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American Iron and Steel  
Association.

Statistics of the American  
and foreign iron trades ...  
Annual statistical report o



STATISTICS  
OF THE  
AMERICAN AND FOREIGN IRON TRADES  
FOR 1890.

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ANNUAL STATISTICAL REPORT  
OF THE  
AMERICAN  
IRON AND STEEL ASSOCIATION,

CONTAINING  
COMPLETE STATISTICS OF THE AMERICAN IRON TRADE FOR  
1890 AND PRECEDING YEARS, AND A BRIEF REVIEW  
OF ITS PRESENT CONDITION; ALSO THE LATEST  
STATISTICS OF THE IRON INDUSTRY  
OF FOREIGN COUNTRIES.

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PRESENTED TO THE MEMBERS, APRIL 15, 1891.

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PHILADELPHIA :  
THE AMERICAN IRON AND STEEL ASSOCIATION,  
No. 261 SOUTH FOURTH STREET.  
1891.

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## LETTER TO THE PRESIDENT.

HON. B. F. JONES,

*President of The American Iron and Steel Association, Pittsburgh, Pa.*

DEAR SIR: I submit herewith the Annual Statistical Report of this Association for the year 1890. The Report is confined almost entirely to the statistics of our iron and steel and allied industries in the year mentioned and in immediately preceding years, and to like statistics for foreign countries so far as they have been received. In the Annual Report which appeared a year ago a large number of tables were given which showed the production and prices of iron and steel in the United States, the production of iron ore, immigration statistics, railroad mileage, imports and exports of iron and steel, etc., for a long series of years, and it has not been deemed necessary to reproduce these tables in the present Report. Our Iron and Steel Necrology, which was first introduced into the Annual Report for 1887, has been continued in the following pages.

The editorial, statistical, and clerical work of the Association during the past year has been more than usually arduous and exacting. During the year 1890 the Bulletin appeared regularly, and in addition there were published the usual Annual Statistical Report, a statistical souvenir of the visit of the Iron and Steel Institute and Continental metallurgists and engineers to our country, several tariff tracts, and an exhaustive digest of the metal schedule of the new tariff which became a law on the 1st day of October. In addition to my own duties these various publications imposed a great deal of labor on our small clerical force, which is also required from day to day under my direction to dispose of a constantly increasing miscellaneous correspondence, much of which relates to applications for information.

In addition to the statistical and other work above referred to a great deal of attention was given during the past year to the question of tariff revision, which was one of the first subjects to be considered by the Congress which was elected in 1888 and which met for the first time on the first Monday in December, 1889. The deliberations of Congress on this subject finally resulted in the passage of the tariff act known as the McKinley Bill, which was signed by the President on the 1st day of October last and went into effect on the 6th day of the same month. During the long period in which this measure received the consideration of Congress the views of this Association concerning the proper framing of the metal schedule of the new tariff were frequently solicited and were promptly given. This schedule as it was finally adopted is, in my judgment, the most harmonious and the most completely protective of all the metal schedules that have ever formed a part of our tariff legislation, notwithstanding the fact that it embodies many reductions in duties. But these reductions, which would have been dis-

astrous ten or twenty years ago, our iron and steel industries can now afford to accept. Upon the other hand a few duties in the metal schedule of the old tariff which were too low to be protective have been increased in the new tariff, and many duties in the old tariff were left unchanged in the new tariff. Our iron and steel manufacturers have reason to be thankful that the new tariff adequately protects their interests from injurious foreign competition, and also adequately protects all other American interests. It is working admirably.

A most interesting event of the past year was the visit to this country of the Iron and Steel Institute, the *Verein deutscher Eisenhüttenleute*, and other representatives of the iron and steel industries of Europe. This is not the place for a detailed and adequate report of this visit, but it may be said that our European guests, numbering almost five hundred, were most courteously and hospitably received and entertained by our iron and steel manufacturers and iron-ore producers, and that the amplest facilities were afforded them to inspect our native resources and our mechanical appliances for the manufacture of iron and steel in all their forms. Wherever they went they were heartily welcomed. The American Iron and Steel Association did not formally participate in their entertainment or in any of the courtesies extended to them, but its large number of members everywhere joined zealously and participated liberally in all the duties which a visit of such importance and significance imposed.

The membership of the Association does not materially change from year to year. For very many years it has embraced over 300 firms and companies, and this number remains on our books. All the iron and steel manufacturers of the country, with scarcely an exception, cordially respond to our calls for statistical information, and all share the benefits of our statistical and other work, and it would therefore seem to be only natural and proper that all should be members of the Association and contribute to its treasury. I commend this subject to the attention especially of all newly-organized firms and companies.

The financial condition of the Association continues satisfactory, although I will frankly say that if our receipts were larger than they are we could do more work than we do, particularly educational tariff work. On January 1, 1890, the balance in the hands of the Treasurer, Andrew Wheeler, was \$3,856.07; the receipts during the year amounted to \$17,246.88; the expenditures amounted to \$16,889.24; and the balance on hand at the close of the year was \$4,213.71.

In the collection of the statistics for 1890 and in the general clerical work of the office for the past year I have again had the assistance of Mr. WM. M. BENNEY and Mr. WM. G. GRAY. For other assistance in the preparation of the present Report acknowledgment is thankfully made in its pages. To all iron and steel manufacturers my thanks are tendered for continued confidence and encouragement.

I am, Sir, Very Respectfully,

JAMES M. SWANK, *General Manager.*

No. 261 SOUTH FOURTH STREET, PHILADELPHIA, April 15, 1891.



## IRON AND STEEL NECROLOGY.

FROM APRIL, 1890, TO APRIL, 1891.

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(1890.) Dr. Ryland T. Brown, chemist and geologist, at Indianapolis, Ind., May 2d, aged 82 years, 6 months, and 25 days.—Colonel James W. Sloss, the pioneer iron manufacturer of Birmingham, Ala., at Birmingham, May 4th, aged about 70 years.—James Nasmyth, inventor of the steam hammer, at London, England, May 7th, in his 82d year. He was born in Edinburgh, Scotland, August 19, 1808.—Dr. Frank King, owner of the Van Buren Furnace, near Woodstock, Va., May 11th. He was a native of Massachusetts.—W. W. Thurston, president of the Bethlehem Iron Company, at London, England, May 13th, in his 39th year. He was born on April 25, 1852.—Henry Swindell, Sr., head of the Swindell Construction Company, residing in Allegheny City, Pa., May 23d.—John T. Davis, general superintendent of the Diamond State Iron Company, at Wilmington, Del., May 28th, aged 64 years. He was born at Bristol, England, on April 4, 1826.—Francis C. Lowthorp, once a prominent civil engineer and inventor, at Trenton, N. J., June 1st, aged 81 years.—Paul Wick, one of the founders of the Youngstown Rolling Mill Company and the Ohio Iron and Steel Company, at Youngstown, Ohio, June 13th, in his 66th year. He was born at Youngstown on October 1, 1824.—Joseph Reeves, for sixty years connected with the Cumberland Nail and Iron Company, at Bridgeton, N. J., June 14th, aged 83 years.—James A. Richards, prominently identified with the iron industry of Eastern Pennsylvania, at South Chester, Pa., July 5th, on the eve of his 64th birthday. He was born in Berks county, Pa.—Reuben Miller, Jr., connected with the pioneer iron industries of Allegheny county, Pa., at Allegheny City, August 13th, aged 85 years. He was born near Philadelphia on June 24, 1805.—Thomas G. Boyle, of Allegheny City, Pa., a member of the firm of Gordon, Strobel & Laureau, of Philadelphia, drowned at Brigantine Beach, N. J., August 29th, aged 30 years.—Capt. Charles William Greene, Secretary of the Ohio Iron Company, at Zanesville, Ohio, August 29th, aged 49 years. He was born near Ironton, Ohio, on March 20, 1841.—Charles E. Haven, a director of the Crane Iron Company and the originator of the Catasauqua Manufacturing Company, at York Harbor, Me., September 16th, aged about 75 years.—Robert Dunbar, mechanical engineer and proprietor of the Eagle Iron Works, at Buffalo, N. Y., September 18th, aged 77 years.—John Brawley, for thirty years superintendent of the Cambria Iron Company's mines in Blair and Cambria counties, Pa., at Hollidaysburg, Pa., October 1st, aged about 70 years.—Samuel Livingston Mather, one of the pioneers in the development of the Lake Superior iron-ore district, at Cleveland, October 8th, aged 73 years. He was born at Middletown,

Conn.—Harvey F. Bollman, one of the pioneers in Pittsburgh's iron development, at Pittsburgh, October 20th, in his 84th year. He was born in Philadelphia.—Charles Wetherill Keim, secretary and treasurer of the Consolidation Coal Company, of Maryland, at Baltimore, October 21st, aged nearly 54 years. He was born at Reading, Pa., November 2, 1836.—William Holliday, who for twenty-one years, from 1861 to 1882, had charge of the manufacture of heavy guns for the United States Government at the South Boston Iron Works, at Boston, October 26th, aged 58 years.—Robert H. Lewis, well known in the Western iron trade, at Cleveland, Ohio, October 27th, aged 51 years.—John W. Clarkson, for nearly twenty years the representative in New York of Morris, Wheeler & Co. and the Pottstown Iron Company, on October 29th.—Robert Nelson Gere, largely interested in the manufacture of iron and salt at Syracuse, N. Y., in that city, November 7th, aged 68 years. He was born at Florida, N. Y.—William McIlvain, senior member of the firm of William McIlvain & Sons, of Reading, manufacturers of boiler plate, at Reading, November 9th, in his 84th year.—General Jacob W. Hoysradt, one of the original stockholders of the Hudson Iron Company, at Hudson City, N. Y., November 15th, in his 67th year. He was born on March 8, 1824.—Hon. Henry M. Watts, once prominently identified with the manufacture of pig iron in Pennsylvania, at Philadelphia, November 30th, in his 86th year. He was born at Carlisle, Pa., on October 10, 1805.—Charles F. Berwind, president of the Berwind-White Coal Company, at Philadelphia, December 4th, in his 45th year. He was born on April 1, 1846.—Cyrus Butler, for many years identified with the iron interests of the Hudson River Valley, at New York City, December 8th, in his 62d year. He was born at Norwalk, Ohio, on July 13, 1829.—George S. Douglass, treasurer of the Iowa Barb Wire Company, of Allentown, Pa., at New York, December 16th, in his 34th year. He was born in Brooklyn, N. Y., on May 25, 1857.—Selah Chamberlain, railroad contractor and largely interested in the development of the Lake Superior iron-ore mines, at Cleveland, December 27th, aged 78 years.—Edward Hoopes, one of the founders of the firm of Hoopes & Townsend, bolt and nut manufacturers, of Philadelphia, at Philadelphia, December 31st, aged 75 years.—Edward L. Griffin, treasurer of the Fall River Iron Works Company, at Fall River, Mass., December 31st, aged 38 years.—William A. Blodgett, formerly an iron merchant of Boston, at Woburn, Mass., in December, aged 61 years.—Col. W. H. Paine, civil engineer, and one of the engineers of the Brooklyn Bridge, at Cleveland, December 31st, aged about 63 years. He was born at Chester, N. H., in 1828. (1891.) Israel L. Boyer, at one time engaged in the manufacture of iron at Liberty Forge, at Mechanicsburg, Pa., January 4th, in his 74th year. He was born in Berks county, Pa., on July 17, 1817.—James K. Verner, for many years secretary and selling agent of the Pittsburgh Forge and Iron Company, at Pittsburgh, January 14th, in his 40th year.—Daniel O. Hitner, at one time one of the prominent pig-iron manufacturers of the Schuylkill Valley, at Spring Mill, Montgomery county, Pa., January 21st, aged 76 years. He was born at Pottstown, Pa., on

January 15, 1815.—Nahum Stetson, Jr., the New York agent of the Bridgewater Iron Company, at New York City, January 20th, aged 55 years. He was a native of Bridgewater, Mass.—Charles W. Matthews, a well-known iron merchant of Philadelphia, in Philadelphia, January 23d, aged nearly 55 years. He was born in Philadelphia on April 12, 1836.—Robert Forester Mushet, without whose triple compound of iron, carbon, and manganese the Bessemer process for making steel could not have been successful, at Cheltenham, England, January 29th, in his 80th year.—Joshua L. Pusey, president of the Pusey & Jones Company, iron shipbuilders, at Wilmington, Del., February 8th, aged over 70 years.—Isaac Fegely, president of the Warwick Iron Company, at Pottstown, Pa., February 17th, aged 65 years. He was born in Berks county, Pa., on December 25, 1825.—William F. Potts, of the firm of W. F. Potts, Son & Co., iron merchants, at Philadelphia, March 7th, in his 77th year. He was born in Philadelphia on March 20, 1814.—Nathaniel Ferguson, for many years prominently identified with the iron industry of Pennsylvania, at Reading, Pa., March 10th, aged 74 years.—General Langhorne Wister, for a number of years extensively engaged in the manufacture of iron in Perry county, Pa., at Germantown, Philadelphia, March 19th, in his 57th year. He was born at Germantown, on September 20, 1834.—Wistar Morris, one of the founders of the wrought-iron pipe firm of Morris, Tasker & Co., of Philadelphia, at Overbrook, a suburb of Philadelphia, March 23d, in his 75th year.—W. J. McTighe, secretary and treasurer of the McClure Coke Company, at Pittsburgh, March 25th, aged 43 years.—Peter W. Sheaffer, geologist, and a leading coal operator in the Schuylkill Valley of Pennsylvania, residing at Pottsville, at Brown's Mills, N. J., March 26th, aged nearly 72 years. He was born on March 31, 1819.—J. H. Buckingham, secretary and general manager of the Chicago Steel Works, at Lansing, Mich., April 5th.—Captain Thomas H. Lapsley, one of the first employes of the Cambria Iron Company at Johnstown, and connected with the Edgar Thomson Steel Works since their erection, at Braddock, Pa., April 5th, aged 72 years. He was born at Pine Creek, Allegheny county, Pa., in 1819.—George Small, president of the Ashland Iron Company, of Baltimore county, Md., at Baltimore, April 11th, aged 50 years.—Colonel S. B. Lowe, one of the pioneers in establishing the iron industry in the South, at Chattanooga, Tenn., April 13th, aged about 63 years. He was born in Connecticut, but had lived in the South nearly all his life. In 1861 Mr. Lowe undertook the erection of the first rolling mill in Chattanooga.



# STATISTICS OF THE AMERICAN IRON TRADE FOR 1890.

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## GENERAL REVIEW OF THE DOMESTIC IRON TRADE.

THE year 1890 was all in all the year of greatest production in the history of the American iron trade. The production of pig iron was phenomenal in its magnitude, and the aggregate production of steel was much the largest we have ever attained. Consumption in all lines fully kept pace with production until just before the close of the year, when a financial panic of serious proportions, originating in London in November as a result of unwise investments in South American speculations, and speedily communicated to this country, suddenly checked the demand for iron and steel and for many other manufactured products. In a little while there was a partial recovery from this sudden reaction, but during November and December and the first three months of the present year there has been a greatly reduced demand for pig iron, steel rails, and all other iron and steel products. There was an accumulation of pig-iron stocks at the close of the year and many furnaces were then blown out, while others have since been added to the idle list. The production of pig iron in the whole country during the first three months of the present year has been fully one-fifth less than the production in the last three months of 1890. In the steel-rail trade during the first quarter of the present year there has been almost complete stagnation. Many rail mills have been entirely idle a large part of the time, while the production of others has fallen very far below their normal capacity. Railroad managers very generally declined during these months to place orders for rails, even for early delivery. The demand for manufactured iron and steel in miscellaneous forms has not been so seriously interrupted as the demand for pig iron and rails.

As these pages go to press in the early days of April there is not noticeable any marked improvement in the demand for pig iron. The stocks of unsold pig iron at the close of the old year have undoubtedly been reduced, but it is significant that prices have also been reduced since the opening of the new year. In the steel-rail market there is a better outlook than existed a month ago. The

purchase in November last of the Allegheny Bessemer steel-rail plant by Mr. Carnegie and his partners, the consolidation early in March of the two large steel-rail plants at Scranton, and the good understanding existing among all the steel-rail manufacturers are influences which have combined to stiffen the prices of rails, so that railroad managers whose roads are in need of rails have nothing to gain by further delay in placing their orders. They are now placing them. The demand for iron and steel for structural purposes, particularly bridge building, continues fairly active, but current orders for locomotives and all kinds of railroad cars suffer greatly by comparison with the orders of a year ago.

The extraordinary character of the demand for pig iron in our country in 1890 was largely due to the increased demand for Bessemer steel, our production of which in that year was much larger than in any previous year, but it was also due in part to an increased demand for open-hearth steel and to the increased wants of foundries, machine shops, and iron rolling mills. The demand for Bessemer steel rails was much more active in 1890 than in 1889, which will account for a part of the increased production of ingots, but there was also an increased demand for both Bessemer and open-hearth steel for various other purposes for which either or both are used—for bridges, ships, buildings, and other structural purposes; for plates, sheets, axles, springs, forgings, castings, machine tools, other tools, etc. There was a greatly increased demand in 1890 for iron and steel plates, and for iron and steel in other forms, to be used in the construction of iron and steel ships for the merchant service and of steel ships and other vessels for the new American navy. Outside of the above demands there was an extraordinary demand for pig iron for all the purposes for which iron and steel are generally used, and for many new uses to which they have in late years been applied, such as the construction of electrical machinery and the equipment of the cable system of street-car lines. The locomotives, cars, and car wheels required by our vast railroad system consumed in 1890 an immense quantity of pig iron and of the finished forms of iron or steel made from it. That the demand for domestic pig iron can not always be maintained at the same rate as that which prevailed in 1890 we already know, for production and consumption in 1891 are certain to be less than in 1890, but it may be regarded as also certain that our production in the years that are not far distant will more frequently exceed than fall below that of 1890.

And the same prediction may safely be made of Bessemer and open-hearth steel. We are pre-eminently an iron and steel consuming people, and our population is rapidly increasing.

The extraordinary production of iron and steel in this country in 1890 naturally called for a greatly increased supply of iron ore, coal, and coke. The increased demand for iron ore and coke may be fairly measured by the increased production of pig iron and of rolled iron and steel. During the year the supply of natural gas for rolling mills and steel works failed in many places, and there was also from this cause an increased demand for raw coal, so that two influences combined to increase the demand for this raw material. There appears to be no doubt that the future supply of natural gas in this country for all purposes will be much less than it has been. The consumption of iron ore by the whole country in 1890 was probably about 18,000,000 gross tons. The shipments of Connellsville coke in 1890 amounted to 6,221,518 net tons; of Pocahontas Flat Top coke to 433,319 net tons.

The mileage of new railroad built in the United States in the last four years is reported to us by the publishers of Poor's *Manual* to have been as follows: 12,985 miles in 1887; 7,028 miles in 1888; 5,756 miles in 1889; and 6,344 miles in 1890. There were 588 more miles of track laid in 1890 than in 1889.

There never was such an active year in the building of locomotives in this country as 1890, the number built being much greater than in 1889. It has been ascertained that sixteen firms built 1,860 locomotives in 1889 and that fourteen firms built 2,213 locomotives in 1890. Other firms are known to have been very busy in the latter year. The number of locomotives built by the Baldwin Locomotive Works in 1889 was 827, which was regarded at the time as a remarkable achievement, but in 1890 the number built by these works was 947. The Schenectady Locomotive Works were the next largest builders in 1890, the number built in that year by these works being 337, which is said to have been an increase upon the number built in 1889 of 53 per cent.

