie Steel Company.)

Duquesne Steel Works,Cochran,Allegheny county Pa. Built in 1886-8 by the Allegheny Bessemer Steel Company and capacity increased in 1891-2 by Carnegie Bros.N& Co.,Limited; first blow made in Bessemer steel converters in February,1889,and first steel rolled in March,1889; first open-hearth steel made in October,1900;two 10-gross-ton Bessemer converters,fourteen 50-gross-ton basic open-hearth steel furnaces, one 50-ton metal mixer,36 soaking pits, and 8 trains of rolls,(one 10,one 13,one 16,two 21,one 26, one 38,and one 40-inch) and one bar reel; product,billets,blooms, slabs,sheet bars,splice bars, and merchant bars; annual capacity,600,000 tons of Bessemer steel ingots,480,000 tons of open-hearth steel ingots, and 820,000 tons of finished products. Fuel, natural gas and coal.(Formerly operated by the Carnegie Steel 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 tons. Fuel,manufactured gas for heating furnaces, and coal for puddling furnaces. Brand, "*Ashco*" (Formerly operated by the American Steel Hoop 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 tons. Brand,"*Ashco*". Fuel,coal. (Formerly operated by the American Steel Hoop Company)

Homestead Steel Works,Munhall,Allegheny county,Pa. Bessemer steel department built in 1880-1 by the Pittsburgh Bessemer Steel Company,Limited; rebuilt and enlarged by Carnegie Phipps & Co.,Limited,in 1892; first blow made March 19,1881; first steel rail rolled August 9,1881. Open-hearth steel department built by Carnegie Phipps & Co.,Limited, and the Carnegie Steel Company, Limited; first acid open-hearth steel in December,1886; 7 furnaces completed in October,1886; 1 in July,1890; 8 in September, 1890; 4 in September, 1895; 5 in April, and 5 in May,1898; 5 in June,5 in July, and 4 in December,1899; 4 in March,1900; and 2 in December,1902. Two 10-gross-ton Bessemer steel converters and fifty basic open-hearth steel furnaces (three 20,twenty-three 40, and twenty-four 45-gross-ton);one 200-gross-ton mixing furnace;one 28 and one 38-inch reversing blooming mill; one 3-high 33-inch, and one 3-high 35-inch train for structural shapes;one 119-inch,one 128-inch, and one 140-inch 3-high sheared plate mill; one 48-inch and one 42-inch universal plate mill; and one 10-inch guide mill; 104 heating pits and 36 heating furnaces; one beam fitting shop; one steel foundry with an annual capacity

of 3,300 tons of steel castings; one armor-plate plant,consisting of a press shop, with one 12,000 ton and one 10,000-ton forging press and 12 heating furnaces, a carbonizing shop with 13 furnaces, and a machine shop for finishing armor plate; also a protective deck plate plant with one 2,000-ton press and 3 heating furnaces. Product,blooms,billets,slabs,structural shapes,structural work, boiler plates, ship plates, tank plates,universal plates, armor plates, and open-hearth steel castings;annual capacity,425,000 tons of Bessemer steel ingots 1,550,000 tons of basic open-hearth steel ingots, and 1,425,000 tons of rolled products. Finishing capacity of armor plate department,10;000 tonsper annum. Fuel,coal,coke and natural gas. (Formerly operated by the Carnegie Steel Company.)

Howard Axle Works,Homestead,Allegheny county,Pa.,Built by the Carnegie Steel Company in 1899-1900; operations commenced in April, 1900;one 24-inch train of rolls with 3 continuous heating furnaces, twelve 7,000 pound steam hammers,3 axle straightening presses, 32 axle cutting off and centering machines, and 27 axle turning lathes; product,car and locomotive axles; annual capacity,130,000 tons. Fuel,coal. (Formerly operated by the Carnegie Steel Company.)

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

Lower Union Mills,Twenty-ninth st.,Pittsburgh,on the Allegheny Valley Railway. Built in 1861-2 by Kloman & Phipps and enlarged by Wilson,Walker & Co.,Limited, and by Carnegie Phipps & Co.,Limited; 10 heating furnaces, 4 trains of rolls,(one 9,one 12, one 15, and one 78-inch,) 6 forge fires, and 6 hammers,(400 to 8,000 pounds) and 4 spring pointing machines; product,sheared plates,forgings,and bar steel; annual capacity,90,000 tonssof rolled and 1,200 tons of forged products. Fuel,natural gas,coal,and oil.(Formerly operated by the Carnegie Steel Company.)

McCutcheon Mill,88 Rebecca st.,Allegheny 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,cotton-ties,and light angles; also strap and T hinges,wrought steel shelf brackets, and wrought steel and iron washers;annual capacity,95,000 tons.Fuel,natural gas and coal. Brands,"Star" for horseshoe bars and "*Ashco*" for other products. (Formerly operated by the American Steel Hoop Company.)

Mingo Steel Works,Mingo Junction,Jefferson county,Ohio. Present plant formed by the consolidation of the Mingo Mill of the former American Steel Hoop Company, and the Mingo Works of the former National Steel Company. The Mingo Mill was built in 1882, first put in operation November 1,1882,and remodeled in 1895. The Mingo Works were built in 1885-6 and first put in

operation in February,1886. The present plant contains two 10-gross-ton Bessemer steel converters with an annual capacity of 450,000 tons of ingots; first blow made February 8,1886; one 50-ton metal mixer, three 4-hole soaking pits, 2 gas heating furnaces, one 36-inch direct-coupled and one 32-inch gear-driven blooming mill, one Kennedy continuous mill, and one 10-inch continuous Morgan bar mill; product, blooms,billets,slabs,sheet and tinplate bars, and steel merchant bars; annual capacity 750,000 tons of partly finished products and 60,000 tons of merchant bars. Fuel,coal and producer gas. Brand for merchant bars,"*Ashco*". Molten pig iron is taken from the Mingo furnace to the converters.

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 tons. Brand,"*Ashco*". Fuel,manufactured gas. (Formerly operated by the American Steel Hoop Company.)

New Castle Steel Works,New Castle,Pa. Two 8-gross-ton Bessemer steel converters built in 1892 and first blow made November 2,1892; converters enlarged to 10 tons in 1892; annual capacity, 60,000 tons of ingots; one 50-ton metal mixer, four 4-hole soaking pits, one 36-inch blooming mill, and one finishing mill,the latter consisting of 2 mills of 9 trains of rolls each driven by four engines; product,8-inch tinplate and sheet bars and billets; annual capacity,550,000 tons. Fuel,coal and producer gas. Molten pig iron is taken from the New Castle furnaces to the converters. (Formerly called the New Castle Works and operated by the National Steel Company.)

,Ohio Steel Works,Youngstown,Ohio. Built in 1893-4;two 10-gros-ton Bessemer steel converters; first steel made February 4,1895;one 50-ton metal mixer,six 4-hole soaking pits,5 trains of rolls, (one 34-inch blooming,three 23-inch roughing and finishing,and one 15-inch Morgan continuous,) and one 1,500-lb.hammer; first steel rail rolled May 14,1900; product,sheet and tinplate bars, slabs,billets to 1½inches square, and T rails;annual capacity, 700,000 tons of ingots, or 600,000 tons of rails, or 600,000 tons of billets and bars. Fuel,coal and producer gas.Molten pig iron is taken from the Ohio Furnaces to the converters.(Formerly called the Ohio Works and operated by the National Steel Company.)

Painter Mill,South Side,Pittsburgh,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,110,000 tons. Fuel,natural gas,producer gas and coal.Brand,"*Ashco*".(Formerly operated by the American Steel Hoop Company.)

Sharon Steel Works,Sharon,Pa. Built in 1896-7 and first put in operation in May,1897; six 40-ton-gross basic open-hearth steel furnaces; first steel made May 24,1897;annual capacity,110,000 tons of ingots;three 4-hole soaking pits,one 35-inch blooming mill,and one 3-high 27-inch finishing mill having connected with it a 22-inch bending and a 24-inch bull-head mill;product,

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blooms and angles; annual capacity 150,000 tons. Fuel,coal and producer gas.(Formerly called the Sharon Works and operated by the National Steel Company.)

South Sharon Works,Sharon,Pa. Built in 1900-1; twelve 50-gross-ton basic open-hearth steel furnaces with an annual capacity of 350,000 tons of ingots; first steel made April 30,1901;4 soaking pits,one 36-inch blooming mill,one 30-inch universal mill, and three 26-inch bull-head mills;product,blooms,billets and universal plates; annual capacity,310,000 tons. Fuel,producer gas. Five additional 50-gross-ton basic open-hearth steel furnaces are projected. (Formerly operated by the Sharon Steel Company; later by the National Steel Company; now owned by the Union Steel Company.)

Upper Union Mill,Youngstown,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,150,000 tons. Fuel,coal and manufactured gas. Brand,"*Ashco*".(Formerly operated by the American Steel Hoop Company.)

Upper Union Mills,Twenty-third Street,Pittsburgh,on the Allegheny Valley Railway. Built in 1863-4 by the Cyclops Iron Company; enlarged by Carnegie,Kloman & Co.,Carnegie Bros.& Co.,Limited, and Carnegie Phipps & Co.,Limited; twenty-one 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 tons,including 15,000 tons of columns,girders,and otherwfitted structural work. Fuel,natural gas and coal. (Formerly operated by the Carnegie 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,45,000 tons Fuel,coal. Brand,"*Ashco*", (Formerly operated by the American Steel Hoop Company.)

Total annual capacity of the 24 rolling mills and steel works; 4,275,000 gross tons of Bessemer steel ingots,2,790,000 tons of open-hearth steel ingots, 90,315 tons of iron,brass and steel castings,moulds,stools etc.,5,739,000 tons of blloms,billets, slabs,and sheet and tinplate bars,1,145,000 tons of rails, 651,000 tons of plates,130,000 tons of axles,107,000 tons of muck iron, and 2,047,000 tons of hoops,bands,cotton-ties,skelp, merchant bars, shafting,and other forms of rolled and forged products.

CAR AND LOCOMOTIVE AXLE WORKS.

Howard Axle Works,Homestead,Allegheny county,Pa. Product,car and locomotive axles;annual capacity,130,000 tons.

Bolt and Rivet Works-2.

Homestead Steel Works,Munhall,Pa. Product,round,square,and hexagon bolts and buttons and cone-headed rivets. Sizes;bolts,from 3/8 of an inch to 3 inches; rivets from 3/8 of an inch to 1 inch.
Upper Union Mills,Pittsburgh,Pa. Product,steel bolts and rivets. Sizes; bolts,from $\frac{1}{2}$ of an inch to $1\frac{1}{2}$ inches in diameter and from $1\frac{1}{2}$ inches to 24 inches long; rivets from 3/8 of an inchto 1 inch in diameterand from $1\frac{1}{2}$ inches to 6 inches long.

Foundries.

Bellaire Steel Works,Bellaire,Ohio.Product,brass castings for the use of the works; annual capacity,15 tons.
Edgar Thomson Steel Works,Bessemer,Pa. Product,iron and brass castings for the company's use; annual capacity,12,000 tons of castings and 75,000 tons of ingot moulds and stools.
Homestead Steel Works,Munhall,Pa. Product,open-hearth steel castings for the use of the works;annual capacity,3,300Ø tons.
Total annual capacity; 15,315 gross tons of iron,brass and steel castings and 75,000 tons of ingot moulds and stools.

THE CARNEGIE COMPANY.

The Carnegie Company; general offices,Carnegie Building,Pittsburgh. Officers;Alva C.Dinkey,President; James H.Reed,Chairman of Board of Board of Directors; H.P.Bope,First Vice-President and General Manager of Sales; W.W.Blackburn,Second Vice-President and Secretary; James J.Campbell,Auditor and Assistant Secretary;W.C.Mc Causland,Treasurer; and W.R.Conrad,Assistant Treasurer.
This compsny was merged with the National Steel Company and the American Steel Hoop Company in March,1903,under the name of the Carnegie Steel Company(of New Jersey.)

CARNEGIE STEEL COMPANY (OF PENNSYLVANIA).

The Carnegie Steel Company (of Pennsylvania) ceased to be an operating company on March 31,1903, its plants having been leased to the Carnegie Steel Company (of New Jersey) on that date. The latter company has since operated all the plants of the former company.

NATIONAL STEEL COMPANY.

The National Steel Company was merged in March,1903,with the American Steel Hoop Company and the CarnegieCompany under the name of the Carnegie Steel Company(of New Jersey).

AMERICAN STEEL HOOP COMPANY.

The American Steel Hoop Company was merged in March,1903,with the National Steel Company and the Carnegie Company under the name of the Carnegie Steel Company(of New Jersey).

PROPERTY AT CONNEAUT, OHIO.

The Carnegie Steel Company owns 5,000 acres of land on the southern shore of Lake Erie,at Conneaut,Ohio, which is suitable for mill sites.

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; general offices,Carnegie Building,Pittsburgh. Officers;James H.Reed,President;Daniel M.Clemson,Vice-President;G.W.Kepler, Secretary and Treasurer; D.Hum,Jr.,Auditor; E.H.Utley,General Manager; O.J.Hammon,General Freight Agent;E.D.Comstock,General Passenger Agent; and J.S.Matson,Superintendent.

This company owns 8.87 and leases 204.03 miles of track (including 12.9 miles of leased track) between Conneaut Harbor,Ohio,Erie, Pa.,and North Bessemer,Pa.,Its equipment consists of 96 standard gauge locomotives,47 passenger cars,8,714 freight cars,and 218 service cars.

CARNEGIE NATURAL GAS COMPANY.

Carnegie Natural Gas Company;general offices,Carnegie Building,Pittsburgh.Officers;Daniel M.Clemson,President;Norwood Johnston, Vice-President; W.W.Blackburn,Secretary; James J.Campbell,Assistant Secretary;H.E.Jeffries,Treasurer; and J.D.DeCourcey, Auditor.

The Carnegie Natural Gas Company has under lease 115,000 acres of gas territory in Allegheny,Washington,Armstrong,and Westmoreland counties,Pennsylvania,and in Wetzel and Doddridge counties, West Virginia. The property includes 175 producing gas wells, and 300 miles of main and branch pipe lines,supplying about 15,000,000,000 cubic feet of natural gas per annum.

PITTSBURGH STEAMSHIP COMPANY.

Five-Sixths of the stock of the Pittsburgh Steamship Company is owned by the Carnegie Steel Company (Of New Jersey).

OLIVER IRON MINING COMPANY.

Five-Sixths of the stock of the Oliver Iron Mining Company is owned by the Carnegie Steel Company (of New Jersey).

H.C.FRICK COKE COMPANY.

Over 74 per cent. of the stock of the H.C.Frick Coke Company is owned by the Carnegie Steel Company (of New Jersey).

PITTSBURGH AND CONNEAUT DOCK COMPANY.

Pittsburgh and Conneaut Dock Company;general offices,Carnegie Building,Pittsburgh. Officers;J.H.Reed,President;D.G.Kerr,Vice-President;William J.Post,Secretary and Auditor; and G.W.Kepler, Treasurer.
This company operates the docks at the lake terminus of the Bessemer and Lake Erie Railroad Company,at Conneaut Harbor,Ohio, which have a daily capacity of 25,000 tons of iron ore and 4,000 tons of coal.

UNION RAILROAD COMPANY.

Union Railroad Company;general offices,Carnegie Building,Pittsburgh. Officers;James H.Reed,President; D.M.Clemson,Vice-President; George E.McCague,Traffic Manager; William J.Post,Secretary and Auditor; and G.W.Kepler,Treasurer.
This company operates 86.39 miles of track,connecting the Monongahela river plants of the Carnegie Steel Company,and 19.73 miles of leased track between Bessemer and North Bessemer,Pa.,equipped with 75 locomotives and 1,100 steel freight cars.

THE PITTSBURGH LIMESTONE COMPANY,LIMITED.

The Pittsburgh Limestone Company,Limited;general offices,New Castle, Pa. Officers; George W.Johnson,Chairman; William B.Schiller, Treasurer; and D.G.Kerr,Secretary.
This company operates limestone quarries at Tyrone and Williamsburg, in Blair county, and at Wick,in Butler county,Pa. The daily capacity of its quarries is about 4,500 tons.

THE YOUGHIOGHENY NORTHERN RAILWAY COMPANY.

All the capital stock of the Youghiogheny Northern Railroad Company is owned by the Carnegie Steel Company (of New Jersey).

YOUGHIOGHENY WATER COMPANY.

All the capital stock of the Youghiogheny Water Company is owned by the Carnegie Steel Company(Of New Jersey).

TROTTER WATER COMPANY.

All the capital stock of the Trotter Water Company is owned by the Carnegie Steel Company(of New Jersey).

MOUNT PLEASANT WATER COMPANY.

All the capital stock of the Mount Pleasant Water Company is owned by the Carnegie Steel Company (of New Jersey).

NATIONAL MINING COMPANY.

Two-thirds of the capital stock of the National Mining Company is owned by the Carnegie Steel Company (of New Jersey), and one-third by the American Sheet and Tinplate Company.

CHAPIN MINING COMPANY.

All the capital stock of the Chapin Mining Company is owned by the Carnegie Steel Company (of New Jersey).

WINTHROP IRON COMPANY.

All the capital stock of the Winthrop Iron Company is owned by the Carnegie Steel Company (of New Jersey).

MINGO COAL COMPANY.

All the capital stock of the Mingo Coal Company is owned by the Carnegie Steel Company (of New Jersey).

NEW YORK,PENNSYLVANIA, AND OHIO DOCK COMPANY;

New York,Pennsylvania,and Ohio Dock Company; general offices,Cleveland,Ohio. Officers; H.G.Dalton,President and Treasurer;Harvey H.Brown,Vice-President; James H.Hoyt,Secretary; and Pickands, Mather & Co.,Managers and Agents.
This company operates the docks at the lake terminus of the Erie Railroad at Cleveland,Ohio,which have a daily capacity of 12,000 tons of iron ore.

