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STATISTICS
OF THE
AMERICAN AND FOREIGN IRON TRADES
FOR 1898.

ANNUAL STATISTICAL REPORT
OF THE
AMERICAN
IRON AND STEEL ASSOCIATION,

CONTAINING
COMPLETE STATISTICS OF THE IRON AND STEEL INDUSTRIES OF THE UNITED STATES FOR 1898 AND PRECEDING YEARS AND A BRIEF REVIEW OF THEIR PRESENT CONDITION; ALSO STATISTICS OF IMPORTS AND EXPORTS OF IRON AND STEEL IN 1897 AND 1898, AND OF THE IRON ORE, SHIPBUILDING, AND TINPLATE INDUSTRIES OF THE UNITED STATES; ALSO STATISTICS OF THE FOREIGN IRON AND STEEL INDUSTRIES.

PRESENTED TO THE MEMBERS, MAY 15, 1899.

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

	PAGE
LETTER TO THE PRESIDENT OF THE ASSOCIATION, . .	7

IRON AND STEEL NECROLOGY FOR 1898 AND 1899, . .	9-15
---	------

STATISTICS OF THE AMERICAN IRON TRADE.

General Review of the Domestic Iron Trade,	17-22
Consolidations in the American Iron Trade in 1898 and 1899, .	19, 20
Imports of Iron and Steel,	20, 24, 33, 56
Exports of Iron and Steel,	20, 24, 33-35, 56
Exports of Agricultural Implements,	20, 34, 35
Imports of Iron and Steel from Great Britain,	21, 22
Exports of Iron and Steel to Great Britain,	21, 22
General Statistical Summary,	23-25
Shipments and Average Price of Connellsville Coke,	23, 24
Shipments of Pocahontas Flat Top Coke,	24
Shipments of Anthracite Coal from the Pennsylvania Mines, .	24, 56
Shipments of Cumberland Coal,	24
Shipments of Monongahela Bituminous Coal and Coke,	24
Miles of New Railroad Built in the United States,	24, 25, 56
Imports of Tinplates,	24
Imports of Pig Iron, Spiegel, Ferro-manganese, and Ferro-silicon, .	24, 33
Number of Locomotives Built in 1898 and previous years, . . .	25
Number of Freight and Passenger Cars Built in 1897 and 1898, .	25
Iron and Steel Shipbuilding,	25, 53, 54, 56
Production of Tinplates and Terne Plates,	25, 54, 55, 56
Average Monthly Prices of Iron and Steel from 1896 to 1899, .	25, 26
Prices of Wire Nails at Chicago from 1891 to 1899,	27
Average Yearly Prices of Iron and Steel from 1894 to 1898, . .	27
Prices of Tinplates at New York in 1897 and 1898,	28
Prices of Lake Superior Iron Ore,	28
Imports of Iron Ore,	29, 30, 56
Imports of Cuban Iron Ore from 1884 to 1898,	29, 30
Shipments of Iron Ore from Leading Districts,	30
Shipments of Iron Ore from the Lake Superior Mines,	23, 30, 31
Receipts of Lake Superior Iron Ore at Lake Erie Ports,	31
Shipments of Iron Ore from the New Jersey Mines,	32
Shipments of Iron Ore from the Cornwall Mines,	32
Consumption of Iron Ore,	32, 56
Imports of Manganese Ore from Cuba,	32
Production of Pig Iron in 1898 and preceding years,	23, 35-40, 56, 57, 58
Production of Pig Iron in Pennsylvania and Ohio by Districts, .	36, 37
Production of different kinds of Pig Iron in 1898,	37

	PAGE
Production of Pig Iron according to Fuel used,	37-39, 57, 58
Production of Bessemer Pig Iron by States,	39
Production of Bessemer Pig Iron in Pennsylvania and Ohio,	39
Production of Basic Pig Iron,	39, 40
Production of Spiegeleisen and Ferro-manganese,	23, 40, 56
Number of Furnaces in Blast,	40
Stocks of Unsold Pig Iron,	40, 41, 59
Consumption of Pig Iron from 1894 to 1898,	42
Limestone Consumed in Making Pig Iron in 1897 and 1898,	42
Production of Bessemer Steel,	23, 43, 44, 56
New Bessemer Steel Plants Erected in 1898 and 1899,	43, 44
Production of Acid and Basic Open-hearth Steel,	23, 44, 45, 56
Production of Open-hearth Steel from 1893 to 1898,	44
Production of Acid and Basic Open-hearth Steel Castings in 1898,	45
Production of Open-hearth Ingots and Castings from 1894 to 1898,	45
Production of Open-hearth Steel Rails in the United States,	45, 47, 56
Production of Crucible Steel,	46, 56
Production of Miscellaneous Steel,	46, 56
Total Production of Steel,	23, 46, 56
Total Production of Steel Castings,	46
Production of Iron and Steel Rails,	23, 46-48, 56, 62
Production of Bessemer Steel Rails,	23, 46, 56
Production of Iron Rails,	47, 48, 56
Weight, per yard, of all kinds of Rails Produced in 1897 and 1898,	47
Production of Street Rails,	23, 47, 48, 56
Production of all kinds of Rails from 1891 to 1898,	48
Production of Iron and Steel Structural Shapes,	23, 48, 56
Production of Plates and Sheets,	23, 49, 56, 62
Production of Black Plates for Tinning,	49
Production of Wire Rods,	23, 49, 50, 56, 62
Production of Wire Nails,	23, 50, 56
Production of Cut Nails,	23, 51, 56, 62
Total Production of Rolled Iron and Steel,	23, 52, 56, 62
Production of Iron and Steel in Allegheny County, Pa.,	53
Production of Iron Blooms and Billets from Ore, Pig, and Scrap,	54, 56
Statistics of Immigration,	55, 56
Summary of United States Statistics for 1897 and 1898,	56
Production of Iron Ore in the United States,	56
Production of Coal in the United States,	56, 62
Imports and Exports of Anthracite and Bituminous Coal,	56
Production of Bar, Hoop, Skelp, Structural Shapes, etc.,	56, 62
Production of Rolled Iron and Steel in Pennsylvania by Districts,	60
Production of Rolled Iron and Steel in Ohio by Districts,	61

STATISTICS OF THE CANADIAN IRON TRADE.

Production of Pig Iron, Bessemer and Open-hearth Steel, and Rolled Iron and Steel in the Dominion of Canada,	63, 64, 75, 76
---	----------------

STATISTICS OF THE FOREIGN IRON TRADE.

	PAGE
Summary for 1898 and for the Early Part of 1899,	65
Production of Pig Iron, Bessemer Steel Ingots, Bessemer Rails, and Open-hearth Steel Ingots and Rails in Great Britain, . .	65, 66
Production of Puddled Bars in Great Britain,	66
Production and Imports of Iron Ore by Great Britain,	66
Exports and Imports of Iron and Steel by Great Britain, . . .	66, 67
Exports of Tinplates by Great Britain,	67
Imports and Exports of Tin by Great Britain,	67
Production and Exports of Coal by Great Britain,	67
Production of Pig Iron in Germany,	68
Production of Steel and Steel Rails in Germany,	68
Imports and Exports of Iron and Steel by Germany,	68
Production of Iron Ore in Germany and Imports and Exports, .	68
Production and Imports and Exports of Coal by Germany, . .	68, 69
Production of Pig Iron and Steel in France,	69
Production of Iron Ore and Coal in France,	69, 70
Imports and Exports of Iron Ore by France,	69
Production of Pig Iron and Steel in Belgium,	70
Imports and Exports of Pig Iron by Belgium,	70
Production and Exports and Imports of Iron Ore by Belgium, . .	70
Production, Imports, and Exports of Coal by Belgium,	70
Production of Pig Iron in Austria and Hungary,	70
Production of Steel in Austria and Hungary,	70, 71
Production of Iron Ore and Coal in Austria and Hungary, . . .	71
Production of Iron Ore, Coal, Pig Iron, and Steel in Sweden, . .	71
Exports of Iron Ore by Sweden,	71, 72
Production of Iron Ore in Norway,	72
Production and Exports of Iron Ore by Spain,	72
Production of Pig Iron and Steel in Spain,	72
Production and Imports and Exports of Coal by Spain,	72
Production of Pig Iron and Finished Steel in Italy,	72
Imports and Exports of Pig Iron by Italy,	72, 73
Production and Imports and Exports of Iron Ore by Italy, . .	73
Production and Imports and Exports of Coal and Coke by Italy, .	73
Production of Pig Iron and Steel in Russia,	73
Production of Coal, Lignite, Iron Ore, and Manganese in Russia, .	73, 74
Production of Iron Ore and Lignite in Greece,	74
Imports of Iron Ore into Japan from Mexico,	74
Production and Exports of Coal by Japan,	74
Production of Pig Iron and Steel in China,	74, 75
Production of Coal in India, Australasia, and South Africa, . . .	75
Production of Coal, Coke, and Iron Ore in Canada,	75
Production of Pig Iron and Steel in Canada,	75
Imports of Pig Iron by Canada,	76
Production of Iron Ore in Newfoundland,	76
Production of Manganese Ore in Brazil,	76
Production of Tin in Bolivia,	76

LETTER TO THE PRESIDENT.

HON. B. F. JONES, *President of The American Iron and Steel Association.*

DEAR SIR: I have the honor to present herewith the Annual Statistical Report of the American Iron and Steel Association for 1898. In addition to the usual statistics of the iron and steel industries and related industries of our own country and the usual Necrological record the present Report contains a full account of the recent progress and present condition of the iron and steel industries of other countries, which account has special value at this time because of the greatly increased interest in late years of our iron and steel manufacturers in foreign markets.

Since the appearance of our last Annual Report in September, 1898, the work of this office has been continued on the lines with which our members are now so familiar, and upon previous explanations of which work it is not, therefore, necessary now to enlarge. Much clerical labor has been devoted to the task of keeping a record of the changes in ownership of iron and steel works that have taken place as a consequence of the numerous consolidations of iron and steel firms and companies in the last twelve or fifteen months. Our large miscellaneous correspondence has been promptly attended to. Our statistics have been industriously collected and given early publicity in the columns of the Bulletin.

The financial condition of the Association during the year 1898 is shown by the following abstract of the statement of our Treasurer, Mr. Andrew Wheeler, on December 31, 1898: On January 1, 1898, the balance in the hands of the Treasurer was \$1,203.35; the receipts from members and from advertisements in the Bulletin during the year were \$10,756.75; the total amount available during the year was \$11,960.10; the expenditures were \$10,780.68; and the balance on hand on December 31, 1898, was \$1,179.42. These figures do not include that part of the cost of our Annual Report in 1898 and of our Directory for 1898 which was met by the income derived from their sale to brokers, commission merchants, and others who are not members of the Association.

I renew the expression of my obligations to Mr. William G. Gray for intelligent assistance in the collection of our statistics, and to the officials of the Bureau of Statistics of the Treasury Department and other Bureaus of the General Government for valuable statistical information. I also express my thanks for statistical information to other gentlemen who are mentioned in the body of the Report and to a large number of foreign statistical correspondents. Very Truly Yours,

JAMES M. SWANK, *General Manager.*

No. 261 SOUTH FOURTH STREET, PHILADELPHIA, May 5, 1899.

IRON AND STEEL NECROLOGY.

FROM AUGUST, 1898, TO MAY, 1899.

(1898.) Captain Thomas Sharp, president of the Spathite Iron Company, of Nashville, Tennessee, died at Nashville, August 3, 1898, in his 68th year. He was born in Pennsylvania on July 9, 1831, but settled in the South when only 17 years old.—E. S. McLain, of Allegheny City, Pa., September 1, from the effects of a gunshot wound. He was 54 years old. For a number of years Mr. McLain was connected with the iron industry at New Castle, Pa.—John A. Funston, at Bloomsburg, Pa., September 14, aged 78 years. He was born on February 9, 1820. In early life he was connected with the Irondale Furnaces, at Bloomsburg.—James R. Moore, secretary and treasurer of Moorhead, Brother & Co., Incorporated, of Sharpsburg, Pa., September 19. Mr. Moore was a native of England, and was born 36 years ago.—Thomas Collins, a prominent railroad contractor, at Bellefonte, Pa., September 25, aged 75 years. He was born at Munster, Cambria county, Pa. He was a member of the Bellefonte Furnace Company.—Abraham Storm Patterson, treasurer of the Pulaski Iron Company, of Pulaski, Va., and prominently identified with other iron and steel enterprises, at Port Kennedy, Pa., September 27. Mr. Patterson, was the son of Morris Patterson, and was born at Philadelphia 49 years ago.—Joseph Mather Brainard, a member of the Cleveland Rolling Mill Company, of Cleveland, Ohio, September 28, at East Cleveland, aged 68 years.—E. A. Saunders, vice president of the Richmond Standard Spike and Iron Company, at Richmond, Va., October 3.—General James L. Botsford, at Youngstown, Ohio, October 6, aged 67 years. He was for many years an officer of the Mahoning Valley Iron Company.—Charles Meredith DuPuy, at his home in New York, October 7. Mr. DuPuy was born at Philadelphia in 1823. He was long engaged in experiments in the manufacture of iron direct from ores for the production of fine steel. His son Herbert is a member of the firm of Anderson, DuPuy & Co., steel manufacturers, of Pittsburgh.—William H. Shoenberger, formerly a resident of Pittsburgh, October 16, at Cobourg, Canada, aged about 62 years. He was a son of George K. Shoenberger and grandson of Dr. Peter Shoenberger. He was born at Cincinnati. He was for a time associated with the original Shoenberger Company, and afterwards he became a member of the firm of Shoenberger, Blair & Co.—Andrew D. Smith, president of the La Belle Steel Company, of Pittsburgh, and one of the first persons to ship coal down the Ohio river in "tows," October 21, at his home in Allegheny City, aged almost 78 years. He was born on November 11, 1820.—John Gjers, the inventor of the soaking pit, at Bournemouth, England, October 7, 1898, aged about 68 years. He was born at Gothenburg, Sweden, in 1830.—Thomas S. Blair, October 22, at Pittsburgh. Mr. Blair was born at Kit-

tanning in 1825. He was the son of Thomas Blair, attorney, and the grandson of John Blair, of Blair's Gap, after whom Blair county was named. In early life he associated himself with G. & J. H. Shoenberger, one of the pioneer iron manufacturing firms of Pittsburgh. The firm developed into Shoenberger, Blair & Co., with which he was connected until his retirement about 25 years ago.—John H. Dialogue, the well-known shipbuilder, October 23, at Camden, N. J., aged about 70 years. He was born at Philadelphia of French-German ancestry.—George Lloyd, Sr., a native of England, and a pioneer iron manufacturer of the Shenango Valley, Pa., at his home in Shenango township, Mercer county, October 24. He retired from the iron business in 1865.—Horace B. Miller, a native of Pennsylvania, at his residence in Brown's Valley, California, aged 59 years. He was with Farragut at the opening of the Mississippi river. After the war he conducted the *American Machinist*, a trade paper of New York City.—David Harpster, at Harpster, Ohio, October 29. He was one of the most extensive wool growers in America, and was a factor in most of the wool tariff legislation for the past quarter of a century.—Col. George E. Waring, Jr., of yellow fever, at New York, October 29. Col. Waring was the most prominent sanitary engineer in this country. He was born at Poundridge, N. Y., July 4, 1833. He contracted yellow fever while on a professional visit to Havana at the request of the Government.—Franklin P. Kaercher, for the last eighteen years secretary of the Philadelphia and Reading Coal and Iron Company, November 5, at Philadelphia, aged 50 years. He was born at Pottsville.—David A. Wells, the noted free trade writer, at Norwich, Conn., November 5. He was born at Springfield, Mass., June 17, 1828.—Samuel Lee, the founder of Leesport, Berks county, Pa., November 8, aged 92 years. Mr. Lee helped to drive the first stake in the survey of the East Pennsylvania Railroad.—J. Harry Smith, who was connected with the Lalance and Grosjean Manufacturing Company, of Woodhaven, Long Island, as stockholder and superintendent for over twenty years, November 9, at Brooklyn, in his 72d year.—Colonel Thomas Donaldson, widely and favorably known as a publicist and man of letters, at his home in Philadelphia, November 18, aged almost 55 years. He was born at Columbus, Ohio, of Virginia ancestry, December 27, 1843. When in his 18th year he enlisted in the Union army and served until the close of the civil war. He was an ardent advocate of the protective policy.—John E. Graeff, for many years a prominent coal merchant of Philadelphia, November 18, in his 78th year. He was born at Pine Grove, Schuylkill county, Pa., and was in his early life a Lutheran minister.—John W. Keely, the inventor of the "Keely motor," at his residence in Philadelphia, November 18, in his 72d year. He was born at Philadelphia, September 3, 1827. Mr. Keely never patented his invention.—Lindley Smyth, a retired merchant and banker of Philadelphia, November 18, in his 83d year. He was born at Wilmington, Delaware, on July 28, 1816. He was the father of Marriott C. Smyth, president of the Latrobe Steel Company.—W. M. Wilson, vice president of the American Steel Casting Company, at New York City, November 18. He

was born at Warren, Ohio.—General Don Carlos Buell, at his home in Muhlenburg county, Kentucky, November 19. General Buell was born near Lowell, Ohio, March 23, 1818. He reinforced Grant at the battle of Pittsburg Landing. After the war he was president of the Green River Iron Works.—Sir John Fowler, who was engineer-in-chief of the Forth Bridge, November 21, aged 81 years. He was born at Wadsley Hall, Sheffield, in 1817.—Morris P. Janney, at Pottstown, Pa., November 30. He was born at Philadelphia, February 1, 1850. He filled positions of responsibility with the Pottstown Iron Company and the Glendon Iron Company.—J. Taylor Gause, president of the Harlan and Hollingsworth Company, at Wilmington, Delaware, December 1, aged 75 years. He was born September 30, 1823, on his father's farm near Kennett Square, Pa.—John Baizley, proprietor of one of the largest machine shops in Philadelphia, December 3, at the age of 73 years.—Major Alonzo Loring, who had been prominently identified with the iron and steel interests of Wheeling, at St. Louis, December 7. He was born at Batavia, N. Y., August 20, 1820.—George H. Parrish, one of the oldest residents of Wilkesbarre, Pa., and a prominent coal operator, December 10, aged 79 years. He was born at Wilkesbarre, May 10, 1819.—Edmund S. Whitaker, son of the late George P. Whitaker, proprietor of Principio Furnace and Forge, in Cecil county, Md., suddenly, December 13, at Principio, where he was born. He was a brother of Hon. N. E. Whitaker, of Wheeling, W. Va.—James Gardner, fire-brick manufacturer, of Cumberland, Md., formerly of Johnstown, Pa., at Cumberland, December 15, aged 73 years.—Henry A. Chapin, who developed the Chapin iron ore mine in Michigan, December 16, at his home in Niles, Michigan. He was born in Massachusetts, October 13, 1813.—Col. James Collord, treasurer of the Oliver and Snyder Steel Company, at Pittsburgh, December 16, aged about 62 years. During the civil war he made a splendid record, attaining the rank of colonel.—John E. Wootten, formerly general manager of the Reading Railroad and inventor of valuable engineering devices, including the Wootten locomotive, at Philadelphia, December 16, in his 77th year.—William Burt, at Marquette, Michigan, December 19, aged about 73 years. He was born at Mt. Vernon, Michigan, October 31, 1825. He was the son of Judge Wm. A. Burt, the first white man to discover iron ore in the Lake Superior region. This discovery was made on September 16, 1844, near the eastern end of Teal Lake.—Alexander Nimick, one of the most prominent iron and steel manufacturers of Pittsburgh, December 20, in his 79th year. He was born at Pittsburgh, February 2, 1820. Mr. Nimick was a member of the manufacturing firms of Singer, Nimick & Co., Phillips, Nimick & Co., and the Kemble Iron Company, and was senior member of the firm of Nimick & Co., metal brokers.—James D. Claire, of Portsmouth, Ohio, at Columbus, Ohio, December 21, in his 77th year. He was born at Washington, D. C., November 13, 1822. Mr. Claire was the principal owner of Bloom Furnace, at Bloom Switch, Scioto county, Ohio, and of Madison Furnace, at Rempel, Jackson county, Ohio. These were charcoal furnaces. He was also one of the builders of Huron Furnace, at Jackson, Jackson county, Ohio. Mr. Claire

was also the president of the Ohio Stove Company, at Portsmouth, established in 1872.—John H. Bringham, at Philadelphia, December 24, in his 87th year. He is reputed to have been the first sawmaker in Philadelphia, antedating Henry Disston. He was at a later day connected with the Philadelphia Iron and Steel Company, of which he was president and which operated a rolling mill on the Delaware river. He was born at Germantown.—Colonel P. H. Moore, editor of the *Ohio Valley Manufacturer*, at Wheeling, December 26. When the civil war opened Mr. Moore cast his fortunes with the Confederacy and rose to the rank of lieutenant-colonel in the engineer corps. In 1859 he established the *Wheeling Daily Union*. The *Ohio Valley Manufacturer* was established twelve years ago and Colonel Moore had ever since been its editor.—John W. Chalfant, at his home in Allegheny City, Pa., December 28, of paralysis. Mr. Chalfant was born December 13, 1827, and was a graduate of Jefferson College. Soon after his graduation he entered the office of Spang & Co., who operated an iron rolling mill at Etna, about five miles east of Pittsburgh. He subsequently became the active head of the company, the name of which was changed to Spang, Chalfant & Co. He had also been the active spirit in the Isabella Furnace Company, whose furnaces, built in 1872, are also located at Etna. The Spang Steel and Iron Company, with works also at Etna, built in 1880, is another enterprise with which Mr. Chalfant was actively identified.—The Hon. Justin S. Morrill, United States Senator from Vermont, at his home in Washington, D. C., December 28, as the result of an attack of grip, followed by pneumonia. Senator Morrill was born at Strafford, Vt., April 14, 1810. He lived all his days where he was born. Senator Morrill had served continuously in one or the other branch of Congress since December, 1855, when he first took his seat in the House of Representatives—a period of 43 years. He was the father of the Morrill protective tariff of 1861. He was opposed to reciprocity, the annexation of Hawaii, and the acquisition of the Philippine Islands.—C. W. Cadwallader, a member of the firm of Hamilton & Co., manufacturers of black plates at West Newton, Westmoreland county, Pa., and the owner of a tin dipping plant at Pittsburgh, December 30, 1898. He was a native of Ohio and was about 50 years old.