As with locomotives so also with iron and steel ships. We built more iron and steel ships for our merchant marine in 1890 than in any previous year, and the vessels built averaged a much larger tonnage than those built in previous years. The year 1889 was a year of large aggregate tonnage, but 1890 much exceeded it in both the number and tonnage of vessels built. The number of vessels built in the fiscal year 1889 was 48, while the number built

in the fiscal year 1890 was 63. The largest number built in any fiscal year previous to 1889 was 48 in 1885. Many of the vessels built in 1889 and 1890 were built at shipyards on the great lakes.

The year 1890 was an anomalous one for our iron and steel manufacturers in its relation to prices, as it was also for manufacturers of other products. The production and consumption of all leading articles of iron and steel, except steel rails, were not only much larger in 1890 than in any preceding year but prices steadily receded from January to December. Many other manufactured products were produced and sold in exceptionally large quantities but at declining prices. About the beginning of the year prices also began to decline in Europe. It has usually been the experience of manufacturers that prices fall with a decreased demand and rise when the demand increases. The experience of many American manufacturers in 1890 was of a precisely opposite character. One explanation of the change is doubtless found in the fact that our productive capacity in all leading manufacturing industries is now so large that we are able to meet any extraordinary consumptive demands without creating that scarcity in supply which is essential to a rise in prices. The day for exciting booms in any American manufactured product seems to be over.

The season prices of Lake Superior iron ore which were established early in 1890 were maintained all through the year, except just before its close, when concessions were made on new contracts. Such contracts as have been made for the present season have been at prices fully one dollar per ton below the prices ruling in 1890.

The price of Connellsville coke was advanced on November 1, 1889, from \$1.50 to \$1.75 per ton of 2,000 pounds, free on board cars at the ovens, which price continued to rule until February 10, 1890, when it was further advanced to \$2.15 per ton. This price was maintained until the close of the year, but on the 1st of January, 1891, it was reduced to \$1.90 per ton. On the 9th of February a general strike of Connellsville miners and coke workers interfered with further production until the present time, and prices for such coke as could be obtained have not been uniform.

Although prices of iron and steel continued to shrink throughout 1890 no attempt was made to reduce wages until about the close of the year, when in some instances a reduction of about 10 per cent. was made. This action naturally followed after the occurrence of the English panic and the business reaction early in November. Since the opening of the new year reductions previ-



ously made have been continued, and others have been made necessary by the increased dullness in trade.

There were few strikes or other difficulties in the iron trade or related industries during 1890. Toward the close of the year, however, two notable strikes for increased wages occurred. About the 1st of December several thousand coal miners and coke workers in Alabama demanded an advance in wages, which was refused and a general strike was ordered, which lasted until the middle of January, when the men returned to work at the old wages. During the strike many blast furnaces were banked or blown out. On the last day of the old year several hundred Hungarians and others employed at the Edgar Thomson blast furnaces struck for an increase in wages, which was refused, whereupon a riot was precipitated by the strikers on the 1st of January, who undertook to prevent other workmen from taking care of the furnaces. One innocent man was killed and others were seriously injured. Several of the furnaces were banked. In the end order was restored but wages were not advanced.

Since the beginning of the present year the most serious labor difficulty that has occurred has been in the Connellsville coke region, where a general refusal by the miners to accept a reduction of 10 per cent. in their wages, coupled with a demand for an increase of 12½ per cent., resulted in a strike of 10,000 miners on the 9th of February, which was speedily followed by a strike of other miners and by the refusal of several thousand coke workers to longer work at the ovens. Nearly all the coke ovens in the district have since been idle, and as a consequence the supply of coke for blast furnaces has been greatly curtailed, and many furnaces from this cause alone have been banked or blown out.

While the liquidations which have been made compulsory by the panic of last November are yet productive of much individual hardship all signs indicate that the financial disturbances of six months ago have about spent their force.

#### AVERAGE MONTHLY PRICES OF IRON AND STEEL.

We present below a table of the average monthly prices at two principal markets in the United States of nine leading articles of iron and steel from January 1, 1888, to April 11, 1891, averaged from weekly quotations, except for April. The prices are per ton of 2,240 pounds, except for bar iron and nails, which are quoted by the pound and the keg respectively, the keg holding 100 pounds.

Months.	Old iron T rails, at Philadelphia.	No. 1 anthracite foundry pig iron, at Philadelphia.	Gray forge pig iron, at Philadelphia.	Gray forge pig iron, Lake ore mixed, at Pittsburgh.	Bessemer pig iron, at Pittsburgh.	Steel rails, at mills in Pennsylvania.	Best refined bar iron, from store, Philadelphia.	All muck bar iron, at Pittsburgh.	Cut nails, (gross price,) at Pittsburgh.
January, '88	\$21.75	\$21.00	\$16.75	\$17.00	\$18.10	\$31.50	2.20c.	1.85c.	\$1.90
February....	22.00	20.75	17.00	16.75	17.80	31.50	2.20c.	1.80c.	1.90
March.....	21.50	20.50	17.00	16.50	17.35	31.50	2.10c.	1.80c.	1.90
April.....	21.50	19.75	16.50	15.65	17.25	31.50	1.95c.	1.75c.	1.90
May.....	21.75	18.50	16.00	15.50	16.55	31.00	1.90c.	1.75c.	1.90
June.....	21.00	18.00	15.75	15.25	16.65	30.00	1.85c.	1.70c.	1.90
July.....	21.25	18.00	15.75	14.75	17.10	30.00	1.90c.	1.70c.	1.90
August.....	21.00	18.00	15.75	15.00	17.15	29.00	1.90c.	1.70c.	1.90
September...	23.25	18.00	16.00	16.25	17.95	28.50	2.00c.	1.80c.	1.90
October.....	23.75	18.00	16.00	16.50	18.00	28.00	2.10c.	1.80c.	1.90
November...	24.00	18.00	16.00	16.50	17.50	27.50	2.00c.	1.80c.	1.90
December...	24.00	18.00	16.00	16.25	17.15	28.00	2.00c.	1.80c.	1.90
January, '89	23.50	18.00	15.50	15.50	16.75	27.50	2.00c.	1.75c.	1.90
February....	23.50	18.00	15.25	14.75	16.35	27.50	1.90c.	1.70c.	1.90
March.....	23.50	18.00	15.25	15.00	16.50	27.50	1.80c.	1.65c.	1.90
April.....	23.50	17.35	15.00	14.25	16.25	27.50	1.80c.	1.65c.	1.90
May.....	22.75	17.00	14.75	14.00	16.00	27.00	1.85c.	1.60c.	1.85
June.....	22.50	17.25	14.90	14.00	16.00	27.50	1.90c.	1.60c.	1.85
July.....	22.75	17.25	15.00	14.15	16.35	28.00	1.90c.	1.60c.	1.90
August.....	23.50	17.50	15.25	14.90	17.50	28.00	1.95c.	1.72c.	1.90
September...	25.00	17.50	15.25	15.50	18.00	29.50	1.95c.	1.75c.	1.95
October.....	26.00	17.50	15.60	16.60	20.75	32.00	2.00c.	1.80c.	2.25
November...	26.50	18.50	16.75	17.25	21.75	34.00	2.05c.	1.80c.	2.25
December...	27.25	19.25	17.25	18.25	23.75	35.00	2.15c.	1.90c.	2.30
January, '90	27.50	19.90	17.90	18.00	23.60	35.25	2.20c.	1.90c.	2.40
February....	27.25	19.50	17.38	18.00	22.55	35.00	2.20c.	1.90c.	2.35
March.....	25.25	19.25	17.00	17.00	20.25	34.00	2.10c.	1.85c.	2.25
April.....	23.85	18.25	16.10	15.35	17.85	33.50	2.10c.	1.85c.	2.00
May.....	23.25	18.00	15.65	15.25	17.55	31.35	2.10c.	1.75c.	1.90
June.....	24.50	18.00	15.50	15.25	19.00	31.50	2.00c.	1.80c.	1.95
July.....	25.00	18.00	15.25	15.25	18.62	31.50	1.90c.	1.80c.	1.90
August.....	25.00	18.00	15.10	15.25	18.10	31.25	1.95c.	1.85c.	1.85
September...	25.50	18.00	15.00	15.25	18.00	30.50	2.00c.	1.85c.	1.85
October.....	25.50	18.00	15.00	15.00	17.35	30.00	2.00c.	1.85c.	1.85
November...	25.10	18.00	15.00	15.00	17.00	29.00	2.00c.	1.85c.	1.80
December...	24.50	18.00	15.00	14.75	16.60	28.50	2.00c.	1.85c.	1.80
January, '91	23.50	17.50	14.50	14.25	15.95	29.00	2.00c.	1.80c.	1.65
February....	23.35	17.50	14.50	14.50	16.25	30.00	1.90c.	1.75c.	1.65
March.....	22.50	17.50	14.75	15.00	16.50	30.00	1.90c.	1.75c.	1.65
April 11th...	22.50	17.50	14.75	14.25	15.75	30.00	1.90c.	1.75c.	1.60

## AVERAGE YEARLY PRICES OF IRON AND STEEL.

The following table gives the average yearly prices of the articles mentioned in the preceding table for the years 1886, 1887, 1888, 1889, and 1890. The prices are per ton of 2,240 pounds, except for bar iron and nails, which are quoted by the hundred pounds and the keg respectively.

Articles.	1886.	1887.	1888.	1889.	1890.
Old iron T rails, at Philadelphia.....	\$21.42	\$22.97	\$22.23	\$24.19	\$25.18
No. 1 anthracite foundry pig iron, at Philada..	18.71	20.92	18.88	17.75	18.40
Gray forge pig iron, at Philadelphia.....	16.40	17.79	16.21	15.48	15.82
Gray forge pig iron, Lake ore mixed, at Pitts..	16.58	19.02	15.99	15.37	15.78
Bessemer pig iron, at Pittsburgh.....	18.96	21.37	17.38	18.00	18.85
Steel rails, at mills in Pennsylvania.....	34.50	37.08	29.83	29.25	31.75
Best refined bar iron, from store, Philadelphia..	1.92	2.20	2.01	1.94	2.05
All muck bar iron, at Pittsburgh.....	1.70	1.95	1.77	1.71	1.85
Cut nails, (gross price,) at Pittsburgh.....	2.17	2.15	1.90	1.99	1.99

## PRICES OF LAKE SUPERIOR IRON ORE.

It has been the rule for the Lake Superior iron-ore companies to fix the season prices of iron ore very early in the year. In late years, however, this rule has been as much honored in the breach as in the observance. In 1888 season prices were not fixed until May, and in April of the present year few contracts have been made. We give below the prices at which Lake Superior iron ore has been sold during the last seven years for season contracts, delivered at Cleveland and neighboring ports on Lake Erie. The figures given for 1891 relate to sales made in March, but they do not cover purchases made by any large consumers of ore. It is not expected that any large sales will be made until May.

Districts.	1885.	1886.	1887.	1888.	1889.	1890.	1891.
Republic and Champion No. 1	\$5.75	\$6.25	\$7.00	\$5.75	\$5.50	\$6.50	\$5.50
Barnum, Cleveland, and Lake							
Superior specular No. 1.....	5.00	5.50	6.50	5.25	5.00	6.00	5.00
Chapin and Menominee No. 1.	4.75	5.25	6.00	4.75	4.50	5.50	4.25
Vermillion district, No. 1 Bes-							
semer.....	5.00	5.75	6.75	5.75	5.50	6.50	5.50
Gogebie district, first quality							
Bessemer.....	5.00	5.00	6.00	4.75	5.00	6.00	4.75
Hematites No. 1 non-Bessemer	4.00	4.50	5.00	4.00	3.75	4.50	3.75

It will be seen from the above table that March prices in 1891 are almost the same as those which prevailed in the spring of 1889; in some instances they are lower.

## STATISTICAL SUMMARY OF THE DOMESTIC IRON TRADE IN 1890.

In the following table we give the statistics of the production of leading articles of iron and steel in the United States in 1890 and in the three preceding years. All products are given in net tons of 2,000 pounds, except nails, which are given in kegs of 100 pounds. (The net ton has been used by the United States Census Office in 1870, 1880, and 1890.)

Net tons of 2,000 pounds. (Except nails.)	1887.	1888.	1889.	1890.
Pig iron, including spiegel.	7,187,206	7,268,507	8,516,079	10,307,028
Spiegeleisen .....	47,598	54,769	85,823	149,162
Bessemer steel ingots.....	3,288,357	2,812,500	3,281,829	4,131,535
Bessemer steel rails .....	2,354,132	1,552,631	1,691,264	2,091,978
Open-hearth steel ingots...	360,717	352,036	419,488	574,820
Open-hearth steel rails.....	19,203	5,261	3,346	4,018
Crucible steel ingots.....	84,421	78,713	84,969	79,716
Rolled iron, except rails...	2,565,438	2,397,402	2,576,127	2,804,829
Rolled steel, except rails...	902,156	1,201,885	1,584,364	1,829,247
Iron rails .....	23,062	14,252	10,258	15,548
Pig, scrap, and ore blooms	43,306	39,875	36,260	30,783
Kegs of iron cut nails.....	3,419,578	2,170,107	1,778,082	1,806,130
Kegs of steel cut nails.....	3,489,292	4,323,484	4,032,676	3,834,816
Kegs of wire nails.....	1,250,000	1,500,000	2,435,000	3,135,911
Iron and steel wire rods.....		313,341	407,513	511,951

The total production of pig iron in 1890 was 10,307,028 net tons of 2,000 pounds, or 9,202,703 gross tons of 2,240 pounds. It was 1,599,061 gross tons larger than that of 1889—an increase of over 21 per cent. That the full significance of this increase may be realized it is necessary to add that the production of 1889 was itself 1,247,572 net tons, or 1,113,904 gross tons, larger than that of 1888—an increase of over 17 per cent. The production of 1890 was more than 41 per cent. larger than that of 1888. It was about 1,200,000 gross tons larger than that of Great Britain in the same year, and it was over 600,000 gross tons larger than that of Great Britain in 1882, which was its year of greatest production. Our production of pig iron in 1890 was larger for the first time than that of our European rival.

There was a large increase in our production of spiegeleisen and ferro-manganese in 1890, the production in that year being 149,162 net tons, against 85,823 tons in 1889, 54,769 tons in 1888, and 47,598 tons in 1887. The large increase in the last two years, and

particularly in 1890, is due in part to an increase in our imports of manganiferous iron ores and in part to greater industry than had previously prevailed in searching for native manganiferous iron-ore deposits.

The total production of Bessemer steel ingots in 1890 was the largest in our history, and very much the largest. It amounted to 4,131,535 net tons, or 3,688,871 gross tons, an increase of 758,667 gross tons, or nearly 26 per cent., over the production of 1889. In 1887 our production of Bessemer steel ingots was very slightly in excess of that of 1889, but in all other years, except 1890, it was less than in either 1887 or 1889. Great Britain's largest production of Bessemer steel ingots was in 1889, when it amounted to 2,140,793 gross tons.

The total production of Bessemer steel rails in 1890 was 2,091,978 net tons, or 1,867,837 gross tons, which was an increase of 23 per cent. on the production of 1889. The production in 1890 was the largest in our history except in the year 1887, when it amounted to 2,354,132 net tons, or 2,101,904 gross tons. The largest annual production of Bessemer steel rails by Great Britain was in 1882, when it amounted to 1,235,785 gross tons. The steadily increasing use of Bessemer steel in this country for purposes other than the manufacture of rails has frequently been referred to, but this use was more marked in 1889 and 1890 than in any preceding year. In these years nearly one-half of the Bessemer steel ingots we produced were converted into forms other than rails, our production of ingots in 1890 amounting to 3,688,871 gross tons and our production of rails amounting to 1,867,837 gross tons; whereas in all preceding years except 1889 very much more than one-half of our ingots were converted into rails.

Our production of open-hearth steel in 1890 was much larger than in any preceding year, but we still fall far below Great Britain's annual production of this kind of steel, which is largely used in her extensive shipyards. Our iron and steel shipbuilding industry is yet small, although it can not be said that it is in its infancy, while that of our great industrial rival is the first in the world.

Our table shows a steadily increasing production of rolled steel other than rails, the production of 1890 largely exceeding that of 1889. Our production of rolled iron in 1890 also largely exceeded that of 1889. The table also shows the steady advance of wire nails, which are nearly all made of steel; in the last two years they have even checked the production of steel cut nails.

## CONSUMPTION OF PIG IRON AND STEEL RAILS IN 1890.

Our consumption of pig iron in the last four years is approximately shown in the following table, in gross tons, the comparatively small quantity of foreign pig iron held in bonded warehouses and of domestic pig iron exported not being considered. The stocks of pig iron in pig-iron storage warrant yards which we give in the table include only the quantity held by others than the makers.

Pig iron—Gross tons.	1887.	1888.	1889.	1890.
Domestic production.....	6,417,148	6,489,738	7,603,642	9,202,703
Imported.....	467,522	197,237	148,759	134,955
Stocks on hand January 1...	225,629	301,913	300,144	283,879
Total supply.....	7,110,299	6,988,888	8,052,545	9,621,537
Deduct stocks December 31..	301,913	300,144	247,679	608,921
Also stocks in warrant yards.....			36,200	52,937
Approximate consumption	6,808,386	6,688,744	7,768,666	8,959,679

It will be observed that our consumption of pig iron in 1890 was not so large as our production. It will also be noticed that our imports of pig iron in the last three years have borne an insignificant relation to our total supply. The imports in 1889 and 1890 were mainly of spiegeleisen and ferro-manganese.

Our consumption of pig iron since 1874, calculated as above, with an allowance in some years for foreign stocks and domestic exports, has been as follows, in gross tons. The consumption in 1890 was more than four times as large as in any of the years 1875, 1876, or 1877.

Years.	Gross tons.	Years.	Gross tons.
1874.....	2,500,000	1883.....	4,834,740
1875.....	2,000,000	1884.....	4,229,280
1876.....	1,900,000	1885.....	4,348,844
1877.....	2,150,000	1886.....	6,191,354
1878.....	2,500,000	1887.....	6,808,386
1879.....	3,432,534	1888.....	6,688,744
1880.....	3,990,415	1889.....	7,768,666
1881.....	4,982,565	1890.....	8,959,679
1882.....	4,963,278		

Our consumption of steel rails in any year may be assumed to correspond almost exactly with the aggregate of the domestic production and the imports for that year. In 1890 our imports of both iron and steel rails amounted to only 204 gross tons, so that

the consumption in that year was virtually the same as the home production. The following table shows approximately, in gross tons, our consumption of Bessemer steel rails in the last four years.

Bessemer steel rails—Gross tons.	1887.	1888.	1889.	1890.
Production.....	2,101,904	1,386,278	1,510,057	1,867,837
Importation.....	137,588	63,016	6,202	204
Approximate consumption	2,239,492	1,449,294	1,516,259	1,868,041

#### SOUTHERN PROGRESS IN 1890.

The rapid development of the pig-iron industry in the Southern States in the last few years continues to attract attention. It is noticeable, however, that the progress made by these States in 1890, flattering and gratifying as it was, did not keep pace with that made in 1889, as will be made plain from the following table of production during the last six years.