UNION SUPPLY COMPANY.

Union Supply Company; general offices,Carnegie Building,Pittsburgh. Officers at Pittsburgh;Thomas Lynch,President; J.W.Anawalt,Vice-President;William McWilliams,Secretary; and Philip Keller,Treasurer. Officer at Uniontown,Pa.;John Lynch,General Superintendent
This company operates 40 stores and transacts a general merchandise business.

PENNSYLVANIA AND LAKE ERIE DOCK COMPANY.

Pennsylvania and Lake Erie Dock Company;general offices,Carnegie Building,Pittsburgh,Pa. Officers at Pittsburgh;-----President, and T.J.Crump,Secretary,Frick Building;D.G.Kerr,Vice-President and Treasurer,Carnegie Building. Officers at Conneaut Harbor Ohio; R.R.Richardson,General Manager.
This company operates docks at the lake terminus of the Baltimore and Ohio Railroad at Fairport Harbor,Ohio, which have a daily capacity of 14,000 tons of iron ore.

THE ILLINOIS STEEL COMPANY.

The Illinois Steel Company; general offices,Rookery Building, Chicago. Officers;E.J.Buffington,President;T.W.Robinson, First Vice-President;C.H.McCullough,Jr.,Second Vice-President; T.J.Hyman,Secretary and Treasurer; L.D.Doty,Purchasing Agent; George Baker,General Manager of Sales;and E.M.Hager,Manager of Cement Department. Officers at the Works; North Works--W.H.Pratt,General Superintendent,and L.J.Miller,Auditor; South Works--W.A.Field,General Superintendent, and J.F.Wislon,Auditor; Joliet Works--D.R.Mathias,General Superintendent, and L.W.McNamee,Auditor; Milwaukee Works--R.B.Charlton,General Superintendent,and C.H.Hosler,Auditor.

Sales Department;Chicago-George Baker,General Manager of Sales. Boston-Wilbur Sargent Locke,Manager,and William Fred Hickey Assistant Manager,125 Milk St. New York-Charles W.Baker, Manager,and C.C.Cluff,Assistant Manager,Empire Building. Philadelphia-James B.Bonner,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. New Orleans-John R.Scott,Manager,Hennen Building. Detroit-N.D.Carpenter,Manager,Union Trust Building.St.Paul-George A. McDougall,Manager,Pioneer Press Building. St.Louis-W.J.Totten,Manager,New Bank Of Commerce Building. Denver-Edward M.Sparhawk,Manager,Boston Building. San Francisco-William B.Isaacs,Manager,226 Market St.Montreal,Canada,Charles Cassils,Manager,Bell Telephone Building. Mexico-F.W.Highberger, Manager,924 Apartado. St.Louis-J.C.Van Doorn,Agent Cement Department,324 Odd Fellows Building. Portland,Oregon-Richard R.Hoge,Manager,Ainsworth Building.

Capital Stock,$18,650,600,all common. The Illinois Steel Company operates the following works;

Blast Furnaces-19 Active and 1 Idle.

Joliet Works,Joliet,Illinois.Four stacks,three active and one idle; Nos.1 and 2,each 78 1/3x19½; old No.3(idle)78½x195/12; and new No.3,80x20. Nos.1 and 2 built in 1873 and rebuilt in 1891, old No.3 built in 1889-90,and new No.3 built in 1903; the stoves,blowing engines etc. of old No.3 were used in equipping new No.3; if the old furnace is rebuilt it will be known as No.4; 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,not including old No.3;395,000 tons. One Heyl & Patterson pig-iron casting machine. Selling Agents,Pickands,Brown & Co.,Chicago.-Active in 1903.

Milwaukee Works,Bay View Furnaces, Milwaukee,Wisconsin.Two stacks,Nos.1 & 2,each 66x16,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 tons.Brands,"Bay View,Nos. 1,2,and 3" Gertrude",and "Milwaukee Scotch".Selling Agents, Pickands,Brown & Co.Chicago.--Active in 1903.

North Works,Chicago.Furnaces at the foot of Wabansia avenue,on the north branch of the Chicago river. Two stacks,Nos.1 and 2,each 66x16,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 tons.Selling Agents,Pickands, Brown & Co.Chicago.-Active in 1903.

South Wprks,South Chicago,Ill.Ten stacks;Nos.1,2,3,and 4 built in 1880-1;No.4 remodeled in 1901 and Nos.1,2land 3 remodeled in 1903;Nos.1 and 2 75x20,No.3 75x19,and No.4 90x21;sixteen Siemens-Cowper-Foote stoves.Nos.5,6,7,8 built in 1890-1; Nos.5,6,8 remodeled in 1902 and No.7 remodeled in 1903;Nos. 5,7;8,each 88½x21,and No.6 88½x20;sixteen Massicks & Crooke stoves. Nos.9 and 10;each 95x22,built in 1900-1;No.9 blown in July 3 and No.10 December 13,1901;eight 4-pass hot blast stoves. Fuel,Connellsville and Pocahontas coke;ores,Lake Superior and Northern ranges;product,Bessemer pig iron; total annual capacity,1,200,000 tons. Equipped with four Heyl & Patterson pig-iron casting machines. Selling Agents,Pickands,Brown & Co.Chicago.-Active in 1903.

Union Works,Chicago. Furnaces at Ashland avenue and 31st st.on the south branch of the Chicago river. Two stacks,Nos.3 & 4,each 73x15 1/3 built in 1881 and rebuilt in 1889; 7 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 speigeleisen and ferromanganese;product,spiegeleisen,ferromanganese,and Bessemer pig iron; total annual capacity,140,000 tons. Selling agents,Pickands,Brown & Co.,Chicago.-Active in 1903.

Total annual capacity of the 19 active furnaces,excluding old No. 3 at Joliet;1,930,000 gross tons of pig iron,ferromanganese,etc.

Rolling Mills and Steel Works-3.

Joliet Works,Joliet,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,700,000 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,600,000 tons of billets. Wire-rod mill contains one Garrett mill built in 1888, and another added in 1895 and four heating furnaces;annual capacity,240,000 tons. A third wire-rod mill,arranged to roll either rods,hoops,or cotton-ties,added in 1898;annual capacity 50,000 tons of wire-rods,or 30,000 tons of cotton-ties and hoops. (This mill is now used for merchant products and its

capacity is included in the figures given below for merchant and factory products.) 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 the merchant mill,55,000 tons of merchant products; of factory products,66,000 tons. Iron,brass and steel foundries are connected with these works. Fuel,coal for steam,manufactured gas in the principal departments,and some fuel oil for heating purposes. Total annual capacity;ingots,700,000 tons;rolled products,895,000 tons;factory products,66,000 tons.

Milwaukee Works,Milwaukee,Wisconsin.Built in 1868 and 1874;remodeled in 1895-6;6 continuous 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 nars;annual capacity, 150,000 tons of light rails and steel bars and 60,000 tons of angles and splice bars. Fuel,coal and manufactured gas.

South Works,South Chicago,Illinois. Three 15-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;annual capacity,880,000 tons of ingots and 720,000 tons of rails.Open-hearth steel department added in 1894-5,first steel made February 11,1895;ten basic furnaces(four 50-gross-ton Wellman stationary and six 31-gross-ton Siemens);one plate train,with 2 stands of rolls,34x90 and 34x132 inches,and 4 gas heating furnaces;product,fire-box and boiler,ship,and tank plate;annual capacity,240,000 tons of open-hearth ingots and 110,000 tons of plates.Slabbibg 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 4x4 inches up to 24x24;annual capacity,240,000 tons of slabs,blooms and billets. Iron,brass and steel foundries are connected with these works. Fuel,coal for steam and manufactured gas,natural gas and fuel oil for heating purposes. Total annual capacity; ingots,1,130,000 tons;finished and partly finished rolled products,1,070,000 tons. Seven 50-gross-ton basic open-hearth furnaces,with an annual capacity of 250,000 tons of ingots, are being added;also one 40-inch blooming mill with an annual capacity of 270,000 tons of blooms. These additions will probably be completed in July. One 28-inch structural mill, and one 48-inch plate mill will also be installed.

Total annual capacity of the three rolling mills and steel works; 1,580,000 tons of Bessemer steel ingots,840,000 tons of slabs, blooms and billets,720,000 tons of standard sizes of steel rails,110,000 tons of plates,60,000 tons of angles and splice bars, 240,000 tons of wire-rods, 150,000 tons of light rails and bars, and 121,000 tons of merchant and factory products. When the new equipment at the South Works is installed the company will have an additional capacity of 250,000 tons of openhearth steel ingots,270,000 tons of blooms,150,000 tons of structural shapes, and 125,000 tons of plates.

Wire-Rod and Bridge and Strustural Plants.

Joliet Works,Joliet,Ill.Product,wire rods;annual capacity;240,000 t.
North Works,North Chicago.Product,railroad and highway bridges; also erect iron and steel bridges;annual capacity,15,000 t.

Bolt,Nut,and Spike Works.

Joliet Works,Joliet,Ill. Product,steel bolts,nuts,and standard steel spikes.Sizes;Bolts and nuts,from $\frac{1}{2}$ of an inch to 1 in. spikes,from 4x$\frac{1}{2}$ up to 5$\frac{1}{2}$x5/8 of an inch;annual capacity, 9,000 tons of bolts and nuts and 57,000 tons of spikes.

Iron,Brass and Steel Foundries.

Joliet Works,Joliet,Ill.Product,iron,brass and Bessemer steel castings for the company's use;annual cap.13,000 tons.
South Works,South Chicago.Product,iron,brass and open-hearth steel machinery castings for the company's use;annual capacity, 24,000 tons of iron and brass castings,and 2,000 tons of open-hearth steel castings.
Total annual capacity of the iron,brass and steel foundries;39,-000 gross tons of castings.

Cement Plants-2 Completed and 1 Building.

North Works,North Chicago. Built in 1895;product,"Steel Puzzolan Cement" of high quality made from blast furnace slag;daily capacity,500 barrels.
South Works,South Chicago.Built in 1899-1900;product,"Universal Portland Cement;" daily capacity,1,500 barrels.
Buffington Cement Plant,Buffington,near Indiana Harbor,Ind.Commenced building in April,1903;product,"Universal Portland Cement2;daily capacity,4,000 barrels.
Total daily capacity of the cement plants;6,000 barrels.

Railroads,Iron-Ore Mines,Coal Lands,and Coke Ovens.

The Illinois Steel Company owns the entire capital stock of the Chicago,Lake Shore and Eastern Railroad Company,which operates over 350 miles of track by ownership,lease or otherwise. It also owns all the capital stock of the Cundy Iron Company,which operates the Cundy mine,at Quinnesec,Michigan.In addition it owns the Iron Ridge mine, at Iron Ridge,Dodge county,Wisconsin,and 3,938 acres of iron ore lands in Marquette,Dickinson,Iron and Baraga counties,Michigan,on which is located the Youngstown mine,near Crystal Falls;also,2,920 acres of coal lands in Williamson county,Ill.115 acres of limestone lands in Vermilion county,Ill.and all the capital stock of the United States Coal and Coke Company,which leases 50,000 acres of coal lands in McDowell county,West Virginia.

AMERICAN STEEL AND WIRE COMPANY OF NEW JERSEY.

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

American Steel and Wire Company of New Jersey,Rookery Building, Chicago.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;D.A.Merriman and G.F.Rummel,Assistant General Sales Agents;and Max Pam,General Counsel. Officers at Cleveland;Wm.P.Palmer,President;C.A.Vogt,Auditor;E.E. Stone,General Purchasing Agent;R.W.Ney,Manager;J.H.Early, Assistant Manager;M.McMurray,General Superintendent Blast Furnaces and Steel Works,Cleveland and Pittsburgh Districts; and A.S.Chisholm,Assistant to President,Western Reserve Building. Officers at Pittsburgh,Pa..C.L.Miller,General Superintendent,Frick Building;George W.Jewett,Manager and S.W.Tener,Assistant Manager Pittsburgh District,Shoenberger Works,Penn ave.and Fifteenth st. Officer at New York City; J.R.Thomas, Assistant Secretary and Assistant Treasurer, Battery Park Building. Officers at Worcester,Mass.;F.H. Daniels,Chief Engineer;H.G.Stoddard,Manager and E.J.Watson, Assistant Manager Worcester District.

Sales Offices and Agents;Domestic;Chicago,Rookery Building-F. Baakes,General Sales Agent;D.A.Merriman and G.F.Rummel,Assistant General Sales Agents.New York City,Battery Park Building-T.H.Taylor,Assistant General Sales Agent.San Francisco,California,Sixteenth and Folsom sts.-A.T.DeForest;Pacific Coast Sales Agent?Butte,Montana,19 West Granite st. Charles H.Lane,Sales Agent. Boston,Mass.-A.F.Walker,Sales Agent.Cleveland,Ohio,H.T.Pratt,Sales Agent.Denver,Colorado-American Steel and Wire Company of Colorado;E.R.Pohl,President. Los Angles,Cal.-Burton W.Smith,Sales Agent. Pittsburgh,Pa.-W.L.Hirsch,Sales Agent.Portland,Oregon-E.R.Eldredge,Sales Agent. St.Louis,Mo.-O.B.Barrows,Sales Agent. St.Paul,Minnesota-N.R.McLeod,Sales Agent.Salt Lake City, Utah-Grant Brothers,Sales Agents. Foreign;London,England-Millard Hunsicker,Manager. Montreal,Canada-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.

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;

Blast Furnaces-12.

Breaker Island Furnaces,on Breaker Island,Albany county,opposite Troy,New York. Three stacks,each 80x18,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,180,000 tons.(Formerly called Troy Furnaces and owned by the Troy Steel Company; later by the Troy Steel Products Company.)-Idle since 1897.

Central Furnaces,Cleveland,Ohio. Three stacks;one,75x20,built in 1881-2 and rebuilt in 1895-6,has one McClure and three Whitwell stoves; one,80x20,built in 1887,has four fire-brick stoves;and one,100x22,built in 1900-1and blown in January 17, 1901,has four fire-brick stoves,each 22x100. Fuel,coke;ore, Lake Superior;product,No.1 Bessemer pig iron; total annual capacity,395,000 tons. Molten metal is conveyed from these furnaces to the Newburgh Steel Works. Equipped with one Uehling pig-iron casting machine. -Active in 1903.

Edith Furnace,Allegheny,Pa. One stack,97x20 built and blown in 1898; one Massicks & Crooke and four Kennedy stoves; one 80x20, built in 1887,has four fire-brick stoves; and one,100x22,b built ; fuel,Connellsville coke;ore,Lake Superior;product, Bessemer pig iron;annual capacity,150,000 tons. One Uehling pig iron casting machine. (Edith Furnace,75x16½,built in 1882 and abandoned in 1898,is now used as a dust catcher.) -Active in 1903.

Emma Furnace,Cleveland,Ohio. One stack,73x17,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,100,000 tons.Brand,"Emma". Molten metal is conveyed from this furnace to the Newburgh Steel Works. One Uehling pig iron casting machine serves Emma and Newburgh furnace.-Active in 1903.

Neville Island Furnace,Neville Island,Neville Township,Allegheny county,below Pittsburgh,Pa. One stack,100x21,built in 1900-1 and blown in July 3,1901; four Kennedy two-pass stoves;fuel, Connellsville coke;ore,Lake Superior;product,Bessemer pig iron;annual capacity,168,000 tons. Equipped with one Uehling pig-iron casting machine.-Active in 1903.

Newburgh Furnace,Cleveland,Ohio. One stack,62x16,built in 1872 and remodeled in 1886;rebuilt in 1895-6;fuel,coke;ore,Lake Superior; product,No.1 Bessemer pig iron;annual capacity, 75,000 tons. One Uehling pig-iron casting machine serves Newburgh and Emma Furnace.-Active in 1903.

Shoenberger Furnaces,Pittsburgh,Pa. Two stacks;one,76x14,and one 76½x16,built in 1865 and rebuilt in 1890; seven Massicks & Crookes stoves; fuel,coke;ore,Lake Superior;product,Bessemer and basic pig iron; total annual capacity,175,000 tons.Equipped with two pig-iron casting machines.-Active in 1903.

Total annual capacity of the twelve furnaces;1,243,000,gross tons.

Rolling Mills and Steel Works-16.

Allentown Works,Allentown,Pa.Built in 1889,by the Iowa Barb Wire Company;2 gas heating furnaces,4 trains of rolls,(9,10,14, and 16-inch) 162 wire-drawing blocks,and 169 wire nail machines; product,wire-rods drawn into wire and chiefly used by the company inthe manufacture of barbed wire,wire nails, and wire hoops; annual capacity,82,000 tons of wire rods, 69,000 tons of wire,and 600,000 kegs of wire nails. Fuel, coal and manufactured gas. A galvanizing plant is connected with the works.

American Works,Cleveland,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,2 heating furnaces,and 4 trains of rolls; one continuous rod mill with 3 gas producers,one heating furnace,and 3 trains of rolls;and 2272 wire-drawing blocks;products,steel wirerods and wire; annual capacity,125,000 tons of rod and 60,000 tons of wire. Fuel,coal.Galvanizing and tinning plants are connected with the works.

Anderson Works,Anderson,Madison county,Indiana.Built in 1889 by the American Wire Nail Company;2 continuous heating furnaces, one rod mill,104 wire-drawing blocks,and 165 wire-nail machines;product,steel wire rods,wire,and wire nails;annual capacity,75,000 tons of rods,70,000 tons of wire,and 650,000 kegs of nails. Fuel,natural gas and coal. A galvanizing plant is connected with the works.