(1899.) William H. Platt, a member of the firm of Scranton & Platt, which was merged into the Lackawanna Iron and Coal Company, at New York, January 1, aged 77 years.—Sherman D. Hubbard, founder of the Hubbard shovel and axe manufactory at Pittsburgh, January 2, at Elkhart, Indiana. He was born in Vermont and was 76 years old.—W. Dewees Wood, a leading iron and steel manufacturer of Pittsburgh, January 2, of pneumonia. He was born at Philadelphia, April 17, 1826, and was nearly 73 years old. Mr. Wood was trained by his father in all the details of the manufacture of plate and sheet iron, and at an early age was intrusted by him with the management of the Delaware Iron Works, near Wilmington. His identification with the iron industry of Pittsburgh and Allegheny county dated from 1851, in which year, in company with his father-in-law, Richard B. Gilpin, he established sheet-iron works at McKeesport. Since 1871 he and his

sons have exclusively owned and managed the works. Mr. Wood was also one of the owners of the works of the Wellsville Plate and Sheet Iron Company, at Wellsville, Ohio.—John T. Murdoch, at Pittsburgh, January 3, aged 82 years. He was born at Edinburgh, Scotland. He was one of the oldest steel workers in the country. He was employed at the Crescent Steel Works for 25 years.—John S. Lyon, secretary and treasurer of the Firth-Sterling Steel Company, January 5, at Pittsburgh, aged about 42 years. He was born in Centre county, Pa.—James Denniston, former president of the Hollidaysburg and Gap Iron Works, at Hollidaysburg, January 8, aged 71 years. He was born at Indiana, Pa., in 1827.—Edward B. Grubb, January 8, at the Presbyterian Hospital, Philadelphia. He was the treasurer of the Sheridan Iron Works Limited, of Sheridan, Pa.—S. Stuart Lyon, at Bellefonte, Pa., January 11. He was 76 years old. He was born in Penn's Valley, Centre county, and was the son of John Lyon, one of the oldest and foremost ironmasters in the country in his day.—Herbert C. Ayer, at one time a prominent iron merchant of Chicago, January 12, in a sanitarium at Newark, N. J., aged 60 years.—The Hon. Nelson Dingley, of Maine, January 13, at Washington, D. C., in his 67th year. As the author of our present tariff Mr. Dingley's name will long be remembered. The Dingley tariff was his last and most important contribution to wise Congressional legislation. He was born at Durham, Maine, on February 15, 1832.—Samuel R. Parke, president of the Parkesburg National Bank, of Parkesburg, Pa., and formerly treasurer of the Parkesburg Iron Company, at Parkesburg, January 13, aged 66 years.—Jacob Capp, a retired iron manufacturer of Lebanon, Pa., January 16, aged 74 years.—Thomas Gogin, at Boston, January 17. He was born at Stamford, Conn., February 29, 1824. He began life as a roller in Cooper, Hewitt & Co.'s rolling mill at Trenton and was afterwards employed as a roller at the Quinsigamond mill of Henry S. Washburn at Worcester, Mass., until 1853, in which year he went to South Boston as superintendent of a rod mill which Mr. Washburn built in the same year. In 1857 this mill was purchased by Naylor & Co. and styled the Norway Iron Works. Here Mr. Gogin remained as superintendent until 1884, when he retired from active business.—William Henry Lampton, January 17, at New York City, aged 86 years. Mr. Lampton was a successful manufacturer of pig iron in the Hanging Rock region of Kentucky and Ohio sixty years ago.—Major Jedediah Hotchkiss, chief of staff of engineers to "Stonewall" Jackson in his Shenandoah Valley campaign, at Staunton, Va., January 18, aged about 71 years. Major Hotchkiss was born at Windsor, Broome county, N. Y., and went to Virginia fifty years ago. He was active in the development of the iron and coal industries of Virginia.—J. Blodgett Britton, the distinguished chemist, formerly of Philadelphia, at his residence in Warrenton, Virginia, January 19, aged 80 years. His "Ironmasters' Laboratory," in Philadelphia, was established in 1866. He was born at the village of Mantua, now a part of West Philadelphia, February 25, 1819. In early life he successfully practiced law in New Orleans.—General Selden E. Marvin, of Troy, N. Y., at New York City,

January 19, in his 64th year. He was born at Jamestown, N. Y., on August 20, 1835. General Marvin was long identified as secretary and treasurer with the iron and steel firm of John A. Griswold & Co. and its successors, the Albany and Rensselaer Iron and Steel Company and the Troy Steel and Iron Company.—Isaac Eberly, February 1, at Columbus, Ohio, at the age of 85 years. Mr. Eberly was born near Ephrata, Pa., and went to Columbus when 17 years old. He was the president of the Franklin Iron Works, which built Franklin Furnace, at Columbus, in 1873.—William Neal, of Bloomsburg, Columbia county, Pa., February 6, aged 86 years. Mr. Neal was a member of the firm of McKelvy & Neal, which built Bloom Furnace, at Bloomsburg, in 1847. At a later day the furnace was owned and operated by Mr. Neal and his sons.—Of paralysis, at Webster Groves, Mo., February 13, the Hon. A. W. Campbell, of Wheeling, one of the proprietors of the Wheeling *Intelligencer* and until a few years ago its editor. Mr. Campbell was also the president of the Benwood Iron Works about 1892.—John Adams Emereck, at his home in Langhorne, Bucks county, Pa., February 15, aged 71 years. Mr. Emereck was born at Hudson, N. Y. He was at one time president of the Eureka Cast Steel Company, of Chester, Pa.—W. H. Conner, superintendent of the foundry department of the Edgar Thomson Steel Works, at Braddock, Pa., January 29, aged 57 years. Mr. Conner was born at Cumberland, Md.—Alexander P. Sterling, at Canajoharie, N. Y., February 9, aged 66 years. His father, James Sterling, was one of the early settlers of Jefferson county, and owned a number of iron mines and furnaces there. Alexander P. Sterling spent most of his life in the iron trade.—R. H. Johnson, general manager of the Columbus and Hocking Coal and Iron Company, of apoplexy, at Columbus, Ohio, February 15. He was born in New England on April 14, 1844. He went to Columbus in 1893.—Charles Howard Porter, vice president of the Hollidaysburg and Gap Iron Works, at Hollidaysburg, Pa., February 18, aged 59 years.—William Faux, at Philadelphia, February 19, in his 83d year. He was buried at Riverside Heights, opposite Danville, Pa. He was born in Northumberland county, Pa. After the civil war he built a rolling mill at Danville, which was removed to Denver, Colorado, after the panic of 1873.—Colonel Arthur L. Conger, at Des Moines, Iowa, February 25, aged 61 years. Colonel Conger was for many years one of the leading manufacturers of Ohio, his enterprises embracing agricultural implements, tinplate works, and many other specialties.—Daniel M. Cauffiel, at his residence in Jenner township, Somerset county, Pa., March 1, in his 80th year. He was born September 7, 1819. He was one of the last of the charcoal furnace managers in Western Pennsylvania. There is now not one charcoal furnace in Western Pennsylvania where fifty years ago there were hundreds.—Thomas Hobart, at East Orange, N. J., on March 4, aged 80 years. From 1852 to 1872 Mr. Hobart was associated with Edward Lewis in the management of the Lake Erie Iron Works, of Cleveland, Ohio.—William B. Middleton, general manager of the Taylor Iron and Steel Company, of High Bridge, N. J., at New York, on March 8, from the effects of a surgical

operation. He was born on September 17, 1849, and was therefore in his 50th year.—A. J. Haws, of Johnstown, Pa., a prominent fire-brick manufacturer, and one of the early employes of the Cambria Iron Company, at Philadelphia, on March 9, in his 75th year.—Jeremiah Head, a celebrated English metallurgical engineer, at Hastings, England, March 10. He was managing director of the Otis Steel Company, of Cleveland, Ohio. He was born at Ipswich in 1835.—William C. Colburn, president of the Detroit Bridge and Iron Works, at Detroit, Michigan, March 12, aged 62 years. He was born in Vermont.—Frank Carter, at Pottsville, Pa., March 22, at the age of 65 years. In 1871 Mr. Carter was appointed land agent for the Philadelphia and Reading Coal and Iron Company, which position he held until his death.—Joseph H. Jackson, who was engaged in the iron business in New York City, March 23, at Morristown, N. J., aged 80 years. He was born at Rockaway, N. J., and for a number of years was engaged with his uncle, Colonel Joseph Jackson, in the iron business there. In 1848 he went to Maryland and was interested in the Mount Savage Iron Company for ten years.—James Williams, at Johnstown, March 28. He was born on June 13, 1818, at Wells-by-the-Sea, Norfolk county, England. After following a seafaring life for many years he located at Catasauqua, Pa., and entered the service of the Crane Iron Company. In 1854 he removed to Johnstown and was for many years a foreman of the Cambria Iron Company.—William Allen Smith, March 24, at New York City, aged 51 years. He was born at Amherst, Massachusetts. For several years he was employed by Cooper, Hewitt & Co. and Phelps, Dodge & Co., in New York. For the last few years he had been with the Harvey Steel Company.—Colonel Edwin Jefferies, at Germantown, Philadelphia, March 29. He was born at Lancaster, Pa., on June 20, 1815, and was educated as a civil engineer. In 1858 he formed a partnership with the late J. Barlow Moorhead in the manufacture of pig iron at Conshohocken, with which his active career ended.—Joseph McClure, March 29, near Sharon, Pa., aged 89 years. In 1846 he formed a partnership with B. B. Vincent and David Himrod, under the firm name of Vincent & Himrod, who erected and operated Mary Ann Furnace, on the Shenango river.—William Chambers Dickey, president of the Cumberland Steel and Tin Plate Company, April 18, at Cumberland, Md., aged 59 years. He was born at Oxford, Pa.—Jackson D. Brooks, of Wilkinsburg, Allegheny county, Pa., April 21, at Los Angeles, Cal., aged 46 years. Mr. Brooks had been in the employ of the Carnegie Steel Company, Limited, for several years as a clerk.—James Asa Adair, at Wilmington, Delaware, April 22, aged 47 years. He was formerly connected with the Carnegie Steel Works and the Harlan and Hollingsworth Company.—Alfred E. Hunt, captain of Battery B, National Guard of Pennsylvania, and president of the Pittsburgh Reduction Company, at Philadelphia, April 26, aged 44 years. He was born at Douglass, Massachusetts.—L. M. Pitkin, president of the Variety Iron Works Company, of Cleveland, was struck by a railroad train and instantly killed at Coits, a suburb, April 29. He was 70 years old.

STATISTICS OF THE AMERICAN IRON TRADE FOR 1898.

GENERAL REVIEW OF THE DOMESTIC IRON TRADE.

REFERRING to our last Annual Report, which appeared in September, 1898, the industrial situation in this country as it then presented itself was thus summed up: "In the period that has elapsed since the Dingley tariff became a law there has been greater industrial activity in this country than in any other period of twelve months since 1892. In all manufacturing lines there has been an increased demand for manufactured products and more general employment of labor. But the revival of industrial activity which followed the enactment of the new tariff was greatly promoted by the fortuitous circumstance that there was an extraordinary foreign demand in 1897 for our agricultural products, which has continued in 1898." In the general improvement in business in 1897 and 1898 which is here noted the iron and steel industries of the United States had fully shared. There was an increased demand for iron and steel.

This was the industrial situation in our country eight months ago. The favorable conditions which then existed have continued to the present time and have become more and more favorable as the days have passed. The demand for manufactured articles has steadily increased; the foreign demand for our surplus agricultural products has been well maintained; the carrying capacity of the railroads has been taxed to the utmost; prices generally have risen and wages have advanced.

While the correct settlement of the tariff question by the enactment of the Dingley tariff on July 24, 1897, had given confidence to the business world, and particularly to our manufacturers, and while the increased foreign demand for our agricultural products had greatly increased the prices of these products, so that, as has been stated, the industrial condition of the country had greatly improved, there were still needed two additional influences to assure complete prosperity to our manufacturing industries and the industries that are directly dependent upon them, namely, higher prices for manufactured articles and higher wages for the labor that produces them. Both of these aids to complete prosperity are now effective in many of the leading manu-

facturing industries of the country, and their extension at an early day to all productive industries is confidently looked for.

In the iron trade prices began to advance in December, 1898, and they continued to advance slowly but steadily in January and the early part of February of the present year. In the latter part of February this conservative advance was succeeded by excited markets, which condition lasted until the latter part of March, when prices became stationary. They have since undergone but little change. Until the advance took place in December Bessemer pig iron at Pittsburgh ranged throughout the year from \$9.75 to \$10.50, Bessemer billets at Pittsburgh from \$14.75 to \$16, and steel rails at Pennsylvania mills from \$17 to \$18; other prices showed similar narrow fluctuations. But from December, 1898, to March, 1899, prices advanced as follows: Bessemer pig iron at Pittsburgh to \$15.65, Bessemer billets at Pittsburgh to \$25.50, and steel rails at Pennsylvania mills to \$26.

Coincidentally with the advance in iron and steel prices, particularly after the advance in February, the wages of iron and steel workingmen which did not rest on a sliding scale were voluntarily increased by the manufacturers. This increase represents to-day an addition of at least 10 per cent. to the wages previously paid. There has been no serious strike for higher wages in the iron trade recently, and there have been few strikes since 1892. For many years the best possible understanding has existed in this country between the large corporations that are engaged in the manufacture of iron and steel and their workmen. The wages paid have been the highest that the iron and steel markets would afford, and the men have recognized the fact that they have been fairly treated. The day for serious trouble between employers and employed in the iron trade of this country has gone by.

While the controlling influences in restoring complete prosperity to our country have been the right settlement of the tariff question and the foreign demand for our surplus crops of 1897 and 1898 there have been other favorable influences that should not be overlooked. The low prices of our manufactured products which have prevailed for several years, coupled with the superior character of these products and the enterprise of our manufacturers, have enabled us to send constantly increasing quantities of these products to foreign markets, iron and steel and manufactures of iron and steel being especially prominent in this increase in our export trade, while the low prices referred to have also greatly reduced our imports of manufactured goods. Increased

exports and decreased imports of manufactured goods have co-operated with the increased foreign demand for our agricultural products to greatly increase our previously favorable balance of trade. Instead of sending our gold abroad to pay for the products of foreign workshops other countries have sent us large quantities of their own gold in 1897 and 1898 to pay for the products of American workshops and American farms. Furthermore, the Spanish war of 1898, like all destructive wars, had a stimulating effect upon the business activity of the country by creating a demand for supplies for the army and navy, this demand putting in circulation hundreds of millions of dollars. We have had, therefore, from our improved balance of trade and the Spanish war a great increase in the amount of money in actual circulation in our country, which fact of itself, independently of the causes that have created this condition, could have only a beneficial effect upon general business, by stimulating enterprise, enhancing prices, and increasing wages. It is officially stated that the per capita circulation of money on April 1 of the present year was \$25.45, against \$23.69 on April 1, 1898, \$23.01 on April 1, 1897, and \$21.53 on April 1, 1896.

Referring more particularly to the course of the iron trade since the beginning of better times in 1897 the enormous production of iron and steel in 1898 and thus far in 1899 is of first importance. In 1898 we made more pig iron than in any previous year, more Bessemer steel, and more open-hearth steel, and rolled more wire rods, more structural steel, more plates and sheets, and, with the single exception of the year 1887, more steel rails. Not only was there an increased production of iron and steel in 1898 as compared with 1897 but there was a greatly increased production. Prices, however, as has already been stated, did not advance until near the close of 1898, so that the consumers and not the producers received the benefit of the year's extraordinary production. It is also true that most of the orders for iron and steel that have been filled during the early months of 1899 were taken at the low prices that prevailed before the present standard of values was established.

The year 1898 witnessed the beginning of a movement in the iron trade of this country that may fairly be classed as revolutionary and the progress of which is being watched with the deepest interest. We refer to the numerous consolidations of iron and steel firms and companies, new corporations with large capital and centralized management taking their place and ab-

sorbing their business. The capitalization of the corporations that have already been organized exceeds five hundred millions of dollars. These new corporations are not trusts in any sense and should not be referred to as trusts. We enumerate them as follows, in the order of their creation: The American Steel and Wire Company; the Federal Steel Company; the American Tinplate Company; the National Steel Company; the United States Cast Iron Pipe and Foundry Company; the Virginia Iron, Coal, and Coke Company; the Empire Iron and Steel Company; the American Steel Hoop Company; and the Republic Iron and Steel Company. Other consolidations with large capital that have recently taken place embrace the American Car and Foundry Company, the Pressed Steel Car Company, and the American Shipbuilding Company, these companies being large consumers of iron and steel. Still other consolidations are now pending.

Our export trade in iron and steel and manufactures of iron and steel aggregated in value in 1898 \$82,771,550, against \$62,737,250 in 1897 and \$48,670,218 in 1896, showing an increase in two years of more than 70 per cent. Included in the exports of 1898 were 253,057 tons of pig iron, 291,038 tons of steel rails, 28,600 tons of ingots, blooms, and billets, 18,510 tons of steel wire rods and 24,195 tons of other steel rods and bars, 27,075 tons of steel plates and sheets, 74,665 tons of wire, 15,735 tons of cut nails and spikes, 13,714 tons of wire nails and spikes, and 34,038 tons of structural iron and steel. We also sent abroad in the same year 580 locomotives. Other exports embraced large shipments of machinery composed mainly or wholly of iron and steel. Agricultural implements are not included in the above figures. Of these the exports in 1898 amounted to \$9,073,384, against \$5,302,807 in 1897 and \$4,643,729 in 1896.

Our imports of iron and steel have greatly declined in late years. With the exception of tinplates, the importation of which is encouraged by an objectionable drawback provision in our tariff legislation, we now import very few of the products of European iron and steel works. In 1898 our total imports of iron and steel and manufactures of iron and steel amounted in foreign value to \$12,473,637, against \$13,836,204 in 1897, \$19,462,561 in 1896, and \$25,772,136 in 1895. Prior to 1895 our average annual importations of iron and steel from 1871, a period of 24 years, amounted to \$42,826,681 in foreign value.

In 1880 this country imported iron and steel and manufactures of iron and steel valued at \$80,443,362 and exported like articles

of the value of \$15,156,703. In 1898, as stated above, we exported iron and steel and manufactures of iron and steel valued at \$82,771,550 and imported like articles valued at \$12,473,637, thus completely reversing the conditions of nineteen years ago.

In 1897 and 1898, and particularly within the past few months of 1899, English iron and steel and machinery manufacturers have been startled by a series of surprises which have marked the entrance into their home and colonial markets of formidable American competition. That a far-away country with a protective tariff should build up iron and steel industries that would beard the British free trade lion in his den is a revelation that they had not dreamed of. But the unexpected has happened. In the period mentioned this country has shipped directly to the United Kingdom considerable quantities of pig iron, steel billets, steel rails, steel plates, structural steel, wire rods, wire nails, and cast iron pipe, and more recently it has received orders for sixty locomotives to be used on two of the great railways running from England to Scotland, the Midland and the Great Northern. More remarkable still, in February last the British Government itself ordered a steel railroad bridge of American design and construction, consisting of seven spans of 150 feet each, to be built across the Atbara river in the Soudan country, south of Egypt. American steel rails and locomotives have recently been shipped to India and Australia. The owners of the Baldwin Locomotive Works, of Philadelphia, are now filling an order for forty-five locomotives for railroads in India. In the present month of May the Pennsylvania Steel Company has received a contract to construct a \$700,000 steel viaduct, 2,260 feet long and 320 feet high, over the Gokteik Gorge in India, and the Phoenix Bridge Company, of Phoenixville, Pennsylvania, has received a contract to build twelve steel railway bridges for the Russian Government.

An interesting feature of our foreign iron trade is disclosed by a careful examination of the statistics of our imports of iron and steel and manufactures of iron and steel from Great Britain and our exports of like articles to the same country. These statistics show that our imports of iron and steel and manufactures of iron and steel from Great Britain in the fiscal year ended June 30, 1898, including tinplates, amounted in value to \$8,369,866, and that our exports to Great Britain in the same fiscal year amounted to \$12,752,016. The weight of all the articles both imported and exported is not a matter of record, but, considering only those articles imported from Great Britain in 1898 which were weighed,

tinplates included, and the articles weighed and exported in the same year from this country to Great Britain, we find that we imported 119,189 gross tons and exported 118,232 tons. Only a few years ago this country was Great Britain's principal customer for iron and steel, but now we sell her in her own home markets virtually as much iron and steel as she sells to us.

The immediate future of our export trade in iron and steel, which trade has been a factor in bringing about the present improved condition of our iron and steel industries, need not cause apprehension, notwithstanding our enhanced prices. Under any circumstances we will continue to export large quantities of leading iron and steel products to Canada, Mexico, the West Indies, and Central America, while the high prices for iron and steel that now prevail in European countries will help us to maintain our present advantage in all markets. The excellent quality of our iron and steel products and our proverbial promptness in filling orders will also be powerful factors in enabling us to hold our present export trade in the cruder forms of iron and steel, as well as in locomotives and machinery generally. Nor can the day be very far distant when we will build iron and steel ships and naval vessels for all the maritime world. In this new branch of our export trade we have already made a good beginning in building first-class naval vessels for Russia and Japan.

In previous Annual Reports attention has been called to the fact that the productive capacity of our iron and steel works was in excess of the consumptive demand, large as that demand has been in some recent years. This excess of capacity was shown by the reports from the manufacturers as detailed in our "Directory," and it was particularly emphasized in the low prices that had long prevailed for all iron and steel products. If our capacity had been less than it was our prices, with the help of a protective tariff, could not have fallen so low as they did. That prices have recently advanced is due to the greatly increased demand for iron and steel both for home consumption and for export, this increased demand calling into activity a large part of the reserve capacity of our iron and steel works, and in some lines practically for the time being absorbing all of it. That this active demand will continue all through the present year there can be little doubt, with the result that this year's production of iron and steel will greatly exceed that of last year. Before the year closes our capacity for the production of iron and steel and the raw materials of their manufacture will be materially increased.

GENERAL STATISTICAL SUMMARY.

In 1898 the United States made 11,773,934 gross tons of pig iron, 6,609,017 tons of Bessemer steel ingots, 2,230,292 tons of open-hearth steel, and 8,932,857 tons of steel of all kinds, and rolled in all 8,513,370 tons of finished iron and steel, including rails; there were also shipped in the same year 14,029,682 gross tons of Lake Superior iron ore and 8,460,112 net tons of Connellsville coke. The following table gives the shipments of Lake Superior iron ore and Connellsville coke and the production of leading articles of iron and steel in 1898 as compared with 1897.