States—Net tons.	1885.	1886.	1887.	1888.	1889.	1890.
Alabama.....	227,438	283,859	292,762	449,492	791,425	914,940
Tennessee.....	161,199	199,166	250,344	267,931	294,655	299,741
Virginia.....	163,782	156,250	175,715	197,396	251,356	327,912
West Virginia.....	69,007	98,618	82,311	95,259	117,900	144,970
Kentucky.....	37,553	54,844	41,907	56,790	42,518	53,604
Georgia.....	32,924	46,490	40,947	39,397	27,559	32,687
Maryland.....	17,299	30,502	37,427	17,606	33,847	165,559
Texas.....	1,843	3,250	4,383	6,587	4,544	10,865
North Carolina.....	1,790	2,200	3,640	2,400	2,898	3,181
Total.....	712,835	875,179	929,436	1,132,858	1,566,702	1,953,459

Nor did the progress of the Southern States in 1890 keep pace with that of some Northern States. The increased production of pig iron in Pennsylvania in 1890 over 1889 was 763,927 net tons. The next largest increase was in Illinois, with 184,204 net tons; followed by Ohio, with 173,598 tons; Maryland, with 131,712 tons; Alabama, with 123,515 tons; Wisconsin, with 87,603 tons; Virginia, with 76,556 tons; New York, with 72,134 tons; New Jersey, with 52,095 tons; Michigan, with 44,105 tons; West Virginia, with 27,070 tons; Colorado, with 20,910 tons; and Missouri, with 14,360 tons. The production of pig iron in Alabama in 1890 shows a much smaller increase, both absolutely and relatively, than in either of the two preceding years. Tennessee, Kentucky, Georgia, and North Carolina made only nominal progress in 1890.



The two Virginias made good progress. Maryland is hardly a Southern State in any respect, and in the production of pig iron it is not in any sense a Southern State, as its recent wonderful progress as a producer of pig iron is mainly due to the use of foreign ores, Pennsylvania fuel, and Northern capital. If Maryland's large production of pig iron in 1890 be eliminated from the above table it will be seen at a glance that the progress made by the South in the production of pig iron in that year fell very far below that of 1889, and that it shows a smaller percentage of growth in that year than that of the country taken as a whole. The strike among the coal miners in Alabama in December, 1890, is partly responsible for this adverse showing.

But, if the South did not make as rapid progress in the production of pig iron in 1890 as in 1889, that section of our country may be said to have added in that year an entirely new honor to its metallurgical achievements, namely, the manufacture of basic steel. Previous to 1890 the manufacture of steel by the basic process in the South had been undertaken in the open hearth by the Henderson Steel and Manufacturing Company at Birmingham, but in the year mentioned a more ambitious attempt to make steel by this process in the open hearth was undertaken at Chattanooga by the Southern Iron Company, and this attempt met with complete success. The first cast was made on September 15th. This company is now making basic steel from Southern pig iron in commercial quantities. Some of the steel made by it has been rolled into sheets, and these have been successfully coated with tin at the works of the St. Louis Stamping Company. Several other plants for the manufacture of basic open-hearth steel have been undertaken or projected in the Southern States. A plant is now completed and ready to be put in operation at Fort Payne, Alabama.

Now that the enterprising men of the South have turned their attention in earnest to the production of steel it is supposed that they will not neglect the opportunity which is offered to them by the passage of a new tariff bill to fully establish on Southern soil another industry which would assist in the consumption of Southern pig iron, and which has special claims to Southern recognition and encouragement, namely, the manufacture of cotton ties. The new tariff greatly increases the protective duty on this product. The South now makes small quantities of cotton ties, but it has every inducement to largely increase their production. It has all the raw materials that are required and it has a home market.



Simultaneously with the introduction in the South of a new industry which is expected to consume large quantities of its native iron ores in the production of steel our correspondents advise us of the virtual abandonment of all the Catalan forges in North Carolina and Tennessee, which have heretofore formed an interesting and picturesque feature of the Southern iron industry because of their association with primitive methods of ironmaking all the world over. Formerly there were many of these Catalan forges in the South and also in the North, but in late years the manufacture of iron by these primitive agencies has been entirely confined to Mitchell county in North Carolina and Johnson county in Tennessee. The direct process as it is still practiced in New York is a modern improvement upon the Catalan process. We are now informed that none of the old forges in Mitchell county are likely to be operated again, and that only one in Johnson county will make iron during the present year. Less than ten tons of bar iron were made in the few remaining Catalan forges of the South in 1890. The Southern Catalan forges die and the basic open-hearth steel process takes their place. Our sympathy goes to the old and dying process, which well served the people of this country in the early days. Among the treasures of our office is a piece of bar iron, made in a Catalan forge in Virginia, which has the ring of the best steel.

#### IMPORTS OF IRON AND STEEL.

The following table shows the foreign values of all our imports of iron and steel, including fire-arms, hardware, cutlery, anvils, chains, machinery, etc., for the calendar years from 1871 to 1890. The total foreign value of all our imports of iron and steel in these twenty years was \$901,473,833.

Years.	Values.	Years.	Values.	Years.	Values.
1871.....	\$57,866,299	1878.....	\$18,013,010	1885.....	\$31,144,552
1872.....	75,617,677	1879.....	33,331,569	1886.....	41,630,779
1873.....	60,005,538	1880.....	80,443,362	1887.....	56,420,607
1874.....	37,652,192	1881.....	61,555,077	1888.....	42,311,689
1875.....	27,363,101	1882.....	67,075,125	1889.....	42,027,742
1876.....	20,016,603	1883.....	47,506,306	1890.....	44,540,084
1877.....	19,874,399	1884.....	37,078,122		

We present below a table, compiled from the publications of the Bureau of Statistics of the Treasury Department, giving the quantities and values of our imports of iron and steel in 1890, compared with the quantities and values imported in 1889.

Articles—Gross tons of 2,240 pounds.	1889.		1890.	
	Quantities.	Values.	Quantities.	Values.
Pig iron.....	148,759	\$2,863,137	134,955	\$3,694,839
Scrap iron and scrap steel.....	38,157	481,381	56,273	840,687
Bar iron.....	29,570	1,097,132	24,034	1,002,480
Iron and steel rails.....	6,217	163,339	204	5,035
Cotton-ties, hoops, etc.....	20,815	630,950	15,100	521,451
Hoop, band, and scroll iron or steel....	14,020	783,506	6,077	344,325
Steel ingots, billets, blooms, slabs, etc....	72,809	1,989,837	28,636	1,578,286
Sheet, plate, and taggers' iron or steel...	7,032	444,456	9,041	649,449
Tinplates.....	331,311	21,726,707	329,346	23,670,158
Wire rods, of iron or steel.....	73,758	2,409,259	55,427	2,346,150
Wire and wire rope, of iron or steel.....	4,081	731,216	4,611	823,053
Anvils.....	1,400	179,254	1,390	167,691
Chains.....	621	77,618	584	101,571
Cutlery.....		2,362,530		2,381,726
Files, file blanks, rasps, and floats.....		69,157		137,755
Fire-arms.....		1,233,242		1,497,465
Machinery.....		2,829,633		2,590,348
Needles.....		279,244		285,361
All other.....		1,676,144		1,902,254
Total.....	748,550	\$42,027,742	665,678	\$44,540,084

The total foreign value of our imports of iron and steel in 1890 exceeded in value our imports in 1889 by \$2,512,342, although the weight of leading articles was much less in 1890 than in 1889. The total foreign value of our imports of iron and steel amounted to \$41,630,779 in 1886, \$56,420,607 in 1887, and \$42,311,689 in 1888. Our imports of the articles named in the above table the weights of which are recorded by the Government officials amounted in 1886 to 1,098,565 gross tons, in 1887 to 1,783,256 tons, and in 1888 to 914,940 tons. In both 1889 and 1890 there was a large decrease in the quantities of iron and steel imported.

Of the pig iron imported in 1889 and 1890 much the larger part was spiegeleisen and ferro-manganese, which pay duty as pig iron. The quantity of ferro-manganese and spiegeleisen entered at custom houses for consumption in the United States, for the use of our Bessemer and open-hearth steel manufacturers, amounted to 99,482 gross tons in 1889 and 101,167 tons in 1890.

#### EXPORTS OF IRON AND STEEL.

The value of the exports from the United States to all countries of domestic iron and steel and manufactures thereof in 1890 was \$27,000,134, against \$23,712,814 in 1889, \$19,578,489 in 1888, and \$16,235,922 in 1887. The figures for 1890 are very much the largest in our commercial history, and are very encouraging,

as were the figures for 1889. We are indebted to the Bureau of Statistics of the Treasury Department for the following details of the quantities and values of our exports of the articles above mentioned in the calendar years 1889 and 1890.

Commodities.	1889.		1890.	
	Quantities.	Values.	Quantities.	Values.
Pig iron.....Net tons.	15,202	\$227,048	18,302	\$266,107
Bar iron....."	872	52,341	1,196	97,317
Band, hoop, and scroll iron....."	15	993	7	545
Car-wheels.....No.	11,390	101,162	11,082	89,107
Castings, not elsewhere specified.....		432,621		931,288
Cutlery.....		105,245		127,199
Fire-arms.....		909,229		825,551
Steel ingots, bars, and rods.....Net tons.	45	5,642	172	19,423
Builders' hardware.....		1,838,615		2,077,005
Machinery.....		8,222,904		9,423,958
Cut nails and spikes.....Net tons.	5,898	282,458	6,721	329,495
Horseshoe and wire nails, etc....."	959	169,313	926	148,461
Iron plates and sheets....."	365	28,547	575	47,623
Steel plates and sheets....."	49	4,173	245	15,623
Printing presses, and parts of.....		277,800		304,448
Iron rails.....Net tons.	1,212	30,340	116	4,738
Steel rails....."	9,232	279,485	18,865	573,178
Saws and tools.....		1,975,131		1,830,632
Scales and balances.....		335,456		306,576
Sewing machines, and parts of.....		2,575,539		2,889,574
Fire-engines.....No.	7	10,939	2	2,362
Locomotives....."	187	1,586,746	137	1,037,404
Stationary engines....."	269	205,407	282	275,255
Boilers and parts of engines.....		422,223		632,513
Stoves, and parts of.....		274,739		231,828
Wire.....Net tons.	9,693	679,969	11,653	851,198
Other iron and steel manufactures.....		2,678,749		3,661,726
Total.....		\$23,712,814		\$27,000,134
Agricultural implements, additional.....		\$4,246,079		\$3,264,995

An examination of this table will show that our principal exports of the articles mentioned embrace machinery, hardware, sewing machines, saws and tools, locomotives, fire-arms, scales and balances, nails and wire, miscellaneous castings, and engines and boilers. In 1890 we shipped abroad much larger quantities of pig iron and steel rails than in preceding years, nearly all to our immediate neighbors on the American continent and in the West Indies. The high prices of iron and steel prevailing abroad in 1889 and in the early part of 1890 were a leading cause of the increased shipments of these two articles. Our extraordinary exports of 187 locomotives in 1889, however, fell to 137 in 1890.

The following table shows the volume of our export trade in iron and steel and manufactures thereof in the twenty calendar years from 1871 to 1890.

Years.	Values.	Years.	Values.	Years.	Values.	Years.	Values.
1871.....	\$14,185,359	1876.....	\$13,641,724	1881.....	\$18,216,121	1886.....	\$14,865,087
1872.....	12,595,539	1877.....	18,549,922	1882.....	22,348,834	1887.....	16,235,922
1873.....	14,173,772	1878.....	15,101,899	1883.....	22,716,040	1888.....	19,578,489
1874.....	17,312,239	1879.....	14,223,646	1884.....	19,290,895	1889.....	23,712,814
1875.....	17,976,833	1880.....	15,156,703	1885.....	16,622,511	1890.....	27,000,134

#### OUR ENORMOUS IMPORTS OF TINPLATES.

Great Britain has produced nearly all the tinplates that have been manufactured up to this time. The following table, compiled from the British Board of Trade returns, shows the exports of tinplates from Great Britain to the United States and to all other countries since 1870, in gross tons.

Years.	United States. Gross tons.	Other countries. Gross tons.	Total exports. Gross tons.	Years.	United States. Gross tons.	Other countries. Gross tons.	Total exports. Gross tons.
1870.....	75,373	24,478	99,851	1881...	179,843	63,538	243,381
1871.....	86,929	32,677	119,606	1882...	214,568	50,471	265,039
1872.....	87,360	30,723	118,083	1883...	212,724	56,651	269,375
1873.....	85,527	35,111	120,638	1884...	211,925	76,689	288,614
1874.....	91,424	31,536	122,960	1885...	223,820	74,566	298,386
1875.....	96,995	42,368	138,363	1886...	263,581	71,111	334,692
1876.....	90,233	42,331	132,564	1887...	268,355	85,151	353,506
1877.....	106,593	46,633	153,226	1888...	292,626	98,735	391,361
1878.....	108,123	47,117	155,240	1889...	336,689	93,961	430,650
1879.....	155,595	41,402	196,997	1890...	318,108	100,617	418,725
1880.....	164,167	53,551	217,718				

The following table, compiled from the publications of the Bureau of Statistics of the Treasury Department, shows the quantities of tinplates imported into the United States in each calendar year from 1871 to 1890, inclusive, with their foreign values.

Years.	Gross tons.	Values.	Years.	Gross tons.	Values.
1871.....	82,969	\$9,946,373	1881.....	183,005	\$14,886,907
1872.....	85,629	13,893,450	1882.....	213,987	17,975,161
1873.....	97,177	14,240,868	1883.....	221,233	18,156,773
1874.....	79,778	13,057,658	1884.....	216,181	16,858,650
1875.....	91,054	12,098,885	1885.....	228,596	15,991,152
1876.....	89,946	9,416,816	1886.....	257,822	17,504,976
1877.....	112,479	10,679,028	1887.....	283,836	18,699,145
1878.....	107,864	9,069,967	1888.....	298,238	19,762,961
1879.....	154,250	13,227,659	1889.....	331,311	21,726,707
1880.....	158,049	16,478,110	1890.....	329,346	23,670,158

The total quantity of tinplates imported into this country in these twenty years was 3,622,750 gross tons, and the total foreign value of these importations was \$307,341,404. In addition to this sum our people paid freights and duties and importers' profits.

THE UNITED STATES WILL SOON MAKE ITS OWN TINPLATES.

In framing the McKinley tariff bill, which is now a law, the last Congress provided for increased duties on tinplates and on articles made from them, to take effect on the 1st of July next, and public attention is now attracted by the prospect of this country being soon able to furnish a large part of its supply of tinplates, of which we consume annually a larger quantity than all the rest of the world. The new duties on tinplates, terne plates, taggers tin, and on articles made from them are as follows :

On and after July 1, 1891, all iron or steel sheets, or plates, or taggers iron coated with tin or lead or with a mixture of which these metals or either of them is a component part, by the dipping or any other process, and commercially known as tin plates, terne plates, and taggers tin, shall pay two and two-tenths cents per pound: *Provided*, That on and after July 1, 1891, manufactures of which tin, tin plates, terne plates, taggers tin, or either of them, are component materials of chief value, and all articles, vessels or wares manufactured, stamped or drawn from sheet-iron or sheet-steel, such material being the component of chief value, and coated wholly or in part with tin or lead or a mixture of which these metals or either of them is a component part, shall pay a duty of fifty-five per centum *ad valorem*.

The American manufacturers of iron and steel and the American manufacturers on a large scale of articles made from tinplate are now offered the opportunity to engage in an industry that is virtually new in this country. They must, however, do this at an early day, as the paragraph in the new tariff law relating to tinplates contains the following warning provisos :

*Provided*, That on and after October 1, 1897, tin plates and terne plates lighter in weight than 63 pounds per hundred square feet shall be admitted free of duty, unless it shall be made to appear to the satisfaction of the President (who shall thereupon by proclamation make known the fact) that the aggregate quantity of such plates lighter than 63 pounds per hundred square feet produced in the United States during either of the six years next preceding June 30, 1897, has equaled one-third the amount of such plates imported and entered for consumption during any fiscal year after the passage of this act, and prior to said October 1, 1897: *Provided*, That the amount of such plates manu-

factured into articles exported, and upon which a drawback shall be paid, shall not be included in ascertaining the amount of such importations: *And provided further*, That the amount or weight of sheet iron or sheet steel manufactured in the United States and applied or wrought in the manufacture of articles or wares tinned or terne-plated in the United States, with weight allowance as sold to manufacturers or others, shall be considered as tin and terne plates produced in the United States within the meaning of this act.

It is gratifying to be able to state that the increase in the duty on tinplates and terne plates from one cent to two and two-tenths cents per pound, although not taking effect until the 1st of July next, has already induced several enterprising firms and companies to engage in their manufacture. We summarize below trustworthy information which we have received in relation to the establishment of this new American industry.

About the 1st of October last, when the new tariff became a law, the United States Iron and Tin Plate Company Limited, of Demmeler, Allegheny county, Pennsylvania, commenced the manufacture of tinplates of best quality, and before the year closed the company had manufactured and sold about fifty tons of bright tinplates, the rise in the price abroad enabling it to compete with the dealers in foreign tinplates. This company has since continued to manufacture best tinplates as a regular product of its works, and during the present year it expects to make both tinplates and terne plates in large quantities. It is now enlarging its rolling mill and its other facilities for this purpose.

P. H. Laufman & Co. Limited, of Apollo, Armstrong county, Pennsylvania, had made about six hundred boxes of terne plates for roofing between October last and the middle of March, but the company has recently greatly increased its capacity for the production of these plates and expects to actively engage in their manufacture from this time forward.

The Britton Rolling Mill Company, of Cleveland, Ohio, is now building a tinplate mill, and expects to be ready to supply tinplates in commercial quantities about the 1st of July next.

Norton Brothers, of Chicago, extensive manufacturers of tin cans, commenced tinning plates in December last, using black sheets imported from Wales, but they have since obtained black sheets from Pennsylvania mills. They have nearly completed a rolling mill of their own, in which they will roll sheets for tinning. The firm started its tinning plant with a capacity of fifty boxes per

day, and is now increasing its tinning facilities. This firm will not at once put any of its tinplates on the market, but will for some time consume all that it makes. It uses about one thousand boxes of tinplates daily.

Soon after the new tariff became a law the St. Louis Stamping Company, of which Hon. F. G. Niedringhaus, a member of the last Congress, is president, commenced making the best quality of tinplates for its own use in the manufacture of stamped specialties. The company has since continued to make tinplates regularly, partly from its own black sheets and partly from purchased sheets, but it has now well advanced toward completion new buildings and machinery for the production of a much larger quantity of black sheets and which will also greatly add to the tinning capacity of the present works. It is expected that the new works will be in operation about the 1st of July next. Some of the tinplates thus far produced have been made from basic steel manufactured at Chattanooga by the Southern Iron Company.

Somers Brothers, of South Brooklyn, New York, have completed plans for the building of a tinplate mill and have invited bids for the necessary machinery. It is expected that they will commence the erection of their works in April of the present year. This firm will probably consume in the manufacture of stamped specialties, in which it does a large business, all the tinplates it may make.

Other firms and companies are reported to be considering the advisability of engaging in the manufacture of tinplates and terne plates, but we confine our record of the inauguration of this new industry to information which we know to be authentic.

#### PRODUCTION OF IRON ORE IN 1890 BY LEADING DISTRICTS.

The total production of iron ore and coal and coke in the United States can only be approximately ascertained in the years which are not census years. The statistics of their production in the last census year have not yet appeared.

The following table shows the shipments of iron ore from the various mines of the Lake Superior region in the last five years. For the statistics contained in this table we are indebted to the courtesy of Mr. James Russell, the editor of the *Marquette Mining Journal*. Our statistics of the shipments of the Lake Superior mines have always been taken from the columns of the *Journal*, and the footings have always been carefully verified. The figures



given in the table include shipments to local furnaces and all shipments by rail as well as by water.