Braddock Works,Braddock,Pa.Built in 1891 and put in operation in February,1892;3 heating furnaces,3 trains of rolls,(9, 12 and 16-inch) 118 wire-drawing blocks,and 132 wire-nail machines;product,steel wire rods,wire,and wire nails;annual capacity,80,000 tons of wire rods, 73,500 tons of rolled and drawn products,(including 70,000 tons of wire) and 675, 000 kegs of wire nails. Fuel,bituminous coal. A galvanizing plant is connected with the works.

Breaker Island 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,2 5-hole Hainsworth pit furnaces,and 24 soaking pits; annual capacity,200,000 tons of ingots. Rolling mill connected with the steel works contains one 2-high 35-inch reversing blooming mill,with 42x60-inch reversing engines,and one 3-high 21-inch billet mill;product,billets,blooms,slabs and skelp;annual capacity ofbrolled material,200,000 tons. Fuel,bituminous coal. (Formerly called the Bessemer Steel Works and owned by the Troy Steel Company;later owned by the Troy Steel Products Company) -Idle.

Consolidated Works,Cleveland,Ohio. Wire-drawing and wire nail plants built in 1890-1 by the Baackes Wire Nail Company; rod mill added in 1892;2 heating furnaces,148 wire-drawing blocks,274 wire nail machines,71 barbed wire machines,and one 9,one 12,and one 16-inch train of rolls;product,steel wire rods,wire,galvanized wire,wire nails,staples,and American and Ellwood field fencing;annual capacity,95,000 tons of rods,80,000 tons of wire,and 1,1001000 kegs of nails.Fuel, coal and producer gas.A galvanizing plant is connected with the works.

Donora Works,Donora,Pa.Built in 1900-1 and first put in operation in 1901(September);4 heating furnaces,one continuous and one right and one left hand Garrett finishing rod mills,308 wire-drawing blocks,and 282 wire nail machines;product,wire rods,bright and galvanized wire,barbed wire,wire nails and

staples; annual capacity, ~~95,000 tons of rod~~ 200,000 tons of wire rods, 172,000 tons of wire, and 1,600,000 kegs of wire nails. Fuel, natural gas and coal. A galvanizing plant is connected with the works. (Formerly operated and now owned by the Union Steel Company.)

H.P. Works, Cleveland, 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, one 10, one 12, and one 16-inch train of rolls, 200 wire-drawing blocks, and 613 wire nail machines; product, steel wire rods, steel wire, wire nails, staples, tacks and rivets; annual capacity, 60,000 tons of rods, 90,000 tons of finished products, (including 60,000 tons of wire) and 1,100,000 kegs of wire nails. A plant for galvanizing nails, pole steps, etc., is connected with the works. Fuel, coal for boilers and producer gas for the rod mill.

Newburgh Steel Works, Newburgh, 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, 525,000 tons of ingots. Open-hearth steel works built in 1876-8 and rebuilt in 1899-1900; one stationary and 4 rolling 50-gross-ton furnaces (2 acid and 3 basic); annual capacity, 143,000 tons of ingots. Blooming mill built in 1881 and remodeled in 1891; 8 soaking pits and 2 trains of rolls (one 2-high 38-inch reversing and one 3-high 23-inch); annual capacity, 440,000 tons of blooms, billets and slabs. New blooming mill built in 1901, 4 soaking pits and one 2-high 35-inch reversing train of rolls; annual capacity, 220,000 tons of blooms, billets and slabs. One rod mill built in 1902; annual capacity, 100,000 tons. A foundry, a forge and a machine shop are also connected with the works. Product, Bessemer and open-hearth steel blooms, billets, slabs, wire rods, and forgings. Fuel, coal for steam and manufactured and natural gas for heating. (Rail, structural and bar mills dismantled in 1902, will probably be rebuilt.)

New Castle Works, New Castle 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) 111 wire-drawing blocks, and 185 wire-nail machines; product, wire rods, wire, and wire nails; annual capacity, 90,000 tons of rods, 75,000 tons of wire, and 900,000 kegs of nails. Fuel, bituminous coal.

Rankin Works, Rankin Station, Pa. Built in 1885-6 by the Braddock Wire Company; rod mill rebuilt in 1897; 2 heating furnaces, 4 trains of rolls, (2 9, one 12, and one 18-inch) 132 wire-drawing blocks, 191 wire-nail machines, and 86 barbed wire machines; 4-inch billets rolled into 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 tons of wire rods, 90,000 tons of wire, and 1,000,000 kegs of wire nails. Fuel, bituminous coal and manufactured gas. Galvanizing and field fencing plants are connected with the works.

Sharon Works,Sharon,Pa.Built in 1900-1 and first put in operation in May,1901;first wire rods rolled in August,1901;3 continuous heating furnaces,2 reheating furnaces,one continuous billet mills,2 continuous rod mills,one tinplate bar mill, 180 wire-drawing blocks,and 181 wire-nail machines;product, tinplate bars,wire rods,wire,wire nails,galvanized wire,barbed wire and staples;annual capacity,97,000 tons of tinplate bars;105,000 tons of wire rods,86,000 tons of wire, and 900,000 kegs of wire nails. Fuel,producer gas and coal. A galvanizing plant is connected with the works.(Fromerly owned and operated by the Sharon Steel Company;now owned by the Union Steel Company.)

Shoenberger Works,Pittsburgh,Pa.Established in 1824;16 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 54x24-inch,two 60x24-inch,and one 72x24-inchsheet, one 34x127-inch plate,2 blooming,(one 32 and one 36-inch) and one continuous train) and 18 horseshoe machines. Open-hearth steel department added in 1879;first steel made(acid) in June or July of that year; first acid blooms rolled September 12,1879;works now contain three 35-gross-ton basic furnaces and 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 horseshoe billets,horse and mule shoes,steel blooms and billets,horseshoe bars and toe calks;annual capacity, 75,000 tons of open-hearth ingots,319,000 tons of Bessemer ingots,440,000 tons of blooms,billets and slabs,and 407,000 tons of other rolled products,including 257,000 tons of rod billets.Fuel,natural gas, manufactured gas, and bituminous coal.

South Works,Worcester,Mass.Rolling mill built in 1846;12 heating furnaces,4 soaking pits,4 annealing furnaces,13 trains of one 34-inch blooming mill,5 rod mills,and 219 wire-drawing blocks;products,billets,iron and steel wire rods,copper rods,iron and steel wire,copper wire,galvanized,telegraph, and barbed wire,staples,woven wire fence,springs,wire rope, electrical wire,copperas and venetian red;annual capacity, 155,000 tons of rods and 52,150 tons of wire. Open-hearth steel department contains one 15 and three 20-gross-ton stationary furnaces and four 50-gross-ton rolling furnaces (5 acid and 3 basic);first open-hearth steel made September 26,1885;annual capacity,170,000 tons of ingots and 165,000 tons of billets. Fuel,coal and manufactured gas. Galvanizing and tinning plants are connected with the works.

Twenty-sixth Ward Street Works, Pittsburgh,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 4x4 inches to 20x8 inches;annual capacity,194,000 tons of ingots and 176,000 tons of billets and slabs.Fuel,natural gas and coal.

Waukegan Works,Waukegan,Illinois.Built in 1891 and first put in operation in that year; destroyed by fire in 1899 and immediately rebuilt;put in operation in September,1900;6 heating furnaces for 4-inch steel wire billets,one continu-

billet mill,and one continuous,one single Belgian,and one double Belgian finishing rod mill,1,166 wire-drawing blocks, and 32 wire nail machines;product,steel and copper wire rods plain,galvanized,telegraph,mattress,tinned,and broom wire, barbed wire,wire nails,staples,springs,bale ties,etc.;annual capacity,131,000 tons of rods,115,000 tons of wire,and 60,000 kegs of nails.Fuel,coal and coke.Galvanizing and tinning p plants are connected with the works.

Total annual capacity of the 16 rolling mills and steel works;Bessemer steel ingots,1,238,000 gross tons;open-hearth steel ingots,388,000 tons;billets,blooms,slabs,etc.,etc.,1,641,000 tons;wire rods,1,398,000 tons;and plates,sheets,skelp,horseshoe bars,horse and mule shoes,rod billets,tinplate bars,etc., 504,000 tons.

13 Wire-Rod Mills,22 Wire-Drawing Plants,and 16 Wire-Nail Plants.

Allentown Works,Allentown,Pa. Product,wire rods drawn into wire, and chiefly used by the company in the manufacture of barbed wire,galvanized wire, wire nails, staples,etc.;annual capacity,82,000 tons of wire rods,69,000 tons of wire,and 600, ooo kegs of wire nails.

American Works,Cleveland,Ohio. Product,steel wire rods,pump rods, and galvanized;mattress,broom,telegraph,flat,shaped and other wire;annual capacity,125,000 tons of rods, and 60,000 tons of wire.

Anderson Works,Anderson,Indiana. Product,steel wire rods,plain wire,galvanized and barb wire,wire nails,staples etc.;annual capacity,75,000 tons of rods,70,000 tons of wire,and 650,000 kegs of wire nails.

Bluff Street Works,Joliet,Ill. Product,bright and annealed wire; number of wire-drawing blocks,67;sizes from No.2 to No.8 gauge;annual capacity 35,000 tons.

Braddock Works,Braddock,Pa. Product,Bessemer and basic open-hearth steel wire rods,plain wire,varnished wire,galvanized wire, fence staples and wire nails;annual capacity,80,000 tons of wire rods,73,500 tons of rolled,and drawn products,(including 70,000 tons of wire) and 675,000 kegs of wire nails.

Central Works,Worcester,Mass. Product,bright,coppered,tinned,galvanized,and annealed wire; annual capacity,22,000 tons.Galvanizing and tinning plants are connected with the works.

Consolidated Works,Cleveland,Ohio.Product,steel wire rods,plain wire,galvanized and barbed wire,staples,wire nails,and American and Ellwodd field fencing;annual capacity,95,000 tons of rods,80,000 tons of wire,and 1,100,000 kegs of nails.

DeKalb Works,DeKalb,Ill. Product,plain wire, galvanized and barbed wire,staples and all sizes of wire nails; annual capacity, 75,000 tons of wire,1,025,000 kegs of nails.(also makeswoven wire fencing,and poultry netting.)

Donora Works,Donora,Pa. Product,wire rods,plain,galvanized and barbed wire,staples, and all sizes of wire nails;annual capacity,200,000 tons of wire rods,172,000 tons of wire, and 1,600,000 kegs of wire nails.

Granite City Works,Granite City,Illinois. Product,market wire, annealed and galvanized barbed wire,steel wire nails,hog and

cattle wire,etc.;annual capacity,24,000 tons of wire,75,000 kegs of wire nails.A galvanizing plant is connected with the works.

H.P.Works,Cleveland,Ohio.Product,steel wire rods,steel wire,galvanized wire,common and special wire nails,staples,tacks, spikes,pole steps,rivets,etc.;annual capacity,60,000 tons of rods,90,000 tons of finished products,(including 60,000 tons of wire) and 1,100,000 kegs of wire nails.

Newburgh Steel Works,Newburgh,Ohio.Product,wire rods;annual capacity,100,000 tons.

Newburgh Wire Works,Newburgh,Ohio.Product,plain wire,barbed wire, galvanized wire,tinned wire,annealed wire,staples,cold-rolled shafting,etc.;annual capacity,90,000 tons.Galvanizing and tinning plants are connected with the works.

New Castle Works,New Castle,Pa. Product,wire rods,wire,and wire nails;annual capacity,90,000 tons of rods,75,000 tons of wire,and 900,000 kegs of nails.

North Works,Worcester,Mass. Product,iron,steel,and copper wire, shaped wire,music,mattress,and broom wire,wire nails,galvanized wire,springs,bale ties,bicycle spokes,etc.;57,200 tons of wire,400,000 kegs of wire nails (annual capacity). Galvanizing and tinning departments are connected with the works.

Pacific Works,San Francisco,California.Product,street railway and submarine cable,plain and annealed wire,wire rope, and springs;annual capacity,3,500 tons of plain wire and 7,500 tons of rope and cable wire.

Rankin Works,Rankin Station,Pa. Product,steel wire rods,plain and galvanized market wire,barbed wire,wire nails,staples, and woven wire fencing;annual capacity,100,000 tons of wire, 90,000 tons of wire,and 1,000,000 kegs of wire nails.

Rockdale Works,near Joliet,Ill.Product,plain wire,galvanized and barbed wire,wire nails,staples,woven wire fence,poultry netting,etc.;annual capacity,68,000 tons of wire and 160,000 kegs of wire nails. A galvanizing plant is connected with the works.

Salem Works,Salem,Ohio.Product,wire and wire nails;annual capacity,20,000 tons of wire,450,000 kegs of wire nails.

Scott Street Works,Joliet,Ill.Product,plain wire, galvanized and barbed wire,wire nails,wire hoops,staples,etc.;annual capacity,88,000 tons of wire,1,250,000 kegs of wire nails. A galvanizing plant is connected with the works.

Sharon Works,Sharon,Pa. Product,wire rods,plain wire,barbed wire, wire nails,galvanized staples,etc.;annual capacity,105,000 tons of rods,86,000 tons of wire,900,000 kegs of wire nails. (Formerly operated by the Sharon Steel Company;now owned by the Union Steel Company.)

South Works,Worcester,Mass. Product,iron and steel wire rods,copper rods,iron and steel wire,copper wire,galvanized,telegraph and barbed wire,staples,woven wire fence,poultry netting,etc.;annual capacity,155,000 tons of rods,52,150 tons of wire.

Waukegan Works,Waukegan,Ill. Product,steel and copper wire rods, plain,galvanized,telegraph,mattress,broom wire,barbed wire, wire nails,staples etc. annual capacity,131,000 tons of rods, 115,000 tons of wire,and 60,000 kegs of nails.

Total annual capacity of the 13 wire rod mills,22 wire-drawing plants,and 16 wire-nail plants;wire rods,1,090,000 gross tons;wire,1,489,350 tons;and nails,11,945,000 kegs of 100lbs.

Cold-Drawn Steel Works-2

Newburgh Wire Works,Newburgh,Ohio.Product,cold-drawn steel shafting and machine screw stock. Sizes;rounds,squares,hexagons and flats, from 7/16 of an inch to 2½ inches.Annual capacity,7,000 tons.
North Works,Worcester,Mass.Products,cold-drawn steel shaftings and screw stock. Annual capacity,1,200 tons.
Total annual capacity of the 2 works;8,200 gross tons.

Galvanizing Works-18.

Allentown Works,Allentown,Pa.Number of galvanizing pans,3;product,galvanized wire;annual capacity,51,500 tons.
American Works,Cleveland,Ohio. Number of galvanizing pans,3;product,fence and telegraph wire;annual capacity,24,500 tons.
Anderson Works,Anderson,Indiana. Number of galvanizing pans,3; product,fence wire;annual capacity,18,900 tons.
Braddock Works,Braddock,Pa. Number of galvanizing pans,2;product,fence wire;annual capacity,35,000 tons.
Central Works,Worcester,Mass. Number of galvanizing pans,1;product,fence wire;annual capacity,19,200.
Consolidated Works,Cleveland,Ohio.Number of galvanizing pans,2; product,fence wire;annual capacity,35,000 tons.
DeKalb Works,DeKalb,Ill.Number of galvanizing pans,3;product, fence and netting wire;annual capacity,32,ooc tons.
Donora Works,Donora,Pa. Number of galvanizing pans,4;product, fence wire;annual capacity,67,500 tons.
Granite City Works,Granite City,Ill.Number of galvanizing pans, 2;product,fence wire;annual capacity,8,500 tons.
H.P.Works,Cleveland,Ohio. Number of revolving furnaces,7;product, galvanized nails,spikes,pole steps etc.;annual capacity, 7,000 tons.
Newburgh Wire Works,Newburgh,Ohio. Number of galvanizing pans,3; product,fence wire;annual capacity,32,000 tons.
North Works,Worcester,Mass.Number of galvanizing pans,3;product, fine and flat wire;annual capacity,1,950 tons.
Rankin Works,Rankin Station,Pa. Number of galvanizing pans,4; product,fence wire;annual capacity,49,000 tons.
Rockdale Works,near Joliet,Ill. Number of galvanizing pans,4;p product,fence and netting wire;annual capacity,66,000 tons.
Scott Street Works,Joliet,Ill.Number of galvanizing pans,3;product fence wire;annual capacity,28,000 tons. Number of furnaces,6;product,galvanized nails;annual capacity,4,000 tons.
Sharon Works,Sharon,Pa.Number of galvanizing pans,3;product, fence wire;annual capacity,28,000 tons.
South Works,Worcester,Mass. Number of galvanizing pans,8;product, fence,telegraph,and armor wire;annual capacity,32,000 tons.

Waukegan Works,Waukegan,Ill.Number of galvanizing pans,6;product, fence and telegraph wire and pump rods;annual capacity, 69,000 tons.
Total annual capacity of the 18 galvanizing works;609,250 gross tons of all kinds of galvanized products.

Tinning Works-6.

American Works,Cleveland,Ohio. Number of tinning furnaces,8 double; product,market,broom,mattress,bottling,etc.,wire;annual capacity,3500 net tons.
Central Works,Worcester,Mass. Number of tinning furnaces,6 double; product,mattress and broom wire;annual capacity,1,800 net tons.
Newburgh Wire Works,Newburgh,Ohio. Numberof tinning furnaces,21; product,market,mattress,broom,fine wire;annual capacity, 5,000 net tons.
North Works,Worcester,Mass. Number of tinning furnaces,12 doublev and 2 single;product,market,mattress,broom,fine,flat,card, music and other wire;annual capacity,6,600 net tons.
South Works,Worcester,Mass. Number of tinning furnaces,1;product, tinned copper wire;annual capacity,2,750 net tons.
Waukegan Works,Waukegan,Ill.Number of tinning furnaces,7 double; product,market,mattress,broom and fine wire;annual capacity,5,000 net tons.
Total annual capacity of the 6 tinning works;24,650 net tons.