Articles—Gross tons, except coke and nails.	1897.	1898.
Shipments of iron ore from Lake Superior.....	12,463,793	14,029,682
Shipments of Connellsville coke, in net tons.....	6,915,052	8,460,112
Production of pig iron, including spiegel and ferro..	9,652,680	11,773,934
Production of spiegeleisen and ferro-manganese.....	173,695	213,769
Production of Bessemer steel ingots and castings.....	5,475,315	6,609,017
Production of open-hearth steel ingots and castings..	1,608,671	2,230,292
Production of all kinds of steel.....	7,156,957	8,932,857
Production of structural shapes, not including plates	583,790	702,197
Production of plates and sheets, except nail plate.....	1,207,286	1,448,301
Production of all rolled iron and steel, except rails..	5,353,836	6,532,129
Production of Bessemer steel rails.....	1,644,520	1,976,702
Production of all kinds of rails.....	1,647,892	1,981,241
Production of street rails, included above.....	122,244	143,815
Production of iron and steel wire rods.....	970,736	1,071,683
Production of all rolled iron and steel, including rails	7,001,728	8,513,370
Production of iron and steel cut nails, in kegs.....	2,106,799	1,572,221
Production of iron and steel wire nails, in kegs.....	8,997,245	7,418,475

The shipments of Lake Superior iron ore increased 1,565,889 tons, as compared with the shipments of 1897, or over 12 per cent., and the shipments of Connellsville coke increased 1,545,060 tons, or over 22 per cent. The production of pig iron increased 2,121,254 tons, or almost 22 per cent.; spiegeleisen and ferro-manganese, 40,074 tons, or over 23 per cent.; Bessemer steel ingots, 1,133,702 tons, or over 20 per cent.; open-hearth steel ingots and castings, 621,621 tons, or over 38 per cent.; all kinds of steel, 1,775,900 tons, or over 24 per cent.; structural shapes, 118,407 tons, or over 20 per cent.; plates and sheets, 241,015 tons, or almost 20 per cent.; Bessemer steel rails, 332,182 tons, or over 20 per cent.; wire rods, 100,947 tons, or over 10 per cent.; and all rolled iron and steel, including rails, 1,511,642 tons, or over 21 per cent. There was a decrease in the production of iron and steel cut nails in 1898 as compared with 1897 of 534,578 kegs,

or over 25 per cent., and in iron and steel wire nails of 1,578,770 kegs, or over 17 per cent.

✧ Mr. H. P. Snyder, the editor of the *Connellsville Courier*, reports that the shipments of coke from the Connellsville coke region in 1898 amounted to 8,460,112 net tons, against 6,915,052 tons in 1897, an increase of 1,545,060 tons. The average price of all coke shipped from the Connellsville region in 1898 was \$1.55 per net ton, against an average price of \$1.65 in 1897. The present price of Connellsville coke is \$1.60 to \$1.75 per ton.

The shipments of Pocahontas Flat Top coke in 1898 amounted to 1,276,172 net tons, against 855,756 tons in 1897, an increase of 420,416 tons. The shipments in 1896 amounted to 999,697 tons. For the first time they exceeded a million tons in 1898.

Mr. William W. Ruley, Chief of the Bureau of Anthracite Coal Statistics, reports that the shipments of anthracite coal from the Pennsylvania mines in 1898 amounted to 41,899,751 gross tons, against 41,637,864 tons in 1897, an increase of 261,887 tons.

The shipments of Cumberland coal from the mines of Western Maryland and West Virginia in 1898 amounted to 5,533,636 gross tons, against 5,303,489 tons in 1897, an increase of 230,147 tons. The shipments of bituminous coal in 1898 through the locks and pools of the Monongahela river, formerly controlled by the Monongahela Navigation Company, amounted to 153,020,000 bushels, against 132,245,950 bushels in 1897. No record was kept of the coke shipped. The quantity, however, was very small.

The foreign value of all the iron and steel and manufactures thereof which were imported into the United States in the calendar year 1898 was \$12,473,637, against \$13,836,204 in 1897, a decrease of \$1,362,567. In the above figures are included our imports of tinplates. In 1898 these imports amounted to 67,222 gross tons, against 83,851 tons in 1897, 119,171 tons in 1896, 219,545 tons in 1895, 215,068 tons in 1894, 253,155 tons in 1893, 268,472 tons in 1892, 327,882 tons in 1891, 329,435 tons in 1890, and 331,311 tons in 1889, when the maximum was reached.

The imports of pig iron, spiegeleisen, ferro-manganese, and ferro-silicon in the calendar year 1898 amounted to only 25,137 gross tons, against 19,212 tons in 1897, an increase of 5,925 tons.

The exports of iron and steel from the United States in 1898, including all manufactures of iron and steel except agricultural implements, amounted to \$82,771,550, against \$62,737,250 in 1897, an increase of \$20,034,300.

The number of miles of new railroad in the United States on

which track was laid in 1898, not including double tracks or sidings, was about 3,000. The new railroad constructed in 1897 is definitely reported in *Poor's Manual of Railroads* as amounting to 2,188 miles, against 2,013 miles in 1896. The number of miles of new railroad to be constructed in 1899 will probably reach 5,000. At the end of 1897 there were 184,603 miles in operation.

The *Railroad Gazette* reports that the contracting shops built 1,875 locomotives in 1898, which number exceeded that of 1897 by 624 locomotives. Of the whole number of locomotives built in 1898 there were 554 built for export to foreign countries. Returns have not been received from the railroad shops. The following figures show the number of locomotives built by contracting shops since 1888: 1898, 1,875; 1897, 1,251; 1896, 1,175; 1895, 1,101; 1894, 695; 1893, 2,011; 1892, 2,012; 1891, 2,165; 1890, 2,240; 1889, 1,860; 1888, 2,180.

The same authority says that the number of freight cars built by contracting shops in 1898 was 99,809, against 43,588 built in 1897. The number of passenger cars built in 1898 was 699, against 494 in 1897. The number of street railroad cars built in 1898 was 4,650.

The number of locomotives built by the Baldwin Locomotive Works in 1898 was 755, against 501 in 1897, 547 in 1896, 401 in 1895, 313 in 1894, and 772 in 1893. The number built by the Schenectady Locomotive Works in 1898 was 283, against 131 in 1897, 119 in 1896, 148 in 1895, 56 in 1894, and 219 in 1893.

The number of iron and steel vessels built in the United States in the fiscal year ended June 30, 1898, not including vessels for the navy, was 63, with a gross tonnage of 62,266 tons, against 68 vessels in the fiscal year 1897, with a gross tonnage of 124,394 tons, a decrease of 5 in the number of vessels built and of 62,128 tons in the gross tonnage.

Statistics compiled by the editor of the *Metal Worker*, of New York, place the total production of tinplates and terne plates in the United States in 1898 at 326,915 gross tons. The production in 1897 was 256,598 tons.

Statistics of the total production of iron ore, coal, and coke in the United States in 1898 are not yet available.

AVERAGE MONTHLY PRICES OF IRON AND STEEL.

In the following table we give the average monthly prices of various leading articles of iron and steel in Pennsylvania in 1896, 1897, and 1898, and in the first five months of 1899. The pri-

ces named are per gross ton of 2,240 pounds, except for bar iron, which is quoted by the pound.

Months.	Old iron T rails, at Philadelphia.	No. 1 foundry pig iron, at Philadelphia.	Gray forge pig iron, at Philadelphia.	Gray forge pig iron, Lake ore, at Pittsburgh.	Bessemer pig iron, at Pittsburgh.	Steel rails, at mills, in Pennsylvania.	Steel billets, at mills, at Pittsburgh.	Best refined bar iron, from store, Philadelphia.	Best refined bar iron, at Pittsburgh.
January, 1896.....	\$14.25	\$13.56	\$11.55	\$10.90	\$11.81	\$28.00	\$16.60	1.45c.	1.25c.
February.....	14.75	13.50	11.50	11.00	12.95	28.00	17.69	1.40c.	1.25c.
March.....	15.00	13.45	11.30	10.92	12.25	28.00	17.19	1.35c.	1.21c.
April.....	14.87	13.25	11.19	10.85	13.32	28.00	19.80	1.40c.	1.20c.
May.....	14.43	12.83	11.00	10.79	12.83	28.00	19.55	1.40c.	1.20c.
June.....	14.00	12.75	11.00	10.62	12.47	28.00	19.42	1.40c.	1.20c.
July.....	14.00	12.75	10.90	10.37	12.12	28.00	19.50	1.40c.	1.20c.
August.....	14.00	12.75	10.75	9.63	10.91	28.00	19.22	1.40c.	1.20c.
September.....	13.50	12.50	10.75	9.50	11.31	28.00	19.41	1.40c.	1.20c.
October.....	12.75	12.56	10.81	9.87	11.71	28.00	19.73	1.40c.	1.20c.
November.....	13.94	12.81	11.12	10.34	12.46	28.00	19.89	1.40c.	1.22c.
December.....	14.50	12.75	11.25	9.94	11.54	28.00	18.00	1.40c.	1.25c.
January, 1897.....	14.00	12.75	11.06	9.66	10.77	25.00	15.90	1.40c.	1.22c.
February.....	13.87	12.75	11.00	9.54	10.72	20.00	15.50	1.40c.	1.20c.
March.....	12.60	12.60	10.65	9.41	10.57	18.00	15.62	1.40c.	1.20c.
April.....	11.62	12.12	10.50	8.85	9.91	18.00	14.65	1.25c.	1.14c.
May.....	11.50	11.87	10.25	8.70	9.52	18.00	13.96	1.25c.	1.04c.
June.....	11.50	11.75	10.10	8.36	9.74	18.00	14.12	1.25c.	.99c.
July.....	11.50	11.75	10.19	8.36	9.39	18.00	14.00	1.25c.	.95c.
August.....	11.55	11.75	10.05	8.29	9.54	18.00	14.29	1.25c.	.99c.
September.....	12.25	11.87	10.50	8.85	10.04	18.00	15.50	1.25c.	1.07c.
October.....	13.69	12.00	10.50	9.75	10.70	18.00	16.55	1.35c.	1.15c.
November.....	13.15	12.00	10.50	9.56	10.52	18.00	15.87	1.35c.	1.15c.
December.....	12.67	12.00	10.50	9.00	10.09	18.00	15.00	1.35c.	1.15c.
January, 1898.....	12.50	12.00	10.37	9.00	10.00	18.00	15.00	1.40c.	1.15c.
February.....	12.50	11.87	10.25	8.97	10.06	18.00	15.12	1.35c.	1.15c.
March.....	12.50	11.75	10.25	9.06	10.37	18.00	15.37	1.35c.	1.05c.
April.....	12.44	11.75	10.25	9.22	10.35	18.00	15.30	1.25c.	1.05c.
May.....	12.00	11.65	10.25	9.12	10.41	18.00	14.94	1.25c.	1.05c.
June.....	12.00	11.44	10.25	9.14	10.42	17.50	14.75	1.25c.	1.05c.
July.....	12.00	11.25	10.25	9.11	10.31	17.00	14.75	1.25c.	1.05c.
August.....	12.05	11.30	10.25	9.19	10.35	17.50	15.62	1.25c.	1.05c.
September.....	12.50	11.50	10.19	9.36	10.45	17.50	16.00	1.25c.	1.08c.
October.....	12.50	11.70	10.00	9.33	10.40	17.50	15.80	1.25c.	1.10c.
November.....	12.70	11.75	10.00	9.24	10.22	17.00	15.12	1.25c.	1.04c.
December.....	12.94	11.97	10.41	9.46	10.64	17.50	15.90	1.25c.	1.00c.
January, 1899.....	13.30	12.12	10.75	9.89	11.00	18.50	17.06	1.30c.	1.12c.
February.....	14.16	13.25	11.69	10.87	11.69	20.25	18.87	1.45c.	1.22c.
March.....	16.87	16.00	14.37	13.29	14.77	24.80	24.25	1.70c.	1.38c.
April.....	17.87	16.50	15.00	14.50	15.06	25.75	25.25	1.75c.	1.65c.
May.....	18.00	16.50	15.00	14.65	15.15	25.00	26.50	1.75c.	1.70c.

PRICES OF WIRE NAILS AT CHICAGO.

The following table, prepared for this Report by George W. Cope, associate editor of the *Iron Age*, gives the average monthly base prices of standard sizes of wire nails, per keg of 100 pounds, in car-load lots, free on board at Chicago, from 1891 to 1898.

Months.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.
January.....	\$2.22	\$1.82	\$1.57	\$1.17	\$0.95	\$2.42	\$1.47	\$1.55
February.....	2.27	1.87	1.55	1.20	.95	2.42	1.45	1.57
March.....	2.22	1.85	1.65	1.15	1.00	2.57	1.50	1.55
April.....	2.12	1.75	1.65	1.00	.95	2.55	1.47	1.47
May.....	2.05	1.70	1.60	1.07	1.10	2.70	1.43	1.45
June.....	2.02	1.57	1.50	1.20	1.50	2.70	1.41	1.43
July.....	2.07	1.70	1.47	1.20	1.95	2.70	1.35	1.36
August.....	2.02	1.70	1.47	1.15	2.20	2.70	1.36	1.36
September..	2.00	1.67	1.47	1.10	2.40	2.70	1.49	1.43
October.....	1.90	1.57	1.40	1.05	2.40	2.70	1.54	1.46
November..	1.85	1.60	1.30	1.05	2.42	2.70	1.49	1.39
December...	1.80	1.60	1.27	1.00	2.42	*1.60	1.49	1.37
Average..	\$2.04	\$1.70	\$1.49	\$1.11	\$1.69	\$2.50	\$1.45	\$1.45

*A new nail card was adopted in December, 1896. The average price given for wire nails in December, 1896, on the new card, \$1.60 per keg, would be equivalent to \$1.10 per keg on the old card, showing a very great decrease in prices.

In January, 1899, the average monthly base price was \$1.59; in February, \$1.73; in March, \$2.09; in April, \$2.25.

AVERAGE YEARLY PRICES OF IRON AND STEEL.

The following table gives the average yearly prices of leading articles of iron and steel in Pennsylvania for the years 1894, 1895, 1896, 1897, and 1898. These prices are obtained by averaging monthly quotations, and these have in turn been averaged from weekly quotations. The prices given are per ton of 2,240 pounds, except for bar iron, which is quoted by the 100 pounds. Prices in May, 1899, will be found on the preceding page.

Articles.	1894.	1895.	1896.	1897.	1898.
Old iron T rails, at Philadelphia.....	\$11.95	\$14.09	\$14.16	\$12.49	\$12.39
No. 1 foundry pig iron, at Philadelphia..	12.66	13.10	12.95	12.10	11.66
Gray forge pig iron, at Philadelphia..	10.73	11.49	11.09	10.48	10.23
Gray forge pig iron, at Pittsburgh.....	9.75	10.94	10.39	9.03	9.18
Bessemer pig iron, at Pittsburgh.....	11.38	12.72	12.14	10.13	10.33
Steel rails, at mills, in Pennsylvania..	24.00	24.33	28.00	18.75	17.62
Steel billets, at mills, at Pittsburgh..	16.58	18.48	18.83	15.08	15.31
Best bar iron, from store, at Philada...	1.34	1.44	1.40	1.31	1.28
Best bar iron, at Pittsburgh.....	1.20	1.25	1.21	1.10	1.07

PRICES OF IMPORTED AND DOMESTIC TINPLATES AT NEW YORK.

In the following table we give the average wholesale monthly prices per box of "full weight" (108 pounds) imported coke Bessemer tinplates, I. C., 14 by 20, at New York, freight and duty paid, and of domestic tinplates at New York, in 1897 and 1898.

Months.	For- eign.	Do- mestic.	Months.	For- eign.	Do- mestic.	Months.	For- eign.	Do- mestic.
Jan., 1897..	\$3.95	\$3.55	Septem ...	\$3.83	\$3.18	May.....	\$4.00	\$3.00
February ..	3.95	3.35	October...	4.01	3.11	June.....	4.00	2.99
March.....	3.95	3.32	Novem....	3.96	3.10	July.....	4.00	2.94
April.....	3.95	3.39	Decem....	4.01	3.10	August....	4.00	2.93
May.....	3.95	3.34	Jan., 1898	4.00	3.05	Septem....	4.00	2.98
June.....	3.81	3.30	February.	4.00	3.02	October...	4.00	2.98
July.....	3.76	3.17	March.....	4.00	3.00	Novem....	4.00	2.98
August....	3.70	3.20	April.....	4.00	3.00	Decem....	4.00	3.00

PRICES OF LAKE SUPERIOR IRON ORE.

We give below the prices at which Lake Superior iron ore has been sold upon season contracts in 1897 and 1898, per gross ton, delivered at lower ports on Lake Erie; also the prices at which sales were made early in 1899 for season delivery. These prices have been furnished for these pages by Mr. A. I. Findley, editor of the *Iron Trade Review*, of Cleveland.

Grades.	1897.	1898.	1899.
Mesabi Bessemer.....	\$2.10 @ \$2.30	\$2.15 @ \$2.25	\$2.25 @ \$2.40
Mesabi non-Bessemer.....	1.80 @ 2.00	1.70 @ 1.85	1.90 @ 2.10
Marquette specular No. 1 Bessemer.	2.80 @ 3.10	3.10 @ 3.35	3.21 @ 3.50
Marquette specular No. 1 non-Bes...	2.45	2.35 @ 2.45	2.50
Chapin.....	2.40	2.56	2.73½
Soft hematites, No. 1 non-Bessemer..	2.25	1.80 @ 2.00	2.00 @ 2.15
Gogebic, Marquette, and Menomi- nee No. 1 Bessemer hematites..	2.65 @ 2.85	2.75 @ 2.95	2.80 @ 3.25
Minnesota No. 1 hard Bessemer.....	3.11	3.36	3.58
Minnesota No. 1 hard non-Bessemer.	2.65	2.50	2.65
Chandler No. 1 Bessemer.....	2.92½	3.13	3.35
Marquette extra low-phos. Bessemer.	3.42 @ 3.46	3.65	3.85 @ 3.90

The bulk of the ore sold for season delivery in 1899 was sold in January. Soon afterwards the rapid advance in the prices of pig iron and finished material caused sales to be made at prices ranging from 50 cents to 75 cents per ton above the opening prices, Biwabik, for example, selling at \$3 per ton, whereas opening sales were made at \$2.40. Some lots of ore were held late in April at 90 cents and \$1 per ton above the opening prices.

IMPORTS OF IRON ORE.

The following table, for which we are indebted to the Bureau of Statistics of the Treasury Department, gives the quantities and values of iron ore imported into the United States during the calendar years 1896, 1897, and 1898, by customs districts.

Districts.	1896.		1897.		1898.	
	Gross tons.	Values.	Gross tons.	Values.	Gross tons.	Values.
Baltimore.....	368,761	\$577,135	292,613	\$369,483	143,925	\$177,764
New York.....	4,199	10,502	309	1,272	239	2,143
Philadelphia....	308,217	444,687	194,814	302,211	42,861	74,226
Puget Sound....	126	350	1,919	5,351	.....	.....
Vermont.....	35	132	21	81	29	113
All other.....	1,468	4,111	294	514	154	1,302
Total.....	682,806	\$1,036,917	489,970	\$678,912	187,208	\$255,548

The imports of Cuban iron ore into the United States from 1884 to 1898, included above, were as follows. Owing to the war with Spain the mines were in operation for a part of 1898 only.

Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.
1884.....	21,798	1889.....	256,278	1894.....	150,439
1885.....	81,106	1890.....	362,068	1895.....	386,044
1886.....	111,710	1891.....	266,377	1896.....	409,883
1887.....	97,711	1892.....	330,357	1897.....	397,173
1888.....	198,048	1893.....	362,685	1898.....	164,077

During 1898 the Juragua Iron Company Limited exported to the United States 83,852 gross tons of iron ore from its Cuban mines, which was a decrease of 160,965 tons as compared with its total exports in 1897. All the ore exported by this company in 1898 was sent to the United States in 27 cargoes and was received at the port of Baltimore. The total exports of iron ore by this company to the United States from 1884 to the close of 1898 amounted to 3,154,747 tons, shipped in 1,128 cargoes. In addition 2 cargoes, containing 5,932 tons, were exported to Nova Scotia in 1897, making the total exports amount to 3,160,679 tons.

The Spanish-American Iron Company first commenced shipping iron ore from its Cuban mines in 1895, 74,992 gross tons having been sent to the United States in that year. In 1896 the shipments to the United States amounted to 111,584 tons, in 1897 to 152,356 tons, and in 1898 to 80,225 tons, of which latter 28,933 tons were received at Philadelphia and 51,292 tons at Balti-

more. The same company shipped 51,537 tons of ore to foreign countries in 1897, but in 1898 no foreign shipments were made.

No iron ore was shipped in 1894, 1895, 1896, 1897, or 1898 from the Cuban mines of the Sigua Iron Company. This company exported 14,022 gross tons of iron ore in 1893 and 7,830 tons in 1892, when its first shipments were made.

SHIPMENTS OF IRON ORE FROM LEADING DISTRICTS.

The shipments of iron ore from some of the leading iron ore districts of the country in the last three years, as reported to us, including the consumption by local furnaces, were as follows.

Shipments of iron ore from leading districts.	1896. Gross tons.	1897. Gross tons.	1898. Gross tons.
Lake Superior mines of Michigan and Wis...	5,943,274	6,904,448	8,150,774
Vermilion Lake and Mesabi mines of Minn..	3,972,761	5,559,345	5,878,908
Missouri mines.....	26,102	46,919	90,235
Cornwall mines, Pennsylvania.....	463,059	419,878	584,342
New Jersey mines.....	262,070	239,634	269,771
Chateaugay mines, on Lake Champlain.....	15,098	12,594	93,576
Hudson River Ore and Iron Company.....	14,634	9,400	.....
Salisbury region, Connecticut.....	11,195	13,427	12,000
Alleghany county, Virginia.....	258,142	226,604	154,090
Tennessee Coal, Iron, and Railroad Company's Inman mines in Tennessee.....	33,230	52,709	47,282
The same company's mines in Alabama.....	1,148,645	1,294,946	1,219,181
Calhoun, Etowah, and Shelby counties, Ala..	93,499	114,124	92,876
Total of the above districts.....	12,241,709	14,894,028	16,593,035

LAKE SUPERIOR IRON ORE SHIPMENTS. †

The following table, for which we are indebted to Mr. George A. Newett, the editor of the *Ishpeming Iron Ore*, gives the shipments of iron ore from the mines of the Lake Superior region in the last five years. The figures include shipments to local furnaces and all shipments by rail and water to other consumers.