Districts.	Iron ore—Gross tons.				
	1886.	1887.	1888.	1889.	1890.
Marquette Range, Michigan.....	1,627,383	1,851,717	1,926,954	2,634,817	2,997,927
Menominee Range, Mich. and Wis.....	880,006	1,199,343	1,191,097	1,796,764	2,289,017
Gogebic Range, Mich. and Wis.....	756,237	1,285,265	1,433,689	2,016,391	2,845,171
Vermilion Lake, Minnesota.....	304,396	394,252	511,953	844,782	880,264
Total.....	3,568,022	4,730,577	5,063,693	7,292,754	9,012,379

The Lake Superior mines which produced the largest quantities of iron ore in 1890 were the following: Norrie, in the Gogebic range, 906,754 tons; Chapin, in the Menominee range, 742,843 tons; and Ashland, also in the Gogebic range, 435,472 tons.

The production of iron ore by all the leading iron-ore districts of the country in the last three years was as follows, in gross tons, the figures in nearly every instance denoting shipments from the mines, and not taking account of stock piles at the mines at the beginning or end of any year.

Shipments of iron ore from leading districts.	Gross tons.		
	1888.	1889.	1890.
Lake Superior mines of Michigan and Wisconsin.....	4,551,740	6,447,972	8,132,115
Vermilion Lake mines of Minnesota.....	511,953	844,782	880,264
Missouri mines.....	217,931	233,784	188,653
Cornwall mines, Pennsylvania.....	722,917	769,020	686,302
New Jersey mines.....	447,738	482,169	477,289
Chateaugay mines, near Lake Champlain, New York.....	132,966	122,923	130,398
Crown Point mines, New York.....	67,578	65,169	78,737
Port Henry mines, New York.....	419,009	409,000	417,810
Other Lake Champlain mines, New York.....	45,000	45,000	35,000
Hudson River Ore and Iron Company, New York.....	58,000	54,000	72,505
Tilly Foster mines, New York.....	4,332	70,889	76,949
Forest of Dean mines, New York.....	12,017	12,042	23,016
Salisbury region, Connecticut.....	32,599	32,000	26,058
Cranberry mines, North Carolina.....	10,129	12,974	22,873
Tennessee Coal, Iron, and Railroad Company's Inman mines.....	123,159	120,232	119,402
Alleghany county, Virginia.....	156,126	162,322	184,640
Calhoun, Etowah, and Shelby counties, Alabama.....	134,932	165,084	212,540
Total of the above districts.....	7,648,126	10,049,362	11,764,551

The great increase in the production of the Lake Superior mines in 1889 and 1890 is an important fact, but a fact of almost equal importance is also shown in the table, namely, that there was very



little increase in these two years in the production of other leading iron-ore districts, notwithstanding the great demand for ore which then prevailed.

## IMPORTS OF IRON ORE.

Our imports of iron ore in 1890 were the largest in our history, amounting to 1,246,830 gross tons. The following table, for which we are indebted to the Bureau of Statistics of the Treasury Department, shows the quantities and values of iron ore imported into the United States during the calendar years 1888, 1889, and 1890, by customs districts.

Districts.	1888.		1889.		1890.	
	Gross tons.	Values.	Gross tons.	Values.	Gross tons.	Values.
Baltimore .....	119,570	\$254,110	273,050	\$519,736	481,250	\$1,015,093
Boston.....			50	283		
Buffalo Creek.....			78	198	82	185
Cuyahoga.....	13,122	39,066	1,224	3,403	4,675	15,460
Detroit.....			18	36		
New York.....	23,615	47,792	25,824	72,297	38,717	101,908
Oswegatchie.....			2,309	6,353	12,617	23,446
Perth Amboy.....	56,393	128,383	11,558	26,075	25,524	50,984
Philadelphia.....	367,439	823,841	525,124	1,192,141	683,665	1,641,654
Puget Sound.....	6,901	13,816	13,670	27,860		
Vermont.....	83	455	462	707	239	258
All other.....	347	6,126	206	3,303	61	5,130
Total.....	587,470	\$1,313,589	853,573	\$1,852,392	1,246,830	\$2,834,118

During 1890 the Juragua Iron Company Limited, an American company, with headquarters in Philadelphia, imported 362,068 gross tons of iron ore from its Cuban mines, an increase of 105,790 tons over its imports in 1889. Of the quantity imported by this company in 1890 there were received at Philadelphia 51 cargoes, containing 127,089 tons; at Baltimore 75 cargoes, containing 211,759 tons; and at Perth Amboy 8 cargoes, containing 23,220 tons. The company expects to import about 400,000 tons in 1891.

Two other iron-ore companies, organized with American capital, expect to be prepared to make shipments of iron ore from Cuba before the close of the present year. These are the Sigua Iron Company, with headquarters in Philadelphia, and the Spanish-American Iron Company, with headquarters in New York. The possessions of these companies, like the mines of the Juragua Iron Company Limited, are on the southern coast of Cuba. Both companies have abundant capital and valuable iron-ore lands, and they

are making extensive preparations to ship large quantities of ore. All the Cuban ores that have been brought to this country from the mines of the Juragua company have been of Bessemer quality. We have also recently imported from Cuba some cargoes of man-ganiferous iron ores.

In the following table we give the total imports of iron ore in-to the United States from 1879 to 1890, in gross tons. Previous to 1879 the imports never amounted in any one year to 100,000 tons.

Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.
1879.....	284,141	1883.....	490,875	1887.....	1,194,301
1880.....	493,408	1884.....	487,820	1888.....	587,470
1881.....	782,887	1885.....	390,786	1889.....	853,573
1882.....	589,635	1886.....	1,039,433	1890.....	1,246,830

Our imports of iron ore have come principally from Spain, Elba, Algeria, Greece, and Cuba. Shipments of iron ore from Cuba to the United States commenced in 1884. We receive very little iron ore from Canada, only a few thousand tons annually. Some of the iron ores which we import from the other side of the Atlantic are man-ganiferous ores.

#### CONSUMPTION OF IRON ORE IN 1890.

In former Annual Reports we have estimated the country's annual consumption of iron ore by considering the exact quantity of pig iron produced, the quantity of iron-ore blooms produced, and the probable consumption of iron ore for fettling purposes in rolling mills. These elements enable us to ascertain the probable total consumption of iron ore. If we deduct from this aggregate the quantity imported the remainder will represent the consumption of domestic ore. We have estimated the total consumption of iron ore in the United States in 1890 at 18,000,000 gross tons. Our imports of iron ore in 1890 amounted to 1,246,830 gross tons; this quantity subtracted from the quantity consumed leaves 16,753,170 tons as the consumption of domestic ore in 1890, against 14,096,427 tons which entered into consumption in 1889, 12,062,530 tons in 1888, 11,300,000 tons in 1887, and 10,000,000 tons in 1886, ascertained for each year in the same manner as for 1890.

In 1890 there was a much larger quantity than usual of iron ore shipped from the Lake Superior region which did not enter into immediate consumption, so that our production of iron ore in the

country at large in 1890 was in excess of the quantity of domestic iron ore we have estimated as having been consumed. The *Cleveland Iron Trade Review* published at the close of 1890 a table showing the total receipts of Lake Superior ore at ports on Lake Erie, Buffalo and Erie included, in the last eight years; also the quantity left on the docks at the close of navigation in each year. From this table we take the following summary.

Years.	Receipts. Gross tons.	On dock. Gross tons.	Years.	Receipts. Gross tons.	On dock. Gross tons.
1883.....	1,692,689	943,095	1887.....	3,439,198	1,558,861
1884.....	1,841,877	1,038,135	1888.....	3,783,659	1,848,555
1885.....	1,503,969	1,048,940	1889.....	5,856,344	2,607,106
1886.....	2,270,554	966,472	1890.....	6,874,664	3,893,487

The *Review* says that there were on dock at these ports at the opening of navigation on May 1, 1890, 936,228 gross tons of ore. The total receipts for the season of 1890, closing December 1st, were 6,874,664 tons, making a total supply of 7,810,892 tons. Of this total there were shipped during the season of 1890 to furnaces by rail from Lake Erie ports 3,917,405 tons, leaving 3,893,487 tons on dock on December 1st, against 2,607,106 tons on dock at the close of navigation in 1889. This exhibit shows an increase of ore on dock at the close of 1890 of 1,286,381 tons as compared with the close of 1889, which increase was clearly beyond even extraordinary consumptive demands. The iron-ore situation has not improved since the opening of the new year. As nearly all the furnaces in the Mahoning and Shenango valleys and some at Pittsburgh and elsewhere which use Lake Superior ore were idle during the first three months of the present year and are still idle the stocks of iron ore on Lake Erie docks have been but slightly reduced since the close of navigation last fall.

#### RECEIPTS OF IRON ORE AT BUFFALO AND ERIE IN 1890.

The receipts of Lake Superior iron ore at the Lake Erie ports of Buffalo and Erie in 1887 and preceding years were not of statistical importance, as the aggregate quantity was not large. Nearly all the receipts were at Erie and were intended for furnaces west of the Alleghenies. But in 1888, 1889, and 1890 the receipts at both Buffalo and Erie greatly increased, the largest receipts being in 1890, amounting to over a million tons, more than half of which was intended for furnaces east of the Alleghenies.

The receipts at these ports in the three years mentioned were as follows, in gross tons, according to the *Iron Trade Review*.

Ports—Gross tons.	1888.	1889.	1890.
Buffalo.....	240,000	298,000	548,000
Erie.....	240,338	373,595	487,493
Total.....	480,338	671,595	1,035,493

As at other Lake Erie ports there was a large increase at Buffalo and Erie of iron ore on dock at the close of navigation in 1890 as compared with previous years. The quantity shipped eastward from Buffalo in 1890 was about 490,000 tons. We are assured, however, that all the receipts at Buffalo in 1890 would be shipped to eastern furnaces before May 1st of the present year. Of the receipts at Erie in 1890 it has been estimated that about 190,000 tons were shipped to eastern furnaces in that year. Adding these shipments to the Buffalo shipments in 1890 above mentioned gives us approximately 680,000 tons of Lake Superior iron ore shipped to eastern furnaces in that year, which is a great increase on the shipments in any preceding year.

#### PRODUCTION OF PIG IRON.

Twenty-three States made pig iron in 1890. The solitary furnace in the new State of Washington, which was active in 1889 and immediately preceding years, was not in operation in 1890.

The total production of pig iron in the United States in 1890 was 9,202,703 gross tons, against 7,603,642 gross tons in 1889, an increase of 1,599,061 gross tons, or over 21 per cent. Changing gross to net tons, our production in 1890 was 10,307,028 net tons, against 8,516,079 net tons in 1889. The production of the first half of 1890 was 4,560,513 gross tons, and the production of the second half was 4,642,190 gross tons, an increase in the last half of 81,677 gross tons.

Our production of pig iron in 1890 was about 1,200,000 gross tons larger than that of Great Britain in the same year, and it was over 600,000 gross tons larger than that of Great Britain in 1882, which was its year of greatest production. Our production of pig iron in 1890 was larger for the first time than that of our European rival.

The following table shows the production of pig iron by States in 1889 and 1890, in the order of their prominence in 1890.

States—Net tons.	1889.	1890.	States—Net tons.	1889.	1890.
Pennsylvania.....	4,181,242	4,945,169	Kentucky.....	42,518	53,604
Ohio.....	1,215,572	1,389,170	Georgia.....	27,559	32,687
Alabama.....	791,425	914,940	Colorado.....	2,678	23,588
Illinois.....	601,035	785,239	Connecticut.....	24,143	22,552
New York.....	297,247	369,381	Indiana.....	9,839	16,398
Virginia.....	251,356	327,912	Oregon.....	9,426	12,305
Tennessee.....	294,655	299,741	Texas.....	4,544	10,865
Michigan.....	214,356	258,461	Massachusetts..	7,751	5,531
Wisconsin.....	158,634	246,237	North Carolina.	2,898	3,181
New Jersey.....	125,693	177,788	Maine.....	5,200	1,200
Maryland.....	33,847	165,559	Washington.....	10,371	.....
West Virginia.....	117,900	144,970			
Missouri.....	86,190	100,550	Total.....	8,516,079	10,307,028

Pennsylvania produced almost 48 per cent. of the total production of pig iron in 1890; Ohio, over 13 per cent.; Alabama, almost 9 per cent.; and Illinois, over 7 per cent. Every other State fell below 4 per cent.

The increased production in 1890 over 1889 was well distributed throughout the leading pig-iron producing States, although the increase in Pennsylvania was exceptionally large, amounting to 763,927 net tons. The next largest increase was in Illinois, with 184,204 net tons; followed by Ohio, with 173,598 tons; Maryland, with 131,712 tons; Alabama, with 123,515 tons; Wisconsin, with 87,603 tons; Virginia, with 76,556 tons; New York, with 72,134 tons; New Jersey, with 52,095 tons; Michigan, with 44,105 tons; West Virginia, with 27,070 tons; Colorado, with 20,910 tons; and Missouri, with 14,360 tons. Some other States made small increases in their production. The production of Maine, Massachusetts, and Connecticut declined.

There was a very large increase in the production of spiegeleisen in 1890, the production being 149,162 net tons, against 85,823 net tons in 1889 and 54,769 tons in 1888. The production of 1890 was confined to New Jersey, Pennsylvania, Illinois, and Colorado. Both foreign and domestic ores were used. Thus far a sufficient supply of domestic manganiferous iron ores has not been developed to meet the demand for them in this country.

The production of pig iron in 1890 according to the fuel used was as follows, in net tons, compared with the production of the four preceding years. The steady growth of our charcoal pig-iron industry in these five years and the decline in the production of pig iron with anthracite alone will not escape attention.

Fuel used—Net tons.	1886.	1887.	1888.	1889.	1890.
Bituminous, chiefly coke.....	3,806,174	4,270,635	4,743,989	5,951,425	7,154,725
Anthracite and coke.....	1,655,851	1,919,640	1,648,214	1,575,996	2,169,597
Anthracite alone.....	443,746	418,749	277,515	344,358	279,184
Charcoal.....	459,557	578,182	598,789	644,300	703,522
Total.....	6,365,328	7,187,206	7,268,507	8,516,079	10,307,028

The following table shows the production of bituminous pig iron by States in 1890, in the order of their prominence.

States.	Net tons.	States.	Net tons.
Pennsylvania.....	2,850,249	West Virginia.....	144,970
Ohio.....	1,362,973	Missouri.....	66,585
Alabama.....	804,588	Kentucky.....	49,857
Illinois.....	785,239	Georgia.....	26,057
Virginia.....	320,889	Colorado.....	23,588
Tennessee.....	245,729	Indiana.....	16,398
New York.....	157,082	North Carolina.....	577
Wisconsin.....	151,209		
Maryland.....	148,735	Total.....	7,154,725

The following table shows the production of anthracite and of mixed anthracite and bituminous pig iron by States in 1890.

States.	Net tons.
Pennsylvania.....	2,076,642
New York.....	194,351
New Jersey.....	177,788
Total.....	2,448,781

The following table shows the production of charcoal pig iron by States in 1890, according to their prominence.

States.	Net tons.	States.	Net tons.
Michigan.....	258,461	Oregon.....	12,305
Alabama.....	110,352	Texas.....	10,865
Wisconsin.....	95,028	Virginia.....	7,023
Tennessee.....	54,012	Georgia.....	6,630
Missouri.....	33,965	Massachusetts.....	5,531
Ohio.....	26,197	Kentucky.....	3,747
Connecticut.....	22,552	North Carolina.....	2,604
Pennsylvania.....	18,278	Maine.....	1,200
New York.....	17,948		
Maryland.....	16,824	Total.....	703,522

Full-page tables in the latter part of this Report show the production of each of the States in the last six years, the aggregate

production being first given and afterwards the production according to the fuel used.

The following table gives the production of Bessemer pig iron by States in 1890, compared with 1887, 1888, and 1889, in net tons.

States—Net tons.	1887.	1888.	1889.	1890.
Pennsylvania.....	1,842,449	1,770,544	2,216,948	2,637,864
Illinois.....	549,111	551,076	544,965	704,327
Ohio.....	331,144	336,755	452,646	551,107
New York.....	62,626	52,074	76,947	199,124
Maryland.....	18,473	.....	14,478	144,285
West Virginia.....	73,070	84,133	106,787	138,308
New Jersey.....	63,773	27,405	24,004	72,476
Missouri.....	122,725	76,520	73,845	69,454
Wisconsin.....	109,585	34,536	17,697	41,464
Colorado.....	23,295	16,044	1,267	21,373
North Carolina.....	.....	.....	.....	2,357
Michigan.....	12,766	3,000	.....	1,285
Tennessee.....	11,500	2,315	.....	.....
Total.....	3,220,517	2,954,402	3,529,584	4,583,424

It will be observed that our production of Bessemer pig iron in 1890 was more than a million net tons greater than in 1889.

Of the total production of Bessemer pig iron in Pennsylvania in 1890 the Lehigh Valley produced 296,424 net tons; the Schuylkill Valley, 155,984 tons; the Upper Susquehanna Valley, 131,452 tons; the Lower Susquehanna Valley, 397,558 tons; the Juniata Valley, 24,299 tons; Allegheny county, 1,072,904 tons; the Shenango Valley, 326,258 tons; and the remainder of the State, 232,985 tons. Of the total production of Bessemer pig iron in Ohio in 1890 the Mahoning Valley produced 97,502 net tons; the Hocking Valley, 33,426 tons; and the rest of the State, 420,179 tons.

The United States is not only independent of other countries for its supply of Bessemer pig iron but it is the largest producer of Bessemer pig iron in the world. In the early days of the Bessemer steel industry in this country our manufacturers were uncertain whether American ores would make good Bessemer pig iron, and many failures occurred in using domestic pig iron that was unsuited for conversion into steel. Large quantities of Bessemer pig iron were imported.

The following table shows the production of pig iron in Pennsylvania from 1872 to 1890, in net tons, by districts. The production of the Juniata Valley is embraced in the figures for the Upper Susquehanna Valley and the miscellaneous coke furnaces.



*Net Tons*

Years.	Lehigh Valley.	Schuylkill V.	Upper Susq.	Lower Susq.	Shenango V.	Allegheny Co.	Misc. Coke.	Charcoal.	Total. Net tons.
1872.....	449,663	232,225	127,260	159,305	160,188	110,599	117,224	45,033	1,401,497
1873.....	389,969	236,409	129,304	157,403	160,831	138,789	111,014	45,854	1,389,573
1874.....	316,789	232,420	88,243	137,556	156,419	143,660	97,068	40,978	1,213,133
1875.....	280,360	123,184	71,731	79,717	137,025	131,856	102,520	34,491	960,884
1876.....	261,274	144,969	79,217	103,369	138,495	128,555	130,635	23,099	1,009,613
1877.....	335,059	155,434	56,776	111,252	145,179	141,749	178,271	29,636	1,153,356
1878.....	416,907	144,538	84,547	137,719	122,958	217,299	189,285	29,360	1,342,633
1879.....	456,350	191,748	125,971	165,500	150,861	267,315	214,123	35,895	1,607,763
1880.....	544,987	306,926	168,128	217,889	215,313	300,497	286,007	43,374	2,083,121
1881.....	560,190	309,049	125,785	218,329	198,968	385,453	341,104	51,908	2,190,786
1882.....	609,338	342,701	201,367	300,240	264,078	358,840	322,717	49,975	2,449,266
1883.....	575,987	337,433	165,629	337,419	290,069	392,475	301,564	38,315	2,638,891
1884.....	431,867	278,578	148,352	419,439	246,086	487,055	350,870	23,155	2,385,402
1885.....	473,963	204,841	127,278	429,166	206,995	585,696	405,409	12,148	2,445,496
1886.....	665,941	393,545	158,120	493,362	388,728	737,124	439,742	16,727	3,293,289
1887.....	722,939	520,375	165,086	521,377	409,102	897,849	435,980	11,910	3,684,618
1888.....	558,954	479,264	165,234	535,261	465,846	890,569	478,919	15,139	3,589,186
1889.....	577,058	461,582	196,764	558,235	594,050	1,293,435	484,167	15,951	4,181,242
1890.....	815,888	605,926	220,872	567,240	669,608	1,497,786	549,571	18,278	4,945,169

It will be seen from this table that the principal increase in the production of pig iron in Pennsylvania in 1890 occurred in the Lehigh and Schuylkill valleys and in Allegheny county.