Plants for the manufacture of Copperas-5.

DeKalb Works,DeKalb,Illinois.Annual capacity,2,500 tons.
Newburgh Works,Newburgh Ohio.Annual capacity,6,000 tons.
Rockdale Works,near Joliet,Ill.Annual capacity,2,500 tons.
South Works,Worcester,Mass.Annual capacity,4,500 tons.
Waukegan Works,Waukegan,Ill.Annual capacity,4,500 tons.
Total annual capacity of the 5 works;20,000 gross tons of copperas.

Die Foundries-2.

South Works,Worcester,Mass. Product,chilled iron dies,and round dies for the use of the company;annual capacity,990 net tons.
Waukegan Works,Waukegan,Ill. Product,chilled iron dies for the use of the company;annual capacity, 350 net tons.
Total annual capacity of the 2 die foundries;1,340 net tons.

Zinc Works-2.

The American Steel and Wire Company of New Jersey operates a zinc smelting plant at Cherryvale,Kansas,containing 4,800 retorts, with an annual capacity of 22,500 net tons of spelter. It also operates a zinc smelting plant at Carondelet,Missouri, containing 2,000 retorts,with an annual capacity of 8,500 net tons of spelter.

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,the Clark mine,and the Chisholm mine,all in the Mesabi range;the Atlantic mine,at Iron Belt,Wisconsin,in the Gogebic Range;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. It also owns a half interest in 250 coke ovens at Dawson,Fayette county,Pa.,operated by the Juniata Coke Company. It also operates limestone quarries at Williamsburg,Blair county,Pa.

AMERICAN SHEET AND TIN PLATE COMPANY.

Practically all of the stock of the American Sheet and Tin Plate Company is owned by the United States Steel Corporation. The American Sheet and Tin Plate Company was formerly called the American Sheet Steel Company. On December 31,1903,it purchased all the property of the American Tin Plate Company and changed its name to the American Sheet and Tin Plate Company. Unless otherwise stated rolling mill capacities are given on triple turn.

American Sheet and Tin Plate Company;general offices,Frick Building,Pittsbufgh,Pa. Officer at New York;George G.McMurtrie, Chairman of the Board of Directors. Officers at Pittsburgh; W.T.Graham,President;C.W.Bray,First Vice-President and Chief Engineer;E.W.Pargny,Second Vice-President and Manager of Sales;W.P.Beaver,Assistant to President;S.A.Davis,Assistant to First Vice-President;Howard M.Davis,Assistant Manager of Sales;H.B.Wheeler,Secretary and Treasurer; H.L.Austin,Auditor; G.M.McGinnis,Assistant Auditor; and R.A.McKinney,Purchasing Agent. District Sales Agents;Frank Dickerson,New York;W.H.Eaton,Chicago; W.J.Wetstein,St.Louis; I.B.Williams, San Francisco; Richard R.Hoge,Portland,Oregon;E.W.Sparhawk, Denver; J.R.Scott,New Orleans;and W.T.Shannon,Cincinnati.
Capital Stock,$49,000,000, of which $24,500,000 is 7 per cent. cumulative preferred and $24,500,000 is common. The American Sheet and Tin Plate Company operates the following;

Rolling Mills and Steel Works-41.

Aetna-Standard Works,Bridgeport,Ohio. Built in 1872 and since enlarged; 6 regenerative gas heating furnaces, 12 pair and 16 sheet furnaces,6 combination pair and sheet furnaces,16 double box annealing furnaces,one 3-high plate mill,6 jobbing mills, 16 hot sheet mills, and 6 cold mills; product,black sheets and painted and formed roofing;annual capacity,105,000 net tons of sheets. Fuel,natural gas and coal.
American Works,Elwood,Indiana. Built in 1891-2 and first put in operation in June,1892; 28 pair and 28 sheet furnaces,3 annealing furnaces,and 28 hot and 20 cold mills;product,black plates for tin and terne plates;annual capacity,double turn, 52,000 gross tons. Fuel,coal.Make tin and terne plates.
Anderson Works,Anderson,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 tinplates.
Beaver Works,Lisbon,Ohio. Built in 1894-5 and first put in operation April 10,1895;7 sheet and 7 pair furnaces,4 double annealing furnaces,and 7 hot and 7 cold mills;product,black plates for tinning;annual capacity,15,600 gross tons.Fuel, bituminous coal.Make tin and terne plates.

Cambridge Works,Canbridge,Ohio. Built in 1894-5 and first put in operation January,1895; 6 double heating furnaces, 5 annealing furnaces, and 6 hot and 7 cold mills; product,black plates for tinning; annual capacity, 14,000 gross tons. Fuel, bituminous coal.

Canton Works,Canton,Ohio. Built in 1894 and first put in operation in August,1894; one pair,one sheet, and 4 combination pair and sheet furnaces, 4 single annealing furnaces,5 hot sheet mills and 2 cold mills;product,iron and steel black sheets for tinning and roofing;annual capacity,16,250 net tons. Fuel,natural gas and coal.

Chester Works,Chester,West Virginia. 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; purchased by the American Tin Plate Company in 1901 and equipped with machinery for the manufacture of black plates; first black plates made in December 1901. Works now have 7 sheet furnaces,7 pair furnaces,3 annealing furnaces,one sheet mill, 6 hot black plate mills, and 7 cold mills;product,black plates for tinning and large sheets;annual capacity,18,000 gross tons. Fuel,coal.Make tin and terne plates.

Crescent Works,Cleveland,Ohio. Built in 1895 and first put in operation June 1,1895;6 pair and 6 heating furnaces,one double annealing furnace, 6 hot mills and 7 cold mills;product,black plates for tinning and stamping;annual capacity,14,000 gross tons.Fuel,coal. Make tin and terne plates.

Dennison Works,Dennison,Ohio. Built in 1897 and first put in operation November 10,1897; 4 pair,4 sheet, and 4 single annealing furnaces,4 hot sheet mills and 2 cold mills;product,common cold-rolled sheets for stamping and black plates for tinning;annual capacity,8,750 net tons.Fuel,bituminous coal.

Dover Works,Canal Dover,Ohio. Built in 1865-6 and enlarged in 1895; first iron rolled in 1866;7 pair,5 sheet and 4 combination pair and sheet furnaces,one softening furnace,6 single and 2 double annealing furnaces, one plate mill,9 hot sheet mills, and 3 cold mills; also a complete galvanizing,pickling,painting and forming plant;product,light plates,black and galvanized, painted and formed, and cold-rolled sheet steel;annual capacity,33,750 net tons of black sheets and 15,000 net tons of galvanized sheets. Fuel,coal.Also make metal laths.

Dresden Works,Dresden,Ohio. Built and put in operation in 1898; 4 sheet furnaces,4 pair furnaces,2 double annealing furnaces, 4 hot sheet mills, and 2 cold mills;product,iron and steel sheets;annual capacity,12,500 net tons.Fuel,coal.

Falcon Works,Niles,Ohio. Built in 1892-3 and first put in operation in April,1893;12 sheet and pair furnaces,one annealing furnace,6 hot mills and 7 cold mills; product,black plates for tinning;annual capacity,14,000 gross tons.Fuel,bituminous coal. Make tin and terne plates.

Falcon Works,Niles,Ohio. Built in 1867;9 single and 5 double puddling furnaces,2 sheet bar pile furnaces,4 pair and 4 sheet furnaces,10 single box annealing furnaces,one 20-inch skelp mill,one 24-inch bar mill, one muck mill, 4 hot sheet mills, and 2 cold mills; product,muck bar and sheet iron and sheet

steel;annual capacity,23,000 tons (gross) of muck bar and 11,500 net tons of sheet iron and sheet steel. Fuel,bituminous coal and slack.

Guernsey Works,Cambridge,Ohio. Built in 1899-90 and first put in operation in July,1890;2 bar furnaces,6 sheet and 6 pair furnaces,one combination sheet and pair furnace, 6 double annealing furnaces,one muck mill, 7 hot sheet mills and 3 cold mills; product,sheet bars,black sheets,painted and formed roofing,and galvanized sheets;annual capacity,23,750 net tons of sheet iron and sheet steel (sheet bar mill idle) Fuel, producer gas for bar mill and natural gas and coal for sheet mill. Brand for galvanized sheets,"Apollo C" in a diamond. Also operates a galvanizing plant with an annual capacity of 37,500 net tons.

Humbert Works,South Connellsville,Pa. Built in 1896 and first put in operation October 31,1896; 6 double sheet and pair furnaces, one annealing furnace, 6 hot and 6 cold mills;product,black plates for tinning;annual capacity,13,500 gross tons. Fuel, coal.Make tin and terne plates.

Hyde Park Works,Hyde Park,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, 2 billet heating furnaces, 7 annealing furnaces, one 24-inch sheet bar mill, 5 hot sheet mills and 2 cold mills;product, sheet bars and fine grades of soft steel sheets for stamping, japanning, tinning,galvanizing,and armatures,double annealed and cold rolled, and cold rolled and annealed finishes; annual capacity,25,000 gross tons of sheet bars and 15,000 net tons of sheets. Fuel,natural gas.

Irondale Works,Middledale,Indiana. Built in 1893-4,using machinery from the Irondale Steel and Iron Company's mill at Anderson,which was destroyed by fire on October 31,1893;4 pair and 4 sheet furnaces and 4 hot mills;product,black plates for tinning;annual capacity,10,000 gross tons. Fuel,coal and natural gas.

La Belle Works,Wheeling,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, 10 hot and 10 cold mills;product,black plates for tinning;annual capacity,20,000 gross tons.Fuel,natural gas.Make tinplates.

Laughlin Works,Martins Ferry,Ohio. Black plate mill added to rolling mill in 1895 and first black plates made in August, 1895;23 sheet and 23 pair furnaces,4 annealing furnaces, and 23 hot and 22 cold mills;product,black plates for tinning; annual capacity,50,000 gross tons.Fuel,coal.Make tin and terne plates.

Leechburg Works,Leechburg,Pa. Built in1872;10 pair furnaces,10 sheet furnaces,2 single and 4 double annealing furnaces, 10 hot sheet mills, 4 cold mills;product,steel sheets;annual capacity,32,500 net tons. Fuel,natural gas and coal.

Midland Works,Muncie,Indiana.Built in 1892 and first put in operation October 10,1892;6 pair,6 sheet,12 single annealing, one continuous billet,and 2 softening furnaces, one plate mill,one bar mill, 6 hot sheet mills and 4 cold mills;product,sheet bars and stamping sheets;annual capacity,25,000

gross tons of sheet bars and 26,750 net tons of sheets and plates. Fuel,natural gas esclusively.

Monongahela Works,Pittsburgh,Pa.Built in 1894-5 and first put in operation February 14,1895;8 sheet and 8 pair furnaces,4 annealing furnaces,8 hot and 8 cold mills;product,black plates for tinning;annual capacity,18,000 gross tons.Fuel,bituminous coal. Make tin and terne plates.

Morewood Works,Gas City,Indiana. Built in 1892-3 and first put in operation in December,1893; 8 sheet and 8 pair furnaces, 3 annealing furnaces, and 8 hot and 8 pairs of cold mills; product, black plates for tinning;annual capacity,16,000 gross tons.Fuel,natural gas. Make tinplates. Iron and brass foundries are connected with the works.

National Works,Monessen,Pa. Built in 1897-8 and first put in operation in January,1898; 24 sheet and 24 pair furnaces, 9 annealing furnaces, and 24 hot and 20 cold mills; product, black plates for tinning;annual capacity,85,000 gross tons. Fuel,coal. Make tin and terne plates.

New Castle Works,New Castle,Pa. Built in 1892-3 and first put in operation in October,1893; 20 pair and 20 sheet furnaces, 6 annealing furnaces, 20 hot and 21 cold mills;product,black plates for tinning;annual capacity,40,000 gross tons. Fuel, bituminous coal. Make tin and terne plates.

New Philadelphia Works,New Philadelphia,Ohio. Built in 1883;6 pair 6 sheet and 3 combination pair and sheet furnaces,one softening and 4 double annealing furnaces, 9 hot sheet mills, one plate mill, and 4 cold mills;product, light plates,black sheets, and cold-rolled sheet steel;annual capacity,35,000 net tons.Fuel,coal.

Pennsylvania Works,New Kensington,Pa. Built in 1894 and first put in operation in 1895; 6 sheet and 6 pair furnaces, 3 annealing furnaces, 6 hot and 6 cold mills;product, black plates for tinning; annual capacity,14,000 gross tons. Fuel,coal. Make tin plates.

Piqua Works,Piqua,Ohio. Built in 1889;4 combination pair and sheet furnaces,5 single annealing furnaces,2 pile furnaces,5 single puddling furnaces,one bar mill,4 hot sheet mills,and one cold mill;product,sheet bars and iron and steel sheets;annual capacity,15,000 gross tons of sheet bars and 12,000 net tons of sheets. Fuel,natural gas and coal.

Pittsburgh Works,New Kensington,Pa. Built in 1894 and first put in operation in December,1894;7 sheet and 7 pair furnaces; one double annealing furnace,7 hot mills, and 7 cold mills; product,black plates for tinning and soft stamping sheets; annual capacity,15,600 gross tons.Fuel,bituminous coal. Make tin and terne plates.

Saltsburg Works,Saltsburg,Pa. Built in 1894-5 and first put in operation July 1,1895; 4 pair,4 sheet, and 4 single annealing furnaces,4 hotnsheet and 2 cold mills; product,fine sheet iron;annual capacity,12,500 net tons.Fuel,natural gas and coal.

Scottdale Works No.1,Scottdale,Pa. Built in 1873 and remodeled in 1894 and in 1897; 7 pair and 9 sheet furnaces, 7 double annealing furnaces, 9 hot and 3 cold mills,;product,black steel sheets;annual capacity,27,500 net tons.Fuel,natural gas,coal and coke.

Sharon Works,Sharon,Pa. Built in 1901-3;10 pair and 10 sheet furnaces 3 double annealing furnaces,10 hot sheet mills and 6 cold mills;product,black sheets;annual capacity,30,000 net tons. Fuel,coal and producer gas.

Sharon Works,Sharon,Pa. Built in 1900-1 and put in operation May 16,1901;20 sheet and pair furnaces,6 double annealing furnaces,20 hot mills,and 15 sets of cold mills;product,black plates for tinning;annual capacity,45,000 gross tons. Fuel, manufactured gas and coal. Make tinplates.

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

Star Works,Pittsburgh,Pa. Built in 1895 and first put in operation January 6,1896; 8 sheet and 8 pair furnaces, 9 annealing furnaces, and 8 hot and 8 cold mills;product, black plates for tinning;annual capacity,18,000 gross tons. Fuel,bituminous coal and gas. Make tinplates.

Struthers Works,Struthers,Ohio. Built in 1881-2 and entirely rebuilt in 1895; partly destroyrd by fire on August 12,189?,but immediately rebuilt;6 pair and 6 sheet furnaces,2 single and 5 double annealing furnaces, 6 hot sheet and 4 cold mills; product, high grade pickled and finished steel sheets; annual capacity,17,500 net tons. Fuel,coal.

United States Works,Demmler,Pa. Built in 1873-4;burned and rebuilt in 1883; 11 sheet,11pair and 6 annealing furnaces,11 hot mills, and 12 stands of cold mills;product, refined and cold-rolled black sheet iron,Bessemer and open-hearth steel sheets,and black plates for tinning;annual capacity,25,000 gross tons. Fuel,bituminous coal. Make tin and terne plates.

Vandergrift Works,Vandergrift,Pa. Built in 1895-6 and put in partial operation in October,1895; 21 pair and 21 sheet furnaces,8 combination sheet and pair furnaces,18 double annealing furnaces, eight 30-gross-ton acid open-hearth furnaces,four 4-hole soaking pits, 29 hot sheet mills, 14 cold mills, one bar mill,one blooming mill, one stand of 2-high rolls,and 18 galvanizing pots;first open-hearth steel made January 11,1897;product,acid open-hearth steel ingots, sheet bars,and black and galvanized sheets; annual capacity, 200,000 gross tons of ingots,160,000 gross tons of sheet bars, 95,000 net tons of black sheets, and 150,000 net tons of galvanized sheets.Fuel,natural gas,coal, and producer gas.

Wellsville Works,Wellsville,Ohio. Mill built in 1873 to make tinplates;remodeled in 1880; 10 pair and 10 sheet furnaces, 26 single annealing furnaces, one pile furnace, 10 hot sheet mills, 13 cold mills, and one bar mill; product, light plate and sheet iron and highly finished sheet steel;annual capacity,20,000 gross tons of sheet bars, and 30,000 net tons of light plates and sheets.Fuel,natural gas.

Wood's Works,McKeesport,Pa. Built in 1851;16 forge fires,2 refining fires,28 annealing furnaces,19 pair furnaces,16 sheet furnacesfurnaces, 7 slab furnaces,2 softening furnaces,24 heating furnaces,two bar mills,16 sheet mills,4 cold mills, one plate mill, and 8 hammers;open-hearth steel department, built in 1899-90,contains 2 open-hearth acid steel furnaces;

product,light plates and sheet iron and sheet steel,both black and planished; specialty,patent planished sheet iron;annual capacity,22,500 gross tons of ingots,30,000 gross tons of sheet bars, and 52,500 net tons of sheets. Fuel,natural gas, manufactured gas,and coal. Charcoal refinery fires for the manufacture of blooms are connected with the works; 16 knobbling fires; annual capacity of blooms,10,500 gross tons.
Total annual capacity of the 41 rolling mills and steel works; open-hearth ingots,222,500 gross tons;large and small bars, 275,000 gross tons;hammered blooms,10,500 gross tons;muck bar,23,000 gross tons;black sheets and plates,625,250 net tons;black plates or sheets for tinning,stamping,etc.,571,-700 gross tons; and galvanized sheets,202,500 net tons.