Districts—Gross tons.	1894.	1895.	1896.	1897.	1898.
Marquette range, Mich...	2,058,683	2,095,166	2,605,152	2,711,505	3,125,039
Menominee range, Michigan and Wisconsin.....	1,139,273	1,926,203	1,538,238	1,935,669	2,527,274
Gogebic range, Michigan and Wisconsin.....	1,810,290	2,560,765	1,799,884	2,257,274	2,498,461
Vermilion Lake, Minn...	948,514	1,077,838	1,088,389	1,278,482	1,265,142
Mesabi range, Minnesota.	1,792,172	2,778,296	2,884,372	4,280,863	4,613,766
Total.....	7,748,932	10,438,268	9,916,035	12,463,793	14,029,682

The Lake Superior mines which shipped the largest quantities of iron ore in 1898 were the following: the Norrie mines, in the Gogebic range, 700,990 tons; Chapin, in the Menominee range, 724,768 tons; Lake Angeline, in the Marquette range, 460,333 tons; Lake Superior, in the Marquette range, 686,583 tons; Cleveland-Cliffs, in the Marquette range, 869,482 tons; Mountain Iron, in the Mesabi range, 650,955 tons; and Fayal, in the Mesabi range, 575,933 tons.

In 1898 lake shipments were made from the following ports: Marquette, 2,245,965 gross tons; Escanaba, 2,803,513 tons; Gladstone, 335,956 tons; Ashland, 2,391,088 tons; Two Harbors, 2,693,245 tons; Duluth, 2,635,262 tons; Superior, 550,403 tons; total by lake, 13,655,432 tons: all-rail shipments, 374,250 tons: total shipments in 1898, 14,029,682 tons.

RECEIPTS OF IRON ORE AT LAKE ERIE PORTS.

The *Iron Trade Review* annually publishes the statistics of the receipts of Lake Superior iron ore at Cleveland and other ports on Lake Erie, the ports of Buffalo and Erie included, the principal receipts being at Ashtabula and Cleveland; also the quantity left on the docks at the close of navigation. From these statistics we compile the following summary of the receipts at all Lake Erie ports from 1885 to 1898 and of the stocks on dock at the close of navigation in each of these years.

Years.	Receipts. Gross tons.	On dock. Gross tons.	Years.	Receipts. Gross tons.	On dock. Gross tons.
1885.....	1,503,969	1,048,940	1892.....	6,660,734	4,149,451
1886.....	2,270,554	966,472	1893.....	5,333,061	4,070,710
1887.....	3,439,198	1,558,861	1894.....	6,350,825	4,834,247
1888.....	3,783,659	1,848,555	1895.....	8,112,228	4,415,712
1889.....	5,856,344	2,607,106	1896.....	8,026,432	4,954,984
1890.....	6,874,664	3,893,487	1897.....	10,120,906	5,923,755
1891.....	4,939,684	3,508,489	1898.....	11,028,321	5,136,407

The receipts of Lake Superior iron ore at the ports of Buffalo, (including Tonawanda,) Erie, and Conneaut in the last seven years are given by the *Review* as follows, in gross tons.

Ports.	1892.	1893.	1894.	1895.	1896.	1897.	1898.
Buffalo....	197,000	308,238	395,339	719,742	545,101	797,446	1,075,975
Erie.....	645,230	469,299	624,438	811,989	847,849	1,311,526	1,092,364
Conneaut	1,130	203,207	237,905	244,967	327,623	495,327	1,404,169
Total.	843,360	980,744	1,257,682	1,776,698	1,720,573	2,604,299	3,572,508

SHIPMENTS OF IRON ORE FROM NEW JERSEY MINES.

The shipments of iron ore from the mines in New Jersey have been as follows from 1890 to 1898, in gross tons.

Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.
1890.....	537,066	1893.....	328,028	1896.....	262,070
1891.....	449,046	1894.....	277,483	1897.....	239,634
1892.....	469,236	1895.....	285,417	1898.....	269,771

SHIPMENTS OF IRON ORE FROM THE CORNWALL MINES.

The following table shows the shipments of iron ore, in gross tons, by the Cornwall mines in Pennsylvania from 1890 to 1898.

Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.
1890.....	686,302	1893.....	439,705	1896.....	463,059
1891.....	663,755	1894.....	371,710	1897.....	419,878
1892.....	634,714	1895.....	614,598	1898.....	584,342

CONSUMPTION OF IRON ORE.

We estimate our total consumption of iron ore in 1898 at 21,193,000 gross tons, against 17,375,000 tons in 1897, 15,525,000 tons in 1896, 17,253,000 tons in 1895, 12,235,000 tons in 1894, 13,480,000 tons in 1893, 17,400,000 tons in 1892, and 15,740,000 tons in 1891. Our imports of iron ore in 1898 amounted to 187,208 gross tons. This quantity subtracted from the quantity consumed leaves 21,005,792 tons as the probable consumption of domestic iron ore in 1898, against 16,885,030 tons in 1897, 14,842,194 tons in 1896, 16,728,847 tons in 1895, 12,067,693 tons in 1894, 12,953,049 tons in 1893, and 16,593,415 tons in 1892.

IMPORTS OF MANGANESE ORE FROM CUBA.

Mines of manganese ore of great extent and richness were opened in the interior of the province of Santiago de Cuba a few years ago, and a branch railroad was built which connected them with a railroad to the coast. One cargo of ore was shipped to the United States before the breaking out of the Cuban insurrection in 1895, when operations were stopped until peace should be restored. The mines are situated at Ponupo, and the company operating them is styled the Ponupo Iron Company, all the stockholders being citizens of Pennsylvania. Since the termination of our war with Spain in 1898 the company has shipped about 3,000 tons of manganese ore to the United States.

IMPORTS OF IRON AND STEEL.

The following table, which has been compiled from statistics furnished by the Bureau of Statistics of the Treasury Department, gives the quantities and values of our imports of iron and steel and manufactures thereof in the calendar years 1897 and 1898.

Articles—Gross tons.	1897.		1898.	
	Tons.	Values.	Tons.	Values.
Pig iron, spiegel, and ferro-mang....	19,212	\$484,655	25,137	\$703,829
Scrap iron and scrap steel.....	1,549	12,433	1,783	33,330
Bar iron.....	13,264	614,323	19,119	844,351
Iron and steel rails.....	415	15,939	200	5,181
Cotton-ties.....	105	3,686	.....	.....
Hoop, band, and scroll iron or steel..	28	2,873	3	224
Steel ingots, billets, blooms, slabs, etc.	17,233	1,523,410	10,656	1,008,360
Sheet, plate, and taggers' iron or steel.	2,614	170,385	2,270	181,021
Tinplates.....	83,851	4,366,828	67,222	3,311,658
Wire rods, of iron or steel.....	16,459	772,950	15,762	767,909
Wire and wire rope, of iron or steel..	2,554	344,855	2,017	318,553
Anvils.....	317	43,450	309	43,166
Chains.....	233	37,047	117	15,967
Cutlery.....	.....	1,855,375	.....	1,059,536
Files, file blanks, rasps, and floats..	.....	39,908	.....	40,492
Fire-arms.....	.....	632,104	.....	611,862
Machinery.....	.....	1,370,935	.....	1,932,884
Needles.....	.....	337,375	.....	409,427
All other.....	.....	1,207,673	.....	1,185,887
Total.....	157,834	\$13,836,204	144,595	\$12,473,637

Of the pig iron imported in 1897 and 1898 and immediately preceding years much the larger part was spiegeleisen and ferro-manganese, which pay duty as pig iron. Of these there were entered for consumption 101,167 gross tons in 1890, 41,449 tons in 1891, 47,310 tons in 1892, 37,199 tons in 1893, 9,722 tons in 1894, 39,582 tons in 1895, 39,311 tons in 1896, 17,163 tons in 1897, and 17,203 tons in 1898. There were also entered for consumption 158 tons of ferro-silicon in 1892, 154 tons in 1893, 228½ tons in 1894, 1,544 tons in 1895, 941 tons in 1896, 1,254 tons in 1897, and 1,038 tons in 1898.

EXPORTS OF IRON AND STEEL.

We are indebted to the Bureau of Statistics of the Treasury Department for the quantities and values of our exports of iron and steel in the calendar years 1897 and 1898, as follows. These statistics are given with more than usual fullness.

Articles—Gross tons.	1897.		1898.	
	Quantities.	Values.	Quantities.	Values.
Pig iron: ferro-mang. Gross tons.	5,185	\$209,295	3,700	\$155,299
Pig iron: all other..... "	257,501	3,059,715	249,357	2,547,252
Scrap and old..... "	42,469	468,185	73,845	771,590
Bar iron..... "	4,493	150,897	7,074	241,499
Steel bars or rods, other than wire rods..... "	39,167	1,066,083	24,195	676,113
Steel wire rods..... "	*10,484	240,737	18,510	390,144
Iron rails..... "	5,413	95,520	10,865	152,189
Steel rails..... "	142,808	2,949,901	291,038	5,787,384
Billets, ingots, and blooms "	*6,356	108,333	28,600	544,771
Hoop, band, and scroll.. "	1,424	44,754	1,593	58,731
Iron sheets and plates... "	4,045	175,799	4,462	204,170
Steel sheets and plates... "	5,074	173,567	27,075	787,245
Tinplates and terne plates "	†2	176	46	5,510
Structural iron and steel "	*15,072	604,339	34,038	1,255,451
Wire..... "	53,075	2,353,829	74,665	3,036,818
Cut nails and spikes..... "	15,077	670,709	15,735	641,779
Wire nails and spikes... "	5,793	255,543	13,714	574,909
All other, including tacks "	3,167	295,111	2,094	264,390
Car-wheels.....No.	21,973	136,852	20,821	124,069
Castings, not elsewhere specified.		862,208		780,830
Cutlery		164,250		172,982
Fire-arms.....		661,366		641,005
Locks, hinges, and other h'dware.		4,027,757		4,308,799
Saws		89,312		232,095
Tools, not elsewhere specified....		2,288,013		2,404,327
Electrical machinery.....		*917,453		2,523,644
Metalworking machinery.....		*2,040,888		5,741,750
Printing presses, and parts of....		743,221		843,688
Pumps and pumping machinery..		*955,334		2,300,811
Sewing machines.....		3,193,136		3,062,471
Shoemaking machinery.....		*405,252		939,671
Fire engines.....No.	3	1,169	7	6,588
Locomotive engines..... "	348	3,055,842	580	5,190,782
Stationary engines..... "	546	359,698	523	352,668
Parts of engines and boilers.....		695,267		1,145,508
Typew'g machines, and parts of..		1,566,916		2,077,250
All other machinery.....		16,237,045		16,413,893
Pipes and fittings.....		*1,252,252		4,595,451
Safes.....No.	706	*46,469	1,542	106,085
Scales and balances.....		368,831		328,940
Stoves, ranges, and parts of.....		360,847		449,007
All other manufactures.....		9,385,379		9,933,992
Total.....		\$62,737,250		\$82,771,550
Agricult. implements, additional..		\$5,302,807		\$9,073,384

* Not separately stated prior to July 1, 1897. † Not separately stated prior to December, 1897.

Our exports of iron and steel first exceeded our imports in value in the calendar year 1893. In 1898, five years later, the exports of iron and steel exceeded the imports by \$70,297,913.

EXPORTS OF AGRICULTURAL IMPLEMENTS.

The exports of agricultural implements in 1898 amounted to \$9,073,384, against \$5,302,807 in 1897, an increase of \$3,770,577. Mowers formed more than two-thirds of the total value of the agricultural implements exported in 1898, the exports of mowers alone amounting to \$6,551,741. During the same year the value of the plows exported amounted to \$1,126,070 and other agricultural implements to \$1,395,573.

PRODUCTION OF PIG IRON.

Nineteen States made pig iron in 1898, the same number as in 1897 and the same States. North Carolina, Minnesota, and Oregon did not make pig iron in 1897 or 1898.

The total production of pig iron in 1898 was 11,773,934 gross tons, the largest in our history, against 9,652,680 tons in 1897, an increase of 2,121,254 tons, or very nearly 22 per cent. Large as was the increase in tonnage in 1898 as compared with the production in 1897 it was not so large as the increased production in 1895 over the production of 1894. In 1894 we made 6,657,388 tons and in 1895 we made 9,446,308 tons, an increase of 2,788,920 tons, or nearly 42 per cent. There have been other years in our history, notably 1880 and 1886, in which the percentage of increased production exceeded that of 1898.

The production of pig iron in the second half of 1898 exceeded that of the first half by only 34,528 tons. The following table gives the total production of pig iron by half years since 1890.

Years—Gross tons.	First half.	Second half.	Total.
1890.....	4,560,513	4,642,190	9,202,703
1891.....	3,368,107	4,911,763	8,279,870
1892.....	4,769,683	4,387,317	9,157,000
1893.....	4,562,918	2,561,584	7,124,502
1894.....	2,717,983	3,939,405	6,657,388
1895.....	4,087,558	5,358,750	9,446,308
1896.....	4,976,236	3,646,891	8,623,127
1897.....	4,403,476	5,249,204	9,652,680
1898.....	5,869,703	5,904,231	11,773,934

The following table gives the production of pig iron by States in 1898, in half-yearly periods, according to their prominence.

States—Gross tons.	First half, 1898.	Second half, 1898.	States—Gross tons.	First half, 1898.	Second half, 1898.
Pennsylvania	2,767,549	2,770,283	Kentucky.....	48,730	51,994
Ohio	998,951	987,407	New Jersey.....	54,695	45,986
Illinois	666,580	699,318	Colorado	35,597	55,625
Alabama.....	511,848	521,828	Missouri.....	23,350	26,438
Virginia.....	126,941	156,333	Georgia.....	7,315	6,447
Tennessee	130,820	132,619	Connecticut.....	3,426	2,910
New York.....	114,114	113,897	Texas	1,817	3,361
West Virginia.....	104,516	88,183	Massachusetts.....	1,243	2,418
Maryland	105,684	85,290	.....	.....	.....
Wisconsin	91,679	81,102			
Michigan.....	74,848	72,792	Total.....	5,869,703	5,904,231

The following table gives the production of pig iron by States in 1897 and 1898, in the order of their prominence in 1898.

States—Gross tons.	1897.	1898.	States—Gross tons.	1897.	1898.
Pennsylvania	4,631,634	5,537,832	Kentucky	35,899	100,724
Ohio.....	1,372,889	1,986,358	New Jersey.....	95,696	100,681
Illinois.....	1,117,239	1,365,898	Colorado.....	6,582	91,222
Alabama	947,831	1,033,676	Missouri	23,883	49,788
Virginia.....	307,610	283,274	Georgia.....	17,092	13,762
Tennessee.....	272,130	263,439	Connecticut	8,336	6,336
New York.....	243,304	228,011	Texas.....	6,175	5,178
West Virginia.....	132,907	192,699	Massachusetts ...	3,284	3,661
Maryland.....	193,702	190,974	.....	.....	.....
Wisconsin	103,909	172,781			
Michigan.....	132,578	147,640	Total.....	9,652,680	11,773,934

Twelve States increased their production of pig iron in 1898, the most notable increases being in Pennsylvania, Ohio, and Illinois. The increase in Kentucky, from 35,889 tons in 1897 to 100,724 tons in 1898, is also notable. Seven States, Connecticut, New York, Maryland, Virginia, Tennessee, Georgia, and Texas, made less pig iron in 1898 than in 1897, although the shrinkage in each State was more nominal than real.

Pennsylvania made over 47 per cent. of the total production of pig iron in 1898; Ohio over 16 per cent.; Illinois over 11 per cent.; Alabama almost 9 per cent.; all the other States fell below 3 per cent.

The production of all kinds of pig iron in Pennsylvania by districts in 1898 was as follows, in gross tons: Lehigh Valley, 268,268 tons; Schuylkill Valley, 302,421 tons; Upper Susquehanna Valley, 96,666 tons; Lower Susquehanna Valley, 494,841 tons; Juniata Valley, 56,804 tons; Shenango Valley, 769,677 tons;

Allegheny County, 3,022,901 tons; Western Pennsylvania, except Allegheny County, 523,063 tons; charcoal, (whole State,) 3,191 tons: total, 5,537,832 tons.

Allegheny County produced more than one-half of the production of Pennsylvania in 1897 and 1898, and more than one-fourth of the country's production in each year. In 1898 it increased its production 359,808 tons over 1897. The Shenango Valley and the Lower Susquehanna Valley increased their production in 1898 respectively 223,222 and 246,907 tons over 1897. Of the other districts Western Pennsylvania outside of Allegheny County increased its production 65,288 tons, Schuylkill Valley, 26,696 tons, and Upper Susquehanna Valley, 5,365 tons; while Lehigh Valley and Juniata Valley each made less pig iron in 1898 than in 1897.

The production of all kinds of pig iron in Ohio in 1898 by districts was as follows, in gross tons: Mahoning Valley, including the Leetonia furnaces, 769,334 tons; Hocking Valley, 2,765 tons; Lake Counties, 388,876 tons; miscellaneous bituminous, 673,799 tons; Hanging Rock bituminous, 145,233 tons; Hanging Rock charcoal, 6,351 tons: total, 1,986,358 tons. The increase in the Mahoning Valley in 1898 over 1897 was 187,038 tons; in the Lake Counties, 87,046 tons; in the miscellaneous bituminous district, 301,177 tons; and in the Hanging Rock bituminous district, 39,319 tons. It is an interesting coincidence that the production of the Mahoning Valley in Ohio and the Shenango Valley in Pennsylvania in 1898 was almost exactly the same, the former producing 769,334 tons and the latter 769,677 tons.

The total production of 11,773,934 tons of pig iron in 1898 was divided as follows: Bessemer pig iron, 7,337,384 tons; charcoal pig iron, excluding charcoal Bessemer, included above, 292,681 tons; basic pig iron, 785,444 tons; spiegeleisen and ferro-manganese, 213,769 tons; foundry and forge pig iron, 3,144,656 tons.

PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

The production of pig iron in 1898, classified according to the fuel used, was as follows, compared with the four preceding years.

Fuel used—Gross tons.	1894.	1895.	1896.	1897.	1898.
Bituminous, chiefly coke	5,520,224	7,950,068	7,166,471	8,464,692	10,273,911
Anthracite and coke.....	794,667	1,214,297	1,034,745	911,628	1,180,999
Anthracite alone.....	120,075	56,602	111,667	21,149	22,274
Charcoal.....	222,422	225,341	310,244	255,211	296,750
Total.....	6,657,388	9,446,308	8,623,127	9,652,680	11,773,934

The manufacture of pig iron in this country with unmixed anthracite coal is a rapidly decaying industry. As will be seen from the above table we made only 21,149 tons of pig iron with anthracite alone in 1897 and only 22,274 tons in 1898. In both 1897 and 1898 New York did not make any pig iron with anthracite coal, either mixed or unmixed, whereas in former years anthracite was the principal fuel used in that State in the manufacture of pig iron.

The following table gives the production of bituminous pig iron by States in 1897 and 1898, according to their prominence in 1898.

States—Gross tons.	1897.	1898.	States—Gross tons.	1897.	1898.
Pennsylvania.....	3,792,565	4,432,049	Maryland	189,122	188,868
Ohio.....	1,365,082	1,980,007	Wisconsin.....	86,992	134,558
Illinois.....	1,117,239	1,365,898	Kentucky	35,899	100,724
Alabama.....	932,918	996,942	Colorado.....	6,582	91,222
Virginia.....	307,390	283,274	Missouri.....	12,369	40,318
Tennessee	247,703	245,941	.....	.....	.....
New York.....	237,924	221,411			
West Virginia.....	132,907	192,699	Total.....	8,464,692	10,273,911

The table below gives the production of anthracite and mixed anthracite and bituminous pig iron by States from 1893 to 1898.

States. Gross tons.	1893.	1894.	1895.	1896.	1897.	1898.
Pennsylvania	1,148,854	779,461	1,151,806	1,053,772	837,081	1,102,592
New Jersey...	74,305	63,273	55,502	59,163	95,696	100,681
New York.....	124,370	72,008	63,591	33,477	.....	.....
Total	1,347,529	914,742	1,270,899	1,146,412	932,777	1,203,273

The following table gives the production of charcoal pig iron by States in 1897 and 1898, according to their prominence in 1898.

States—Gross tons.	1897.	1898.	States—Gross tons.	1897.	1898.
Michigan	132,578	147,640	Connecticut.....	8,336	6,336
Wisconsin	28,431	47,693	Texas	6,175	5,178
Missouri.....			Massachusetts ...	3,284	3,661
Alabama.....	14,913	36,734	Pennsylvania....	1,988	3,191
Tennessee	24,427	17,498	Maryland	4,580	2,106
Georgia	17,092	13,762	Virginia	220	.....
New York.....	5,380	6,600			
Ohio	7,807	6,351	Total	255,211	296,750

In 1897 Michigan produced a little more than one-half of the

total production of charcoal pig iron and in 1898 it produced a little less than one-half. In 1896 it also produced a little less than one-half. In preceding years its proportion of the total production was much less than in 1896, 1897, or 1898.

PRODUCTION OF BESSEMER PIG IRON.

The following table gives the production of Bessemer pig iron by States in each year from 1893 to 1898, in gross tons. The number of States that make Bessemer pig iron has greatly declined since 1893, while the production has more than doubled.

States—Gross tons.	1893.	1894.	1895.	1896.	1897.	1898.
Pennsylvania.....	2,383,230	2,494,098	3,430,880	2,796,884	3,434,930	4,040,965
Ohio.....	421,197	589,940	1,031,735	799,061	1,027,897	1,570,535
Illinois.....	358,592	543,309	885,744	807,511	1,017,991	1,210,124
West Virginia ...	81,591	80,781	141,968	105,275	132,907	192,699
Maryland.....	147,166	2,309	10,916	74,628	151,105	186,563
Colorado.....	39,850	69,524	55,485	40,193	6,582	88,701
Missouri.....	32,360	892	25,938	3,198	5,000	30,238
Wisconsin.....	2,695	5,207	16,979	21,957	15,699	14,620
Michigan.....			1,789	3,497	3,473	2,939
North Carolina..	2,843		323	2,151		
Kentucky	15,646	2,895	10,000	600		
New York.....	71,213	19,612	11,938			
Minnesota	10,373					
New Jersey.....	1,842					
Total.....	3,568,598	3,808,567	5,623,695	4,654,955	5,795,584	7,337,384

Of the total production of Bessemer pig iron in Pennsylvania in 1898 the Lehigh Valley produced 75,120 tons; the Schuylkill Valley, 55,141 tons; the Upper Susquehanna Valley, 96,666 tons; the Lower Susquehanna Valley, 360,309 tons; Allegheny County, 2,459,264 tons; the Shenango Valley, 625,225 tons; and the remainder of the State, 369,240 tons: total, 4,040,965 tons.