The following table shows the production of pig iron in Ohio from 1872 to 1890, in net tons, by districts, so far as it has been possible to divide the State into districts.

Years.	Charcoal—Net tons.		Bituminous coal and coke—Net tons.				Total. Net tons.
	Miscellaneous.	Hanging Rock.	Hanging Rock.	Mahoning V.	Hocking Valley.	Miscellaneous.	
1872.....	8,182	87,440	23,169	152,756	.....	128,196	399,743
1873.....	8,133	92,365	28,601	136,972	.....	139,958	406,029
1874.....	6,962	85,873	26,015	121,403	.....	184,748	425,001
1875.....	4,558	57,413	36,899	115,993	1,250	199,780	415,893
1876.....	6,109	42,822	44,260	137,546	7,483	165,057	403,277
1877.....	1,905	40,212	44,544	136,526	23,895	153,316	400,398
1878.....	.....	33,513	31,137	134,400	65,690	156,251	420,991
1879.....	.....	43,445	43,097	147,844	51,908	161,457	447,751
1880.....	4,336	64,854	60,316	226,877	85,719	232,105	674,207
1881.....	4,682	61,487	77,500	245,737	88,146	232,994	710,546
1882.....	3,168	55,546	77,364	258,478	78,770	225,634	698,900
1883.....	2,394	38,134	82,455	244,265	48,439	263,956	679,643
1884.....	.....	24,880	64,781	246,288	24,126	207,038	567,113
1885.....	.....	18,018	68,837	236,078	50,481	180,549	553,963
1886.....	.....	16,161	116,398	350,178	57,867	367,490	908,094
1887.....	1,300	17,244	126,487	364,236	62,323	403,949	975,539
1888.....	.....	21,864	106,852	429,575	92,808	452,719	1,103,818
1889.....	.....	22,467	84,737	490,685	71,990	545,693	1,215,572
1890.....	.....	26,197	98,261	555,249	90,175	619,288	1,389,170



In the following table we give the production of pig iron in the United States in each year from 1872 to 1890, classified according to fuel used, in net tons.

Years—Net tons.	Anthracite and mixed anthracite and coke.	Charcoal.	Coke and raw bituminous.	Total.
1872.....	1,369,812	500,587	984,159	2,854,558
1873.....	1,312,754	577,620	977,904	2,868,278
1874.....	1,202,144	576,557	910,712	2,689,413
1875.....	908,046	410,990	947,545	2,266,581
1876.....	794,578	308,649	990,009	2,093,236
1877.....	934,797	317,843	1,061,945	2,314,585
1878.....	1,092,870	293,399	1,191,092	2,577,361
1879.....	1,273,024	358,873	1,438,978	3,070,875
1880.....	1,807,651	537,558	1,950,205	4,295,414
1881.....	1,734,462	638,838	2,268,264	4,641,564
1882.....	2,042,138	697,906	2,438,078	5,178,122
1883.....	1,885,596	571,726	2,689,650	5,146,972
1884.....	1,586,453	458,418	2,544,742	4,589,613
1885.....	1,454,390	399,844	2,675,635	4,529,869
1886.....	2,099,597	459,557	3,806,174	6,365,328
1887.....	2,338,389	578,182	4,270,635	7,187,206
1888.....	1,925,729	598,789	4,743,989	7,268,507
1889.....	1,920,354	644,300	5,951,425	8,516,079
1890.....	2,448,781	703,522	7,154,725	10,307,028

## NUMBER OF FURNACES IN BLAST.

The number of furnaces in blast on June 30, 1890, was 339, and at the close of 1890 there were 311 in blast. The following table shows the number in blast at the close of each year since 1873.

Years.	Furnaces.	Years.	Furnaces.	Years.	Furnaces.
1873.....	410	1879.....	388	1885.....	276
1874.....	365	1880.....	446	1886.....	331
1875.....	293	1881.....	455	1887.....	339
1876.....	236	1882.....	417	1888.....	332
1877.....	270	1883.....	307	1889.....	344
1878.....	265	1884.....	236	1890.....	311

The following table shows the number of furnaces in blast at the close of each year since 1886, classified according to the fuel used.

Kind of fuel used.	1886.	1887.	1888.	1889.	1890.
Bituminous coal and coke.....	143	147	156	177	150
Anthracite and anthracite and coke.	125	118	105	104	97
Charcoal.....	63	74	71	63	64
Total.....	331	339	332	344	311

At the close of 1890 the total number of furnaces in the United States which were active or likely to be some day active was 562, and 38 new furnaces were in course of erection.

#### UNSOLD STOCKS OF PIG IRON.

Our statistics of stocks unsold do not include pig iron sold and not removed from the furnace bank, nor pig iron in second hands or in the hands of creditors, nor pig iron manufactured by rolling-mill proprietors for their own use. Nor do they include the small quantities of foreign pig iron in bond at the close of each year.

The stocks of pig iron which were unsold in the hands of manufacturers or their agents at the close of 1890, and which were not intended for the consumption of the manufacturers, amounted to 681,992 net tons, against 277,401 tons at the close of 1889. On June 30, 1890, the stocks unsold amounted to 389,244 net tons. In addition to the stocks of unsold pig iron at the close of 1890 the American Pig Iron Storage Warrant Company held in its yards on December 31, 1890, 64,200 gross tons, of which 11,263 tons are included above as being still controlled by the manufacturers, leaving 52,937 gross tons, or 59,289 net tons, of pig iron in other hands, which quantity should be added to the unsold stocks on the market in the hands of makers or their agents.

The following table shows the quantity of each kind of pig iron which was unsold in the hands of pig-iron manufacturers or their agents at the close of each year since 1874.

Years.	Net tons of 2,000 pounds.				Per cent. of production.
	Anthracite.	Bituminous.	Charcoal.	Total.	
1874.....	248,988	216,479	330,317	795,784	30.0
1875.....	274,743	165,482	330,683	760,908	34.0
1876.....	268,122	174,302	244,374	686,798	33.0
1877.....	239,493	156,818	246,040	642,351	28.0
1878.....	226,734	144,835	202,996	574,565	22.0
1879.....	33,507	39,275	68,892	141,674	5.0
1880.....	175,862	184,626	96,170	456,658	11.0
1881.....	90,351	36,495	84,050	210,896	5.0
1882.....	107,239	157,196	165,239	429,694	8.0
1883.....	178,020	171,802	183,978	533,800	10.0
1884.....	178,993	191,845	222,162	593,000	13.0
1885.....	68,178	115,982	232,352	416,512	9.0
1886.....	50,503	70,634	131,567	252,704	4.0
1887.....	114,107	127,978	96,057	338,142	4.7
1888.....	106,529	118,261	111,371	336,161	4.6
1889.....	77,502	86,772	113,127	277,401	3.2
1890.....	164,301	341,303	176,388	681,992	6.6

## PRODUCTION OF BESSEMER STEEL.

The production of Bessemer steel ingots in the United States in 1890 was 4,131,535 net tons, or 3,688,871 gross tons, against 3,281,829 net tons, or 2,930,204 gross tons, in 1889, an increase in 1890 of 758,667 gross tons, or nearly 26 per cent.

The following table shows the production of Bessemer steel ingots in the first half and second half of 1890, and the total production in 1890 compared with 1889. In the figures for the periods mentioned is included the production of ingots by the Clapp-Griffiths process, but we also add to the table a statement of the ingots produced by this process alone. The small production of steel by the Robert-Bessemer steel works of the country is also included in the totals.

States—Ingots.	First half 1890. Net tons.	Second half 1890. Net tons.	Total 1890. Net tons.	Total 1889. Net tons.
Pennsylvania.....	1,275,616	1,247,808	2,523,424	1,973,545
Illinois.....	386,497	462,254	848,751	740,001
Ohio.....	204,098	201,267	405,365	331,298
Other States.....	175,028	178,967	353,995	236,985
Total.....	2,041,239	2,090,296	4,131,535	3,281,829
Clapp-Griffiths only..	39,627	37,363	76,990	82,850

Neither the Clapp-Griffiths nor the Robert-Bessemer process is growing in favor. No new works for the use of either of these processes are in course of erection or projected. Two years ago there were 8 Clapp-Griffiths plants, but now there are only 5. There are now 7 Robert-Bessemer plants, the same number as a year ago. The production of Clapp-Griffiths steel in 1890, as shown above, was less than in 1889. The production of Robert-Bessemer steel in 1890 was a little over 15,000 net tons, against somewhat less than 4,000 tons in 1889.

Some progress was made in 1890 in the building of standard Bessemer steel works. A large and well-appointed plant, in some respects the best in the country, owned by the Pennsylvania Steel Company, is nearly completed at Sparrow's Point, Maryland. This company already has in operation at Sparrow's Point two large blast furnaces, and two others are fully completed. The steel plant is to embrace four large converters, a rail mill, plate mill, etc. A shipyard at the same place, owned by this company, now has two tugs on the stocks. A Bessemer plant is in course of erection

at Ashland, Kentucky, which will contain two 5-ton converters, and still another plant is being built at West Superior, Wisconsin.

Eight States contributed to the total production of Bessemer steel in 1890, namely: Massachusetts, New York, Pennsylvania, West Virginia, Ohio, Illinois, Michigan, and Colorado. Forty works with 85 converters, including 4 Clapp-Griffiths plants with 7 converters and 5 Robert-Bessemer plants with 10 converters, were employed during 1890 in the production of Bessemer steel.

Pennsylvania made 61 per cent. of all the ingots produced in 1890, against 60 per cent. in 1889, over 56 per cent. in 1888, 53 per cent. in 1887, and 59 per cent. in 1886. Illinois made over 20 per cent. in 1890, against 22 per cent. in both 1888 and 1889, 26 per cent. in 1887, and 21 per cent. in 1886.

The following table shows the production of Bessemer steel ingots in the United States since 1874, in net tons of 2,000 pounds.

Years—Net tons.	Pennsylvania.	Illinois.	Other States.	Total.
1874.....	85,625	62,492	43,816	191,933
1875.....	148,374	136,356	90,787	375,517
1876.....	258,452	171,963	95,581	525,996
1877.....	328,599	111,299	120,689	560,587
1878.....	426,481	179,500	126,245	732,226
1879.....	514,165	250,980	163,827	928,972
1880.....	643,894	304,614	254,665	1,203,173
1881.....	844,501	375,763	318,893	1,539,157
1882.....	933,631	397,436	365,383	1,696,450
1883.....	1,044,396	273,325	336,906	1,654,627
1884.....	1,031,484	339,068	170,043	1,540,595
1885.....	1,109,039	366,659	226,064	1,701,762
1886.....	1,507,577	535,602	498,314	2,541,493
1887.....	1,752,445	857,513	678,399	3,288,357
1888.....	1,592,629	620,856	599,015	2,812,500
1889.....	1,973,545	740,001	568,283	3,281,829
1890.....	2,523,424	848,751	759,360	4,131,535

The production of Bessemer steel rails in the United States in 1890 was 2,013,188 net tons, or 1,797,489 gross tons, against 1,646,699 net tons, or 1,470,267 gross tons, in 1889, an increase of 22 per cent. These figures embrace Bessemer steel rails of all sizes, including street rails, but do not embrace the Bessemer steel rails which were rolled in both years in iron rolling mills from purchased blooms, and which will hereafter be referred to in connection with our total production of iron and steel rails.

The following table shows the production of Bessemer steel rails in the first half and second half of 1890, with the total production in 1890 compared with that of 1889.

States—Rails.	First half 1890. Net tons.	Second half 1890. Net tons.	Total 1890. Net tons.	Total 1889. Net tons.
Pennsylvania .....	738,931	657,529	1,396,460	1,102,451
Illinois.....	279,441	308,096	587,537	522,054
Other States.....	14,286	14,905	29,191	22,194
Total.....	1,032,658	980,530	2,013,188	1,646,699

Pennsylvania made 69 per cent. of the Bessemer steel rails produced by Bessemer works in 1890, against nearly 67 per cent. in 1889, over 59 per cent. in 1888, 53 per cent. in 1887, 63 per cent. in 1886, and 68 per cent. in 1885. Illinois made 29 per cent. in 1890, against nearly 32 per cent. in 1887, 1888, and 1889, 25 per cent. in 1886, and 28 per cent. in 1885.

A table showing our total production of Bessemer steel rails since 1874 will be found on a succeeding page.

#### PRODUCTION OF OPEN-HEARTH STEEL.

Our statistics of the production of open-hearth steel in the United States include steel made in the open hearth by the basic process. Except experimentally we have not yet made any basic steel in the Bessemer converter, unless when the converter has been used in connection with the open hearth.

The production of open-hearth steel in the United States in 1890 was much the largest we have yet attained. It amounted to 574,820 net tons, or 513,232 gross tons, against 419,488 net tons, or 374,543 gross tons, in 1889, an increase of 138,689 gross tons, or 37 per cent. This is a much larger production than previous experience would have justified us in predicting a year ago. Our open-hearth industry has been of slow growth, but last year it may be said to have fully escaped from all the bonds which had previously limited its development. For the first time we engaged largely in the production of basic steel in the open hearth, but we also greatly increased our production of open-hearth steel by the old method. For many important purposes open-hearth steel produced by the old method is preferred to Bessemer steel, while basic steel promises to have an important field almost entirely for its own.

While we have not attempted in our statistics to separate basic steel from other steel made in the open hearth it is possible to ascertain approximately the quantity made by the basic process in 1890. In October last the Superintendent of the Census published the report of Dr. Wm. M. Sweet, special agent, on the production of

steel in the United States in the year ended June 30, 1890, from which we take the following extract, which possesses historical as well as statistical value.

The first basic steel made in the United States was produced experimentally at Steelton, Pennsylvania, by the Pennsylvania Steel Company, on May 24, 1884, in a Bessemer converter. The beginning of the manufacture of basic steel in this country as a commercial product, however, dates from 1888, on the 28th of March of which year the first basic open-hearth steel was produced at the Homestead Steel Works of Carnegie, Phipps & Company Limited, at Homestead, near Pittsburgh, Pennsylvania. Since that date the manufacture of basic open-hearth steel has been continued at these works, and during 1890 this firm commenced the erection of eight additional open-hearth furnaces for the manufacture of basic steel, of which number four are now in operation and the remaining four furnaces are expected to be ready for working in a short time. When completed these works will contain 16 open-hearth furnaces prepared to manufacture basic steel. The manufacture of basic steel is now also regularly carried on at the Steelton works of the Pennsylvania Steel Company, where a combination of the Bessemer and open-hearth processes is used. During 1890 the Henderson Steel and Manufacturing Company, at Birmingham, Alabama, produced steel experimentally by the basic process. Since the close of the year the Southern Iron Company has successfully commenced the manufacture of basic open-hearth steel at its works at Chattanooga, Tennessee. The Pottstown Iron Company, at Pottstown, Pennsylvania, has also produced steel by the basic process.

The total production of basic steel in the United States during 1890 amounted to 62,173 tons of 2,000 pounds, nearly all of which was made by the basic open-hearth method, a small part being produced by the duplex process, a combination of the Bessemer and open-hearth methods.

The production of basic steel by the open-hearth and duplex processes in the calendar year 1890 probably amounted to about 90,000 net tons, or over one-seventh of the total open-hearth production of the year.

The open-hearth steel made in 1890 was produced by 47 plants, located in ten States—New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, Tennessee, Alabama, Ohio, Illinois, and California. The total number of completed open-hearth steel works in the United States at the close of 1890 was 62, six more than at the close of 1889.

The quantity of open-hearth steel rails produced in 1890 was only 4,018 net tons, nearly all being made in California.

The following table shows the production of open-hearth steel ingots and direct castings by States since 1874, in net tons.

Years.	New England, New York, and New Jersey.	Pennsylvania.	Western and Southern States.	Total. Net tons.
1874.....	5,300	1,700	.....	7,000
1875.....	3,010	4,240	1,800	9,050
1876.....	6,085	7,547	7,858	21,490
1877.....	6,652	7,771	10,608	25,031
1878.....	8,228	12,231	15,667	36,126
1879.....	14,660	19,575	22,055	56,290
1880.....	23,293	48,003	41,657	112,953
1881.....	29,600	63,363	53,983	146,946
1882.....	30,936	67,822	61,784	160,542
1883.....	20,904	69,333	43,442	133,679
1884.....	16,700	81,501	33,416	131,617
1885.....	18,263	94,898	36,220	149,381
1886.....	23,382	172,144	49,724	245,250
1887.....	18,442	270,710	71,565	360,717
1888.....	13,677	285,738	52,621	352,036
1889.....	19,417	349,692	50,379	419,488
1890.....	30,951	467,614	76,255	574,820

## PRODUCTION OF CRUCIBLE STEEL.

The following table gives in net tons the annual production of crucible steel ingots and direct castings in the United States since 1874, the quantity of the latter being proportionately very small.

Years.	New England.	New York.	New Jersey.	Pennsyl- vania.	Western States.	Southern States.	Total. Net tons.
1874.....	1,509	2,696	8,164	23,289	570	100	36,328
1875.....	1,620	2,300	7,098	26,615	1,500	268	39,401
1876.....	1,098	2,300	6,806	28,217	700	261	39,382
1877.....	1,974	2,032	6,749	27,983	1,400	292	40,430
1878.....	1,602	2,800	7,377	30,585	480	62	42,906
1879.....	1,608	2,300	8,651	43,614	605	2	56,780
1880.....	660	3,500	10,387	57,077	800	.....	72,424
1881.....	2,780	4,961	14,500	66,290	1,231	.....	89,762
1882.....	1,000	4,693	12,400	65,139	1,857	.....	85,089
1883.....	2,373	2,976	10,539	63,687	880	.....	80,455
1884.....	1,832	1,975	11,549	42,295	2,003	8	59,662
1885.....	2,795	4,375	7,572	45,789	3,060	920	64,511
1886.....	2,661	4,870	8,046	61,792	2,340	900	80,609
1887.....	2,925	5,000	7,499	65,766	2,431	800	84,421
1888.....	2,614	6,223	6,708	59,315	2,640	1,213	78,713
1889.....	2,288	7,174	7,359	63,383	3,205	1,560	84,969
1890.....	2,288	6,978	6,915	60,490	1,945	1,100	79,716

The production of crucible steel in the United States in 1890 amounted to 79,716 net tons, or 71,175 gross tons, against 84,969 net tons, or 75,865 gross tons, in 1889, a decrease in 1890 of 4,690 gross tons, or 6 per cent. The production of 1890 was made in ten States—Massachusetts, Connecticut, New York, New Jersey,



Pennsylvania, Maryland, Tennessee, Ohio, Indiana, and Michigan.

As we have heretofore explained the production of crucible steel in this country has been practically stationary for many years, the failure of this branch of our steel industry to advance being chiefly due to the competition of open-hearth steel. Bessemer steel is also a sharp competitor. The crucible-steel industry of Great Britain and the Continent of Europe has also made no progress for a number of years and for the same reasons. In 1890 this country made less crucible steel than in 1889.