Tinplate and Terne Plate Works-19.

Capacities are given on double turn and in boxes of 100lb.

American Works,Elwood,Ind. Built in 1891-2 and first tin and terne plates made in July,1892;58 sets;weekly capacity,30,000 base boxes of tin and terne plates.Fuel,coal and a limited quantity of natural gas. Make black plates.
Anderson Works,Indiana. Built in 1894-5 and first tin and terne plates made in August,1895;12 sets;weekly capacity,6,500 base boxes of tinplates.Fuel,natural gas.Make black plates.
Beaver Works,Lisbon,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.Make black plates.
Chester Works,Chester,West Va. Tinning plant added to a rolling mill in 1901; first tin and terne plates made in May,1902; 18 sets,17 for tinplates and one for terne plates; weekly capacity,5,000 boxes of tinplates and 700 boxes of terne plates. Fuel,coal.Make black plates.
Crescent Works,Cleveland,Ohio. Built in 1894-5 and first tin and terne plates made in January,1896;11 sets; weekly capacity, 5,400 boxes.Fuel,coal.Make black plates.
Falcon Works,Niles,Ohio. Tinning plant added to rolling mill in 1895 and first tin and terne plates made in March,1895;12 sets; weekly capacity,7,000 boxes.Fuel,bituminous coal. Make black plates.
Humbert Works,South Connellsville,Pa. Built in 1896 and first tinplates made December 4,1896;12 sets; weekly capacity, 6,000 boxes. Fuel,natural gas.Make black plates.
La Belle Works,Wheeling,West,Va. Tinning plant added to rolling mill in 1895; first tinplates made in July,1895 and first terne plates in January,1896; 14 sets;weekly capacity,9,000 boxes of tinplates.Fuel,natural gas. Do not now make terne plates. Make black plates.
Laughlin Works,Martins Ferry,Ohio. Tinning plant added to rolling mill in 1895 and enlarged in 1896-7 and 1900; first tin and terne plates made August 29,1895; 46 sets;weekly capacity, 20,000 boxes.Fuel,coal.Make black plates.
Monongahela Works,Pittsburgh,Pa.Built in 1893; first terne plates made June 1 and first tinplates November 15,1893;18 sets,17

for tin and one for terne plates;weekly capacity,10,000 boxes.Fuel,natural gas and coal.Make black plates.

Morewood Works,Gas City,Ind. Built in 1893;first terne plates made in June and first tinplates made in December,1893; 13 sets;weekly capacity,7,000 base boxes of tinplates.Fuel, natural gas.Make black plates.

National Works,Monessen,Pa. Built in 1897-8 and first tin and terne plates made in 1897-8 (March 98);45 sets for tin and terne plates; weekly capacity,27,000 boxes. Fuel,coal.Make black plates.

New Castle Works,New Castle,Pa. Built in 1892-3 and first tin and terne plates made in November,1893;26 sets;weekly capacity,20,000 boxes. Fuel,coal.Make black plates.

Pennsylvania Works,New Kensington,Pa. Built in 1895,and first tin and terne plates made in April,1895;12 sets for tinplates; weekly capacity,6,000 boxes.Fuel,coal.Make black plates.

Pittsburgh Works,New Kensington,Pa. Built in 1891-2 and first terne plates made in February and first tinplates in October,1892;12 sets; weekly capacity,5,500 boxes.Fuel,bituminous coal. Make black plates.

Sharon Works,Sharon,Pa. Built in 1900-1 and first tinplates made in July,1901; 24 sets; weekly capacity 18,000 boxes of tinplates. Fuel,coal.Make black plates.

Shenango Works,New Castle,Pa. Built in 1897-8 and first tin and terne plates made in July,1899; 42 sets; weekly capacity, 30,000 boxes.Fuel,coal.Make black plates.

Star Works,Pittsburgh,Pa.Built in 1895;14 sets for tinplates; weekly capacity,6,000 boxes.Fuel,natural gas.Make black plates.

United States Works,Demmler,Pa. Original works built in 1874; f 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;weekly capacity, 7,000 boxes.Fuel,coal.Make black plates.

Total weekly capacity of the 19 tinplate and terne plate works; on double turn; 232,100 boxes of 100 pounds.

Iron and Brass Foundries.

Morewood Works,Gas City,Indiana. One iron and one brass foundry; product,castings for mill maintenance;annual capacity,3,000 gross tons of iron and brass castings.

Metal Laths.

Dover Works,Canal Dover,Ohio. Product,Cambridge rigid reversible metal laths;annual capacity,4,000 net tons.

Galvanizing Works-3 Active and 1 Idle.

Cambridge Works,Cambridge,Ohio.Number of pots,5;product,Apollo galvanized sheets;annual capacity,37,500 net tons.

Dover Works,Canal Dover,Ohio.Number of pots,3;product,Apollo galvanized sheets;annual capacity,15,000 net tons.

Piqua Works,Piqua,Ohio. Number of pots,1;annual capacity,6,500 net tons.-Idle.

Vandergrift Works,Vandergrift,Pa.Number of pots,18;product,Apollo galvanized sheets;annual capacity,150,000 net tons.
Total annual capacity of the 3 active works,202,500 net tons;of the idle works,6,500 net tons;total,209,000 tons.

Coal Lands,Railroads,Copperas Plants,Etc.

The cpmpany owns 2,085 acres of coal lands,located in Armstrong and Westmoreland counties,Pennsylvania and in Tuscarawas and Belmont counties in Ohio.It also owns the Laughlin coal mine at Martins Ferry,Ohio,which has an annual capacity of 50,000 net tons of bituminous coal.In addition it owns one-third of the capital stock of the National Mining Company,which owns about 8,000 acres of coal lands in Allegheny and Washington counties,Pa. It also owns extensive natural gas territory and pipe lines in Pennsylvania and Indiana.
In addition the company owns the McKeesport Terminal Railroad,at McKeesport,Pa.,and the Canal Dover Belt Railway,at Canal Dover,Tuscarawas county,Ohio.It also owns a plant at Elwood, Madison county,Indiana,which manufactures copperas and which has an annual capacity of 2,500 net tons.

NATIONAL TUBE COMPANY.

All the stock of the National Tube Company is owned by the United States Steel Corporation.

National Tube Company;general offices,Frick Building,Pittsburgh. Officers at Pittsburgh;Wm.B.Schiller,President;Edward Worcester,First Vice-President and General Manager of Sales;John D. Culbertson,Second Vice-President,Treasurer and Secretary;Taylor Allerdice,Third Vice-President; B.C.Moise,Assistant Secretary,Assistant Treasurer,and Auditor; Peter Boyd,General Superintendent; George S.Garritt,Assistant General Manager of Sales; S.M.Lynch,Purchasing Agent; and Thomas Ewing,Solicitor.
Managers of Sales; New Endland,New York and Philadelphia,Clifton Wharton,Jr.,New York;Pittsburgh,A.M.Lally; Chicago,H.S.Raymond;St.Louis,E.A.Downey; Pacific Coast,Charles M.Woods,San Francisco.
Capital stock,$80,000,000 of which $40,000,000 is 7 per cent.is cumulative preferred and $40,000,000 is common.The National Tube Company operates the following works;

Blast Furnaces-5 Completed and 1 Building.

Monongahela Furnaces,(National Department)McKeesport,Pa.Two completed stacks and one building. Completed stacks A and B built in 1889-90;Furnace a,90x20,blown in December 1,1890,and rebuilt in 1900;Furnace B,90x20,blown in June 1,1891,and rebuilt in 1901;seven Cowper-Kennedy stoves,fuel,Connellsville coke; ore,Lake Superior;product,Bessemer pig iron;total annual capacity,275,000 tons.Equipped with one Uehling pig-iron casting machine.Building furnace to be 90x82 feet,equipped with 4 hot-blast stoves,and will have an annual capacity of 150,000 tons of Bessemer pig iron.
Riverside Furnaces,(Riverside Department)Benwood,West Virginia. Two stacks;Furnace A,75x17,built in 1871-2 and first blown in February 14,1872;remodeled in 1876 and entirely rebuilt in 1889 and 1903;four Massicks & Crooke stoves. Furnace B,100x21, built in 1901-3 and first blown in March 12,1903; four Massicks & Crooke stoves. Fuel,Connellsville coke and by-product coke made from Connellsville coal;ore,Lake Superior;product,Bessemer pig iron;total annual capacity,250,000 tons.Equipped with one Uehling pig-iron casting machine.
Steubenville Furnace,(Riverside Department) Steubenville,Ohio.One stack,75x16,built in 1872 and rebuilt in 1886;remodeled in 1901; three Massicks & Crooke stoves;fuel,by-product coke made from Connellsville coal;ore,Lake Superior;product,Bessemer pig iron;annual capacity,72,000 tons.
Total annual capacity of the 5 completed furnaces,597,000 gross tons;of the building furnace,150,000 tons;total,747,000 tons.

Rolling Mills and Steel Works-7.

Boston Iron and Steel Works,(National Department) McKeesport,Pa. built in 1891-2;7 heating furnaces and 3 trains of rolls;product,wrought iron and steel skelp and socket iron;annual capacity,45,000 tons of skelp and 15,000 tons of socket iron.Fuel,coal.

Elba Rolling Mills,(Continental Department) Pittsburgh,Pa. Built in 1862;28 single puddling furnaces,4 heating furnaces and 4 trains of rolls;product,wrought iron and steel skelp;annual capacity,40,000 tons.Fuel,bituminous coal and producer gas

Monongahela Steel Works,(National Department) McKeesport,Pa. Built in 1892-3;2 8-gross-ton Bessemer steel converters,4 cupolas, 3 soaking pits, one 200-ton mixer,and one 2-high 36-inch reversing blooming train;first blow made December 14,1893; product,slabs and billets;annual capacity,330,000 tons of ingots and 300,000 tons of slabs and billets.Fuel,producer gas.

National Rolling Mills,(National Department) McKeesport,Pa.Built from 1878 to 1896;20 charcoal knobbling fires,2 refinery f fires,2 heating furnaces,2 steam hammers,6 double and 25 single puddling furnaces,26 heating furnaces,one train of 2-high slabbing rolls,3 muck trains,one 82-inch plate mill, and 4 grooved mills;product,charcoal and wrought iron and steel skelp;annual capacity,240,000 tons.Fuel,coal and producer gas.(The

Republic Iron Works,(National Department,) Pittsburgh,Pa.Built in 1863;26 single and 10 double puddling furnaces,10 heating furnaces,one train of muck rolls,2 grooved mills,and one 72 inch plate mill;product,wrought iron and steel skelp and plates;annual capacity,40,000 tons of grooved skelp and 22,500 tons of plates.Fuel,natural gas and coal.

Riverside Skelp Mills,(Riverside Department,) Benwood,West Virginia. Built in 1885;10 regenerative gas heating furnaces and 5 trains of 21-inch grooved rolls;product,steel skelp;annual capacity,200,000 tons.Fuel,producer gas.

Riverside Steel Works,(Riverside Department) Benwood,W.Va.Built in 1883-4;2 5-gross-ton Bessemer steel converters;first blow made June 11,1884;two 3-hole soaking pits,three 8-foot cupolas,and one 2-high,30-inch reversing blooming mill;product,steel ingots,slabs and billets;annual capacity,150,000 tons of ingots and 135,000 tons of slabs and billets.Fuel, producer gas.

Total annual capacity of the 7 rolling mills and steel works;Bessemer ingots,480,000 tons;slabs and billets,435,000 tons; skelp,565,000 tons;plates,22,500 tons;and socket iron,15,000 tons.

Galvanized and "Kalameined" Pipe Works.

National Galvanizing Works,(National Department) Versailles,Pa. Built in 1895;product,galvanized and "kalameined" pipe;annual capacity,54,000 tons.

Wrought Iron and Steel Pipe and Tube Works-11.

Allison Department,Philadelphia,Pa. Product;charcoal iron boiler tubes;sizes from 1½ to 8 inches inclusive;annual capacity, 13,000 tons.

American Department,Middletown,Pa.Product,wrought iron and steel pipes;sizes,from 1/8 of an inch to 16 inches inclusive;annual capacity,85,000 tons.An iron foundry is connected with these works;alsp a department for the manufacture of galvanised tubular goods with annual capacity of 18,000 tons.

Chester Department,South Chester,Pa.Product,wrought iron and s steel pipes;sizes from 1½ to 12 inches inclusive;annual capacity,50,000 tons.
Cohoes Department,Cohoes,New York.Product,wrought iron and steel pipe;sizes from 1/8 of an inch to 2 inches inclusive;annual capacity,15,000 tons.
Continental Pipe Mills,(Continental Department,)Pittsburgh,Pa. Product,wrought iron and steel pipe;sizes from 1/8 of an inch to 8 inches inclusive;annual capacity 50,000 tons.A shop for the manufacture of thread protectors for all the pipe mills of the company is connected with these works.
National Pipe Mills,(National Department,)McKeesport,Pa. Product, wrought iron and steel pipe and charcoal iron and steel boiler tubes;sizes,from 1/8 of an inch to 30 inches inclusive;annual capacity,300,000 tons.Also make iron and brass castings.
Pennsylvania Department,Second avenue,Pittsburgh,Pa.Product,wrought iron and steel pipe;sizes from 1/8 of an inch to 30 inches inclusive;annual capacity,120,000 tons.
Riverside Pipe Mills,(Riverside Department) Benwood,W.Va. Product, wrought iron and steel pipe;sizes,from 1/8of an inch to 8 inches inclusive;annual capacity,95,000 tons.An iron foundry is connected with these works; also a department for the manufacture of galvanized tubular goods,with an annual capacity of 20,000 tons.
Sharon Tube Works,Sharon,Pa.Equipped to produce wrought steel pipe;sizes from 1/8 of an inch to 12 inches,outside diameter; annual capacity,100,000 tons. Never put in operation.
Syracuse Department,Syracuse,New York.Product,wrought iron and steel pipe and charcoal iron and steel boiler tubes;sizes from 1¼ to 7 inches inclusive;annual capacity,20,000 tons.
Youngstown Department,Youngstown,Ohio.Product,wrought iron and steel pipe;sizes from 1½to i6 inches inclusive;annual capacity, 30,000 tons.
Total annual capacity of the 11 wrought iron and wrought steel pipe and tube works;878,000 gross tons of pipe and boiler tubes and 38,000 tons of galvanized tubular goods.

Seamless Pipe and Tube Works-2.

Standard Seamless Tube Works,(Seamless Department) Ellwood City,Pa. Product,seamless pipe and tubes.
United States Seamless Tube Works,(Seamless Department) McKeesport, Pa.Product,seamless pipe and tubes.

Iron and Brass Foundries.

American Department,Middletown,Pa.Product,iron castings;annual capacity,2,000 tons.
National Pipe Mills,(National Department) McKeesport,Pa.Product, iron and brass castings;annual capacity,7,500 tons of iron and 200 tons of brass castings.
Riverside Pipe Mills,(Riverside Department) Benwood,West Virginia. Product,iron castings;annual capacity,2,000 tons.
Total annual capacity of the foundries;11,500 gross tons of iron castings and 200 tons of brass castings.

Coke Ovens,Iron-Ore Mines,and Limestone Quarries.

Semet-Solvay by-product coke ovens,Benwood,Marshall county,West Virginia.Number of ovens,120;product,coke from Connellsville coal;annual capacity,160,000 net tons.Plant owned by the National Tube Company but operated under lease by the Semet-Solvay Company.

The National Tube Company owns iron-ore mines in the Gogebic and Menominee Ranges of the Lake Superior region;it also owns an interest in limestone quarries in Lawrence county,Pa.

FOUR LARGEST INDEPENDENT COMPANIES IN THE UNITED STATES OUTSIDE OF THE UNITED STATES STEEL CORPORATION.

JONES AND LAUGHLIN STEEL COMPANY.

Jones and Laughlin Steel Company; general offices,Pittsburgh,Pa. Officers; B.F.Jones,Jr.,President; Willis L.King,Vice-President and General Sales Agent; James B.Laughlin,Treasurer; William C.Moreland,Secretary; William Larimer Jones,General Manager;Thomas K.Laughlin,Assistant Treasurer;and Wendell Van Hook,Auditor.
Branch Offices;Chicago;Buffalo;Boston,Mass.;Cincinnati,Ohio;Philadelphia,Pa.;and New York.
Sales Agents; Otis,Bonnell & Co.,Cleveland;F;A;Goodrich & Co.,Detroit,Mich.;and the F.A.Goodrich Iron and Steel Company,St. Louis,Missouri.
Capital stock,$30,000,000,all common.The company operates the following works;

Blast Furnaces-6

Eliza Furnaces,Pittsburgh,Pa. Five stacks;No.1 built in 1888-9 and blown in in May,1889;enlarged in 1893,partlydismantled 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. No.5 built in 1903 and blown in April 2,1904. Twenty Siemens-Cowper stoves;fuel,coke;ore,Lake Superior;product, Bessemer and basic pig iron;total annual capacity,935,000 tons. Equipped with 3 Uehling pig-iron casting machines.
Soho Furnace,Pittsburgh,Pa. One stack,80x19,built in 1872 and first put in blast November 22,1872;remodeled in 1888 and rebuilt in 1901;four improved Cowper stoves;fuel,coke;ore,Lake Superior;product,basic open-hearth and Bessemer pig iron;annual capacity,100,000 tons.Slag granulating pits are connected with this furnace.
Total annual capacity of the 6 furnaces;1,035,000 gross tons.

Rolling Mills and Steel Works-2.