In Ohio in 1898 the Mahoning Valley and the Hanging Rock bituminous district produced 545,475 tons of Bessemer pig iron; the Lake Counties, 362,748 tons; and the remainder of the State, 662,312 tons: total, 1,570,535 tons. The Juniata Valley and the Hocking Valley did not make any Bessemer pig iron in 1898.

PRODUCTION OF BASIC PIG IRON.

The production of basic pig iron in 1896 was 336,403 tons; in 1897 it amounted to 556,391 tons; and in 1898 it was 785,444 tons. The production by States in these years was as follows.

States—Gross tons.	1896. Gross tons.	1897. Gross tons.	1898. Gross tons.
New England, New York, and New Jersey	22,692	79,041	645
Pennsylvania—Allegheny county.....	168,095	265,548	378,156
Pennsylvania—Other counties.....	51,768	84,520	204,547
Maryland, Virginia, and Alabama.....	73,604	97,562	154,829
Ohio, Illinois, Wisconsin, and Missouri.....	20,244	29,720	47,267
Total.....	336,403	556,391	785,444

PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

The production of spiegeleisen and ferro-manganese in 1898, included in the total production of pig iron, was 213,769 tons, against 173,695 tons in 1897. The spiegeleisen and ferro-manganese produced in 1898 were made in Pennsylvania, New Jersey, Illinois, and Colorado. The production has been as follows during the last twenty-seven years, in gross tons.

Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.
1872.....	4,072	1879.....	12,438	1886.....	42,841	1893.....	81,118
1873.....	3,930	1880.....	17,503	1887.....	42,498	1894.....	120,180
1874.....	4,070	1881.....	18,827	1888.....	48,901	1895.....	171,724
1875.....	6,993	1882.....	19,610	1889.....	76,628	1896.....	131,940
1876.....	5,907	1883.....	21,941	1890.....	133,180	1897.....	173,695
1877.....	7,897	1884.....	30,262	1891.....	127,766	1898.....	213,769
1878.....	9,530	1885.....	30,956	1892.....	179,131	.....	.....

NUMBER OF FURNACES IN BLAST.

The whole number of furnaces which were in blast at the close of 1898 was 202, against 191 at the close of 1897, 159 at the close of 1896, and 242 at the close of 1895. The following table shows the number of furnaces in blast at the close of each year since 1893, classified according to the fuel used.

Fuel used.	1893.	1894.	1895.	1896.	1897.	1898.
Bituminous coal and coke.....	84	127	163	105	146	152
Anthracite and anth. and coke...	34	34	56	32	29	30
Charcoal	19	24	23	22	16	20
Total	137	185	242	159	191	202

STOCKS OF UNSOLD PIG IRON.

Our statistics of stocks of unsold pig iron do not include pig iron sold and not removed from the furnace bank, or pig iron in

second hands or in the hands of creditors, or pig iron made by the owners of rolling-mills or steel works for their own use.

The stocks of pig iron which were unsold in the hands of manufacturers or which were under their control at the close of 1898, and were not intended for their own consumption, amounted to 291,233 tons, against 656,489 tons at the close of 1897 and 711,649 tons at the close of 1896. The unsold stocks at the close of 1898 were 2.4 per cent. of the total pig iron production of the year. This was the lowest percentage of unsold stocks we have recorded at the close of any year in the last twenty-five years. Charcoal stocks were reduced during 1898 from 209,795 tons to 91,642 tons, anthracite stocks from 106,901 tons to 83,976 tons, and bituminous stocks from 339,793 tons to 115,615 tons.

The following table gives the quantity of unsold pig iron which was in the hands of manufacturers or under their control in warrant yards and elsewhere, and which was not intended for their own consumption, at the close of each year since 1874. Stocks in second hands in warrant yards are not included.

Years.	Gross tons.	Per cent. of production.	Years.	Gross tons.	Per cent. of production.
1874.....	710,521	29.5	1887.....	301,913	4.7
1875.....	679,382	33.5	1888.....	300,144	4.6
1876.....	613,213	33.0	1889.....	247,679	3.2
1877.....	573,528	28.0	1890.....	608,921	6.6
1878.....	513,004	22.0	1891.....	596,333	7.2
1879.....	126,495	5.0	1892.....	506,116	5.5
1880.....	407,730	11.0	1893.....	662,068	9.2
1881.....	188,300	5.0	1894.....	597,688	8.9
1882.....	383,655	8.0	1895.....	444,332	4.7
1883.....	476,607	10.0	1896.....	711,649	8.2
1884.....	529,464	13.0	1897.....	656,489	6.8
1885.....	371,886	9.0	1898.....	291,233	2.4
1886.....	225,629	4.0	.....	.....	....

One cause of the depression in our pig iron industry from 1874 to 1878 is made plain by the figures in the above table.

At the close of 1898 the American Pig Iron Storage Warrant Company held in its yards 150,800 tons of pig iron, of which 26,700 tons are included above as under the control of the manufacturers, leaving 124,100 tons of warrant pig iron in other hands, which should be added to the other unsold stocks above mentioned, making a total of 415,333 tons on the market at the close of 1898, against 874,978 tons on December 31, 1897, 973,678 tons on June 30, 1897, and 847,686 tons on December 31, 1896.

CONSUMPTION OF PIG IRON.

Our consumption of pig iron in the last five years is approximately shown in the following table, in gross tons, the comparatively small quantity of foreign pig iron held in bonded warehouses not being considered. Warrant stocks are included.

Pig iron—Gross tons.	1894.	1895.	1896.	1897.	1898.
Domestic production.....	6,657,388	9,446,308	8,623,127	9,652,680	11,773,934
Imported	15,582	53,232	56,272	19,212	25,137
Stocks on hand January 1..	707,318	661,328	506,132	847,686	874,978
Total supply.....	7,380,288	10,160,868	9,185,531	10,519,578	12,674,049
Deduct stocks December 31..	661,328	506,132	847,686	874,978	415,333
Also exports.....	24,482	26,164	62,071	262,686	253,057
Approximate consumption	6,694,478	9,628,572	8,275,774	9,381,914	12,005,659

It appears from this table that our consumption of pig iron in 1898 averaged a little over a million tons per month.

LIMESTONE CONSUMED IN MAKING PIG IRON.

The limestone consumed for fluxing purposes by the blast furnaces in the United States in 1897 in the production of 9,652,680 gross tons of pig iron amounted to 4,247,688 gross tons, of which 3,680,666 tons were consumed by the bituminous coal and coke furnaces in the production of 8,464,692 tons of pig iron, 524,271 tons by the anthracite and mixed anthracite and coke furnaces in the production of 932,777 tons, and 42,751 tons by the charcoal furnaces in the production of 255,211 tons. The average consumption of limestone for the whole country per ton of pig iron produced in 1897 was a little over 44 hundredths of a ton.

The total quantity of limestone similarly consumed in 1898 in the production of 11,773,934 tons of pig iron was 5,275,819 tons of which 725,729 tons were consumed in producing 1,203,273 tons of pig iron made with anthracite and mixed anthracite coal and coke; 4,502,209 tons were consumed in producing 10,273,911 tons of pig iron made with bituminous coal and coke; and 47,881 tons were consumed in producing 296,750 tons of pig iron made with charcoal. The average consumption of limestone for the whole country per ton of pig iron made in 1898 was almost the same as in 1897, the figures being 448 thousandths of a ton, or about 8 thousandths of a ton more than in 1897.

The average consumption of limestone to the ton of pig iron in the United States in 1897 and 1898 was a little less than half a ton.

PRODUCTION OF BESSEMER STEEL.

The production of Bessemer steel ingots in the United States in 1898 was 6,609,017 tons, against 5,475,315 tons in 1897, 3,919,906 tons in 1896, 4,909,128 tons in 1895, 3,571,313 tons in 1894, and 3,215,686 tons in 1893. The production in 1898 was more than double that of 1893. There was an increase of 1,133,702 tons, or over 20 per cent., in 1898 as compared with 1897. The following table shows the production by States of Bessemer steel ingots in the last five years, including the production by the Clapp-Griffiths and the Robert-Bessemer works. Direct castings are counted as ingots. They amounted in 1898 to 3,539 tons. There were no Clapp-Griffiths works in operation in 1898 and only one Robert-Bessemer plant was active in that year. It was engaged exclusively in the production of steel castings.

States—Ingots.	1894. Gross tons.	1895. Gross tons.	1896. Gross tons.	1897. Gross tons.	1898. Gross tons.
Pennsylvania	2,334,548	2,978,924	2,292,814	3,060,049	3,402,254
Ohio	363,974	719,954	568,535	1,041,541	1,489,115
Illinois	581,540	866,531	780,105	943,774	1,105,040
Other States	291,251	343,719	278,452	429,951	612,608
Total	3,571,313	4,909,128	3,919,906	5,475,315	6,609,017

Sixteen standard Bessemer steel plants, nearly all small works, did not make steel in 1898, and a like number were idle in 1897.

Bessemer steel, including the production of the single Robert-Bessemer plant mentioned above, was made in eight States in 1898, the same number as in 1897, namely, Pennsylvania, Maryland, West Virginia, Kentucky, Ohio, Illinois, Michigan, and Colorado. All the Bessemer steel produced in 1898 was made by the acid process.

The three leading Bessemer steel producing States are Pennsylvania, Ohio, and Illinois. In 1898 Pennsylvania made over 51 per cent. of all the Bessemer steel produced, against over 55 per cent. in 1897; Ohio made over 22 per cent. in 1898, against over 19 per cent. in 1897; and Illinois made over 16 per cent. in 1898, against over 17 per cent. in 1897. No other State made over 4 per cent. in 1898.

No new standard Bessemer steel works were erected in 1898. Early in the year a plant to manufacture steel by the Tropenas process, which is a modification of the standard Bessemer process, was built at Derby, Connecticut, by the Driggs-Seabury Gun and

Ammunition Company. The first steel was made in May, 1898. The plant now contains one 2-gross-ton converter. Early in 1899 the Milwaukee Steel Casting Company, of Milwaukee, Wisconsin, also added a 2-gross-ton Tropenas converter, which was put in operation early in April. The Union Iron Works, of San Francisco, California, are also erecting a 2-gross-ton Tropenas steel converter, which will probably be in operation in June, 1899. The Longview Kelly Company, of Longview, Texas, is erecting a one-gross-ton Tropenas converter, which will be ready in May. All the plants named will produce steel castings only.

PRODUCTION OF OPEN-HEARTH STEEL.

The total production of open-hearth steel in the United States in 1898 was 2,230,292 gross tons, against 1,608,671 tons in 1897, an increase of 621,621 tons, or over 38 per cent.

The following table gives the production of open-hearth steel ingots and direct castings by States during the past six years.

States—Gross tons.	1893.	1894.	1895.	1896.	1897.	1898.
New England	24,759	26,204	36,733	48,055	51,402	47,381
N. Y. and N. J.....	17,591	21,363	32,203	32,120	39,521	47,957
Pennsylvania.....	616,516	659,969	904,352	1,009,608	1,271,751	1,817,521
Ohio	50,385	54,182	75,637	64,691	78,357	79,886
Illinois.....	28,639	23,218	49,500	101,832	120,609	183,103
Other States.....			38,757	42,394	47,031	54,444
Total.....	737,890	784,936	1,137,182	1,298,700	1,608,671	2,230,292

The open-hearth steel made in 1898 was produced by 63 works in thirteen States—Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Kentucky, Alabama, Ohio, Indiana, Illinois, Wisconsin, Missouri, and California.

Our statistics of the production of open-hearth steel separate steel made in the open hearth by the acid and basic processes for the years 1896, 1897, and 1898 only.

Of the total production in 1898 1,569,412 tons were made by the basic process and 660,880 tons by the acid process. In 1897 the production by the basic process amounted to 1,056,043 tons and by the acid process to 552,628 tons. In 1896 the production by the basic process amounted to 776,256 tons and by the acid process to 522,444 tons. Twelve works made basic open-hearth steel only in 1898, 35 made acid open-hearth steel only, and 16 made both acid and basic open-hearth steel. The following table gives the production by States in 1898.

States—Gross tons.	Basic open-hearth steel.	Acid open-hearth steel.	Total. Gross tons.
New England.....	9,466	37,915	47,381
New York and New Jersey	13,024	34,933	47,957
Pennsylvania	1,321,308	496,213	1,817,521
Ohio	43,650	36,236	79,886
Illinois.....	153,891	29,212	183,103
Other States.....	28,073	26,371	54,444
Total.....	1,569,412	660,880	2,230,292

For the first time we have separated the production in 1898 of open-hearth direct steel castings from the ingots. The total production of open-hearth castings in 1898 amounted to 120,587 gross tons, of which 28,460 tons were made by the basic process and 92,127 tons were made by the acid process. The total number of open-hearth steel plants which produced castings in 1898 was 39, and of this number 31 produced castings by the acid process only, 5 by the basic process only, and 3 by both processes. Pennsylvania produced over 39 per cent. of all the open-hearth steel castings made in 1898, Illinois over 26 per cent., and Ohio over 12 per cent. No other State made 5 per cent.

The following table gives the production of open-hearth steel castings by the acid and basic processes in 1898 by States.

States—Gross tons.	Acid castings.	Basic castings.	Total. Gross tons.
Mass., Conn., New York, and New Jersey..	14,657	.....	14,657
Pennsylvania.....	45,712	1,558	47,270
Ohio and Indiana.....	19,669	150	19,819
Illinois, Wisconsin, Missouri, and California	12,089	26,752	38,841
Total.....	92,127	28,460	120,587

The total production of open-hearth steel ingots and castings in the United States by States and districts during the last five years is given in the following table, in gross tons.

Years—Gross tons.	Eastern States.	Pennsylvania.	West and South.	Total.
1894.....	47,567	659,969	77,400	784,936
1895.....	68,936	904,352	163,894	1,137,182
1896.....	80,175	1,009,608	208,917	1,298,700
1897.....	90,923	1,271,751	245,997	1,608,671
1898.....	95,338	1,817,521	317,433	2,230,292

The open-hearth steel rails produced in 1898 amounted to 1,220 tons, against 500 tons in 1897 and 705 tons in 1896.

PRODUCTION OF CRUCIBLE STEEL.

The production of crucible steel in the United States in 1898 amounted to 89,747 gross tons, against 69,959 tons in 1897, 60,689 tons in 1896, 67,666 tons in 1895, 51,702 tons in 1894, 63,613 tons in 1893, 84,709 tons in 1892, 72,586 tons in 1891, and 71,175 tons in 1890. The crucible steel produced in 1898 was made in ten States—Connecticut, New York, New Jersey, Pennsylvania, Maryland, Tennessee, Ohio, Indiana, Illinois, and Wisconsin. The direct castings produced in 1898 amounted to 4,235 tons.

Of the total production in 1898 of 89,747 gross tons of crucible steel Connecticut and New York contributed 8,365 tons; New Jersey, 9,629 tons; Pennsylvania, 69,244 tons; the Western States, 1,704 tons; and the Southern States, 805 tons.

PRODUCTION OF MISCELLANEOUS STEEL.

The production of steel in the United States in 1898 by various minor processes amounted to 3,801 gross tons, of which 3,576 tons were direct castings, against 3,012 tons in 1897, 2,394 tons in 1896, 858 tons in 1895, 4,081 tons in 1894, 2,806 tons in 1893, 4,548 tons in 1892, 4,484 tons in 1891, and 3,793 tons in 1890.

TOTAL PRODUCTION OF ALL KINDS OF STEEL.

The production of all kinds of steel in the United States in 1898 was as follows: Bessemer steel, 6,609,017 gross tons; open-hearth steel, 2,230,292 tons; crucible steel, 89,747 tons; all other steel, 3,801 tons: total, 8,932,857 tons, against 7,156,957 tons in 1897, 5,281,689 tons in 1896, 6,114,834 tons in 1895, 4,412,032 tons in 1894, 4,019,995 tons in 1893, and 4,927,581 tons in 1892. In the total for 1898 are included 131,937 tons of direct castings.

TOTAL PRODUCTION OF IRON AND STEEL RAILS.

The total production of Bessemer steel rails in 1898 amounted to 1,976,702 gross tons, against 1,644,520 tons in 1897. Of the production of 1898 Pennsylvania made 1,053,326 tons, as compared with 1,027,996 tons in 1897; Illinois and the remainder of the country made 923,376 tons, against 616,524 tons in 1897.

The production of all kinds of rails in the United States in 1898, including light and heavy rails, and street, electric, and mine rails, was 1,981,241 gross tons, against 1,647,892 tons in 1897, an increase of 333,349 tons, or over 20 per cent. The production of 1898 was composed of 1,955,427 tons of Bessemer steel rails rolled by the producers of domestic ingots; 21,275 tons of

Bessemer steel rails rerolled from old steel rails and rolled from purchased blooms; 1,220 tons of open-hearth steel rails; and 3,319 tons of iron rails.

Twelve States made rails in 1898, namely, Pennsylvania, Maryland, Alabama, Tennessee, Ohio, Indiana, Illinois, Wisconsin, Kansas, Colorado, Wyoming, and California. All made Bessemer steel rails except Tennessee, Alabama, Indiana, and Wyoming. The production of Bessemer steel rails outside of Pennsylvania, Illinois, Ohio, Maryland, Colorado, and Wisconsin was very small. The iron rails were made in Pennsylvania, Tennessee, Alabama, Ohio, Indiana, Illinois, and Wyoming. The open-hearth steel rails were produced in Pennsylvania, Alabama, and California.

Of the total production of rails in 1898 Pennsylvania made over 53 per cent., against over 62 per cent. in 1897. Illinois made over 27 per cent., against over 26 per cent. in 1897. These two States made almost 81 per cent. of all the rails rolled in 1898, against almost 89 per cent. in 1897.

The total production of 1,981,241 tons of rails in 1898 was divided as follows: weighing under 45 pounds to the yard, 123,881 tons; weighing 45 pounds and less than 85 pounds, 1,404,150 tons; weighing 85 pounds and over, 453,210 tons.

The following table gives in detail the quantity of rails of all kinds rolled in 1897 and 1898 that weighed under 45 pounds to the yard, the quantity that weighed 45 pounds and less than 85 pounds, and the quantity that weighed 85 pounds and over.

Weight per yard.	1897.			1898.		
	Pennsyl- vania.	Other States.	Total.	Pennsyl- vania.	Other States.	Total.
Under 45 lbs.	51,574	37,322	88,896	67,724	56,157	123,881
45 lbs. and less than 85	711,827	511,608	1,223,435	671,232	732,918	1,404,150
85 lbs. and over.	264,675	70,886	335,561	315,265	137,945	453,210
Total	1,028,076	619,816	1,647,892	1,054,221	927,020	1,981,241

The rails reported to us which are known to have been rolled for street and electric railways in 1898 amounted to 143,815 tons, against 122,244 tons in 1897, an increase of 21,571 tons. With the exception of a few hundred tons all were steel rails. The following table gives the production of street rails in this country from 1891 to 1898, in gross tons, as reported to us. The figures for the last few years are given with some reservation, but the errors, if any, do not materially affect the general results.

Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.
1891.....	81,302	1893...	133,423	1895...	163,109	1897...	122,244
1892.....	111,580	1894...	157,457	1896...	145,210	1898...	143,815

The following table gives the production of all kinds of rails in the United States from 1891 to 1898, in gross tons.

Years. Gross tons.	Iron.	Steel.	Total.	Years. Gross tons.	Iron.	Steel.	Total.
1891.....	8,240	1,298,936	1,307,176	1895.....	5,810	1,300,325	1,306,135
1892.....	10,437	1,541,407	1,551,844	1896.....	4,347	1,117,663	1,122,010
1893.....	6,090	1,130,368	1,136,458	1897.....	2,872	1,645,020	1,647,892
1894.....	4,674	1,017,098	1,021,772	1898.....	3,319	1,977,922	1,981,241

With the single exception of 1887, when 2,139,640 gross tons of rails were made, more rails were produced in 1898 than in any other year in our history. The year of next largest production was 1890, the production in that year being 1,885,307 tons. The year of next largest production was 1897.

PRODUCTION OF IRON AND STEEL STRUCTURAL SHAPES.

Our statistics of iron and steel structural shapes embrace the production of beams, beam girders, zee bars, tees, channels, angles, and other structural forms, but they do not include plate girders made from plates. Plates are provided for under other classifications, and under the general statistics of plates are included all plates cut to specifications. Nearly all the structural shapes and plates used for structural purposes are made of steel. The total production in 1897 and 1898 by States was as follows.

States—Gross tons.	1897.	1898.	States—Gross tons.	1897.	1898.
New England, N. Y., and N. J.....	20,785	27,919	Ohio	13,629	21,233
Pennsylvania	538,055	641,726	Colorado and California	8,937	7,731
Kentucky and Alabama	2,384	3,588	Total	583,790	702,197

The increased production of structural shapes in 1898 as compared with 1897 was 118,407 gross tons, or over 20 per cent. Pennsylvania made over 91 per cent. of the total production in 1898, New Jersey almost 4 per cent., and Ohio over 3 per cent. No other State made over 1.5 per cent. The total production of structural shapes in 1897 was 583,790 tons, in 1896 it was 495,571 tons, and in 1895 it was 517,920 tons.

PRODUCTION OF PLATES AND SHEETS.

The production of plate and sheet iron and steel in the United States in 1898, excluding nail plate, amounted to 1,448,301 gross tons, against 1,207,286 tons in 1897, 965,776 tons in 1896, 991,459 tons in 1895, 682,900 tons in 1894, 674,345 tons in 1893, and 751,460 tons in 1892. Skelp iron and steel are not included in our tables with plates and sheets but with other rolled products.