#### PRODUCTION OF MISCELLANEOUS STEEL.

The production of steel in the United States in 1890 by various minor processes amounted to only 4,248 net tons, or 3,793 gross tons, against 5,734 net tons, or 5,120 gross tons, in 1889 and 4,124 net tons, or 3,682 gross tons, in 1888. Blister, puddled, and "patented" steel, including "patented" steel castings, are embraced in these figures. The production of 1890 was made by Pennsylvania, New Jersey, and Maryland.

#### TOTAL PRODUCTION OF STEEL.

The following table shows the production of all kinds of crude steel in the United States, in the form of ingots or direct castings, in each of the last six years, in net tons, with the totals expressed in both net and gross tons. In the Bessemer column the figures include also the production of steel by the Clapp-Griffiths and Robert-Bessemer modifications of the Bessemer process.

Years.	Bessemer. Net tons.	Open- hearth. Net tons.	Crucible. Net tons.	Miscel- laneous. Net tons.	Total.	
					Net tons.	Gross tons.
1885.....	1,701,762	149,381	64,511	1,696	1,917,350	1,711,920
1886.....	2,541,493	245,250	80,609	2,651	2,870,003	2,562,506
1887.....	3,288,357	360,717	84,421	6,265	3,739,760	3,339,071
1888.....	2,812,500	352,036	78,713	4,124	3,247,373	2,899,440
1889.....	3,281,829	419,488	84,969	5,734	3,792,020	3,385,732
1890.....	4,131,535	574,820	79,716	4,248	4,790,319	4,277,071

#### PRODUCTION OF ROLLED STEEL.

In the following table we present the details of the production of rolled steel in 1890, excluding rails, which are given on another page. We have not attempted to collect the statistics of forged steel axles, shafting, and other forged steel. The figures for two works in New England are estimated in the first two columns.



States.	Rolled steel, except rails, in net tons of 2,000 pounds.				
	Cut nails.	Plates and sheets.	Other rolled steel.	Total in 1890.	Total in 1889.
New England.....	5,550	5,261	106,618	117,429	97,831
New York.....	134	3,076	86,637	89,847	100,242
New Jersey.....					
Pennsylvania.....	39,532	288,131	673,919	1,001,582	872,246
Delaware and Maryland.....		2,735	8,835	11,570	2,188
Virginia.....	2,172			2,172	2,500
West Virginia and Kentucky	57,555	32,335	8,050	97,940	86,369
Ohio.....	68,614	66,962	197,832	333,408	295,971
Indiana.....	17,395		121,905	139,300	87,410
Illinois.....					
Missouri and Michigan.....	250	3,037	5,800	9,087	9,580
Wisconsin.....	38		24,138	24,176	13,583
California.....	500		2,236	2,736	7,444
Total.....	191,740	401,537	1,235,970	1,829,247	1,584,364

The following table shows our total production of rolled steel in 1888, 1889, and 1890, in comparison with our total production of rolled iron in the same years.

Articles—Net tons.	1888.		1889.		1890.	
	Iron.	Steel.	Iron.	Steel.	Iron.	Steel.
Rails.....	14,252	1,557,892	10,258	1,694,610	15,548	2,095,996
Cut nails.....	108,505	216,174	88,904	201,634	90,307	191,740
Plates and sheets.....	469,312	213,694	471,193	331,283	505,642	401,537
Wire rods.....	14,571	298,770	14,460	393,053	19,798	492,153
Other rolled products.....	1,805,014	473,247	2,001,570	658,394	2,189,082	743,817
Total.....	2,411,654	2,759,777	2,586,385	3,278,974	2,820,377	3,925,243

#### PRODUCTION OF ROLLED IRON.

By the term rolled iron we include (1) cut nails and cut spikes; (2) bar, rod, bolt, hoop, skelp, and shaped iron, and rolled axles; (3) plate and sheet iron; and (4) all sizes of iron rails. The statistics below relate only to rolled iron, and do not include rolled steel nor hammered axles or other forgings of iron or steel.

The total production of rolled iron in the United States in 1890 was 2,820,377 net tons, or 2,518,194 gross tons, against 2,586,385 net tons, or 2,309,272 gross tons, in 1889, an increase in 1890 of 208,922 gross tons, or 9 per cent. Twenty-six States rolled iron in 1889, the former Territory of Wyoming being one of the States. The single mill in Iowa which ran in 1889 was idle in 1890.

Pennsylvania made over 52 per cent. of the total production of

rolled iron in 1890, 1889, 1888, and 1887; Ohio made 17.8 per cent. in 1890, against 18 per cent. in 1889 and 17 per cent. in 1888; and Illinois made 5 per cent. in 1890, against nearly 5 per cent. in 1889 and over 4 per cent. in 1888. No other State produced as much as 4 per cent. of the total in 1890.

The production of bar, rod, bolt, hoop, skelp, and shaped iron and of rolled iron axles in 1890 amounted to 2,208,880 net tons, against 2,016,030 tons in 1889, an increase of 192,850 tons, or 9 per cent. Pennsylvania made 47 per cent. of the total production of these forms of iron in 1890 and 1889, against over 46 per cent. in 1888; Ohio made 19.5 per cent. in 1890, 20 per cent. in 1889, and nearly 19 per cent. in 1888; and Illinois made 6 per cent. in 1890 and 1889 and over 5 per cent. in 1888. No other State made as much as 5 per cent. of the total in 1890.

The production of plate and sheet iron in 1890, excluding nail plate, amounted to 505,642 net tons, against 471,193 tons in 1889, an increase of 34,449 tons. Pennsylvania made over 74 per cent. of the total production in 1890 and 1889 and 76 per cent. in 1888, and Ohio made 13 per cent. in 1890 and 1889 and nearly 13 per cent. in 1888.

The total production of rolled iron in the United States from 1873 to 1890 is given in detail in the following table, in net tons.

Years.	Iron rails.	Bar, rod, hoop, skelp, and shaped iron.	Plate and sheet iron, except nail plate.	Iron nails. Net tons.	Total. Net tons.
1873.....	761,062	705,964	169,169	201,235	1,837,430
1874.....	584,469	687,650	176,888	245,609	1,694,616
1875.....	501,649	668,755	192,769	236,343	1,599,516
1876.....	467,168	668,956	165,255	207,890	1,509,269
1877.....	332,540	720,531	182,242	241,446	1,476,759
1878.....	322,890	830,837	182,042	219,807	1,555,576
1879.....	420,160	1,107,005	269,768	250,551	2,047,484
1880.....	493,762	1,220,724	349,657	268,525	2,332,668
1881.....	488,581	1,492,555	373,082	289,709	2,643,927
1882.....	227,874	1,545,788	412,814	307,355	2,493,831
1883.....	64,954	1,511,422	384,362	388,136	2,348,874
1884.....	25,560	1,230,094	322,584	379,069	1,957,307
1885.....	14,815	1,200,958	345,069	243,684	1,804,526
1886.....	23,679	1,580,337	420,007	259,599	2,283,622
1887.....	23,062	1,917,403	477,056	170,979	2,588,500
1888.....	14,252	1,819,585	469,312	108,505	2,411,654
1889.....	10,258	2,016,030	471,193	88,904	2,586,385
1890.....	15,548	2,208,880	505,642	90,307	2,820,377

The following table gives the production of plate and sheet iron, excluding nail plate, from 1884 to 1890, by States, in net tons.

States—Net tons.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
New Hampshire.....	50						
Massachusetts.....	12,791	7,991	7,426	3,789	1,578		
New York.....	3,267	3,905	5,197	7,243	6,470	7,836	7,450
New Jersey.....							
Pennsylvania.....	222,321	252,711	305,521	359,998	357,532	351,802	376,614
Delaware.....	10,121	8,379	9,552	12,512	10,644	13,854	15,302
Maryland.....	9,264	6,381	6,389	5,940	5,285	6,735	5,309
Dist. of Columbia.....	6	53	45				
Alabama.....	937	2,750	3,740	4,621	4,893	7,567	7,284
West Virginia.....	14,342	13,040	27,181	22,159	15,423	15,133	14,670
Kentucky.....							
Ohio.....	40,230	41,390	43,603	53,599	60,363	62,283	69,083
Illinois.....		1,550	1,334				
Indiana.....				675	1,000		
Missouri.....	6,892	4,919	6,791	3,000	3,390	3,450	9,930
Michigan.....	2,363	2,000	3,228	3,520	2,734	2,504	
Colorado.....						29	
Total.....	322,584	345,069	420,007	477,056	469,312	471,193	505,642

The following table gives the production of all kinds of rolled iron in the United States from 1884 to 1890, by States, in net tons.

States—Net tons.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
Maine.....	9,638	8,219	8,486	8,097	9,669	10,248	10,588
New Hampshire.....	4,314	500		4,680	5,220	5,680	3,600
Massachusetts.....	77,560	75,074	61,322	45,853	39,786	39,269	43,540
Rhode Island.....	14,000	13,723	14,168	12,622	14,624	14,140	14,618
Connecticut.....	15,054	15,054	15,976	13,849	14,339	17,451	18,231
New York.....	86,955	79,853	102,472	112,688	97,476	96,279	93,971
New Jersey.....	61,046	49,573	60,282	73,844	58,294	63,209	62,535
Pennsylvania.....	913,046	940,865	1,176,286	1,361,270	1,263,776	1,355,076	1,479,318
Delaware.....	28,015	28,721	34,272	43,864	41,340	47,584	50,812
Maryl'd and D. C.....	33,856	17,581	22,539	20,790	13,973	11,164	5,409
Virginia.....	28,286	31,989	40,581	49,967	41,289	51,783	55,224
Alabama.....	17,895	24,850	32,065	24,443	32,816	50,111	42,691
Texas.....	1,000	1,000	924	1,131	1,136		
West Virginia.....	64,632	9,992	7,874	61,997	49,440	33,809	36,099
Kentucky.....	29,212	21,736	38,308				
Tennessee.....	15,217	11,344	14,510	16,547	17,767	24,792	22,067
Georgia.....						1,000	1,500
Ohio.....	310,568	269,263	355,126	408,263	412,391	475,120	504,216
Indiana.....	39,028	35,540	42,224	46,904	32,012	37,534	67,734
Illinois.....	95,815	80,356	110,182	143,206	106,484	126,283	146,695
Missouri.....	18,580	11,547	15,800	14,354	12,887	15,975	22,990
Iowa.....		800	200	200	6,000	3,020	
Michigan.....	9,571	12,840	21,509	29,717	26,344	21,170	31,149
Wisconsin.....	53,628	38,959	60,147	38,265	60,630	40,055	48,547
Minnesota.....	200	1,200	1,000	1,400		300	2,565
Nebraska.....	2,000	3,000	250				
Colorado.....	5,619	5,538	6,299	4,664	4,372	4,270	8,328
Wyoming.....	1,745	2,430	9,853	7,699	7,987	6,002	10,287
California.....	20,827	12,979	30,967	42,186	41,602	35,061	37,663
Total.....	1,957,307	1,804,526	2,283,622	2,588,500	2,411,654	2,586,385	2,820,377

## PRODUCTION OF IRON AND STEEL RAILS.

The production of all kinds of rails in the United States in 1890 was 2,111,544 net tons, or 1,885,307 gross tons, against 1,704,868 net tons, or 1,522,204 gross tons, in 1889, an increase of 363,103 gross tons, or 23.8 per cent. The production of 1890 was composed as follows: Bessemer steel rails rolled by the producers of domestic ingots, 2,013,188 net tons, or 1,797,489 gross tons; Bessemer steel rails from purchased blooms and from old steel rails, 78,790 net tons, or 70,348 gross tons; open-hearth steel rails, 4,018 net tons, or 3,588 gross tons; iron rails, 15,548 net tons, or 13,882 gross tons: total, 2,111,544 net tons, or 1,885,307 gross tons.

Eleven States made rails in 1890, namely, Pennsylvania, West Virginia, Tennessee, Alabama, Ohio, Indiana, Illinois, Wisconsin, Colorado, Wyoming, and California. Of these States seven made Bessemer steel rails, namely, Pennsylvania, West Virginia, Ohio, Illinois, Wisconsin, Colorado, and California. The quantity of Bessemer steel rails made outside of Pennsylvania, Illinois, and Colorado was, however, very small. The open-hearth steel rails were nearly all made in California. The iron rails were made in Pennsylvania, Tennessee, Alabama, Ohio, Indiana, Illinois, Wisconsin, Colorado, and Wyoming.

Of the total production of rails in 1890 Pennsylvania made over 69 per cent., against 67 per cent. in 1889, 59 per cent. in 1888, 54 per cent. in 1887, over 62 per cent. in 1886, and 68 per cent. in both 1885 and 1884. Illinois made 28 per cent. in 1890, against 30 per cent. in 1889, 31 per cent. in 1888, 30 per cent. in 1887, 24 per cent. in 1886, over 28 per cent. in 1885, and nearly 26 per cent. in 1884. These two States made over 97 per cent. of all the rails rolled in 1890, against 97 per cent. in 1889, 90 per cent. in 1888, and 84 per cent. in 1887.

The manufacturers have not been able to separate all the street rails from other rails which they made in 1890. The quantity of rails reported to us which were definitely known to be ordered and rolled for street railways in 1890 was 110,353 net tons, or 98,529 gross tons, showing a great increase over the production in 1889, when 78,534 net tons, or 70,120 gross tons, were made. Nearly all street rails are now rolled from Bessemer steel. The following table shows the ascertained production of street rails alone in the seventeen years from 1874 to 1890, the figures for 1890 being probably a few thousand tons under the actual quantity used for street railways.

Years.	Net tons.	Years.	Net tons.	Years.	Net tons.
1874.....	6,739	1880.....	16,894	1886.....	48,009
1875.....	16,340	1881.....	21,554	1887.....	57,362
1876.....	13,086	1882.....	22,286	1888.....	50,345
1877.....	7,015	1883.....	19,440	1889.....	78,534
1878.....	9,229	1884.....	31,357	1890.....	110,353
1879.....	8,646	1885.....	35,990		

The total production of all kinds of iron and steel rails, including street rails, in the United States in the last seven years, in net and gross tons, has been as follows.

Tons.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
Net.....	1,144,851	1,094,215	1,792,601	2,396,397	1,572,144	1,704,868	2,111,544
Gross.....	1,022,188	976,978	1,600,537	2,139,640	1,403,700	1,522,204	1,885,307

Since 1874 our total production of Bessemer steel rails by Bessemer steel works and by iron rolling mills has been as follows, in net tons.

Years—Net tons.	Pennsylvania.	Illinois.	Other States.	Total.
1874.....	66,902	48,280	29,762	144,944
1875.....	112,843	111,189	66,831	290,863
1876.....	203,750	133,713	74,998	412,461
1877.....	250,531	89,519	92,119	432,169
1878.....	308,093	143,785	98,520	550,398
1879.....	368,187	197,881	117,896	683,964
1880.....	495,716	257,583	201,161	954,460
1881.....	688,276	346,272	295,754	1,330,302
1882.....	759,524	336,122	342,509	1,438,155
1883.....	819,544	231,355	235,655	1,286,554
1884.....	763,223	290,185	63,213	1,116,621
1885.....	736,522	308,242	29,843	1,074,607
1886.....	1,111,171	430,975	221,521	1,763,667
1887.....	1,276,845	728,526	348,761	2,354,132
1888.....	930,140	488,639	133,852	1,552,631
1889.....	1,141,350	522,054	27,860	1,691,264
1890.....	1,470,490	587,537	33,951	2,091,978

The "other States" in the above table in 1890 were West Virginia, Ohio, Wisconsin, Colorado, and California; in 1889 a few Bessemer steel rails were rolled in New York and Indiana.

#### PRODUCTION OF CUT NAILS AND WIRE 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, nor machine-made horseshoe nails. Cut spikes are always included with cut nails.

Our total production of cut nails in 1890 was 5,640,946 kegs of 100 pounds each, against 5,810,758 kegs in 1889, 6,493,591 kegs in 1888, and 6,908,870 kegs in 1887, showing a steady decline.

Twelve States made cut nails in 1890. The following table shows the production of iron and steel cut nails respectively in 1890, and the total production of that year compared with the total production of 1889 and 1888.

States.	1890—Kegs of 100 pounds.			Total 1889.	Total 1888.
	Iron.	Steel.	Total.	Kegs.	Kegs.
Pennsylvania .....	1,035,179	790,645	1,825,824	1,834,899	2,072,969
Ohio .....	46,351	1,372,270	1,418,621	1,546,928	1,522,951
West Virginia.....	1,252	956,442	957,694	980,346	1,145,151
Indiana.....	12,865	217,099	229,964	138,200	175,397
New Jersey.....	257,678	2,689	260,367	252,067	275,591
Illinois .....		130,806	130,806	204,438	241,981
Massachusetts.....	80,573	111,000	191,573	239,903	280,301
California.....	210,000	10,000	220,000	242,000	240,000
Virginia.....	159,114	43,446	202,560	194,998	245,755
Kentucky.....		194,654	194,654	165,000	206,783
Wisconsin.....	3,118	765	3,883	11,435	41,715
Missouri.....		5,000	5,000		
Colorado.....				544	44,997
Total cut nails	1,806,130	3,834,816	5,640,946	5,810,758	6,493,591
Wire nails.....			3,135,911	2,435,000	1,500,000
Total nail production.....			8,776,857	8,245,758	7,993,591

In 1884 the production of steel cut nails in the United States (including 500 kegs of combined iron and steel) was only 393,482 kegs, or 5 per cent. of the total cut-nail production. Steel was afterwards rapidly substituted for iron, until in 1889 steel cut nails represented 69 per cent. of the total cut-nail production of the country. In 1890, however, the decline in the cut-nail production was wholly in steel nails, which represented not quite 68 per cent. of the total for that year. A few thousand more kegs of iron cut nails were made in 1890 than in 1889. The maximum total production of cut nails was reached in 1886, with 8,160,973 kegs, and the maximum production of steel cut nails alone was reached in 1888, with 4,323,484 kegs.

The quantity of combined iron and steel nails made in 1890 was about 111,000 kegs, against 113,463 kegs in 1889. These nails were made in both years in the States of Ohio, West Virginia, and California. They are included in the table with iron nails.

The leading cut-nail-producing district is the Wheeling district,

which comprises Ohio and Marshall counties in West Virginia and Belmont and Jefferson counties in Ohio. The following table shows the production of iron and steel cut nails in this district in the last five years, and also in Allegheny county, Pa. The production of Allegheny county, which was once very large, has greatly dwindled since 1883, when 627,896 kegs were made.

Districts—Kegs.	1886.	1887.	1888.	1889.	1890.
Wheeling district.....	1,858,551	1,848,116	2,137,845	1,825,956	1,744,385
Allegheny county.....	121,441	277,410	232,762	173,765	52,536

We give below the average wholesale prices of iron cut nails per keg from store at Philadelphia since January 1, 1887, compiled by Mr. W. E. S. Baker. The prices of nails at Pittsburgh since January, 1888, will be found on page 18 of this Report. Steel nails in Philadelphia are usually quoted a few cents higher than iron nails.