American Iron and Steel Works,Pittsburgh,Pa. Rolling mill built in 1852;26 heating furnaces,21 trains of rolls,and 3 hammers.
Bessemer Steel Works built in 1886;three 10-gross-ton converters, 4 cupolas,and 34 soaking pits;first blow made August 19,1886; annual capacity,80,000 tons of ingots.Molten metal from the Eliza furnaces is used in the converters.
Open Hearth Steel Department added in 1895 and enlarged in 1896 and 1902;one 25-gross-ton acid and one 250 and six 40-gross ton basic furnaces;first steel made September 28,1895;annual capacity,225,000 tons of ingots.Molten metal from the Eliza Furnaces is used in the open-hearth furnaces.
Product,steel bars,rails,plates,sheets,structural shapes,billets, 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,900,000 tons of steel billets and blooms and 800,000 tons of finished material.Fuel,coal,natural gas and producer gas.
SohoDepartment,Pittsburgh,Pa. Built in 1859;2 Siemens regenerative furnaces,10 Siemens regenerative pit furnaces,and 3 trains of rolls,including a train capable of rolling plates 12 inches

thick,100 inches wide,and 15 tons in weight;product,steel plates;annual capacity,100,000 tons.Steel department contains 4 acid open-hearth steel furnaces;first steel made November 29,1883;annual capacity,70,000 tons of ingots.Fuel,coal and natural gas.

Total annual capacity of the 2 rolling mills and steel works; Bessemer steel ingots,800,000 gross tons; open-hearth ingots, 295,000 tons;steel billets and blooms,900,000 tons;plates, sheets,structuralshapes, and other finished rolled material, 900,000 tons.

Spike,Rivet and Bolt Departments.

Spike,Rivet and Bolt Departments,American Iron and Steel Works, Pittsburgh,Pa.Product,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 $1\frac{1}{2}$ inches 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 tons of rivets,spikes,bolts etc.

Structural Material Fitting Shops.

Strustural Material Fitting Shops;American Iron and Steel Works, Pittsburgh. 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,36,000 tons.

Chain Factory.

Chain Factory,American Iron and Steel Works,Pittsburgh.Product,iron and steel proof coil,BB,BBB,and dredge chains,and close and stud-link cable,railroad brake,switch and safety,agricultural,conveyor,log and binding chains; sizes;machine made common and crane chains from 3/16 of an inch to one inch,handmade BB, BBB,best hand,steel hand,and studlinked chains from $\frac{1}{2}$ of an inch to 2 inches;annual capacity,10,000 tons.

Iron and Steel Foundries.

Foundry Department,American Iron and Steel Works,Pittsburgh.One steel and two iron foundries.Product,iron and steel castings; annual capacity,17,500 tons of iron,and 2,500 tons of steel castings. The castings in the iron foundries are confined almost exclusively to large pulleys,sheaves,balance wheels,couplings,hangers,etc.,which are finished in the machine shops.

Cold-Rolled and Cold-Drawn Departments.

Cold Rolled and Cold Brawn Department,American Iron and Steel Works, Pittsburgh. Product,cold rolled and cold drawn steel rounds, squares,hexagons,pentagons,flats,angles and zees. Annual capac,

ity,30,000 tons of cold-rolled and 45,000 tons of cold-drawn steel products. Does not cold-roll or cold-draw iron shapes.

Forge and Machine Shops,Slag Granulating Pits, Etc.

Forge Department,American Iron and Steel Works,Pittsburgh. 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 tons.

Machine Shop Department,American Iron and Steel Works,Pittsburgh. 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 miscellaneous special devices.

Slag Granulating Department. Connected with Soho Furnace are slag granulating pits;annual capacity,about 40,000 net tons.

Iron-Ore Mines.

The Jones and Laughlin Steel Company owns the capital stock of the Interstate Iron Company,which amounts to $2,000,000,and which operates the Virginia and Buhl mines in Minnesota,which have an annual capacity of about 1,000,000 tons of Bessemer and non-Bessemer iron ore.

In addition the Jones and Laughlin Steel Company has several long-time contracts for iron ore in the Mesabi and Marquette Ranges of the Lake Superior iron-ore region.

Coal Lands,Coke Ovens, Etc.,

The Jones and Laughlin Steel Company also owns all the capital stock of the Vesta Coal Company,amounting to $2,500,000. The latter company owns about 6,000 acres of land in Washington county, Pennsylvania,in the fourth pool of the Monongahela river.Its mines have an annual capacity of about 1,600,000 tons of coal.

The Jones and Laughlin Steel Company also owns and operates 1,268 coke ovens at Pittsburgh,with an annual capacity of 900,000 net tons of coke.In addition it has built 500 coke ovens at the same place.

It also owns a controlling interest in the Blair Limestone Company, which has a capital stock of $50,000.This company owns about 30 acres of limestone land near Hollidaysburg,Pa. Its quarries have an annual capacity of about 300,000 tons.

Docks at Ashtabula,Ohio.

The Jones and Laughlin Steel Company also owns all the capital stock of the Angeline Dock Company,which owns large docks at Ashtabula,Ohio.

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 M.Smith,Treasurer;and Frank Tenney, Assistant to President and Secretary.

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,(of which 107,500 shares,of a par value of $10,750,000, have been issued,) and 250,000 shares of preferred stock,(of which 165,000 shares,of a par value of $16,500,000 have been issued,). The preferred stock is non-cumulative, and is to bear 7 per cent.interest.

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

It also owns all the stock of the Spanish-American Iron Company, which operates extensive iron-ore mines in the province of Santiago in the Island of Cuba.

In addition it owns the entire capital stock of the Baltimore and Sparrows Point Railroad Company,which operates 5.43 miles of track between Colgate Creek and Pennwood Park,Maryland.

The Pennsylvania Steel Company.

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

The Pennsylvania Steel Company;general offices,Girard Building, Philadelphia;branch offices,New York City;Boston;Baltimore; Chicago;and London,Eng.Officers at Philadelphia;Edgar C.Felton, President;Frank Tenney,Assistant to President and Secretary; Edmund M.Smith,Treasurer;and H.F.Martin,General Manager of Sales.Officers at Steelton;H.H.Campbell,General Manager;John W.Dougherty,Superintendent;and FrankD?Carney,Assistant Superintendent.

Sales Agents;W.C.Cuntz,Steelton;Richard Peters,Philadelphia;A.E. Aeby,New York;Charles S.Clark,Boston;R.C.Hoffman & Co.,Baltimore;Clifford J.Ellis,Chicago;J.G.Miller,St.Louis.Pacific Hardware and Steel Co.,San Francisco;and Sanders & Co.,London.

Capital Stock,$6,500,000,of which $1,500,000 is 7 percent. Non-cumulative preferred and $5,000,000 is common. The Pennsylvania Steel Company operates the following works;

Blast Furnaces-7.

Lebanon Furnaces,Lebanon,Pa. Two stacks;No.1,built in 1845 and rebuilt in 1868 and in 1885; No.3, built in 1872-3,put in blast in August,1873,and 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 tons. Equipped with one pig-iron casting machine.

Lochiel Furnace,Harrisburg,Dauphin county,Pa. One stack,65x14,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 tons.

Steelton Furnaces,Steelton,Dauphin county,Pa. Four stacks;No.1,60x14, built in 1872-3,put in blast in October,1873,and remodeled in 1883;two Whitwell stoves.No.2,80x18,built in 1874-6,put in blast in June,1876,and remodeled in 1877;four Whitwell stoves.Nos.3 and 4,each 70x16;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,mixed anthracite coal and coke;ores,foreign and domestic hematite and magnetite;product,Bessemer,low-phosphorus and basic pig iron and spiegeleisen;total annual capacity, 330,000 tons. One pig-iron casting machine. Molten matal is taken from the furnaces to the Bessemer converters and open-hearth furnaces at Steelton.

Total annual capacity of the 7 furnaces;500,000 gross tons.

Rolling Mills and Steel Works-1.

Pennsylvania Steel Works,Steelton,Pa.Bessemer steel works built in 1865-7; three 10-gross-ton converters;first blow made in June, 1867; 4 iron and 2 spiegel cupolas;annual capacity,400,000 tons of ingots;molten metal from the Steelton Furnaces is used in the Bessemer converters;product,blooms and slabs for structural purposes,plates,nail slabs,rails of all sections,street rails,crossings,frogs,switches,steel castings,and merchant steel generally.

One 26-inch rail mill,built in 1867-8,has 5 horizontal heating furnaces,one 3-high 34-inch blooming mill,with 6 pit-heating furnaces,added to rail mill in 1875-6 and put in operation in December,1876;annual capacity,300,000 tons of rails.No.2 blooming mill,30½-inch reversing,with 6 pit-heating furnaces,built in 1885-6 and put in operation in 1886. One slabbing mill,with 26½-inch horizontal and 20½inch vertical rolls,built in 1893; this mill has 6 pit-heating furnaces and can roll slabs 48 inches wide and 32 inches thick. 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 50-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 9 basic furnaces and 2 acid furnaces;total annual capacity, 250,000 tons of ingots worked into boiler,structural, and special steel,and 18,000 tons of castings.Molten metal is used in the open-hearth furnaces.

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 housingsand 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.

Total annual capacity of the rolling mills and steel works;Bessemer ingots,400,000 gross tons;open-hearth ingots,250,000 tons;steel

castings,18,000 tons;steel rails,300,000 tons;steel billets and slabs,200,000 tons; other finished products,140,000,tons.

Bridgebuilding and Frog,Switch,and Signal Works.

Bridge and Construction Department,Steelton,Pa. Product,railroad and highway bridges;also erects iron and steel buildings;annual capacity,from 30,000 to 40,000 tons.
Frog,Switch,and Signal Departments,Steelton,Pa. Product,frogs,switches,signals,etc.,of all kinds for steam and street railways.

Bolt,Rivet,and Polished Steel Shafting Works.

Bolt and Rivet Department,Steelton,Pa. Product,bolts and rivets for the use of the company only.
Polished Steel Shafting Department,Steelton,Pa.Product,polished steel shafting;annual capacity,5,000 tons.

Forging Works and Iron and Steel Foundries.

Forging department,Steelton,Pa.Product,miscellaneous medium and heavy steel forgings;annual capacity,5,000 tons.
Steel Foundry Department,Steelton,Pa. Built in 1902;product,acid open-hearth steel castings;annual capacity,18,000 tons.
The company also operates an iron foundry at Steelton,at which castings for its own consumption are made.

Iron-Ore Mines and Railroads.

The Company has also purchased from Mrs.Annie C.Rogers and some members of the Grubb family the holdings in theCornwall iron-ore banks and associated interests of the heirs of G.Dawson Coleman. It has alsonacquired their interests in the Cornwall and Lebanon Railroad. This road is 21.66 miles long.

Limestone Quarry and Coke Ovens.

The company owns and operates an extensive limestone quarry at Steelton,Pennsylvania,adjoining its property at that place.The limestone quarried is all consumed by the Steelton Furnaces.
It is also building 90 Semet-Solvay by-product coke ovens at Lebanon, Pa.,to furnish coke for its Lebanon furnaces. These ovens will have an annual capacity of about 200,000 net tons.

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 Philadelphia. Officers at Sparrows Point; F.W.Wood,President; CharlesnPettigrew,Superintendent;and R.K.Wood,General Agent. Officers at Philadelphia; E.C.Felton,Vice-President;Frank Tenney,Assistant to President and Secretary; E.N.Smith,Treasurer;and H.F.Martin,General Manager of Sales.

Sales Agents; Richard Peters,Philadelphia; A.E.Aeby,New York;Charles S.Clark,Boston; R.C.Hoffman & Co.,Baltimore; Clifford J.Ellis, Chicago; J.G.Miller,St.Louis; Pacific Hardware and Steel Co., San Francisco; and Sanders & Co.,London,England.The Maryland Steel Company operates the following works;

Blast Furnaces-4.

Maryland Steel Company,Sparrows Point,Maryland. Four stacks;Furnaces A,B,C,and D,each 85x20;commenced building in August 1887,and completed in 1889,1890,and 1891. First blasts;A,October23,1889; B,March 11,1890;C,October 3,1891;and D,April 15, 1893. Each stack is equipped with four Whitwell stoves;fuel, coke from by-product ovens at Sparrows Point;ores,hematite from Cuba,Spain,Africa and Lake Superior;product,Bessemer pig iron and spiegeleisen;total annual capacity,400,000 tons.Furnaces are equipped with one double Heyl & Patterson pig-iron casting machine. Molten metal is conveyed from the furnaces to the Bessemer steel converters of the company.
Total annual capacity of the 4 furnaces;400,000 gross tons.

Rolling Mills and Steel Works-1.

Maryland Steel Company,Sparrows Point,Maryland.Built in 1889-92; three 18-gross-ton Bessemer steel converters,4 iron and 3 spiegel cupolas,10 pit heating furnaces having a capacity of 12 ingots each, one 34-inch blooming mill,and one 27-inch combined billet and 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,500,000 tons of ingots and 400,000 tons of billets and rails. Fuel,bituminous coal and petroleum.Brand,"Maryland".
Total annual capacity of the rolling mills and steel mills;Bessemer steel ingots,500,000 gross tons;rolled products,400,000 tons.

Shipbuilding Works and Iron Foundry.

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. It also builds dry docks capable of docking the largest vessels afloat.
The company also operates a foundry at Sparrows Point which produces gray iron castings for its own consumption.

Coke Ovens.

The company also operates at Sparrows Point 200 Otto-Hoffman by-product coke ovens; annual capacity,400,000 net tons.

LACKAWANNA STEEL COMPANY.

LACKAWANNA STEEL COMPANY.

Lackawanna Steel Company;West Seneca,Erie county,New York.New York Office,100 Broadway. Officers at New York,--------President; Walter Scranton,Chairman of Board of Directors; Moses Taylor,Vice-President;James P.Higginson,Treasurer;John W.Farquhar,Secretary; Frederick F.Graham,Assistant Treasurer and Assistant Secretary; Charles D.Rhodes,General Sales Agent;and George F.McKay,Traffic Manager. Officers at Buffalo; George L. Reis,Vice-President and General Manager; Marshall Lapham,Comptroller; S.B.Sheldon,General Superintendent; and John N.Allen, General Purchasing Agent.

Selling Agents; Gerald Lomer,Canadian Agent,Montreal; F.A.Barbey, New England Agent,Boston; George W.Smith,District Sales Agent, Baltimore; W.G.Henderson,District Sales Agent,Cleveland; Julian L.Yale, General Western Sales Agent,Chicago; and Charles W.Pike & Co.,Pacific Coast Sales Agents,San Francisco.

Capital stock authorized,$60,000,000;issued,$35,000,000.First mortgage 5 per cent.convertible gold bonds authorized,$20,000,000; issued,$15,000,000. The Lackawanna Steel Company operates or controls the following works;

Blast Furnaces-6.

Lackawanna Furnaces,Lackawanna,New York.Six stacks; Nos.1 and 2, each 87x17, built in 1901-2;each furnace has 4 central combustion chamber stoves,each 18x85;No.3, 94x24,built in 1902-4, 4 central combustion stoves,each 22x121 feet;Nos.4,5,6, each 94x24 feet;fuel,Wallston and Mount Pleasant coke; ore,Lake Superior; product,Bessemer pig iron; total annual capacity, 1,135,000 tons. Gas from the blast furnaces largedy used for power purposes.

Rolling Mills and Steel Works.

Lackawanna Steel Works,Lackawanna,New York. Bessemer steel works, built in 1902-3;four 10-gross-ton acid Bessemer converters and 8 iron and 4 spiegel cupolas;first Bessemer steel made,October 13,1903;product,ingots;annual capacity,845,000 tons.

Rail Mill No.1;built in 1902-3;six 16-hole heating pits and 5 stands of 32-inch rolls;first steel rail rolled,October 20,1903; product,steel rails;annual capacity,600,000 tons.Fuel,bituminous coal,coke,and producer gas.

Rail Mill No.2;built in 1902-4;5 continuous gas heating furnaces 5 stands of 24-inch rolls; product,structural shapes,splice bars,merchant bar steel,and light rails;annual capacity,80,000 tons of structural shapes and merchant bars,40,000 tons of splice bars, and 70,000 tons of 12 to 65-pound rails.Fuel,bituminous coal and producer gas.

Open-hearth Steel Department;built in 1903-4;six 60-gross-ton Siemens basic open-hearth steel furnaces;annual capacity,250-000 tons of ingots and direct castings.Fuel,producer gas.

Universal Mill;built 1903- ; one 48-inch universal mill,equipped with 6 Siemens heating furnaces; product,universal plates up to 48 inches wide and sheared plates up to 80 inches wide;annual capacity,180,000 tons.

Slabbing Mill;built 1903- ; one 32-inch slabbing mill,equipped

with four 4-hole soaking pits;product,slabs,blooms,and billets; annual capacity,240,000 tons.
Merchant Mill;built 1903- ; one 16 and 12 inch combination merchant mill;two continuous heating furnaces;product,all sizes and shapes for car,agricultural implement, and bolt manufacturers; annual capacity,75,000 tons.
Total annual capacity of rolling mills and steel works;1,095,000 gross tons of steel ingots and castings,240,000 tons of slabs blooms and billets, 670,000 tons of standard and light rails, and 375,000 tons of other finished rolled products.

Iron and Brass Foundries.

The company owns a foundry at Lackawanna and leases another foundry at Buffalo,the latter owned by the Lake Erie Engineering Company.Brass and iron castings are made at Lackawanna;annual capacity,7,800 tons of iron and 100 tons of brass castings. At Buffalo iron castings are made;annual capacity,7,600 tons.

Railroads,Coke Ovens,and Iron-Ore Properties.