The following table gives the production of iron and steel plates and sheets, by States, not including nail plate, in 1898, in gross tons. In 1894, at the request of the manufacturers, we separated plates and sheets by gauges, observing the following classification: Plates, up to No. 8 inclusive; firebed, No. 9 to No. 19 inclusive; sheets, No. 20 to No. 25 inclusive; and No. 26 and thinner gauges. This classification was continued until 1898, in which year the classification given in the following table was adopted. The production by gauges in 1898 was as follows, as nearly as can be determined from the returns made to us.

States—Gross tons.	Up to No. 8 inclusive.	No. 9 to No. 17 inclusive.	No. 18 and thinner.	Total. Gross tons.
New England.....	.....	243	.....	243
New York and New Jersey.....	2,110	.....	1,000	3,110
Pennsylvania.....	522,851	79,841	315,718	918,410
Delaware and Maryland.....	1,600	552	19,111	21,263
West Virginia.....	67	2,650	30,247	32,964
Kentucky and Alabama.....	8,350	5,713	14,650	28,713
Ohio.....	33,397	21,907	201,129	256,433
Indiana, Illinois, and Missouri...	70,466	6,599	110,080	187,165
Total.....	638,861	117,505	691,935	1,448,301

The production of "black plates for tinning" alone in 1898 is reported to us to have amounted to 345,254 gross tons, against 271,886 tons in 1897, an increase of 73,368 tons, or almost 27 per cent. Of the production in 1898 Pennsylvania made 149,562 tons; Indiana, 80,028 tons; Ohio, 77,788 tons; and Maryland, West Virginia, Kentucky, Illinois, and Missouri, 37,876 tons. The production of "black plates for tinning" in 1896 was 185,387 tons, against 129,615 tons in 1895 and 52,359 tons in 1894.

PRODUCTION OF WIRE RODS.

The production of iron and steel wire rods in the United States in 1898 amounted to 1,071,683 gross tons, against 970,736 tons

in 1897 and 623,986 tons in 1896, showing an increase of 100,947 tons, or over 10 per cent., over 1897 and 447,697 tons over 1896.

Pennsylvania made the largest quantity in 1898, with Ohio second in production, Illinois third, and Massachusetts fourth. Three other States, Connecticut, New Jersey, and Indiana, also rolled rods in 1898. The following table gives our production of wire rods by States during the past six years.

States—Gross tons.	1893.	1894.	1895.	1896.	1897.	1898.
New Eng. and N. Y.	79,618	88,913	91,513	63,808	} 94,471	107,311
New Jersey.....	23,013	20,880	22,290	15,925		
Pennsylvania.....	227,257	246,101	278,406	233,352	351,676	417,636
Ohio.....	140,047	173,272	210,058	146,329	265,317	269,566
Indiana and Illinois..	67,337	144,236	188,863	164,572	259,272	277,170
Total.....	537,272	673,402	791,130	623,986	970,736	1,071,683
Iron.....	1,125	5,772	2,840	2,473	2,019	2,106
Steel.....	536,147	667,630	788,290	621,513	968,717	1,069,577

Ten years ago, in 1888, we made only 279,769 tons of iron and steel wire rods. We still import considerable quantities of the finer grades of iron and steel wire rods, particularly steel wire rods, our total imports amounting to 15,762 gross tons in 1898 and to 16,459 tons in 1897, the imports coming chiefly from Sweden and Great Britain. Norway does not send us wire rods.

PRODUCTION OF WIRE NAILS.

The production of iron and steel wire nails in the United States in 1898 amounted to 7,418,475 kegs of 100 pounds each, compared with 8,997,245 kegs in 1897, a decrease of 1,578,770 kegs, or over 17 per cent. In 1896 the production amounted to 4,719,860 kegs, in 1895 to 5,841,403 kegs, in 1894 to 5,681,801 kegs, and in 1893 to 5,095,945 kegs. The wire nails produced in 1898 were manufactured by 59 works, 5 less than were in operation in 1897. The following table gives the production of wire nails by States in 1897 and 1898, in kegs of 100 pounds.

States—Kegs.	1897.	1898.	States—Kegs.	1897.	1898.
Mass., Rhode I. and Conn.....	} 160,662	126,253	Illinois.....	1,993,547	1,394,981
N. Y. and N. J..			Missouri, Kansas, Michigan, Washington, and California.	} 140,985	168,127
Pennsylvania.....	3,467,509	3,408,504			
Md. and W. Va..	15,100	5,000			
Ohio.....	2,237,641	1,711,399			
Indiana and Wis.	733,669	494,378	Total.....	8,997,245	7,418,475

PRODUCTION OF CUT NAILS.

Our statistics of the production of iron and steel cut nails and cut spikes in the United States do not embrace railroad and other spikes made from bar iron, wire nails of any size, or machine-made horseshoe nails. Cut spikes are included with cut nails.

The total production of cut nails in 1898 was 1,572,221 kegs of 100 pounds each, against 2,106,799 kegs in 1897, a decrease of 534,578 kegs, or over 25 per cent. In 1886 the maximum production of 8,160,973 kegs was reached. In 1898 the production of wire nails exceeded the production of cut nails by 5,846,254 kegs. In 1897 the wire nail production exceeded the cut nail production by 6,890,446 kegs.

Nine States made cut nails in 1898. The following table shows the production of iron and steel cut nails by States from 1893 to 1898, in kegs of 100 pounds. The wire-nail production for the same years is added to the table.

States—Kegs.	1893.	1894.	1895.	1896.	1897.	1898.
Pennsylvania.....	1,113,168	1,061,931	938,865	646,011	1,057,964	768,171
Ohio.....	768,031	490,461	347,162	264,272	411,396	392,003
West Virginia...	330,859	273,822	347,022	286,210	290,203	184,942
Indiana.....	177,648	125,000				
Massachusetts and N. Jersey	337,039	166,350	161,888	137,005	142,021	127,706
Illinois.....	81,128	94,462	81,773	91,145	34,000	87,399
Maryland, Vir- ginia, and Ky.	224,060	213,034	246,184	167,227	164,465	
Missouri, Col., Wyo., and Cal.	17,000	.....	7,000	24,000	6,750	12,000
Total cut nails..	3,048,933	2,425,060	2,129,894	1,615,870	2,106,799	1,572,221
Total wire nails.	5,095,945	5,681,801	5,841,403	4,719,860	8,997,245	7,418,475
Grand total.	8,144,878	8,106,861	7,971,297	6,335,730	11,104,044	8,990,696

The Wheeling district embraces the nail mills in Ohio and Marshall counties in West Virginia and in Belmont and Jefferson counties in Ohio. There were 282,908 kegs of cut nails made in this district in 1898, against 292,950 kegs in 1897, 305,881 kegs in 1896, 347,742 kegs in 1895, 416,329 kegs in 1894, 1,848,116 kegs in 1887, and 1,858,551 kegs in 1886. Allegheny county, Pennsylvania, which has not made any cut nails since 1890, is now a large producer of wire nails. Massachusetts, once a large producer of cut nails, now makes few cut nails but produces considerable quantities of wire nails.

TOTAL PRODUCTION OF ALL ROLLED IRON AND STEEL.

By the phrase rolled iron and steel we include all iron and steel rolled into finished forms, as follows: (1) all sizes of iron and steel rails; (2) plate and sheet iron and steel; (3) iron and steel plates for cut nails and cut spikes; (4) wire rods; (5) iron and steel structural shapes; (6) bar, bolt, hoop, skelp, and rolled axles. Hammered axles and other forgings are not included, nor muck bars, billets, and tinplate and sheet bars.

The production of all iron and steel rolled into finished forms in the United States in 1898 was 8,513,370 gross tons, against 7,001,728 tons in 1897, an increase of 1,511,642 tons, or over 21 per cent. Twenty-seven States rolled either iron or steel or both iron and steel in 1898, one more than in 1897. The following table gives the total production by States of iron and steel rolled into all kinds of finished forms in 1897 and 1898, in gross tons.

States—Gross tons.	1897.	1898.	States—Gross tons.	1897.	1898.
Maine.....	2,519	3,751	Ohio.....	1,017,124	1,231,739
New Hampshire.....			Indiana.....	254,376	352,058
Massachusetts.....	94,319	104,221	Illinois.....	863,013	1,071,327
Rhode Island.....	30,233	42,158	Michigan.....	136,016	192,281
Connecticut.....			Wisconsin.....		
New York.....	81,283	83,735	Minnesota.....	35,505	32,526
New Jersey.....	86,421	98,281	Missouri.....		
Pennsylvania.....	3,956,727	4,622,770	Kansas.....	.....	9,940
Delaware.....	43,982	45,973	Colorado.....	22,710	99,050
Maryland.....	82,926	149,820	Wyoming.....	37,997	30,653
Virginia.....	26,482	34,497	Washington.....		
West Virginia.....	151,424	198,833	Oregon.....		
Kentucky.....	30,968	39,239	California.....		
Tennessee.....	9,940	10,621	.....	.....	.....
Georgia.....			.....	.....	.....
Alabama.....	37,763	59,897	Total.....	7,001,728	8,513,370

Pennsylvania made 54.3 per cent. of the total production of rolled iron and steel in 1898, against 56.5 per cent. in 1897; Ohio made 14.4 per cent. in 1898, against 14.5 per cent. in 1897; Illinois made 12.5 per cent. in 1898, against 12.3 per cent. in 1897; and Indiana made 4.1 per cent. in 1898, against 3.6 per cent. in 1897. No other State produced 3 per cent. in 1898. New Hampshire, Georgia, Texas, and Iowa, all of which have rolling mills located within their borders, did not roll iron or steel in 1898.

It has been impossible in late years to separate rolled iron from rolled steel, but the fact is worthy of mention that the use of puddled iron in this country is now increasing.

PRODUCTION OF ALLEGHENY COUNTY, PENNSYLVANIA.

The following table gives the number of blast furnaces, rolling mills, and steel works, and the production in gross tons of pig iron and crude steel and of iron and steel rolled into finished forms in Allegheny county, Pennsylvania, in 1896, 1897, and 1898.

Details—Gross tons.	1896.	1897.	1898.
Blast furnaces.....Number.	28	30	30
Production of pig iron.....Tons.	2,061,269	2,663,093	3,022,901
Rolling mills and steel works.....Number.	64	61	60
Production of Bessemer steel.....Tons.	1,608,321	2,061,837	2,338,087
Production of open-hearth steel.....Tons.	569,680	725,262	1,042,350
Production of crucible and other steel....Tons.	33,596	42,231	52,352
Total production of steel.....Tons.	2,211,597	2,829,330	3,432,789
Production of rails, bars, bolts, rods, shapes, hoops, skelp, etc.....Tons.	1,350,886	1,797,064	2,091,503
Production of plates and sheets.....Tons.	324,296	395,830	444,850
Total production of rolled iron and steel..Tons.	1,675,182	2,192,894	2,536,353

Allegheny county produced in 1898 over 25 per cent. of the total production of pig iron in the United States; over 35 per cent. of the total production of Bessemer steel ingots and castings; almost 46 per cent. of the total production of open-hearth steel ingots and castings; over 58 per cent. of the total production of crucible steel; over 28 per cent. of the total production of Bessemer steel rails; over 64 per cent. of the total production of structural shapes; over 30 per cent. of the total production of plates and sheets; and almost 25 per cent. of the production of miscellaneous rolled products not enumerated above. Of the total production of all kinds of rolled iron and steel, including rails, Allegheny county made in 1898 over 29 per cent.

IRON AND STEEL SHIPBUILDING.

In the fiscal year 1898 the United States built 63 iron and steel vessels, against 68 in the fiscal year 1897. The gross tonnage of the vessels built in the fiscal year 1898 was 62,266 tons, against 124,394 tons in the preceding year. Vessels for the United States navy are not included in the figures here given, which have all been furnished by the Hon. Eugene T. Chamberlain, Commissioner of Navigation of the Treasury Department. With the exception of two steel sailing vessels and ten steel barges all the vessels built in the fiscal year 1898 were built to use steam. Only one composite vessel and two iron vessels were built. The fiscal year 1899 will show a much larger tonnage.

The following table shows the number and tonnage of the iron and steel vessels launched in the United States during the fiscal year 1898 within the jurisdiction of the ports named.

Ports—Fiscal year 1898.	No.	Gross tonnage.	Ports—Fiscal year 1898.	No.	Gross tonnage.
New York, N. Y.....	2	438	Cleveland, Ohio.....	3	12,163
Newark, N. J.....	10	3,294	Toledo, Ohio.....	1	42
Philadelphia, Pa.....	15	12,435	Detroit, Mich.....	2	2,984
Wilmington, Del.....	5	3,783	Port Huron, Mich.....	2	877
Baltimore, Md.....	4	801	Marquette, Mich.....	3	7,392
San Francisco, Cal.....	4	5,328	Chicago, Ill.....	2	8,073
Port Townsend, Wash....	1	163	Evansville, Ind.....	1	6
Louisville, Ky.....	1	830	.....	...	.....
St. Louis, Mo.....	1	36			
Buffalo, N. Y.....	6	3,621	Total.....	63	62,266

PRODUCTION OF IRON BLOOMS AND BILLETS.

The blooms and billets produced in forges directly from the ore in 1898 amounted to 1,767 gross tons, against 1,455 tons in 1897, 1,346 tons in 1896, 40 tons in 1895, 40 tons in 1894, 864 tons in 1893, 2,182 tons in 1892, 5,290 tons in 1891, 7,094 tons in 1890, and 11,078 tons in 1889. The ore blooms produced in 1897 and 1898 were all made by the Chateaugay Ore and Iron Company, of Plattsburgh, New York. The Helton Forge of W. J. Pasley, at Crumpler, Ashe county, North Carolina, the sole survivor of hundreds of Catalan forges in the South, was not running in 1897 or 1898.

The iron blooms produced in forges from pig and scrap iron in 1898, and which were for sale and not intended for the consumption of the makers, amounted to 6,345 gross tons, against 7,159 tons in 1897, 6,494 tons in 1896, 7,185 tons in 1895, 3,221 tons in 1894, and 6,605 tons in 1893. All the pig and scrap blooms made in forges in 1895, 1896, 1897, and 1898, and for sale, were produced in Pennsylvania and Maryland.

PRODUCTION OF TINPLATES.

The duty on tinplates and terne plates provided for in the tariff act of 1890 went into effect on July 1, 1891. From that date until the close of the fiscal year ending on June 30, 1897, the statistics of our production of tinplates and terne plates were regularly collected for the Treasury Department by Colonel Ira Ayer, special agent. For the second half of 1897 and the year

1898 they have been collected by the editor of the *Metal Worker*, of New York. From the data thus obtained we have compiled the following table in gross tons of our production of tinplates and terne plates in the calendar years 1891 to 1898, the figures for 1891 being for the last six months only. The output of dipping plants is included in the figures for each year.

Calendar years.	Gross tons.	Calendar years.	Gross tons.
1891 (last six months)...	999	1896.....	160,362
1892.....	18,803	1897.....	256,598
1893.....	55,182	1898.....	326,915
1894.....	74,260		
1895.....	113,666	Total.....	1,006,785

STATISTICS OF IMMIGRATION.

The following statistics, for which we are indebted to the Bureau of Statistics of the Treasury Department and the Commissioner General of Immigration of the same Department, give the total number of immigrants who arrived in the United States in the calendar years 1893 to 1898, except from the British North American Possessions and Mexico, for which countries statistics are not collected. In the last six years we have received 861,105 immigrants from Bohemia and Hungary and other Austrian provinces and from Russia, Poland, and Italy—275,157 from Bohemia and Hungary and other Austrian provinces, 231,621 from Russia and Poland, and 354,327 from Italy. There has been a marked falling off in German immigration since 1893 and a decline in immigration from the United Kingdom.

Countries.	1893.	1894.	1895.	1896.	1897.	1898.
United Kingdom.....	106,534	71,317	89,686	49,428	39,771	39,444
Germany.....	89,690	40,505	37,278	28,521	18,785	16,351
France.....	5,260	3,434	4,243	2,080	2,104	1,671
Bohemia and Hungary..	30,858	10,508	25,972	28,024	16,003	} 50,332
Other Austria.....	35,023	12,458	24,979	25,683	15,317	
Russia, except Poland...	51,797	26,978	39,547	37,460	21,969	} 39,640
Poland.....	6,126	1,080	731	1,449	4,844	
Sweden and Norway....	52,058	19,481	28,147	25,506	18,692	17,365
Denmark.....	8,490	4,393	4,246	2,623	1,872	2,090
Netherlands.....	7,757	2,267	1,996	1,443	768	855
Italy.....	70,570	39,826	46,010	69,244	58,787	69,890
Switzerland.....	4,808	2,660	3,088	1,883	1,417	1,202
All other countries.....	26,059	15,406	18,407	27,723	22,070	16,060
Total.....	495,030	250,313	324,330	301,067	222,399	254,900

SUMMARY OF STATISTICS FOR 1897 AND 1898.

Subjects.	1897.	1898.
Production of Pig Iron, gross tons.....	9,652,680	11,773,934
Production of Spiegeleisen and Ferro-manganese, included in Pig Iron, gross tons.....	173,695	213,769
Production of Bar, Hoop, Skelp, etc., and Structural Shapes, gross tons, not including Wire Rods.....	3,081,760	3,941,957
Production of Iron and Steel Structural Shapes, included above, gross tons.....	583,790	702,197
Production of Iron and Steel Wire Rods, gross tons	970,736	1,071,683
Production of Plate and Sheet Iron and Steel, except Nail Plate, gross tons.....	1,207,286	1,448,301
Production of Iron and Steel Cut Nails and Cut Spikes, kegs of 100 pounds.....	2,106,799	1,572,221
Production of Iron and Steel Wire Nails, kegs of 100 pounds.....	8,997,245	7,418,475
Production of all Rolled Iron and Steel, including Cut Nails and excluding Rails, gross tons.....	5,353,836	6,532,129
Production of all Rolled Iron and Steel, including both Cut Nails and Rails, gross tons.....	7,001,728	8,513,370
Production of Bessemer Steel Rails, gross tons.....	1,644,520	1,976,702
Production of Open-hearth Steel Rails, gross tons....	500	1,220
Production of Iron Rails, gross tons.....	2,872	3,319
Production of all kinds of Rails, gross tons.....	1,647,892	1,981,241
Production of Street Rails, included above, gross tons.	122,244	143,815
Production of Bessemer Steel, gross tons.....	5,475,315	6,609,017
Production of Open-hearth Steel, gross tons.....	1,608,671	2,230,292
Production of Crucible Steel, gross tons.....	69,959	89,747
Production of Blister and Patented Steel, gross tons...	3,012	3,801
Production of all kinds of Steel, gross tons.....	7,156,957	8,932,857
Production of Ore, Pig, and Scrap Blooms for sale, gross tons.....	8,614	8,112
Production of Tinplates and Terne Plates, gross tons.	256,598	326,915
Value of Imports of Iron and Steel.....	\$13,836,204	\$12,473,637
Value of Exports of Iron and Steel.....	\$62,737,250	\$82,771,550
Production of Iron Ore, gross tons.....	17,518,046	.....
Imports of Iron Ore, gross tons.....	489,970	187,208
Total Consumption of Iron Ore, gross tons.....	17,375,000	21,193,000
Production of all kinds of Coal, gross tons.....	178,769,344	.....
Shipments of Anthracite Coal from the Mines in Pennsylvania, gross tons.....	41,637,864	41,899,751
Imports of Coal, gross tons.....	1,280,244	1,272,924
Exports of Coal, gross tons.....	3,698,031	4,503,405
Iron and Steel Ships Built in the year ended June 30.	68	63
Miles of New Railroad completed.....	2,188	about 3,000
Immigrants in the year ended December 31.....	222,399	254,900

PRODUCTION OF ALL KINDS OF PIG IRON IN THE UNITED STATES IN 1894, 1895, 1896, 1897, AND 1898, BY STATES.

Statistics collected directly from the Manufacturers by The American Iron and Steel Association.

TOTAL PRODUCTION OF PIG IRON.

States.	Gross tons of 2,240 pounds.				
	1894.	1895.	1896.	1897.	1898.
Massachusetts.....	156	4,710	1,873	3,284	3,661
Connecticut.....	7,416	5,615	10,187	8,336	6,336
New York.....	175,185	181,702	206,075	243,304	228,011
New Jersey.....	63,273	55,502	59,163	95,696	100,681
Pennsylvania.....	3,370,152	4,701,163	4,024,166	4,631,634	5,537,832
Maryland.....	5,600	10,916	79,472	193,702	190,974
Virginia.....	298,086	346,589	386,277	307,610	283,274
North Carolina.....	.....	323	2,151	.....	.....
Georgia.....	40,268	31,034	15,593	17,092	13,762
Alabama.....	592,392	854,667	922,170	947,831	1,033,676
Texas.....	4,671	4,682	1,221	6,175	5,178
West Virginia.....	80,781	141,968	108,569	132,907	192,699
Kentucky.....	33,854	63,780	70,660	35,899	100,724
Tennessee.....	212,773	248,129	248,338	272,130	263,439
Ohio.....	900,029	1,463,789	1,196,326	1,372,889	1,986,358
Illinois.....	604,795	1,006,091	925,239	1,117,239	1,365,898
Michigan.....	95,171	91,222	149,511	132,578	147,640
Wisconsin.....	91,595	148,400	158,484	103,909	172,781
Missouri.....	6,522	27,518	12,548	23,883	} 141,010
Colorado.....	73,669	58,508	45,104	6,582	
Oregon.....	1,000	.....	.....	.....	.....
Total.....	6,657,388	9,446,308	8,623,127	9,652,680	11,773,934

ANTHRACITE AND MIXED ANTHRACITE AND BITUMINOUS PIG IRON.

States.	Gross tons of 2,240 pounds.				
	1894.	1895.	1896.	1897.	1898.
New York.....	72,008	63,591	33,477	.....	.....
New Jersey.....	63,273	55,502	59,163	95,696	100,681
Pennsylvania.....	779,461	1,151,806	1,053,772	837,081	1,102,592
Total.....	914,742	1,270,899	1,146,412	932,777	1,203,273

PRODUCTION OF PIG IRON FROM 1894 TO 1898.—CONTINUED.

CHARCOAL PIG IRON.