Years.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1887.....	\$2.30	\$2.50	\$2.55	\$2.50	\$2.40	\$2.25	\$2.25	\$2.20	\$2.20	\$2.15	\$2.15	\$2.10	\$2.30
1888.....	2.00	2.10	2.10	2.10	2.00	2.00	2.10	2.00	2.00	2.00	2.00	2.00	2.03
1889.....	1.90	1.90	1.90	1.90	1.90	2.00	2.00	2.00	2.00	2.10	2.20	2.20	2.00
1890.....	2.20	2.15	2.10	2.00	2.00	1.90	1.90	1.90	1.90	2.00	2.00	2.00	2.00
1891.....	1.90	1.90	1.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

In 1886 the production of wire nails was estimated to have amounted to 600,000 kegs, made by 27 wire nail works; in 1887 the production was estimated to have been 1,250,000 kegs, made by 47 works; in 1888 it was estimated to have been 1,500,000 kegs; in 1889 it was estimated to have been 2,435,000 kegs, the estimates being based on reports from a large majority of the works. Direct reports which we have received from *nearly every works* in the country and careful estimates, based on trustworthy information, for the few small works which did not report make the total production in 1890 3,135,911 kegs, nearly all of which were of steel. The wire nails made in 1890 were produced by 47 works.

We give in the following table the production of wire nails in 1890 in comparison with that of 1889, in kegs of 100 pounds.

Wire nails—Kegs.	New England, New York, and New Jersey.	Pennsylvania.	Ohio.	Other States.	Total.
1889.....	280,000	816,000	944,000	395,000	2,435,000
1890.....	335,595	1,061,639	1,115,320	623,357	3,135,911



In the "other States" there are only one or two wire-nail companies in each State; we have therefore lumped together their production to avoid the possibility of making public the production of any individual establishment.

#### PRODUCTION OF IRON BLOOMS AND BILLETS.

The production of iron blooms and billets direct from the ore in 1890 was 7,945 net tons, against 12,407 net tons in 1889, 14,088 tons in 1888, and 15,088 tons in 1887. The production of blooms and billets from pig and scrap iron in 1890 was 22,838 net tons, against 23,853 net tons in 1889, 25,787 tons in 1888, and 28,218 tons in 1887. The total production of iron blooms and billets in 1890 was therefore 30,783 net tons, against 36,260 tons in 1889, 39,875 tons in 1888, and 43,306 tons in 1887. The production of wrought iron direct from the ore in forges is now practically confined to the Lake Champlain district of New York, which produced 7,937 net tons in 1890, the few remaining tons being made in two forges in Tennessee. A few tons may be made in Tennessee in 1891, but this industry may now be regarded as being virtually extinct outside of the Lake Champlain region, where it is also declining. Of the pig and scrap blooms made last year Pennsylvania produced 16,606 net tons, the remainder being made in New Jersey and Maryland.

#### PRODUCTION OF COAL.

In the absence of complete census statistics of the production of all kinds of coal in the United States we give the production of bituminous coal for the calendar year 1890 as estimated by Mr. Frederick E. Saward, the well-known coal statistician of New York City, and editor of *The Coal Trade*; also the shipments of anthracite coal for the same year as ascertained by Mr. John H. Jones, of Philadelphia, chief of the Bureau of Anthracite Coal Statistics. Mr. Saward places the production of bituminous coal in 1890 at 104,167,089 gross tons, which is an increase upon his estimate of the production of 1889 of about seven million tons. Mr. Jones gives the shipments of anthracite coal in 1890 as 35,855,175 gross tons, against 35,407,710 tons in 1889. Our total production of coal in 1890, as above noted, was therefore 140,022,264 gross tons, in which total is not included between four and five million tons of anthracite coal consumed at the mines.

Mr. Jones is also the special agent of the Census Bureau for the collection of all coal statistics. In December last the Superintend-



ent of the Census published Mr. Jones's report on the production of anthracite coal in Pennsylvania in the calendar year 1889, the aggregate amounting to 40,665,152 gross tons, of which 35,816,876 tons were loaded on cars; 1,329,580 tons were used by employes and sold to the local trade at the mines; and 3,518,696 tons were used for heating and the production of steam at the mines. The production of anthracite coal in Pennsylvania in the census year 1870 was 13,973,460 gross tons, and in the census year 1880 it was 25,572,160 gross tons.

The circular prices of hard white ash anthracite coal in 1890, per gross ton, free on board vessels at Philadelphia, for shipment beyond the Delaware capes, were as follows:

Months.	Lump.	Broken.	Egg.	Stove.	Chestnut.	Pea.
January, 1890.....	\$4.00	\$3.80	\$4.00	\$4.15	\$3.90	\$2.25
February.....	4.00	3.80	4.00	4.15	3.90	2.25
March.....	4.00	3.80	4.00	4.15	3.90	2.25
April.....	4.00	3.80	4.00	4.15	3.90	2.25
May.....	4.00	3.80	4.00	4.15	3.90	2.25
June.....	4.00	3.80	4.00	4.15	3.90	2.25
July.....	3.85	3.65	3.65	3.75	3.40	2.25
August.....	3.85	3.65	3.65	3.75	3.40	2.25
September.....	3.85	3.65	3.80	3.90	3.50	2.25
October.....	3.85	3.65	3.90	4.05	3.70	2.25
November.....	3.85	3.75	4.00	4.15	3.70	2.25
December.....	3.85	3.75	4.00	4.15	3.70	2.25
Average, 1890.....	\$3.92½	\$3.74	\$3.92	\$4.05	\$3.73	\$2.25
Average, 1889.....	4.04	3.78	3.95	4.12	3.92	2.29

The shipments of bituminous coal and coke from Southwestern Pennsylvania through the locks and pools of the Monongahela Navigation Company greatly increased in 1890. They amounted to 118,061,100 bushels, against 81,162,500 bushels in 1889, 115,814,900 bushels in 1888, 78,912,900 bushels in 1887, and 113,099,147 bushels in 1886. The coal shipments amounted to 116,302,600 bushels in 1890 and the coke shipments to 1,758,500 bushels. The shipments in 1890 were the largest in the history of the company.

The shipments of bituminous coal from the Cumberland mines of Western Maryland and the Piedmont mines of West Virginia in 1890 amounted to 4,006,091 gross tons, against 3,213,886 tons in 1889, 3,671,067 tons in 1888, 3,375,796 tons in 1887, 2,592,467 tons in 1886, and 2,865,974 tons in 1885. The shipments from these regions in 1890 were the largest ever attained. In other leading coal districts there were also increased shipments in 1890.

## RAILROAD STATISTICS.

The publishers of *Poor's Manual of the Railroads of the United States for 1891*, now in press, give the mileage of new railroad constructed in this country in 1890 as 6,344 miles, distributed as follows in eight groups of States:

Groups.	Number of miles.	Groups.	Number of miles.
New England States.....	109.03	Southwestern States.....	1,031.92
Middle States.....	385.00	Northwestern States.....	1,047.13
Central Northern States.....	756.71	Pacific States.....	707.41
South Atlantic States.....	1,361.26		
Gulf and Mississippi Valley.....	945.91	Total.....	6,344.37

The same publishers inform us that the total railroad mileage of the United States on the 1st of January, 1891, not counting double tracks nor side tracks, was 167,741 miles. This mileage was much greater than that of all Europe.

## STATISTICS OF IMMIGRATION.

The following table, for which we are indebted to the Bureau of Statistics of the Treasury Department, gives the total number of immigrants who have arrived in the United States, except from Canada and Mexico, in the calendar years 1886 to 1890.

Countries.	1886.	1887.	1888.	1889.	1890.
Great Britain and Ireland:					
England and Wales.....	59,773	84,654	77,763	62,747	56,177
Ireland.....	52,912	72,888	71,966	60,492	53,418
Scotland.....	13,916	22,067	23,412	14,948	11,408
Total United Kingdom....	126,601	179,609	173,141	138,187	121,003
Germany.....	86,301	111,324	106,975	95,965	96,514
France.....	4,085	5,604	6,872	6,118	6,684
Bohemia and Hungary.....	22,523	18,878	16,585	18,397	32,780
Other Austrian provinces.....	17,593	20,209	25,080	23,773	30,339
Russia.....	26,820	25,815	37,353	33,487	40,922
Poland.....	6,396	4,960	5,902	4,866	19,743
Sweden and Norway.....	46,081	69,558	66,023	42,451	43,322
Denmark.....	6,634	9,305	8,756	8,597	9,993
Netherlands.....	2,667	5,276	5,437	6,339	4,414
Italy.....	30,565	46,256	47,856	30,238	62,969
Switzerland.....	4,518	6,561	7,622	7,336	6,792
All other countries.....	12,103	13,578	17,397	16,181	19,546
Total.....	392,887	516,933	525,019	431,935	495,021

The greatly increased immigration in late years from Bohemia and Hungary and other Austrian provinces, and from Russia, Po-

land, and Italy, is a subject of regret and apprehension to every patriotic American. In the last five years we have received from these countries 650,305 immigrants. Of the whole number mentioned 217,884 came from Italy. The new immigration law promises to greatly restrict undesirable immigration, but further legislation is needed.

#### RAPID PROGRESS IN IRON AND STEEL SHIPBUILDING.

The number of iron and steel vessels of the merchant marine which were launched from American shipyards in the fiscal year ended June 30, 1890, including vessels built on the great lakes, was 63, with an aggregate gross tonnage of 80,377.72 tons. This was very much the largest annual tonnage in our history. Much of the activity of the fiscal year mentioned, as was the case in the preceding fiscal year, was due to the building of a number of large vessels at lake ports for the iron-ore trade of the Lake Superior region.

The following table, compiled from the reports of the National Bureau of Navigation, gives the number and tonnage of all iron and steel vessels built in the United States for our merchant marine since 1868, not including vessels for the United States Navy.

Fiscal years.	Sailing.		Steam.		Total.	
	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.
1868.....				2,801		2,801
1869.....		1,069		3,545		4,584
1870.....		679		7,602		8,281
1871.....		2,067	20	13,412		15,479
1872.....			20	12,766	20	12,766
1873.....			26	26,548	26	26,548
1874.....			23	33,097	23	33,097
1875.....			20	21,632	20	21,632
1876.....			25	21,346	25	21,346
1877.....			7	5,927	7	5,927
1878.....			32	26,960	32	26,960
1879.....			24	22,008	24	22,008
1880.....	1	44	30	25,538	31	25,582
1881.....	1	36	41	28,356	42	28,392
1882.....			43	40,097	43	40,097
1883.....	1	2,033	34	37,613	35	39,646
1884.....	3	4,432	31	31,199	34	35,631
1885.....	1	731	47	43,297	48	44,028
1886.....	3	692	23	14,216	26	14,908
1887.....	1	93	28	34,261	29	34,354
1888.....	4	747	39	35,972	43	36,719
1889.....	1	33	47	53,480	48	53,513
1890.....			63	80,378	63	80,378

Included in the 63 "steam" vessels built in the fiscal year 1890

are three "whaleback" vessels which are used as tows and do not furnish their own steam. These are all large vessels.

The vessels launched in the fiscal year 1890 were built within the jurisdiction of the following ports:

Ports.	Iron.		Steel.		Total.	
	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.
Bath, Maine.....	1	509.51	.....	.....	1	509.51
Bristol, Rhode Island.....	.....	.....	1	116.69	1	116.69
New York, N. Y.....	5	1,989.56	.....	.....	5	1,989.56
Philadelphia, Pa.....	14	18,686.23	3	10,322.16	17	29,008.39
Wilmington, Del.....	12	7,031.07	2	521.26	14	7,552.33
Baltimore, Md.....	1	877.81	1	1,721.59	2	2,599.40
Buffalo, N. Y.....	2	85.77	2	3,304.20	4	3,389.97
Cleveland, Ohio.....	.....	.....	13	28,629.72	13	28,629.72
Port Huron, Mich.....	.....	.....	1	1,073.96	1	1,073.96
Detroit, Mich.....	.....	.....	1	532.91	1	532.91
Duluth, Minn.....	.....	.....	4	4,975.28	4	4,975.28
Total.....	35	29,179.95	28	51,197.77	63	80,377.72

All of the vessels launched in 1890 were steam vessels, except three of the four vessels built at Duluth, all of which were barges of the "whaleback" pattern. One of the vessels built at Philadelphia was constructed of iron and steel.

The following extract from the Annual Report of the Secretary of the Navy, Hon. B. F. Tracy, made to the President on November 26, 1890, gives the progress which had recently been made by the Government in the construction and equipment of a new navy. Thirty-one vessels in all are referred to by the Secretary.

During the twenty months covered by the present Administration nine new ships have been put in commission; four, including one monitor, have been advanced to a point where they are just about to go into commission; five are in such a condition that they will shortly be waiting only for their armor; seven have been built from the keel up, of which the *Texas* and *Monterey* are nearly ready for launching, and the five cruisers are well advanced; while of the six others previously authorized all have been designed and advertised, and all but one, the ram, have been contracted for and are actually under construction.

The 31 vessels here referred to, together with the *Boston*, *Atlanta*, and *Dolphin*, which were built under former Administrations, and a torpedo cruiser and torpedo boat also authorized, make a fleet of 36 vessels which it is expected will be ready to take part in the naval review of the Columbian Exposition in 1893.

## SUMMARY OF THE FOREGOING STATISTICS FOR 1890.

We present below a complete summary of the foregoing statistics for 1890, in which year this country made the best record in the production of iron and steel that has ever been made by any country.

Production of Pig Iron, net tons.....	10,307,028
Production of Spiegeleisen, included in Pig Iron, net tons.....	149,162
Production of Bar, Rod, Hoop, Skelp, and Shaped Iron, net tons...	2,208,880
Production of Bar, Rod, Hoop, Skelp, and Shaped Steel, net tons...	1,235,970
Production of Iron and Steel Wire Rods, included above, net tons..	511,951
Production of Plate and Sheet Iron, except Nail Plate, net tons....	505,642
Production of Plate and Sheet Steel, except Nail Plate, net tons...	401,537
Production of Iron Cut Nails, kegs of 100 pounds.....	1,806,130
Production of Steel Cut Nails, kegs of 100 pounds.....	3,834,816
Total Production of Cut Nails, kegs of 100 pounds.....	5,640,946
Production of Iron and Steel Wire Nails, kegs of 100 pounds.....	3,135,911
Production of all Rolled Iron, including Iron Nails and excluding Rails, net tons.....	2,804,829
Production of all Rolled Steel, including Steel Nails and excluding Rails, net tons.....	1,829,247
Production of Bessemer Steel Rails, net tons.....	2,091,978
Production of Open-hearth Steel Rails, net tons.....	4,018
Production of Iron Rails, net tons.....	15,548
Total production of Rails, net tons.....	2,111,544
Production of Street Rails, included above, net tons.....	110,353
Production of Bessemer Steel Ingots, net tons.....	4,131,535
Production of Open-hearth Steel Ingots, net tons.....	574,820
Production of Crucible Steel Ingots, net tons.....	79,716
Production of Blister and "Patented" Steel, net tons.....	4,248
Production of all kinds of Crude Steel, net tons.....	4,790,319
Production of Iron Blooms, net tons.....	30,783
Value of Imports of Iron and Steel.....	\$44,540,084
Value of Exports of Iron and Steel.....	\$27,000,134
Imports of Iron Ore, gross tons.....	1,246,830
Domestic Production of Iron Ore, gross tons.....	18,000,000
Shipments of Anthracite Coal from the Mines, gross tons.....	35,855,175
Total Domestic Production of Coal, gross tons.....	140,022,264
Iron and Steel Ships built in the fiscal year ended June 30th.....	63
Miles of new Railroad completed.....	6,344
Total number of Miles of Railroad, December 31st.....	167,741
Immigrants in the calendar year ended December 31st.....	495,021

PRODUCTION OF ALL KINDS OF PIG IRON IN 1885, 1886, 1887,  
1888, 1889, AND 1890, BY STATES.

*Statistics collected from the manufacturers by The American Iron and Steel Association.*

TOTAL PRODUCTION OF PIG IRON.

States.	Net tons of 2,000 pounds.					
	1885.	1886.	1887.	1888.	1889.	1890.
Maine.....	440	5,060	4,397	5,574	5,200	1,200
Massachusetts.....	869	8,124	11,114	13,248	7,751	5,531
Connecticut.....	17,500	19,390	21,741	21,644	24,143	22,552
New York.....	160,157	223,618	296,572	257,180	297,247	369,381
New Jersey.....	73,667	157,886	172,554	101,882	125,693	177,788
Pennsylvania.....	2,445,496	3,293,289	3,684,618	3,589,186	4,181,242	4,945,169
Maryland.....	17,299	30,502	37,427	17,606	33,847	165,559
Virginia.....	163,782	156,250	175,715	197,396	251,356	327,912
North Carolina..	1,790	2,200	3,640	2,400	2,898	3,181
Georgia.....	32,924	46,490	40,947	39,397	27,559	32,687
Alabama.....	227,438	283,859	292,762	449,492	791,425	914,940
Texas.....	1,843	3,250	4,383	6,587	4,544	10,865
West Virginia...	69,007	98,618	82,311	95,259	117,900	144,970
Kentucky.....	37,553	54,844	41,907	56,790	42,518	53,604
Tennessee.....	161,199	199,166	250,344	267,931	294,655	299,741
Ohio.....	553,963	908,094	975,539	1,103,818	1,215,572	1,389,170
Indiana.....	6,634	16,660	13,211	15,260	9,839	16,398
Illinois.....	327,977	501,795	565,453	579,307	601,035	785,239
Michigan.....	143,121	190,734	213,543	213,251	214,356	258,461
Wisconsin.....	24,632	65,933	133,508	116,037	158,634	246,237
Missouri.....	51,408	74,523	138,643	91,783	86,190	100,550
Minnesota.....	.....	.....	.....	.....	.....	.....
Colorado.....	5,481	10,451	25,291	20,877	2,678	23,588
Oregon.....	3,832	.....	.....	2,509	9,426	12,305
California.....	.....	1,750	.....	.....	.....	.....
Washington.....	1,857	2,842	1,586	4,093	10,371	.....
Total.....	4,529,869	6,365,328	7,187,206	7,268,507	8,516,079	10,307,028

ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

States.	Net tons of 2,000 pounds.					
	1885.	1886.	1887.	1888.	1889.	1890.
New York.....	145,475	219,238	217,585	185,147	212,502	194,351
New Jersey.....	73,667	157,886	172,554	101,882	125,693	177,788
Pennsylvania....	1,235,248	1,710,968	1,929,777	1,638,700	1,582,159	2,076,642
Maryland.....	.....	11,505	18,473	.....	.....	.....
Total.....	1,454,390	2,099,597	2,338,389	1,925,729	1,920,354	2,448,781

## PRODUCTION OF PIG IRON.—(CONTINUED.)

## CHARCOAL PIG IRON.

States.	Net tons of 2,000 pounds.					
	1885.	1886.	1887.	1888.	1889.	1890.
Maine.....	440	5,060	4,397	5,574	5,200	1,200
Massachusetts.....	869	8,124	11,114	13,248	7,751	5,531
Connecticut.....	17,500	19,390	21,741	21,644	24,143	22,552
New York.....	14,682	14,380	26,491	19,959	19,084	17,948
Pennsylvania.....	12,148	16,727	11,910	15,139	15,951	18,278
Maryland.....	10,432	7,872	15,454	15,702	16,285	16,824
Virginia.....	12,648	6,069	9,456	7,435	8,967	7,023
North Carolina.....	1,790	2,200	3,640	2,400	2,898	2,604
Georgia.....	5,797	459	.....	300	2,273	6,630
Alabama.....	77,573	82,110	95,223	94,126	110,427	110,352
Texas.....	1,843	3,250	4,383	6,587	4,544	10,865
Kentucky.....	4,707	6,363	6,201	5,054	6,786	3,747
Tennessee.....	31,173	27,402	46,224	51,850	50,224	54,012
Ohio.....	18,018	16,161	18,544	21,864	22,467	26,197
Michigan.....	143,121	190,734	213,543	213,251	214,356	258,461
Wisconsin.....	19,629	28,487	47,523	69,757	80,467	95,028
Missouri.....	21,785	20,177	40,752	28,297	32,680	33,965
Minnesota.....	.....	.....	.....	.....	.....	.....
Oregon.....	3,832	.....	.....	2,509	9,426	12,305
California.....	.....	1,750	.....	.....	.....	.....
Washington.....	1,857	2,842	1,586	4,093	10,371	.....
Total.....	399,844	459,557	578,182	598,789	644,300	703,522

## BITUMINOUS COAL AND COKE PIG IRON.

States.	Net tons of 2,000 pounds.					
	1885.	1886.	1887.	1888.	1889.	1890.
New York.....	.....	.....	52,496	52,074	65,661	157,082
Pennsylvania.....	1,198,100	1,565,594	1,742,931	1,935,347	2,583,132	2,850,249
Maryland.....	6,867	11,125	3,500	1,904	17,562	148,735
Virginia.....	151,134	150,181	166,259	189,961	242,389	320,889
N. Carolina.....	.....	.....	.....	.....	.....	577
Georgia.....	27,127	46,031	40,947	39,097	25,286	26,057
Alabama.....	149,865	201,749	197,539	355,366	680,998	804,588
West Virginia.....	69,007	98,618	82,311	95,259	117,900	144,970
Kentucky.....	32,846	48,481	35,706	51,736	35,732	49,857
Tennessee.....	130,026	171,764	204,120	216,081	244,431	245,729
Ohio.....	535,945	891,933	956,995	1,081,954	1,193,105	1,362,973
Indiana.....	6,634	16,660	13,211	15,260	9,839	16,398
Illinois.....	327,977	501,795	565,453	579,307	601,035	785,239
Wisconsin.....	5,003	37,446	85,985	46,280	78,167	151,209
Missouri.....	29,623	54,346	97,891	63,486	53,510	66,585
Colorado.....	5,481	10,451	25,291	20,877	2,678	23,588
Total.....	2,675,635	3,806,174	4,270,635	4,743,989	5,951,425	7,154,725

STOCKS OF ALL KINDS OF PIG IRON UNSOLD AT THE  
CLOSE OF 1886, 1887, 1888, 1889, AND 1890.