The Lackawanna Steel Companynowns the South Buffalo Railway Company,which operates 19 miles of track,22 locomotives,22 passenger cars,and 187 freight and other cars.
The company is building 940 by-product coke ovens at Lackawanna,N.Y. It controls 237 completed by-product ovens owned by the Lackawanna Iron and Steel Company at Lebanon,Pennsylvania. The company has a total annual capacity of 1,198,000 tons of coke.
The iron-ore interests of the Lackawanna Steel Company are represented by extensive leaseholds,(including a one-half interest in the leasehold of the Negaunee mine in Michigan,) contracts for the purchase of mined ore,and by shareholdings in the following companies;Witherbee,Sherman & Co.,of New York;the Odanah Iron Company,of Wisconsin; the Verona Mining Company,of Michigan;the Scranton Mining Company,the Hobart Iron Company,and the Corsica Iron Company,all of Minnesota;and the Ontario Mining Company,of West Virginia; also in the Tilly Foster iron mines in New York.

LACKAWANNA IRON AND STEEL COMPANY.

Practically all of the stock of the Lackawanna Iron and Steel Company is owned by the Lackawanna Steel Company.

Lackawanna Iron and Steel Company,Lebanon,Pa.;also West Seneca,N.Y., and 100 Broadway New York. Officers at New York;------President; Moses Taylor,Vice-President;James P.Higginson,Treasurer; John W.Farquhar,Secretary;Frederick F.Graham,Assistant Treasurer and Assistant Secretary; Charles D.Rhodes,General Sales Agent; and George F.McKay,Traffic Manager.Officers at Buffalo;George L.Reis,Vice-President; Marshall Lapham,Comptroller;and John N. Allen,General Purchasing Agent.
Capital stock authorized,$25,000,000;issued,$20,000,000.Bonds issued,$1,775,000.The company operates the following works;

Blast Furnaces-5.

Bird Coleman Furnaces,(leased) Cornwall,Pa.Two stacks,each 75x18, No.1,built in 1872-3,and No.2,built in 1879;both rebuilt in 1885 and relined in 1903;Whitwell stoves;fuel,coke;ore,Cornwall; product,principally Bessemer pig iron;annual capacity,80,000tons.
Colebrook Furnaces,Lebanon,Pa. Two stacks; No.1,81½x18,built in 1881,remodeled in 1887,rebuilt in 1895,and relined in 1903; No.2,85x18,completed in November,1882,and relined in 1903; Lackawanna stoves;fuel,coke;ore,Cornwall;product,principally Bessemer pig iron;annual capacity,125,000 tons.
North Cornwall Furnace,(Leased,) Cornwall,Pa. One stack,80x18, built in 1872,rebuilt in 1890,and relined in 1903;Whitwell stoves;fuel,coke;ore,Cornwall;product,principally Bessemer pig iron;annual capacity,45,000 tons.
Total annual capacity of the 5 furnaces;250,000 gross tons.

Dismantled Furnaces,Rolling Mills and Steel Works.

The Lackawanna Iron and Steel Company formerly operated four blast furnaces and two rolling mills and steel works at Scranton,Pa. The latter were equipped with Bessemer converters and steel rail trains,and were known as the North and South works. The furnaces and the rolling mills and steel works were dismantled in 1901-2.

Iron-Ore Properties and Coke Ovens.

The Lackawanna Iron and Steel Company owns a one-sixth interest in the Cornwall ore banks at Cornwall,Pa. It also has an additional voting interest.In addition it owns and operates 237 completed by-product coke ovens at Lebanon.

LACKAWANNA COAL AND COKE COMPANY.

All the stock of the Lackawanna Coal and Coke Company is owned by the Lackawanna Steel Company.

Lackawanna Coal and Coke Company,Wehrum,Pa.,also West Seneca,N.Y., and 100 Broadway,New York.Officers at New York;Walter Scranton,President; Moses Taylor and Warren Delano,Jr.,Vice-Presidents;James P.Higginson,Treasurer; John W.Farquhar,Secretary; Frederick F.Graham,Assistant Treasurer and Assistant Secretary; Charles D.Rhodes,General Sales Agent; and George F.McKay,Traffic Manager. Officers at Buffalo; George L.Reis,Vice-President; Marshall Lapham,Comptroller; and John N.Allen,General Purchasing Agent; Officer at Wehrum;C.R.Claghorn,Superintendent.
Capital Stock,$500,000.
The Lackawanna Coal and Coke Company owns 12,642 acres of coal rights in Cambria and Indiana counties,Pennsylvania,and 10,634 acres of coal land in fee in the same counties.Its mines have an annual capacity of about 1,800,000 tons.

THE FRANKLIN IRON COMPANY.

All the stock of the Franklin Iron Company is owned by the Lackawanna Steel Company.

The Franklin Iron Company, Franklin Furnace, New Jersey; also West Seneca, New York, and 100 Broadway, New York City. Officers at New York; Walter Scranton, President; Moses Taylor, Vice-President; James P. Higginson, Treasurer; and John W. Farquhar, Secretary. Officers at Franklin Furnace, New Jersey; S.P. Tompkin, Superintendent. Capital Stock, $300,000.

The Franklin Iron Company owns limestone lands at Franklin Furnace, Sussex county, New Jersey, on which it has one active quarry. (Franklin Furnace, built in 1873 and formerly owned by this company and operated under lease by the Lackawanna Iron and Steel Company, has been dismantled.)

CAMBRIA STEEL COMPANY.

Cambria Steel Company;General offices,Philadelphia. Officers at Philadelphia;Powell Stackhouse,President; John W.Townsend, Vice-President; Alexander P.Robinson,Treasurer and Assistant Secretary;Edward T.Stuart,Assistant Treasurer;and D.B. Gehly,Secretary. Officers at Johnstown;Charles S.Price,General Manager,and H.S.Endsley,Solicitor and General Agent.
Sales Offices; New York,H.L.Waterman;Chicago,C.J.Ellis;Toledo,O Ohio,for rails,W.E.C.Coxe;Cincinnati,Ohio,J.L.Adams; Cleveland,for structural and merchant steel,the Bourne-Fuller Company;Atlanta,Georgia,F.I.Stone & Co.;St.Louis,H.P.Hunnell; Pittsburgh,William McLain;and Boston,structural steel,H.W.Hayes.
Capital Stock,$50,000,000;par value,$50 per share;issued and full paid,900,000 shares,aggregating $45,000,000.The Cambria Steel Company operates the following works,which it leased from the Cambria Iron Company in 1898;

Blast Furnaces-7

Cambria Furnaces,Johnstown,Pa. Seven stacks; Nos.1,2,3,and 4 were built in 1853 and 1854;No.1,97x17½,was rebuilt in 1883,1895, 1899,and 1901;No.2,98x21,was rebuilt in 1883,1891,1896,and 1901;No.3,95½x20½,was rebuilt in 1886,1894,and 1900;No.4, 97x18 was rebuilt in 1886,1892,and 1902;No.5,96x21,was built in 1873-6,blown in December22,1876,and rebuilt in 1890,1896-7, and 1902;No.6,87x22,was first blown in July 20,1879,and rebuilt in 1893,1896,1900 and 1903;No.7,85x22,built 1903-. The furnaces are equipped with 24 Cowper-Kennedy and 4 Kennedy stoves, and 5 pig iron casting machines.Fuel,Connellsville and Otto-hoffman coke;ores,Lake Superior hematite and native and foreign manganiferous;product,Bessemer and basic open-hearth pig iron and spiegeleisen and ferromanganese;total annual capacity of the 7 furnaces;800,000 tons.

Rolling Mills and Steel Works.

Cambria Rolling Mills and Steel Works,Johnstown,Pa.First built in 1853;Bessemer steel works made their first blow July 10,1871; rebuilt and enlarged in 1889 and 1891 and remodeled in 1900; four 12½-gross-ton converters;annual capacity,600,000 tons of ingots.
Open Hearth Plant No.1,built originally in 1878-9,now contains two 20-gross-ton furnaces,one built in 1895 and one in 1896,and two 20-ton basic Wellman furnaces built in 1897;annual capacity,11,000 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,with 2 regenerative heating furnaces.
Rolling mills contain 11 Siemens furnaces,4 continuous furnaces,24 reverberatory furnaces,one 28-inch rail mill,three sets;one 21-inch light rail and structural mill,3 sets; 2 21-inch structural and bar mills,3 sets each;one 12-inch splice bar mill, 4 sets; one 22-inch 2-high puddle mill,2 sets; and one 22-inch 2-high plate mill,2 sets;also the following merchant steel mills;one 16-inch 3-high mill;one 10 and 12-inch train,9 sets; one 9-inch train,6 sets;one 8-inch mill,5 sets; one 10-inch train,8 sets; one 12-inch train,4 sets; one 14-inch train,8

sets; one 20-inch train,3 sets; and one 12-inch cold-rolling train. Also a cold-drawing plant,with full equipment of furnaces,shears,hammers and special machinery.

Open Hearth Plant No.2,Franklin,Johnstown.Built in 1900-1;ten 50-gross-ton stationary furnaces;first open-hearth steel made April 20,1901;annual capacity,216,000 tons of basic ingots, 24,000 tons of acid ingots,and 100,000 tons of slabs. Adding five 50-gross-ton basic open-hearth steel furnaces with annual capacity of 120,000 tons.

Fuel used in all departments,coal and producer gas.

Total annual capacity of rolling mills and steel works;Bessemer steel ingots,600,000 gross tons;open-hearth steel ingots,405,000 tons; finished steel,300,000 tons of steel rails,and 375,000 tons of structural shapes,plates,and steel for tire,spring,toe-calk machinery,plow steel,finger bars,harrow discs,rake teeth,etc.

Car-Axle and Bolt, Nut,and Rivet Works.

Car Axle Department,Johnstown.Product,open-hearth steel car and locomotive axles toughened by the Coffin process or oil tempered and annealed;annual capacity,55,000 axles.

Bolt,Nut,and Rivet Department,Johnstown.Product,allmsizes of iron and steel bolts,nuts and rivets;annual capacity,6,000 tons.

Forgings and Cold-Rolled and Cold-Drawn Shafting.

Forging Department,Johnstown.Product,forged open-hearth steel car and locomotive axles,crank pins,piston rods,and miscellaneous forgings toughened by the Coffin process or oil tempered and annealed;annual capacity about 25,000 tons.

Gautier Department,Johnstown. Product,cold-rolled,drawn and turned steel shafting,piston rods and car axles;cold-rolled and drawn screw rods,hexagons,key steel,flats,and squares;also finger bars,knife backs,angles,zees,tees,and other special shapes. Annual capacity,12,000 tons.

Steel Carbuilding Works.

Steel Carbuilding Department,Johnstown. Product,all kinds of steel cars;also composite cars with steel underframes;annual capacity,4,500 cars.All cars are built of rolled shapes.

Coal Lands,Coke Ovens,Iron-Ore Mines,Etc.

The Cambria Steel Company operates extensive coal mines in Cambria county; also 260 Otto-Hoffman coke ovens at Johnstown and 508 bee-hive ovens in Fayette county,Pennsylvania.

It also owns all the stock of the Penn Iron Mining Company,operating iron-ore mines in the Menominee Range in Michigan;over 99 per cent. of the stock of the Republic Iron Company,which operates the Republic mine at Republic,Michigan;and one-half the stock of the Mahoning mine,in the Mesabi Range in Minnesota.

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

It also owns a controlling interest in the Juianita Limestone Company,Limited,which operates limestone quarries at Carlim,B Blair county,Pa.,and owns and operates the Naginey limestone quarries in Mifflin county,Pennsylvania.

SUMMARY OF IRON AND STEEL WORKS IN THE UNITED STATES.

BLAST FURNACES.

States.	Completed Furnaces, June 1,1904.				Annual Capacity of Completed Furnaces, June 1,1904, in gross tons.			
	ANTHRACITE	BITUS.	CHAR.	TOTAL	ANTH.	BITUS.	CHAR.	TOTAL GROSS TONS
Massachusetts,...	...	...	2	2	.....	.....	9000	9,000
Connecticut,.....	...	...	3	3	.....	.....	15000	15,000
New York,.....	8	10	4	22	390,000	1,040,000	90000	1,520,000
New Jersey,.....	7	5	...	12	151,000	395,000	.....	546,000
Pennsylvania,....	61	89	5	155	2,478,900	8,731,000	15300	11,225,000
Maryland,.....	...	5	1	6	.....	415,000	6000	421,000
Virginia,.....	...	22	4	26	.....	857,000	33500	890,500
West Virginia,...	...	4	...	4	.....	425,000	.....	425,000
Kentucky,.....	...	8	...	8	.....	235,000	.....	235,000
Tennessee,.....	...	19	3	22	.....	787,000	26600	813,600
North Carolina,..	...	1	...	1	.....	35,000	.....	35,000
Georgia,.....	...	1	3	4	.....	72;000	51500	123,500
Alabama,.....	...	43	6	49	.....	2,724,500	94500	2,819,000
Texas,.....	...	...	4	4	.....	.....	72500	72,500
Ohio,.....	...	54	7	61	.....	5,226.000	30700	5,256,700
Illinois,.....	...	22	...	22	.....	2,275,000	.....	2,275,000
Michigan,.....	...	1	10	11	.....	90,000	304000	394,000
Wisconsin,.....	...	5	1	6	.....	310,000	45000	355,000
Minnesota,.....	...	1	...	1	.....	80,000	.....	80,000
Missouri,.....	...	1	1	2	.....	45,000	25000	70,000
Colorado,.....	...	5	...	5	.....	500,000	.....	500,000
Washington,.....	...	...	1	1	.....	.....	18000	18,000
Oregon,.....	...	...	1	1	.....	.....	15000	15,000
Total,.....	76	296	56	428	3,019,000	24,242,500	851600	28,114,000

ROLLING MILLS, STEEL WORKS, TINPLATE WORKS, ETC.

States.	COMPLETED-ROLLING MILLS & STEEL WORKS	COMPLETED IRON & STEEL ROLLING MILLS	CUT-NAIL AND CUT SPIKE MACHINES	Steel Works						TIN PLATE & TERNE PLATE WORKS	FORGES AND BLOOMARIES
				BESSEMER	CLAPP-GRIFFTHS	ROBERT-BESSEMER	TROPENAS AND SPECIAL BESSEMER	OPEN-HEARTH	CRUCIBLE		
Maine,..	1	1	.....	..	..	..	..	...	..	..	...
Mass.,..	13	7	260	..	1	..	1	4	4	..	...
R.I.,...	4	3	.....	..	..	..	1	1	..	..	...
Conn.,..	9	6	.....	..	..	.....		3	2	..	...
N.Y.,...	26	21	.....	2	..	..	1	8	4	2	..2
N.J.,...	23	20	.....	..	..	..	2	5	5	..	...
Penn.,..	248	214	759	12	..	..	3	67	29	26	6
Del.,...	7	6	.....	..	..	..	..	2	..	..	...
Md.,....	6	6	.....	1	..	..	..	1	..	2	1
D;of C.,	1	...	.....	..	..	..	1	...	..	..	...
Va.,....	6	5	137	1	..	..	1	...	..	1	...
W.Va.,..	16	15	353	2	..	..	..	1	..	5	...
Ky.,....	10	10	126	1	..	..	..	1	..	1	...
Tenn.,..	2	1	.....	..	..	..	..	1	1	..	...
Ga.,....	1	1	.....	..	..	..	..	...	..	..	...
Ala.,...	13	11	.....	1	..	..	..	5	..	..	...
Ohio,...	82	73	526	7	..	1	..	16	1	8	...
Ind.,...	36	29	.....	..	..	;;	..	6	1	4	...
Ill.,...	30	24	126	3	..	..	1	8	2	2	...
Mich.,..	5	4	.....	..	..	1	..	...	..	1	...
Wis.,...	14	4	.....	1	..	..	2	3	8	..	...
Minn.,...	2	1	.....	.....		..	1	...	..	..	...
Mo.,....	5	4	.....	..	..	..	..	1	..	1	...
Kan.,...	1	1	.....	..	..	..	.....		..	..	...
Colo.,..	2	2	.....	1	..	..	..	1	..	..	...
Wy.,....	1	1	.....	..	..	..	..	...	..	..	...
Wtn.,...	1	1	.....	..	..	..	..	...	..	..	...
Ore.,...	2	1	.....	..	..	..	1	...	..	..	...
Cal.,...	5	3	15	..	..	..	1	1	..	..	...
Total,.	572	475	2,302	32	1	2	16	135	57	53	9

CAPACITIES OF ROLLING MILLS AND STEEL WORKS.

States—Gross tons	Rolling Mills.		Bessemer Steel Works.		Open-hearth Steel Works.		Crucible Steel Works.		
	NUMBER OF COMPLETED WORKS	ANNUAL CAPACITY OF FINISHED ROLLED PRODUCTS	NUMBER OF CONVERTERS	ANNUAL CAPACITY OF INGOTS & CASTINGS	NUMBER OF FURNACES	ANNUAL CAPACITY OF INGOTS AND CASTINGS	NUMBER OF COMPLETED WORKS	ANNUAL CAPACITY OF INGOTS AND CASTINGS	TOTAL ANNUAL CAPACITY OF INGOTS & CASTING-GROSS TONS
Maine,.	1	30000	...	.....	.....	.....	..	.....	.....
Mass.,.	7	255100	2	31200	14	214000	.4	1750	246,950
R.I.,..	3	78000	2	2500	2	20000	..	.....	22,500
Conn.,.	6	177500	...	.....	6	87000	2	2400	89,400
N.Y.,..	21	1416500	8	1046500	20	407800	4	13780	1,468,080
N.J.,..	20	584300	5	7500	15	215000	5	28200	250,700
Penn.,.	214	12548700	35	5392000	354	7272900	29	170205	12,835,105
Del.,..	6	83600	2	3000	8	170000	..	.....	173,000
Md.,...	6	515000	3	500000	2	35000	..	.....	535,000
D.of C....	.....		1	300	...	.....	..	.....	300
Va.,...	5	172700	3	61000	...	.....	..	.....	61,000
W.Va.,.	15	634300	4	340000	3	24000	..	.....	364,000
Ky.,...	10	260800	2	150000	7	96000	..	.....	246,000
Tenn.,.	1	50000	...	.....	1	500	1	300	800
Ga.,...	1	90000	...	.....	...	.....	..	.....	.....
Ala.,..	11	653000	1	.....	19	531100	..	.....	531,100
Ohio,..	73	3981250	15	3302400	55	959900	1	450	4,262,750
Ind.,..	29	1055900	...	.....	14	203500	1	100	203,600
Ill.,..	24	2080000	10	2088000	42	841000	2	3500	2,932,500
Mich.,.	4	97000	2	5000	...	.....	..	.....	5,000
Wis.,..	4	329000	5	95000	3	9400	8	5925	110,325
Minn.,.	1	25000	1	1000	...	.....	..	.....	1,000
Mo.,...	4	114000	...	.....	5	40000	..	.....	40,000
Kan.,..	1	100000	...	.....	.6.	.....	..	.....	.....
Colo.,.	2	610000	2	600000	..6	200000	..	.....	800,000
Wy.,...	1	18000	...	.....	...	.....	..	.....	.....
Wash.,.	1	24000	...	.....	...	.....	..	.....	.....
Ore.,..	1	6000	1	1200	...	.....	..	.....	1,200
Cal.,..	3	58400	1	2000	...	8000	..	.....	10,000
Total,.	475	25978050	105	13628600	577	11335100	57	226610	25,190,310

GRAND SUMMARY.