States.	Gross tons of 2,240 pounds.				
	1894.	1895.	1896.	1897.	1898.
Massachusetts.....	156	4,710	1,873	3,284	3,661
Connecticut.....	7,416	5,615	10,187	8,336	6,336
New York.....	7,708	5,220	5,200	5,380	6,600
Pennsylvania.....	4,544	4,474	2,714	1,988	3,191
Maryland.....	3,291	.....	4,844	4,580	2,106
Virginia.....	.....	.....	1,373	220	.....
Georgia.....	12,600	13,365	14,250	17,092	13,762
Alabama.....	36,078	18,816	29,787	14,913	36,734
Texas.....	4,671	4,682	1,221	6,175	5,178
Tennessee.....	6,920	19,243	27,133	24,427	17,498
Ohio.....	13,332	10,457	11,426	7,807	6,351
Michigan.....	95,171	91,222	149,511	132,578	147,640
Wisconsin.....	23,013	45,957	41,375	28,431	47,693
Missouri.....	6,522	1,580	9,350		
Oregon.....	1,000	.....	.....	.....	.....
Total.....	222,422	225,341	310,244	255,211	296,750

BITUMINOUS COAL AND COKE PIG IRON.

States.	Gross tons of 2,240 pounds.				
	1894.	1895.	1896.	1897.	1898.
New York.....	95,469	112,891	167,398	237,924	221,411
Pennsylvania.....	2,586,147	3,544,883	2,967,680	3,792,565	4,432,049
Maryland.....	2,309	10,916	74,628	189,122	188,868
Virginia.....	298,086	346,589	384,904	307,390	283,274
North Carolina.....	.....	323	2,151	.....	.....
Georgia.....	27,668	17,669	1,343	.....	.....
Alabama.....	556,314	835,851	892,383	932,918	996,942
West Virginia.....	80,781	141,968	108,569	132,907	192,699
Kentucky.....	33,854	63,780	70,660	35,899	100,724
Tennessee.....	205,853	228,886	221,205	247,703	245,941
Ohio.....	886,697	1,453,332	1,184,900	1,365,082	1,980,007
Illinois.....	604,795	1,006,091	925,239	1,117,239	1,365,898
Wisconsin.....	68,582	102,443	117,109	86,992	134,558
Minnesota.....					
Missouri.....	.....	25,938	3,198	12,369	40,318
Colorado.....	73,669	58,508	45,104	6,582	91,222
Total.....	5,520,224	7,950,068	7,166,471	8,464,692	10,273,911

STOCKS OF ALL KINDS OF PIG IRON UNSOLD AT THE CLOSE OF 1895, 1896, 1897, AND 1898.

These statistics represent only unsold stocks in the hands of makers or their agents, including stocks controlled by the manufacturers in warrant yards, and do not include other warrant stocks, or stocks in the hands of consumers, or pig iron made for the use of the makers, or foreign pig iron held in bond.

States and Districts.	Gross tons of 2,240 pounds.			
	1895.	1896.	1897.	1898.
New England.....	9,058	7,989	8,103	4,339
New York	30,771	47,837	36,444	25,005
New Jersey	9,402	5,467	7,730	1,853
Lehigh Valley.....	45,409	49,079	35,952	27,949
Schuylkill Valley.....	25,665	34,996	22,301	9,926
Upper Susquehanna Valley.....	.....	.....	.....	.....
Lower Susquehanna Valley	17,141	23,888	19,870	26,076
Juniata Valley	3,318	5,112	533	8,533
Allegheny county.....	15,668	20,522	25,743	1,246
Shenango Valley	31,999	65,111	64,532	27,583
Miscellaneous bituminous.....	11,287	10,122	32,463	100
Charcoal	9,271	7,129	7,466	7,392
Total for Pennsylvania.....	159,758	215,959	208,860	108,805
Maryland	1,624	1,544	2,179	2,422
Virginia.....	33,236	43,236	70,509	18,882
North Carolina, Georgia, and Texas.....	18,953	18,800	16,791	14,266
Alabama.....	67,070	122,079	56,020	27,166
Kentucky.....	6,886	14,200	10,546	5,545
Tennessee.....	9,279	29,763	25,008	24,389
Mahoning Valley.....	17,950	78,332	38,148	15,070
Hocking Valley and miscellaneous.	5,730	5,646	5,905	3,041
Lake counties.....	1,436	931	9,900	.....
Hanging Rock bit. and charcoal...	24,053	33,755	22,285	10,799
Total for Ohio.....	49,169	118,664	76,238	28,910
Indiana, Michigan, and Minnesota.....	23,040	64,035	109,272	24,598
Illinois and Wisconsin.....	14,119	15,233	12,939	.....
Missouri and Colorado.....	10,767	5,652	14,663	5,053
Pacific States.....	1,200	1,191	1,187	.....
Grand total.....	444,332	711,649	656,489	291,233

STOCKS ACCORDING TO FUEL USED.

Bituminous.....	193,363	383,928	339,793	115,615
Anthracite and anth. and coke mixed..	115,936	134,687	106,901	83,976
Charcoal.....	135,033	193,034	209,795	91,642
Total.....	444,332	711,649	656,489	291,233

PRODUCTION OF ROLLED IRON AND STEEL IN PENNSYLVANIA IN 1895, 1896, 1897, AND 1898, BY DISTRICTS.

In the following table the Philadelphia district covers Philadelphia county and the Pencoyd Iron Works; Eastern Pennsylvania comprises the eastern counties outside of the Philadelphia district as far west as the limits of Chester, Berks, Schuylkill, and Carbon counties; Central Pennsylvania comprises the counties west of those named, extending to the western limits of Bedford, Blair, Centre, and Clinton counties; Western Pennsylvania comprises all counties west of those last named, except Allegheny.

BARS, RODS, BOLTS, HOOPS, SKELP, SHAPES, ROLLED AXLES, ETC.

Districts.	Gross tons of 2,240 pounds.			
	1895.	1896.	1897.	1898.
Philadelphia	107,253	99,074	118,807	155,196
Eastern Pennsylvania.....	193,121	195,369	196,616	289,962
Central Pennsylvania.....	253,615	254,362	254,058	312,635
Allegheny county.....	1,134,396	1,045,372	1,258,266	1,527,418
Western Pennsylvania.....	243,640	209,615	300,174	330,635
Total.....	1,932,025	1,803,792	2,127,921	2,615,846

IRON AND STEEL PLATES AND SHEETS, EXCEPT NAIL PLATE.

Philadelphia.....	7,506	7,330	8,567	10,212
Eastern Pennsylvania.....	108,351	100,858	113,248	115,398
Central Pennsylvania.....	72,268	70,973	68,145	106,245
Allegheny county.....	350,593	324,296	395,830	444,850
Western Pennsylvania.....	114,401	127,404	167,709	241,705
Total.....	653,119	630,861	753,499	918,410

IRON AND STEEL CUT NAILS AND CUT SPIKES.

Eastern Pennsylvania.....	21,538	9,263	22,563	16,370
Central Pennsylvania.....	19,038	19,555	24,668	17,923
Western Pennsylvania.....	1,338	22	.....	.....
Total.....	41,914	28,840	47,231	34,293

IRON AND STEEL RAILS.

Eastern Pennsylvania.....	83,909	38,981	48,423	6,977
Central Pennsylvania.....	826,650	230,823	287,950	334,558
Allegheny county.....	328,227	305,514	538,798	564,085
Western Pennsylvania.....	126,091	99,333	152,905	148,601
Total.....	864,877	674,651	1,028,076	1,054,221

TOTAL ROLLED IRON AND STEEL.

Philadelphia.....	114,759	106,404	127,374	165,408
Eastern Pennsylvania.....	406,919	344,471	380,850	428,707
Central Pennsylvania.....	671,571	575,713	634,821	771,361
Allegheny county.....	1,813,216	1,675,182	2,192,894	2,536,353
Western Pennsylvania.....	485,470	436,374	620,788	720,941
Total.....	3,491,935	3,138,144	3,956,727	4,622,770

**PRODUCTION OF ROLLED IRON AND STEEL IN OHIO IN
1895, 1896, 1897, AND 1898, BY DISTRICTS.**

In the following table the Lake counties are those bordering on Lake Erie; the Mahoning Valley comprises the counties in the northeastern part of Ohio, including Columbiana county; the interior counties are the counties south and west of the two first-named districts, except the counties along the Ohio river, which are classed in a district by themselves.

BARS, RODS, BOLTS, HOOPS, SKELP, SHAPES, ROLLED AXLES, ETC.

Districts.	Gross tons of 2,240 pounds.			
	1895.	1896.	1897.	1898.
Lake counties.....	314,272	236,333	381,687	407,821
Mahoning Valley.....	257,821	187,291	215,554	314,885
Interior counties.....	46,249	30,316	21,982	33,483
Ohio River counties.....	30,794	65,322	72,300	91,590
Total.....	649,136	519,262	691,523	847,779

IRON AND STEEL PLATES AND SHEETS, EXCEPT NAIL PLATE.

Lake counties.....	28,065	24,319	45,847	43,068
Mahoning Valley.....	33,928	30,695	34,996	43,686
Interior counties.....	44,075	39,816	52,531	79,020
Ohio River counties.....	56,998	60,890	97,453	90,659
Total.....	163,066	155,720	230,827	256,433

IRON AND STEEL CUT NAILS AND CUT SPIKES.

Lake counties.....	.....	143	45	.....
Mahoning Valley.....	2,177	637	1,962	372
Interior counties.....	.....	.....	.....	.....
Ohio River counties.....	13,321	11,018	16,359	17,128
Total.....	15,498	11,798	18,366	17,500

IRON AND STEEL RAILS.

Lake counties.....	65,232	78,811	74,674	108,268
Mahoning Valley.....	.....	.....	.....	.....
Interior counties.....	130	16	99	105
Ohio River counties.....	603	1,413	1,635	1,654
Total.....	65,965	80,240	76,408	110,027

TOTAL ROLLED IRON AND STEEL.

Lake counties.....	407,569	339,606	502,253	559,157
Mahoning Valley.....	293,926	218,623	252,512	358,943
Interior counties.....	90,454	70,148	74,612	112,608
Ohio River counties.....	101,716	138,643	187,747	201,031
Total.....	893,665	767,020	1,017,124	1,231,739

PRODUCTION OF ROLLED IRON AND STEEL IN THE UNITED STATES FROM 1887 TO 1898.

The total production of rolled iron and steel in the United States during the twelve years from 1887 to 1898 is given below. As the production of wire rods was not ascertained separately for 1887 it is included for that year with the bars, hoops, skelp, and shapes produced.

Years—Gross tons.	Iron and steel rails.	Bars, hoops, skelp, and shapes.	Wire rods.	Plates and sheets, except nail plate.	Cut nails. Gross tons.	Total. Gross tons.
1887.....	2,139,640	2,184,279	.....	603,355	308,432	5,235,706
1888.....	1,403,700	2,034,162	279,769	609,827	289,891	4,617,349
1889.....	1,522,204	2,374,968	363,851	716,496	259,409	5,236,928
1890.....	1,885,307	2,618,660	457,099	809,981	251,828	6,022,875
1891.....	1,307,176	2,644,941	536,607	678,927	223,312	5,390,963
1892.....	1,551,844	3,033,439	627,829	751,460	201,242	6,165,814
1893.....	1,136,458	2,491,497	537,272	674,345	136,113	4,975,685
1894.....	1,021,772	2,155,875	673,402	682,900	108,262	4,642,211
1895.....	1,306,135	3,005,765	791,130	991,459	95,085	6,189,574
1896.....	1,122,010	2,731,932	623,986	965,776	72,137	5,515,841
1897.....	1,647,892	3,081,760	970,736	1,207,286	94,054	7,001,728
1898.....	1,981,241	3,941,957	1,071,683	1,448,301	70,188	8,513,370

PRODUCTION OF COAL IN THE UNITED STATES.

The following table gives the production of all kinds of coal in the United States in the census years 1870 and 1880, ending on the 31st day of May of each year; in the census year 1889, ending on the 31st day of December of that year; in the calendar years from 1881 to 1888 and from 1890 to 1897.

Years—Gross tons.	Pennsylvania anthracite.	Bituminous and all other.	Total. Gross tons.
Census year 1870.....	13,973,460	15,369,120	29,342,580
Census year 1880.....	25,572,160	38,250,670	63,822,830
Calendar year 1881.....	28,500,016	48,365,341	76,865,357
Calendar year 1882.....	31,358,264	60,861,190	92,219,454
Calendar year 1883.....	34,336,469	68,531,500	102,867,969
Calendar year 1884.....	33,175,756	73,730,539	106,906,295
Calendar year 1885.....	34,228,548	64,840,668	99,069,216
Calendar year 1886.....	34,853,077	66,646,947	101,500,024
Calendar year 1887.....	37,578,747	79,073,227	116,651,974
Calendar year 1888.....	41,624,611	91,107,002	132,731,613
Calendar year 1889.....	40,665,152	85,432,717	126,097,869
Calendar year 1890.....	41,489,858	99,377,073	140,866,931
Calendar year 1891.....	45,236,992	105,268,962	150,505,954
Calendar year 1892.....	46,850,450	113,264,792	160,115,242
Calendar year 1893.....	48,185,306	114,629,671	162,814,977
Calendar year 1894.....	46,358,144	106,089,647	152,447,791
Calendar year 1895.....	51,785,122	120,641,244	172,426,366
Calendar year 1896.....	48,523,287	122,893,103	171,416,390
Calendar year 1897.....	46,814,074	131,955,270	178,769,344

STATISTICS OF THE CANADIAN IRON TRADE FOR 1898.

THE production of pig iron in the Dominion of Canada was first ascertained from the manufacturers by the American Iron and Steel Association for the year 1894, when it amounted to 44,791 gross tons. In 1895 the production amounted to 37,829 tons, in 1896 to 60,030 tons, and in 1897 to 53,796 tons. In 1898 the production amounted to 68,755 tons, of which about one-eleventh was charcoal iron, the remainder being coke iron. The production of Bessemer pig iron in 1898, included in the figures given above, was 10,200 tons, and the production of basic pig iron was 9,100 tons, all made by one company. The total production of pig iron in 1898 as compared with that of 1897 shows an increase of 14,959 tons. The consumption of limestone by the Canadian furnaces in 1898 amounted to 30,302 tons, against 27,957 tons in 1897.

On December 31, 1898, the unsold stocks of pig iron in Canada which were in the hands of the manufacturers or their agents amounted to 9,979 tons, as compared with 20,265 tons on December 31, 1897, 29,320 tons on December 31, 1896, and 17,800 tons on December 31, 1895. Of the unsold pig iron on hand on December 31, 1898, about four-fifths was charcoal pig iron, the remainder being coke iron.

Canada did not produce any spiegeleisen or ferro-manganese in 1897 or 1898, although some time ago the Mineral Products Company, of Hillsboro, New Brunswick, leased the Bridgeville Furnace, at Bridgeville, Nova Scotia, for this purpose, and expected to have the furnace in operation in 1898. The company now hopes to blow in the furnace some time in May. The ferro-manganese will be made from briquettes of manganese ore. The annual capacity of the furnace is about 7,300 gross tons.

On December 31, 1898, there were 9 completed blast furnaces in the Dominion, and of this number 3 were in blast and 6 were out of blast on the date named. On December 31, 1897, there were 8 completed furnaces, of which 4 were in blast and 4 were idle. In the spring of 1898 the Deseronto Iron Company Limited began building a charcoal furnace at Deseronto, in the Province of Ontario, which it completed in December. The furnace

was blown in on January 25, 1899. It is now making about 1,000 tons of pig iron per month from Lake Superior ores.

The production of crude steel, steel castings, and all kinds of iron and steel rolled into finished forms in Canada in 1898 is given approximately below, full reports or careful estimates having been received by us from all the manufacturers in the Dominion.

The production of Bessemer and of basic and acid open-hearth steel ingots and castings in 1898 was 21,540 gross tons, against 18,400 tons in 1897, 16,000 tons in 1896, and 17,000 tons in 1895. Of the total production of open-hearth steel in 1898 a little more than one-half was made by the acid process. The production of open-hearth steel rails in 1898 amounted to 600 tons, against 500 tons in 1897; structural shapes, 1,565 tons, against 4,300 tons in 1897; cut nails made by rolling mills and steel works having cut-nail factories connected with their plants, 152,688 kegs of 100 pounds, against 202,939 kegs in 1897; plates and sheets, about 1,000 tons, against about 2,000 tons in 1897; all other rolled products, excluding muck and scrap bar, blooms, billets, sheet bars, etc., 80,322 tons, against 61,161 tons in 1897. Changing the cut nail production from kegs of 100 pounds to gross tons of 2,240 pounds the total quantity of all kinds of iron and steel rolled into finished products in the Dominion in 1898, excluding muck and scrap bar, billets, and other intermediate products, amounted to 90,303 tons, against 77,021 tons in 1897, 75,043 tons in 1896, and 66,402 tons in 1895.

The total number of rolling mills and steel works in Canada on December 31, 1898, was 18. Of this number at least four were idle during the whole of 1898. Canada has only one steel casting plant, which is equipped with a 3,000-pound modified acid Bessemer converter. Its first castings were produced in 1897. Canada also has one open-hearth steel plant, which makes steel by both the acid and basic processes.

THE FOREIGN IRON TRADE IN 1898 AND IMMEDIATELY PRECEDING YEARS.

BRIEFLY stated, the active demand for iron and steel which has characterized all the European markets since the second half of 1895 was continued in 1898, with rising prices. Nearly all European iron-producing countries show an increase in production in 1898 as compared with 1897, a conspicuous exception to this rule being Great Britain, in which country there was a decline in production in some leading branches, but not in all, open-hearth steel showing a considerable increase. But on the Continent there was a very general increase. The activity of 1898 has been continued thus far in 1899, and prices generally have been still further advanced.

A leading factor in reducing the British production of iron and steel in 1898 was the strike of the Welsh coal miners for higher wages, which occurred on April 1 and lasted until the last of August, a period of five months. The strike extended also to the adjoining English county of Monmouth. The production of pig iron and tinplates was directly affected by the strike, as was also, of course, the production of coal itself and the business of the railroads. The production of coal in Wales in 1898 was about 5,560,000 tons less than in 1897, and there was a falling off of about 3,250,000 tons in the production of Monmouth. In the end the men yielded to the masters' terms, which granted a slight advance upon the wages previously paid. Another reason for the decline in the production of iron and steel in Great Britain in 1898 was the active competition of the United States and Continental countries in neutral markets and even in the British market itself. British exports of iron and steel sensibly declined in that year.

We present below detailed statistics of the production of iron and steel in foreign countries in 1898 so far as they have been received, statistics for 1897 and other recent years being also given.

Great Britain.—Mr. J. S. Jeans, the secretary of the British Iron Trade Association, estimates the production of pig iron in Great Britain in 1898 at 8,631,151 gross tons, against an ascertained production of 8,796,465 tons in 1897, these latter being the official Government figures. The largest annual production of pig

iron by Great Britain, as officially ascertained, was in 1897. The next largest production was 8,659,681 tons in 1896, and the next largest production was 8,586,680 tons in 1882.

Mr. Jeans gives the production of Bessemer steel ingots in Great Britain in 1898 as 1,759,386 gross tons, against 1,884,155 tons in 1897, and he gives the production of Bessemer steel rails in 1898 as 751,591 tons, against 921,131 tons in 1897. There were 62 Bessemer converters at work in 1898 and 18 were idle.

The production of open-hearth steel ingots in Great Britain in 1898, according to the same authority, was 2,806,600 gross tons, against 2,601,806 tons in 1897. The production of open-hearth steel rails in 1898 amounted to 20,444 tons, against 31,694 tons in 1897. The total number of acid open-hearth furnaces is now 336 and 23 are building. The total number of basic open-hearth furnaces is 42, with none building.

The Bessemer steel ingots produced in 1898 were divided into 1,255,252 tons of acid and 504,134 tons of basic steel. The open-hearth steel ingots produced in 1898 were divided into 2,590,512 tons of acid and 216,088 tons of basic steel.

The production of puddled bars in Great Britain in 1898 was 1,115,699 gross tons, against 1,288,159 tons in 1897, 1,214,005 tons in 1896, and 1,148,012 tons in 1895.

The maximum production of iron ore in Great Britain was attained in 1882, when 18,031,957 tons were mined. After that year there was a steady decline in production until 1893, when only 11,203,476 tons were mined. Since 1893 there has been a gradual increase in production, the figures for 1897 being 13,787,878 tons and for 1898 being 14,176,938 tons. As far back as 1870 the production was 14,370,655 tons.

Great Britain is a large importer of iron ore. In 1896 she imported 5,438,307 gross tons, in 1897 she imported 5,968,680 tons, and in 1898 she imported 5,468,395 tons, the principal imports in each year coming from Spain. In addition to the above imports there were imported in 1896 "purple ore," or residuum of cupreous iron pyrites, amounting to 441,792 tons, and in 1897 amounting to 467,318 tons.

The total exports of iron and steel from Great Britain to all countries in 1898 amounted to 3,247,368 tons, against 3,686,106 tons in 1897 and 3,550,398 tons in 1896. The exports of pig iron in 1898 amounted to 1,042,296 tons, against 1,201,104 tons in 1897. The exports of steel rails in 1898 amounted to 476,786 tons, against 579,983 tons in 1897 and 581,249 tons in 1896. The

exports of tinplates to the United States in 1898 amounted to 65,337 tons, against 85,472 tons in 1897.

The exports of tinplates to all countries declined from 271,230 tons in 1897 to 251,769 tons in 1898. As late as 1893 Great Britain's exports of tinplates to the United States alone exceeded her total exports of tinplates in 1898.

Great Britain obtains from foreign countries most of the tin that her manufacturers use in the production of tinplates. In 1897 she obtained from her own mines in Cornwall and Devonshire 4,452 tons and 14 hundredweights of metallic tin, and in the same year she imported 26,785 tons and 16 hundredweights. In 1896 she produced 4,837 tons and 14 hundredweights and imported 38,374 tons and 15 hundredweights. The imports come chiefly from the Straits Settlements, Australasia, and Chili. In 1896 there were also imported 4,872 tons of tin ore, and in 1897 there were 5,261 tons imported. Great Britain is a very large exporter of tin, most of which had previously been imported. Her total exports in 1897 amounted to 19,724 gross tons, and in 1896 they amounted to 24,907 tons.

During the last few years the imports of iron and steel into Great Britain have largely increased. They amounted to 591,425 tons in 1898, against 362,827 tons in 1897 and 333,050 tons in 1896. In 1894 they amounted to only 292,908 tons. Great Britain imported in 1898 103,439 tons of beams, girders, and pillars, against 75,910 tons in 1897 and 75,197 tons in 1896. In 1897 18,036 tons of steel rails were exported from Germany to England. The imports of pig iron and steel into Great Britain from the United States in 1897 and 1898 were as follows: pig iron, 1897, 91,196 tons; 1898, 76,356 tons; steel, 1897, 25,917 tons; 1898, 29,374 tons.