Number and Capacity of Iron and Steel Works.	June, 1904.	November, 1901.
Completed Blast Furnaces.....	428	406
Electric Furnaces.....	5	.....
Blast Furnaces building.....	17	12
Annual capacity Blast Furnaces g.t..	28,114,000	24,812,037
Annual Cap.Bituminous Furnaces g.t..	24,242,500	20,771,200
Anthracite & An.and Coke Furnaces g.t.	3,019,900	3,190,087
Annual capacity Charcoal Furnaces g.t.	851,600	706,750
Annual Capacity Ch.and Coke Fur. g.t.	.....	144,000
Completed R.Mills and Steel Works.....	572	527
Building etc.R;M; and S.W.....	13	29
Single Puddling Furnaces.....	3,161	3,251
Heating Furnaces.....	3,995	3,723
Annual capacity in finished products of completed R.M.double turn.....	25,978,050	23,220,350
Cut-nail Works.....	23	32
Cut-nail Machines.....	2,302	3,161
Completed standard Bessemer S.Works...	32	35
Standard Bessemer Converters.....	75	81
Annual capacity of convertersg.t.....	13,551,000	12,938,000
Clapp-Griffiths Steel Works.....	1	1
Clapp-Griffiths Converters.....	1	1
Robert-Bessemer Steel Works.....	2	2
Robert-Bessemer Converters.....	3	3
Tropenas and special B.S.Works.....	16	9
Tropenas and special B.Converters.....	24	15
Annual capacity B.Converters g.t.....	13,028,600	12,998,700
Completed Open-Hearth Steel Works.....	135	112
Building Open-Hearth Steel Works.....	5	12
Open-Hearth Steel Furnaces.....	549	403
Annual capacity O-P.Furnaces g.t.....	11,335,100	8,289,750
Completed Crucible Steel Works.....	57	45
Building Crucible Steel Works.....	.....	3
Steel-melting Pots completed works....	3,606	2,896
Capacity Pots ingots and castings.....	226,610	175,000
Completed Tin and Terne Plate Works...	55	55
Building Tin and Terne Plate Works....	2	7
Forges making wrought iron from ore...	1	2
Capacity in blooms,double turn,g.t....	6,000	6,075
Completed Bloomaries.....	8	8
Building Bloomaries.....	1	.....
Annual capacity in blooms of completed and building pig and scrap iron Bloomaries,double turn,gross tons,.	41,300	25,575

TABLES SHOWING THE RELATIVE IMPORT, EXPORT AND CONSUMPTION OF IRON ORE, PIG IRON AND STEEL BY THE UNITED KINGDOM, RUSSIA, FRANCE AND THE UNITED STATES.

1890-1903.

OUTPUT AND CONSUMPTION OF IRON ORE FOR THE UNITED KINGDOM, RUSSIA, GERMANY, FRANCE, AND THE UNITED STATES.

1890--------1903.

UNITED KINGDOM.

Year	Output of Native Iron Ore.	Export	Consumption of Iron Ore.		
	Total.		Native	Imports	Total
	Tons.	Tons.	Tons.	Tons.	Tons.
1890	13,781,000	8,000	13,773,000	4,432,000	18,205,000
1891	12,778,000	23,000	12,755,000	3,164,000	15,919,000
1892	11,313,000	7,000	11,306,000	3,778,000	15,084,000
1893	11,203,000	8,000	11,195,000	4,065,000	15,260,000
1894	12,367,000	2,000	12,365,000	4,412,000	16,777,000
1895	12,615,000	2,000	12,613,000	4,446,000	17,059,000
1896	13,701,000	3,000	13,698,000	5,429,000	19,127,000
1897	13,788,000	3,000	13,785,000	5,959,000	19,744,000
1898	14,177,000	2,000	14,175,000	5,461,000	19,636,000
1899	14,461,000	3,000	14,458,000	7,046,000	21,504,000
1900	14,028,000	3,000	14,025,000	6,293,000	20,318,000
1901	12,275,000	4,000	12,271,000	5,541,000	17,812,000
1902	13,426,000	4,000	13,422,000	6,425,000	19,847,000
1903	13,716,000	4,000	13,712,000	6,304,000	20,016,000

RUSSIA. (exclusive of Finland.)

Year	Output of Native Iron Ore	Export.	Consumption of Iron Ore.		
	Total		Native	Import	Total
	Metric Tons	M.T.	M.T.	M.T.	M.T.
1890	1,736,000	140,000	1,596,000	2,000	1,598,000
1891	1,940,000	83,000	1,857,000	12,000	1,869,000
1892	1,986,000	143,000	1,843,000	15,000	1,858,000
1893	2,041,000	136,000	1,905,000	26,000	1,931,000
1894	2,420,000	160,000	2,260,000	37,000	2,297,000
1895	2,859,000	182,000	2,677,000	22,000	2,699,000
1896	3,130,000	159,000	2,971,000	21,000	2,992,000
1897	4,024,000	202,000	3,822,000	34,000	3,856,000
1898	4,444,000	256,000	4,188,000	41,000	4,229,000
1899	5,790,000	426,000	5,364,000	45,000	5,409,000
1900	6,200,000	453,000	5,747,000	70,000	5,817,000
1901	---	739,000	_____	72,000	_____
1902	_____	505,000	_____	74,000	_____
1903	_____	768,000	_____	82,000	_____

GERMANY (including Luxemburg).

Year	Output of Native Iron Ore. Total	Export	Consumption of Iron Ore. Native	Import	Total
	Metric Tons.	M.T.	M.T.	M.T.	M.T.
1890	11,406,000	2,208,000	9,198,000	1,523,000	10,721,000
1891	10,657,000	1,984,000	8,673,000	1,408,000	10,081,000
1892	11,539,000	2,276,000	9,263,000	1,656,000	10,919,000
1893	11,458,000	2,353,000	9,105,000	1,573,000	10,678,000
1894	12,392,000	2,559,000	9,833,000	2,093,000	11,926,000
1895	12,350,000	2,480,000	9,870,000	2,017,000	11,887,000
1896	14,162,000	2,642,000	11,520,000	2,587,000	14,107,000
1897	15,466,000	3,230,000	12,236,000	3,186,000	15,422,000
1898	15,901,000	2,934,000	12,967,000	3,517,000	16,484,000
1899	17,990,000	3,120,000	14,870,000	4,165,000	19,035,000
1900	18,964,000	3,248,000	15,716,000	4,108,000	19,824,000
1901	16,570,000	2,390,000	14,180,000	4,370,000	18,550,000
1902	17,964,000	2,868,000	15,096,000	3,957,000	19,053,000
1903	21,231,000	3,344,000	17,887,000	5,225,000	23,112,000

FRANCE.

Year	Output of Native Iron Ore	Export	Consumption of Iron Ore.		
	Total		Native	Import	Total
	Metric Tons.	M.T.	M.T.	M.T.	M.T.
1890	3,472,000	285,000	3,187,000	1,610,000	4,797,000
1891	3,579,000	299,000	3,280,000	1,438,000	4,718,000
1892	3,707,000	305,000	3,402,000	1,684,000	5,086,000
1893	3,517,000	302,000	3,215,000	1,630,000	4,845,000
1894	3,772,000	248,000	3,524,000	1,638,000	5,162,000
1895	3,680,000	237,000	3,443,000	1,651,000	5,094,000
1896	4,062,000	238,000	3,824,000	1,862,000	5,686,000
1897	4,582,000	300,000	4,282,000	2,138,000	6,420,000
1898	4,731,000	236,000	4,495,000	2,032,000	6,527,000
1899	4,986,000	291,000	4,695,000	1,951,000	6,646,000
1900	5,448,000	372,000	5,076,000	2,119,000	7,195,000
1901	4,791,000	259,000	4,532,000	1,663,000	6,195,000
1902	5,004,000	423,000	4,581,000	1,563,000	6,144,000
1903	———	712,000	———	1,833,000	———

UNITED STATES.

Year.	Output of Native Iron Ore	Export	Consumption of Iron Ore		
	Total.		Native.	Import.	Total.
	Tons.	Tons	Tons.	Tons.	Tons.
1890	16,036,000	___	16,036,000	1,247,000	17,283,000
1891	14,591,000	___	14,591,000	913,000	15,504,000
1892	16,297,000	___	16,297,000	807,000	m17,104,000
1893	11,588,000	____	11,588,000	527,000	12,115,000
1894	11,880,000	____	11,880,000	167,000	12,047,000
1895	15,958,000	2,000	15,956,000	524,000	16,480,000
1896	16,005,000	11,000	15,994,000	683,000	16,677,000
1897	17,518,000	8,000	17,510,000	490,000	18,000,000
1898	19,434,000	32,000	19,402,000	187,000	19,589,000
1899	24,683,000	41,000	24,642,000	674,000	25,316,000
1900	27,553,000	51,000	27,502,000	898,000	28,400,000
1901	28,887,000	65,000	28,822,000	967,000	29,789,000
1902	35,554,000	88,000	35,466,000	1,165,000	36,631,000
1903	31,606,000	81,000	31,525,000	980,000	32,505,000

PRODUCTION AND CONSUMPTION OF PIG IRON IN THE UNITED KINGDOM, RUSSIA, GERMANY, FRANCE AND THE UNITED STATES.

1890--1903.

UNITED KINGDOM.

Year	Production of Pig Iron	Export	Consumption of Pig Iron.		
	Total		Domestic.	Import.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.
1890	7,904,000	1,139,000	6,765,000	60,000	6,825,000
1891	7,406,000	837,000	6,569,000	61,000	6,630,000
1892	6,709,000	764,000	5,945,000	52,000	5,997,000
1893	6,977,000	836,000	6,141,000	32,000	6,173,000
1894	7,427,000	826,000	6,601,000	59,000	6,660,000
1895	7,703,000	861,000	6,842,000	89,000	6,931,000
1896	8,660,000	1,053,000	7,607,000	106,000	7,713,000
1897	8,796,000	1,200,000	7,596,000	154,000	7,750,000
1898	8,610,000	1,043,000	7,567,000	156,000	7,723,000
1899	9,421,000	1,380,000	8,041,000	167,000	8,208,000
1900	8,960,000	1,428,000	7,532,000	173,000	7,705,000
1901	7,929,000	839,000	7,090,000	195,000	7,285,000
1902	8,680,000	1,103,000	7,577,000	221,000	7,798,000
1903	8,811,000	1,065,000	7,746,000	129,000	7,875,000

RUSSIA (excluding Finland).

Year	Production of Pig Iron. Total	Export	Consumption of Pig Iron. Domestic	Import	Total.
	Metric Tons	M.T.	M.T.	M.T.	M.T.
1890	902,000	*	902,000	133,000	1,035,000
1891	981,000	*	981,000	81,000	1,062,000
1892	1,047,000	*	1,047,000	83,000	1,130,000
1893	1,125,000	*	1,125,000	134,000	1,259,000
1894	1,308,000	*	1,308,000	144,000	1,452,000
1895	1,425,000	*	1,425,000	127,000	1,552,000
1896	1,593,000	*	1,593,000	75,000	1,668,000
1897	1,844,000	*	1,844,000	98,000	1,942,000
1898	2,211,000	*	2,211,000	111,000	2,322,000
1899	2,674,000	*	2,674,000	136,000	2,810,000
1900	2,895,000	*	2,895,000	52,000	2,947,000
1901	2,822,000	15,000	2,807,000	30,000	2,837,000
1902	2,556,000	55,000	2,501,000	18,000	2,519,000
1903	___	*	___	14,000	___

* Less than 500 tons.

GERMANY (including Luxemberg).

Year	Production of Pig Iron	Export	Consumption of Pig Iron.		
	Total		Domestic	Import	Total.
	Metric Tons.	M.T.	M.T.	M.T.	M.T.
1890	4,651,000	117,000	4,534,000	450,000	4,984,000
1891	4,631,000	111,000	4,520,000	285,000	4,805,000
1892	4,928,000	113,000	4,815,000	262,000	5,077,000
1893	4,976,000	109,000	4,867,000	246,000	5,113,000
1894	5,370,000	155,000	5,215,000	213,000	5,428,000
1895	5,455,000	135,000	5,320,000	214,000	5,534,000
1896	6,363,000	140,000	6,223,000	350,000	6,573,000
1897	6,870,000	91,000	6,779,000	423,000	7,202,000
1898	7,301,000	187,000	7,114,000	385,000	7,499,000
1899	8 130,000	182,000	7,948,000	613,000	8,561,000
1900	8,507,000	129,000	8,378,000	727,000	9,105,000
1901	7,867,000	150,000	7,717,000	268,000	7,985,000
1902	8,518,000	347,000	8,171,000	143,000	8,314,000
1903	10,018,000	418,000	9,600,000	158,000	9,758,000

FRANCE.

Year	Production of Pig Iron	Export	Consumption of Pig Iron.		
	Total		Domestic	Import	Total
	Metric Tons.	M.T.	M.T.	M.T.	M.T.
1890	1,962,000	171,000	1,791,000	115,000	1,906,000
1891	1,897,000	98,000	1,799,000	153,000	1,952,000
1892	2,057,000	121,000	1,936,000	150,000	2,086,000
1893	2,003,000	105,000	1,898,000	140,000	2,038,000
1894	2,070,000	118,000	1,952,000	118,000	2,004,000
1895	2,004,000	161,000	1,843,000	75,000	1,918,000
1896	2,340,000	195,000	2,145,000	79,000	2,224,000
1897	2,484,000	109,000	2,375,000	150,000	2,525,000
1898	2,525,000	163,000	2,362,000	159,000	2,521,000
1899	2,578,000	154,000	2,424,000	189,000	2,613,000
1900	2,714,000	114,000	2,600,000	252,000	2,852,000
1901	2,389,000	97,000	2,292,000	138,000	2,430,000
1902	2,405,000	214,000	2,191,000	129,000	2,320,000
1903	2,828,000	195,000	2,633,000	116,000	2,749,000

UNITED STATES.

Year	Production of Pig Iron.	Export	Consumption of Pig Iron.		
	Total		Domestic	Import	Total
	Tons.	Tons.	Tons.	Tons.	Tons.
1890	9,203,000	16,000	9,187,000	135,000	9,322,000
1891	8,280,000	15,000	8,265,000	67,000	8,332,000
1892	9,157,000	15,000	9,142,000	70,000	9,212,000
1893	7,125,000	25,000	7,100,000	54,000	7,154,000
1894	6,657,000	24,000	6,633,000	16,000	6,649,000
1895	9,446,000	26,000	9,420,000	53,000	9,473,000
1896	8,627,000	62,000	8,561,000	56,000	8,617,000
1897	9,653,000	263,000	9,390,000	19,000	9,409,000
1898	11,774,000	253,000	11,521,000	25,000	11,546,000
1899	13,621,000	229,000	13,392,000	40,000	13,432,000
1900	13,789,000	287,000	13,502,000	52,000	13,554,000
1901	15,878,000	81,000	15,797,000	63,000	15,860,000
1902	17,821,000	27,000	17,794,000	625,000	18,419,000
1903	18,009,000	20,000	17,989,000	598,000	18,587,000

TOTAL PRODUCTION OF STEEL IN THE UNITED KINGDOM , RUSSIA, SWEDEN, GERMANY,(and Luxemburg), FRANCE AND THE UNITED STATES.

1890--1903.

Year	United Kingdom	Russia	Germany	France	United States.
	Tons	M.T.	M.T.	M.T.	Tons.
1890	3,579,000	375,000	2,232,000	683,000	4,277,000
1891	3,157,000	429,000	2,563,000	744,000	3,904,000
1892	2,920,000	510,000	2,756,000	825,000	4,928,000
1893	2,950,000	626,000	3,163,000	790,000	4,020,000
1894	3,111,000	720,000	3,642,000	818,000	4,412,000
1895	3,010,000	872,000	3,963,000	876,000	6,115,000
1896	4,133,000	1,013,000	4,821,000	1,180,000	5,282,000
1897	4,486,000	1,212,000	5,137,000	1,325,000	7,157,000
1898	4,566,000	1,602,000	5,781,000	1,434,000	8,953,000
1899	4,855,000	1,877,000	6,329,000	1,499,000	10,640,000
1900	4,901,000	2,201,000	6,362,000	1,565,000	10,188,000
1901	4,904,000	____	6,211,000	1,425,000	13,474,000
1902	4,849,000	____	7,428,000	1,568,000	14,947,000
1903	5,034,000	____	8,802,000	1,855,000	____