The production of coal in Great Britain in 1898 amounted to 202,054,516 tons, against a total production in 1897 of 202,129,931 tons, 195,361,260 tons in 1896, 189,661,362 tons in 1895, 188,277,525 tons in 1894, and 164,325,795 tons in 1893.

The exports of coal from Great Britain to other countries in 1897 amounted to 35,354,296 gross tons, against 32,947,680 tons in 1896 and 31,714,906 tons in 1895. The exports of coke amounted to 978,327 tons in 1897, against 676,811 tons in 1896 and 700,064 tons in 1895. In addition to the coal exports given above 10,455,758 tons of coal were exported in 1897 for the use of British steamers engaged in the foreign trade, against 9,937,305 tons in 1896 and 9,407,789 tons in 1895.

Germany.—The iron and steel statistics of Germany embrace the production of Luxemburg. The production of pig iron in Germany and Luxemburg in 1898 was 7,215,927 metric tons, according to Dr. Rentzsch, the statistician of the Association of German Iron and Steel Manufacturers, against 6,864,405 tons in 1897 and 6,372,575 tons in 1896. Of the production in 1898 Germany made 6,366,901 tons and Luxemburg 849,026 tons. Of the pig iron now annually produced in Germany and Luxemburg about 50 per cent. is Thomas, or basic, pig iron.

The total production of steel in Germany in 1898 was 5,734,307 metric tons, including 441,039 tons of ingots and 986,572 tons of blooms and billets for sale. This is an increase of 642,925 tons on the output of 1897, when the total quantity produced was 5,091,382 tons, including 361,637 tons of ingots and 910,560 tons of blooms and billets.

The production of basic steel in Germany in 1898 amounted to 5,065,896 metric tons, of which 3,606,737 tons were made by the Bessemer process and 1,459,159 tons by the open-hearth process. Steel castings are not included in these figures. The production of steel rails in Germany in 1896 amounted to 580,732 tons, against 493,855 tons in 1895.

The imports of pig iron and old iron into Germany in 1898 amounted to 407,889 metric tons, against 461,084 tons in 1897. The exports of pig iron and old iron from Germany in 1898 amounted to 272,470 tons, against 128,987 tons in 1897. The exports of rails and sleepers from Germany in 1898 amounted to 154,641 tons, against 144,661 tons in 1897; of bars to 263,698 tons, against 246,772 tons in 1897; and of plates and sheets to 157,638 tons, against 138,057 tons in 1897. The imports of these articles into Germany in the two years named amounted to between 30,000 and 40,000 tons annually.

The production of iron ore in Germany and Luxemburg in 1898 amounted to 15,893,246 metric tons, of which Germany produced 10,544,295 tons and Luxemburg 5,348,951 tons. In 1897 the total production amounted to 15,465,979 tons, of which Germany produced 10,116,969 tons and Luxemburg 5,349,010 tons.

The imports of iron ore in 1898 amounted to 3,516,577 metric tons, against 3,185,644 tons in 1897. In 1898 the exports of iron ore amounted to 2,933,734 tons, against 3,230,391 tons in 1897.

The total production of coal in Germany in 1898 amounted to 130,928,490 metric tons, of which 99,279,992 tons were bituminous coal and 31,648,498 tons were brown coal. In 1897 the

total production was 120,474,485 tons, of which 91,054,982 tons were bituminous coal and 29,419,503 tons were brown coal.

The imports of coal into Germany in 1898 amounted to 14,270,481 metric tons, against 14,183,103 tons in 1897. Of the imports in 1898 there were 5,820,332 tons of bituminous coal and 8,450,149 tons of brown coal. The exports of coal from Germany in 1898 amounted to 14,011,376 tons, against 12,409,017 tons in 1897. Almost all the coal exported from Germany is bituminous, the figures for 1898 being as follows: bituminous, 13,989,222 tons; brown coal, 22,154 tons: total, 14,011,376 tons.

Germany is a large exporter of coke, her exports amounting to 2,133,178 metric tons in 1898 and to 2,161,886 tons in 1897. Her imports of coke in 1898 amounted to only 332,578 tons, against 435,160 tons in 1897.

France.—The production of pig iron in France in 1898 was 2,534,427 metric tons, against 2,484,191 tons in 1897, 2,339,537 tons in 1896, and 2,003,868 tons in 1895. The production of Bessemer steel ingots in France in 1898 amounted to 905,995 tons, against 802,326 tons in 1897 and 726,463 tons in 1896, and the production of open-hearth steel ingots in 1898 to 535,638 tons, against 522,887 tons in 1897 and 454,280 tons in 1896. The total production of Bessemer and open-hearth steel ingots in 1898 was 1,441,633 tons, against 1,325,213 tons in 1897 and 1,180,743 tons in 1896. The production of finished steel in France in 1898 amounted to 1,138,633 tons, against 994,891 tons in 1897 and 916,817 tons in 1896. The production of steel rails in 1898, nearly all of which were made of Bessemer steel, amounted to 222,054 tons, against 191,860 tons in 1897 and 176,021 tons in 1896. These statistics are given upon the authority of the Comité des Forges de France and are provisional for 1898.

The production of iron ore in France in 1897, not including Algeria, amounted to 4,582,236 metric tons, against 4,062,390 tons in 1896. Official statistics for 1898 have not yet appeared. The iron ore mined in Algeria in 1897 amounted to 441,467 metric tons, against 374,476 tons in 1896. These are official figures.

The iron ore imported into France in 1898 amounted to 2,032,240 metric tons, against 2,137,901 tons in 1897. The imports from Algeria alone in 1898 amounted to 68,224 tons, against 64,802 tons in 1897. The exports of iron ore in 1898 amounted to 236,169 tons, against 289,694 tons in 1897.

The production of coal in France in 1898 amounted to 32,439,786 metric tons, against 30,797,629 tons in 1897, 29,189,900 tons

in 1896, and 28,019,893 tons in 1895. The figures for 1898 are provisional. For 1896 and 1897 they are final.

Belgium.—The production of pig iron in Belgium in 1898 amounted to 979,101 metric tons, against 1,034,732 tons in 1897 and 959,414 tons in 1896. The production of steel ingots in Belgium in 1898 amounted to 653,130 metric tons, against 616,604 tons in 1897 and 598,974 tons in 1896. The production of finished steel in Belgium in 1898 amounted to 558,995 tons, against 525,731 tons in 1897 and 519,311 tons in 1896. The production of steel rails in Belgium in 1897 amounted to 136,911 metric tons, against 147,183 tons in 1896.

The imports of pig iron into Belgium in 1897 amounted to 288,956 metric tons, against 314,555 tons in 1896 and 225,665 tons in 1895. The exports in 1897 amounted to 10,381 tons, against 10,744 tons in 1896 and 9,864 tons in 1895.

The production of iron ore in Belgium in 1897 amounted to 240,774 metric tons, against 307,031 tons in 1896 and 312,637 tons in 1895. The exports of iron ore in 1897 amounted to 410,817 tons, against 389,235 tons in 1896 and 325,809 tons in 1895. The imports of iron ore in 1897 amounted to 2,544,377 tons, against 2,069,676 tons in 1896 and 1,857,624 tons in 1895. The figures for 1898 have not yet appeared.

The production of coal in Belgium in 1898 amounted to 22,075,093 metric tons, against 21,534,629 tons in 1897 and 21,252,370 tons in 1896. The imports of coal into Belgium in 1897 amounted to 2,017,344 tons, against 1,693,376 tons in 1896 and 1,530,364 tons in 1895. The exports of coal in 1897 amounted to 4,448,544 tons, against 4,649,799 tons in 1896 and 4,661,477 tons in 1895.

Austria-Hungary.—The production of pig iron in Austria alone in 1897 was 887,945 metric tons, against 816,967 tons in 1896 and 778,510 tons in 1895. In Hungary the production in 1897 amounted to 420,478 tons, against 400,815 tons in 1896 and 349,163 tons in 1895. The production of both countries in 1897 was 1,308,493 tons, against 1,217,782 tons in 1896 and 1,127,673 tons in 1895. Statistics for 1898 are not yet at hand.

According to Professor Franz Kupelwieser, of Leoben, Austria, the production of Bessemer and open-hearth steel in Austria-Hungary in 1896 amounted to 880,696 metric tons, of which 343,861 tons were produced by the Bessemer process and 536,835 tons by the open-hearth process. Of the Bessemer steel produced in the year named 223,758 tons were made by the basic process

and 120,103 tons were made by the acid process. Of the open-hearth steel produced 513,835 tons were made by the basic process and 23,000 tons by the acid process. Hungary contributed 294,689 tons of Bessemer and open-hearth steel to the total for 1896, Austria 582,707 tons, and Bosnia 3,300 tons of basic open-hearth steel. The last named country first began to make steel in 1896. From 1890 to 1895 the production of Bessemer and open-hearth steel in Austria-Hungary was as follows: 1890, 499,600 tons; 1891, 486,038 tons; 1892, 511,411 tons; 1893, 569,676 tons; 1894, 660,426 tons; and 1895, 744,547 tons.

The production of iron ore in Austria alone in 1897 amounted to 1,613,876 metric tons, against 1,448,615 tons in 1896 and 1,384,911 tons in 1895. In Hungary the production amounted to 1,721,129 tons in 1897, 1,269,680 tons in 1896, and 955,262 tons in 1895. The total production of iron ore in the whole of Austria-Hungary amounted to 3,335,005 tons in 1897, 2,718,295 tons in 1896, and 2,340,173 tons in 1895.

The production of coal in Austria alone in 1897 amounted to 30,950,863 metric tons, of which 20,458,092 tons were brown coal and 10,492,771 tons were stone coal. The production of coal in Hungary in 1897 amounted to 4,988,554 tons, of which 3,870,530 tons were brown coal and 1,118,024 tons were stone coal. The total production of all kinds of coal in the Austro-Hungarian Empire in 1897 amounted to 35,939,417 tons, against 33,676,411 tons in 1896 and 32,654,777 tons in 1895.

Sweden.—The production of pig iron in Sweden in 1897 was 538,197 metric tons, against 494,418 tons in 1896 and 462,930 tons in 1895. The production in 1898 was about 520,000 tons. The production of Bessemer steel ingots in Sweden in 1897 was 107,679 tons, against 114,120 tons in 1896, and the production of open-hearth steel ingots was 165,836 tons, against 142,301 tons in 1896. The production of blister and crucible steel in 1897 was 1,613 tons, against 1,228 tons in 1896. The total production of all kinds of steel in Sweden in 1897 was 275,128 tons, against 257,649 tons in 1896 and 197,830 tons in 1895.

The production of iron ore in Sweden in 1897 was 2,087,166 metric tons, against 2,039,019 tons in 1896 and 1,904,662 tons in 1895. The production of coal in Sweden in 1897 was 224,343 tons, against 225,848 tons in 1896 and 223,652 tons in 1895. The exports of iron ore from Sweden in 1897 amounted to 1,400,399 metric tons, against 1,150,695 tons in 1896, 800,452 tons in 1895, 831,395 tons in 1894, 484,055 tons in 1893, and 320,071

tons in 1892. The output of the Gellivara mines in 1898 was 851,000 tons, of which 804,730 tons were shipped to foreign countries, Germany and Belgium being the chief importers.

Norway.—The iron industry of this country, never extensive, has now only a nominal existence. The quantity of iron ore produced in 1895 was 1,250 metric tons and in 1896 it was about 2,000 tons. There is no coal mined in Norway.

Spain.—The production of iron ore in Spain in 1897 appears to have been the largest in the history of the country, amounting to 7,419,768 metric tons, against 6,762,582 tons in 1896 and 5,514,339 tons in 1895. There were exported 6,884,588 tons in 1897, against 6,272,588 tons in 1896, of which Great Britain took 5,091,027 tons in 1897 and 4,635,959 tons in 1896. The production in 1898 is given as 7,125,600 tons, of which 6,558,060 tons were exported, Great Britain receiving 4,748,557 tons.

The production of pig iron in Spain in 1898 is reported to have amounted to 261,799 metric tons, against 297,100 tons in 1897, 246,326 tons in 1896, and 206,452 tons in 1895. The production of Bessemer steel ingots in Spain in 1898 is said to have been 154,910 metric tons, against 68,500 tons in 1897 and 62,511 tons in 1896. The production of open-hearth steel ingots in 1898 is given as 58,105 tons, against 52,600 tons in 1897 and 42,066 tons in 1896.

The reported production of coal and lignite in Spain in 1898 was 2,526,600 metric tons, against 2,073,632 tons in 1897. Of the total quantity produced last year 59,800 tons were classed as lignite, against 54,232 tons in 1897. The imports of coal into Spain in 1898 amounted to 1,215,554 tons, against 1,633,333 tons in 1897. The exports of coal from Spain in 1898 amounted to 321,739 tons, against 298,520 tons in 1897. Spain annually imports a large part of the coke she consumes, as the following figures for 1898 will show: production, 308,375 tons; imports, 231,467 tons; consumption, 539,842 tons.

Portugal.—This country does not appear to have any kind of an iron industry. Its production of coal is only nominal. It produces small quantities of manganese ore annually.

Italy.—The production of pig iron in Italy in 1897 amounted to 8,393 metric tons, against 6,987 tons in 1896 and 9,213 tons in 1895. The production of finished steel in 1897 amounted to 63,940 tons, against 65,955 tons in 1896 and 50,314 tons in 1895.

Italy annually imports pig iron in considerable quantities, the imports in 1897 amounting to 164,268 metric tons, chiefly from

Great Britain, the United States, Austria-Hungary, Spain, and Belgium in the order named. She also annually exports a small quantity of pig iron, her exports in 1897 amounting to 498 tons. Italy is also a large importer of iron and steel in finished forms.

The production of iron ore in Italy in 1897 amounted to 200,709 metric tons, of which all but 2,393 tons were produced on the Island of Elba, against a total production of 203,966 tons in 1896 and 183,371 tons in 1895.

The exports of iron ore from Italy in 1897, in which are probably included small quantities of pyrites and manganese ores, amounted to 207,619 metric tons, against 187,059 tons in 1896 and 164,367 tons in 1895. The exports in 1897 were chiefly to Great Britain and France. The imports of iron ore into Italy are nominal, and amounted in 1897 to only 5,831 tons.

The production of anthracite, lignite, fossiliferous, and bituminous coal in Italy in 1897 amounted to 314,222 metric tons, against 276,197 tons in 1896 and 305,321 tons in 1895.

In 1897 the imports of coal and coke into Italy amounted to 4,259,643 metric tons, chiefly from Great Britain, Austria-Hungary, Germany, France, and Belgium. In 1896 the imports of these articles amounted to 4,081,218 tons, against 4,304,787 tons in 1895. In 1897 the exports of coal and coke from Italy amounted to 23,191 tons.

Russia.—According to a recent issue of the *Bulletin Russe de Statistique Financière et de Législation* the production of pig iron in Russia and Finland in 1897 amounted to 1,868,671 metric tons, against 1,612,069 tons in 1896, 1,452,380 tons in 1895, 1,332,505 tons in 1894, 1,148,937 tons in 1893, 1,071,813 tons in 1892, 1,004,923 tons in 1891, and 926,482 tons in 1890. Preliminary statistics published by the "Ministry of Agriculture on Mines" give the production in 1898 as 2,193,750 gross tons.

The *Bulletin Russe* says that the production of all kinds of steel in Russia, including Finland, amounted in 1895 to 879,075 metric tons, as compared with 726,017 tons in 1894, 630,796 tons in 1893, 514,986 tons in 1892, 433,477 tons in 1891, and 378,422 tons in 1890. The "Ministry of Agriculture on Mines" gives the production of steel in 1896 as 1,006,616 gross tons. The production of steel ingots in Russia in 1897 is given by another authority as amounting to 1,153,000 metric tons and the production of rolled steel to 868,000 metric tons.

The *Bulletin Russe* says that the production of coal and lignite in Russia amounted to 9,463,300 metric tons in 1896, against

9,098,800 tons in 1895, 8,762,600 tons in 1894, 7,122,500 tons in 1893, 6,946,200 tons in 1892, 6,233,200 tons in 1891, and 6,015,000 tons in 1890. The production of lignite in Russia is very small, amounting in 1895 to only 133,000 tons.

According to the same authority the production of iron ore in Russia amounted to 2,924,963 metric tons in 1895, against 2,484,938 tons in 1894, 2,194,102 tons in 1893, 2,044,106 tons in 1892, 1,958,452 tons in 1891, and 1,795,663 tons in 1890. The production in 1896 is reported by the "Ministry of Agriculture on Mines" as having amounted to 3,268,400 gross tons.

Russia is rich in manganese, of which it furnishes about one-half of the world's supply. The productive mines are found in the Caucasus mountains, near the town of Chiaturi, in the province of Kutais. They are connected by a narrow-gauge railroad with Sharopan, twenty-five miles distant, on the Trans-Caucasian Railway, which carries the ore to Poti and Batum, on the Black Sea. The production in 1897 was 231,868 tons, the largest ever attained.

Greece.—This country produces considerable quantities of maniferous iron ore and small quantities of magnetic iron ore. In 1895 the total production was 338,957 metric tons, and in 1896 it was 415,987 tons, nearly all being maniferous iron ore. It is also a small producer of lignite, the quantity mined in 1895 amounting to 14,068 metric tons and in 1896 to 13,812 tons.

Japan.—Various statements agree in reporting Japan as on the eve of inaugurating on an extensive scale modern methods of making iron and steel, and to this end it is circumstantially stated that a contract has recently been entered into by the Japanese Government for the shipment to Japan of 500,000 tons of Bessemer iron ore from San Isidro, a point on the beach about fifty miles south of Ensenada, on the coast of Lower California.

The production of coal in Japan has rapidly increased in late years. Ten years ago it was about 2,000,000 tons annually, but in 1897 it is said to have amounted to about 6,000,000 tons. The actual production was 4,301,420 metric tons in 1894, 4,809,873 tons in 1895, and 5,019,690 tons in 1896. A large part of the coal produced in Japan is exported, the exports in 1897 amounting to over 2,500,000 tons, the shipments being to China, Australasia, Corea, and other Eastern countries.

China.—It is impossible to make a satisfactory estimate of the production of coal in China, and the same remark may be made of its iron ore production. The production of iron and steel in

China by modern methods is almost entirely confined to the Government works at Hanyang, for which we have in *Le Moniteur des Intérêts Matériels* circumstantial statistics for 1897. It says: "Only one furnace was in blast during the year, its out-turn having been 24,022 tons of pig iron. The Bessemer converter treated 9,206 tons of pig iron and yielded 8,350 tons of steel ingots, whilst the open-hearth furnace produced 2,116 tons."

A correspondent in China of the American Iron and Steel Association writes that, in addition to the Hanyang works, "there are several arsenals located at different places which produce open-hearth steel in very limited quantities. The best equipped plant is the one at Shanghai. It has splendid machinery for making the very heaviest guns, also for forged armor plate, having a press exactly like the one at Homestead, Pennsylvania, built by the same people. They have the very latest patterns of guns from Armstrong and Krupp."

India.—The total production of coal in India in 1897 was 4,063,127 gross tons, against 3,848,013 tons in 1896, 3,537,820 tons in 1895, 2,820,652 tons in 1894, and 2,562,001 tons in 1893. The principal coal mines in India are situated in Bengal.

Australasia.—The production of coal in 1897 in this division of the British Empire was as follows, in gross tons: Queensland, 358,407 tons; New South Wales, 4,383,591 tons; New Zealand, 840,713 tons; Victoria, 236,277 tons of coal and 3,918 tons of lignite; Tasmania, 48,501 tons: total, 5,871,407 tons.

South African Republic.—This new political division, formerly the Transvaal Republic, produced 1,494,798 metric tons of coal in 1896 and 1,625,892 tons in 1897.

+ *Dominion of Canada.*—The production of coal in the Dominion of Canada in 1898 is reported to have amounted to 3,725,585 gross tons, against 3,380,453 tons in 1897. The production of coke, all made in Nova Scotia and British Columbia, amounted to 64,682 gross tons in 1898, against 54,184 tons in 1897. The production of iron ore in 1898 was 51,929 gross tons, against 45,272 tons in 1897. The figures for 1898 are all subject to revision.

The production of pig iron in the Dominion of Canada in 1898, as ascertained from the manufacturers by the American Iron and Steel Association, was 68,755 gross tons, against 53,796 tons in 1897. The production of open-hearth and Bessemer steel in Canada in 1898, as ascertained by the same authority, was 21,540 gross tons, against 18,400 tons in 1897. The production of all kinds of iron and steel rolled into finished forms, excluding

muck and scrap bars, billets, etc., but including cut nails and cut spikes, amounted to 90,303 gross tons in 1898, against 77,021 tons in 1897 and 75,043 tons in 1896.

Canada now has 9 completed blast furnaces, 17 rolling mills, one Bessemer plant, and one open-hearth steel plant. A new charcoal furnace was virtually completed at Deseronto, Ontario, late in 1898 and blown in on January 25, 1899.

The imports of pig iron into Canada in the fiscal year ending June 30, 1898, amounted to 35,812 tons, of which 2,009 tons were charcoal pig iron and 33,803 tons were other grades. In 1897 the imports of pig iron amounted to 25,650 tons, of which 2,622 tons were charcoal and 23,028 tons were other grades.

Fuller details of the iron and steel industries of Canada will be found on pages 63 and 64 of this Report.

Newfoundland.—The production of iron ore in Newfoundland in 1897 amounted to 58,940 gross tons, against 38,450 tons in 1896. Newfoundland is not embraced in the Dominion of Canada.

Brazil.—A large part of the manganese ore which is now imported into the United States comes from Brazil. Deposits are found in the States of S. Paulo, Minas Geraes, and Matto Grosso, but the only mines in operation are in Minas Geraes. About 95 per cent. of the manganese exported from Brazil is obtained at the mines of Carlos Wigg, near Miguel Burnier, in Minas. The Carnegie Steel Company has taken most of the product of these mines for several years, but a cargo has recently been delivered at Fleetwood, England.

Bolivia.—Tin mines, producing tin ore of good quality, have been opened on the eastern cordillera of the Andes mountains. There are no trustworthy statistics of production.

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