*These statistics, collected directly from the manufacturers by The American Iron and Steel Association, represent only unsold stocks in the hands of makers or their agents, and do not include stocks in the hands of consumers, brokers, creditors, or speculators, nor pig iron made for the use of the makers, nor foreign pig iron held in bond.*

States and Districts.	Net tons of 2,000 pounds.				
	1886.	1887.	1888.	1889.	1890.
New England.....	9,218	7,930	11,266	19,897	11,572
New York.....	28,202	35,019	31,224	42,607	64,381
New Jersey.....	1,632	22,211	23,817	5,800	25,068
Lehigh Valley.....	2,193	31,519	4,788	2,255	39,304
Schuylkill Valley.....	17,816	19,103	31,313	22,714	27,190
Upper Susquehanna Valley.....	2,383	6,589	9,435	3,845	7,972
Lower Susquehanna Valley.....	4,409	7,023	10,602	5,694	16,733
Shenango Valley.....	13,371	29,955	17,837	6,272	42,272
Allegheny county.....		33,841	7,704	567	14,880
Miscellaneous bituminous.....	18,125	17,269	19,400	18,205	45,802
Charcoal.....	12,905	8,876	7,904	7,453	10,382
Total for Pennsylvania.....	71,202	154,175	109,003	67,005	204,585
Maryland.....	5,455	1,167	1,900	1,372	1,637
Virginia.....	7,620	2,755	8,907	4,080	11,301
Georgia, Texas, and North Carolina.....	5,726	4,093	10,006	4,050	17,406
Alabama.....	14,025	14,248	23,851	39,916	69,957
West Virginia.....	4,680	4,835	400		11,414
Kentucky.....	4,218	4,324	8,970	5,382	9,413
Tennessee.....	14,488	7,726	8,282	7,982	28,142
Hanging Rock.....	14,661	7,672	18,272	6,843	18,923
Mahoning Valley.....	1,463	12,365	2,531	12,149	52,632
Hocking V. and miscellaneous.....	7,945	12,970	16,300	8,587	45,033
Total for Ohio.....	24,069	33,007	37,103	27,579	116,608
Michigan and Indiana.....	41,933	39,319	39,886	25,102	56,452
Illinois.....	300				
Wisconsin and Minnesota.....	6,002	845	7,163	9,428	19,504
Missouri and Colorado.....	7,682	5,329	11,701	8,981	29,434
Pacific States.....	6,232	1,159	2,682	8,220	5,168
Grand total.....	252,704	338,142	336,161	277,401	681,992

## STOCKS ACCORDING TO FUEL USED.

Bituminous.....	70,634	127,978	118,261	86,772	341,303
Anthracite and anth. and coke mixed	50,503	114,107	106,529	77,502	164,301
Charcoal.....	131,567	96,057	111,371	113,127	176,388
Total.....	252,704	338,142	336,161	277,401	681,992



# THE MANUFACTURE OF ROLLED IRON IN PENNSYLVANIA IN 1886, 1887, 1888, 1889, AND 1890, 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 just named, extending to the western limits of Bedford, Blair, Centre, and Clinton counties; Western Pennsylvania comprises all counties west of those just named, except Allegheny.

## BAR, ROD, BOLT, HOOP, SKELP, AND SHAPED IRON, AND ROLLED AXLES.

Districts.	Net tons of 2,000 pounds.				
	1886.	1887.	1888.	1889.	1890.
Philadelphia.....	70,654	85,999	93,691	97,484	91,559
Eastern Pennsylvania.....	104,783	120,709	117,220	118,071	135,980
Central Pennsylvania.....	118,986	156,483	148,284	175,845	214,873
Allegheny county.....	412,501	500,244	452,468	498,444	537,860
Western Pennsylvania.....	40,676	55,574	38,679	63,665	68,301
Total.....	747,600	919,009	880,342	953,509	1,048,573

## PLATE AND SHEET IRON, EXCEPT NAIL PLATE.

Philadelphia.....	9,569	11,108	7,441	4,464	3,195
Eastern Pennsylvania.....	124,578	134,711	144,657	142,982	172,221
Central Pennsylvania.....	27,996	41,963	40,108	36,303	47,003
Allegheny county.....	125,633	152,522	141,245	139,206	126,191
Western Pennsylvania.....	17,445	19,694	24,081	28,847	28,004
Total.....	305,521	359,998	357,532	351,802	376,614

## IRON CUT NAILS AND SPIKES. (One net ton equals 20 kegs.)

Philadelphia.....	28,772	19,648	9,213	12,293	14,915
Eastern Pennsylvania.....					
Central Pennsylvania.....	67,365	48,117	38,518	35,584	36,844
Allegheny county.....	3,685	400	.....	200	.....
Western Pennsylvania.....	13,748	4,751	4,866	.....	.....
Total.....	113,570	72,916	52,597	48,077	51,759

## IRON RAILS.

Philadelphia.....	.....	.....	.....	.....	.....
Eastern Pennsylvania.....	334	148	30	39	56
Central Pennsylvania.....	7,646	8,032	2,598	1,019	1,436
Allegheny county.....	1,615	1,047	625	600	800
Western Pennsylvania.....	.....	100	52	30	80
Total.....	9,595	9,347	3,305	1,688	2,372

## TOTAL ROLLED IRON.

Philadelphia (except nails).....	80,223	97,107	101,132	101,948	94,754
Eastern Pennsylvania.....	258,767	275,216	271,120	273,385	323,172
Central Pennsylvania.....	221,993	254,615	229,508	248,751	300,156
Allegheny county.....	543,434	654,213	594,338	638,450	664,851
Western Pennsylvania.....	71,869	80,119	67,678	92,542	96,385
Total.....	1,176,286	1,361,270	1,263,776	1,355,076	1,479,318

## THE MANUFACTURE OF ROLLED IRON IN OHIO IN 1886, 1887, 1888, 1889, AND 1890, 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; the Interior counties cover 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.

## BAR, ROD, BOLT, HOOP, SKELP, AND SHAPED IRON, AND ROLLED AXLES.

Districts.	Net tons of 2,000 pounds.				
	1886.	1887.	1888.	1889.	1890.
Lake counties.....	42,208	41,073	46,455	72,731	71,580
Mahoning Valley.....	169,075	200,364	216,691	248,976	282,792
Interior counties.....	42,906	49,089	55,226	54,856	52,355
Ohio River counties.....	23,236	34,395	26,602	32,580	25,300
Total.....	277,425	324,921	344,974	409,143	432,027

## PLATE AND SHEET IRON, EXCEPT NAIL PLATE.

Lake counties.....	9,969	12,594	11,960	16,449	16,321
Mahoning Valley.....	11,439	18,668	23,772	18,296	13,577
Interior counties.....	3,000	3,013	4,600	7,290	14,761
Ohio River counties.....	19,195	19,324	20,031	20,248	24,424
Total.....	43,603	53,599	60,363	62,283	69,083

## IRON CUT NAILS AND SPIKES. (One net ton equals 20 kegs.)

Lake counties.....	.....	.....	.....	.....	.....
Mahoning Valley.....	9,933	10,393	4,389	500	.....
Interior counties.....	.....	.....	.....	.....	.....
Ohio River counties.....	23,708	15,344	1,766	2,002	2,318
Total.....	33,641	25,737	6,155	2,502	2,318

## IRON RAILS.

Lake counties.....	.....	135	.....	.....	.....
Mahoning Valley.....	.....	2,000	.....	200	.....
Interior counties.....	312	647	426	561	558
Ohio River counties.....	145	1,224	473	431	230
Total.....	457	4,006	899	1,192	788

## TOTAL ROLLED IRON.

Lake counties.....	52,177	53,802	58,415	89,180	87,901
Mahoning Valley.....	190,447	231,425	244,852	267,972	296,369
Interior counties.....	46,218	52,749	60,252	62,707	67,674
Ohio River counties.....	66,284	70,287	48,872	55,261	52,272
Total.....	355,126	408,263	412,391	475,120	504,216

# IRON AND STEEL PRODUCTION OF ALLEGHENY COUNTY, PENNSYLVANIA.

Allegheny county, in Pennsylvania, which includes the city of Pittsburgh within its limits, is well known as the leading iron and steel producing county in the United States. It has long occupied this position. The following table gives the production of iron and steel in this county since 1874, in net tons.

## BLAST FURNACES AND STEEL WORKS.

Years.	Number of blast furnaces.	Make of pig iron. Net tons.	Number of steel works.*	Net tons crucible steel ingots.	Net tons all other steel, including Bessemer ingots.	Total make of steel. Net tons.
1874.....	11	143,660	11	17,915	6,000	23,915
1875.....	11	131,856	14	22,942	15,498	38,440
1876.....	11	128,555	14	25,009	54,467	79,476
1877.....	12	141,749	14	24,747	82,401	107,148
1878.....	12	217,299	14	27,866	106,948	134,814
1879.....	13	267,315	18	40,142	130,781	170,923
1880.....	15	300,497	17	52,136	169,819	221,955
1881.....	15	385,453	17	61,256	247,345	308,601
1882.....	16	358,840	18	59,596	258,501	318,097
1883.....	16	592,475	20	59,128	346,402	405,530
1884.....	17	487,055	22	38,885	289,376	328,261
1885.....	17	585,696	24	42,139	364,905	407,044
1886.....	18	737,124	26	58,208	561,550	619,758
1887.....	20	897,849	26	60,393	761,038	821,431
1888.....	20	890,569	27	54,124	698,315	752,439
1889.....	21	1,293,435	27	55,831	1,049,742	1,105,573
1890.....	25	1,497,786	27	53,122	1,394,798	1,447,920

## ROLLING MILLS.

Years.	Number of rolling mills.†	Product of iron rails, bar, angle, bolt, rod, and hoop. Tons.	Product of iron sheet and plate, except nail plate. Tons.	Product of iron nails. Kegs of 100 pounds.	Total rolled iron, including nails. Net tons.	Product of steel nails. Kegs of 100 pounds.
1874.....	31	194,114	52,361	562,995	274,625	.....
1875.....	31	171,178	45,773	442,359	239,069	.....
1876.....	31	189,511	31,488	538,874	247,943	.....
1877.....	31	208,342	30,254	597,806	268,486	.....
1878.....	31	226,687	33,445	444,013	282,333	.....
1879.....	32	286,882	52,265	294,942	353,894	.....
1880.....	30	287,253	80,899	419,098	389,107	.....
1881.....	30	405,119	75,767	485,916	505,182	.....
1882.....	31	336,628	71,038	459,228	430,627	.....
1883.....	32	367,106	73,850	627,896	472,351	.....
1884.....	31	318,813	68,669	459,512	410,457	.....
1885.....	31	315,810	88,178	176,258	412,801	.....
1886.....	30	414,116	125,633	73,691	543,434	47,750
1887.....	31	501,291	152,522	8,000	654,213	269,410
1888.....	31	453,093	141,245	.....	594,338	232,762
1889.....	33	499,044	139,206	4,000	638,450	169,765
1890.....	33	538,660	126,191	.....	664,851	52,336

\* Bessemer steel works included; a few of these works are also iron rolling mills.

† Exclusive of mills included with steel-producing plants. In the earlier years given in the table these mills rolled iron almost exclusively, but in the later years most of them have rolled more or less steel, and some roll steel exclusively.

## PRODUCTION OF LEADING ARTICLES OF IRON AND STEEL IN THE UNITED STATES FROM 1879 TO 1890.

*Statistics collected from the manufacturers by The American Iron and Steel Association.*

Products.	Net tons of 2,000 pounds.											
	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
Pig iron.....	3,070,875	4,286,414	4,641,564	5,173,122	5,146,972	4,589,613	4,529,820	6,365,328	7,187,206	7,268,507	8,515,079	10,307,028
Spiegeleisen, included above.....	13,931	19,603	21,086	21,963	24,574	33,893	34,571	47,982	47,598	54,769	85,823	149,162
All rolled iron.....	2,047,484	2,392,668	2,643,927	2,408,831	2,348,874	1,937,307	1,894,526	2,283,622	2,588,500	2,411,654	2,586,385	2,890,377
Rolled iron, excluding rails.....	1,627,324	1,898,906	2,155,346	2,265,957	2,283,920	1,931,717	1,780,711	2,259,943	2,565,438	2,397,402	2,576,127	2,804,829
Kegs of cut nails and spikes.....	5,011,021	5,370,512	5,794,206	6,147,097	7,762,737	7,581,379	6,096,815	8,100,973	6,908,570	6,493,591	5,810,758	5,640,946
Bessemer steel rails.....	683,964	954,460	1,330,392	1,438,155	1,286,554	1,116,621	1,074,607	1,763,667	2,351,192	1,552,631	1,691,264	2,691,978
Open-hearth steel rails.....	9,149	13,615	25,217	22,765	9,186	2,670	4,793	5,255	19,203	5,261	3,346	4,018
Iron rails.....	420,160	493,762	488,581	227,874	64,954	25,560	14,815	23,679	23,002	14,202	10,258	15,548
Ratils of all kinds.....	1,113,273	1,461,837	1,844,100	1,688,794	1,360,694	1,141,851	1,094,215	1,792,601	2,396,397	1,572,144	1,704,868	2,111,544
Crucible steel ingots.....	56,780	72,424	89,762	85,080	80,455	59,662	64,511	80,609	84,421	78,713	81,969	79,716
Open-hearth steel ingots.....	56,290	112,903	146,946	160,542	133,679	131,617	149,381	245,250	360,717	392,086	419,488	574,829
Bessemer steel ingots.....	928,972	1,263,173	1,539,157	1,696,450	1,654,627	1,540,505	1,701,762	2,541,493	3,288,357	2,812,500	3,281,829	4,131,635
Miscellaneous steel.....	5,464	8,465	3,047	3,014	5,698	5,111	1,696	2,651	6,205	4,124	5,731	4,248
Steel of all kinds.....	1,047,506	1,397,015	1,778,912	1,945,095	1,874,359	1,736,985	1,917,350	2,870,003	3,739,760	3,247,373	3,792,020	4,790,319
Blooms from ore and pig iron.....	62,353	74,589	84,006	91,233	74,758	57,005	41,700	41,909	43,306	39,875	36,290	39,783

# STATISTICS OF THE FOREIGN IRON TRADE FOR 1890.

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## GENERAL SUMMARY FOR 1890 AND FOR THE FIRST QUARTER OF 1891.

THE extraordinary activity which characterized the iron and steel industries of Europe in 1889 suddenly began to decline with the close of that year. In January, 1890, prices began to weaken and the demand began to slacken. In the immediately following months this reactionary tendency was still further emphasized, and as the year progressed actual depression followed, which was continued until its close. Thus far in 1891 there has been no improvement, but in Great Britain, Germany, and Belgium particularly the depression has deepened. The effects of the reaction are being felt now more than in 1890, both in production and prices.

The causes of the European reaction are easily understood. The high prices which prevailed in the boom year 1889 of themselves tended at last to restrict consumption. Then, again, the extraordinary production of that year, stimulated by an active demand, met not only the immediate wants of consumers but largely also their anticipated wants, so that a slackened pace would eventually ensue from this cause alone as well as from high prices. Both causes affected especially the British shipbuilding industry, which is a large consumer of iron and steel. Many ships were built in 1888 and 1889, but declining freights afterwards showed that it would not be profitable to shipowners to continue giving out contracts with the same degree of liberality as in these two years. Old contracts, however, kept the shipyards active during 1890. Unwise speculation, wild as it could be, was a third and a very powerful cause of the reaction of 1890. Large amounts of British capital had been diverted in 1889 and in immediately preceding years from profitable channels of employment into recklessly speculative investments in the Argentine Republic and elsewhere in South America. For a time the money thus furnished stimulated the iron and steel industries of Great Britain by creating a demand for rails and other railroad material. But about the beginning of 1890 the Argentine boom began to weaken, and soon

afterwards the inevitable day of settlement for South American speculative enterprises exposed the unsubstantial basis upon which the boom rested. An end came to the outflow of British capital, and following this came the inexorable demand upon British banking institutions, which had invested in South American securities, to protect their own credit. The great London panic of November last was the final catastrophe which showed how reckless was the spirit of speculation that had for a year or two prevailed. In the meantime orders for iron and steel for South America had fallen off. The British iron industry is now in a very depressed condition. Exports have greatly declined.

Notwithstanding the reactionary influences of 1890 their effects are seen more in the great fall in prices than in the decline in production. The latter, indeed, owing partly to the free placing of orders in the last half of 1889, was not in the aggregate greatly below that of the year last mentioned. The fall in prices in British iron and steel markets was very great, and it was largely reflected in Continental markets. The *London Iron* for January last summarizes the history of British prices for 1890 as follows:

Scotch and Cleveland pig iron opened almost on a level with each other, the former at 64s. per ton and the latter at 65s., but by the end of January Scotch iron had fallen 7s. 6d. per ton and Cleveland a like amount. The closing figures of the year were 46s. 3d. and 42s. 3d. per ton for Scotch and Cleveland respectively. Steel rails, which were selling last January at £7, can now be bought at £5. Steel ship plates and angles have declined from £8 15s. and £7 15s. per ton respectively to £6 7s. 6d. and £6; iron plates, from £8 5s. to £6; and bar iron about the same.

The *London Economist* says that the highest point reached for Scotch pig-iron warrants in 1890 was on January 6th, when 66s. 3d. was paid, but from this date there was a sharp reaction, the price falling 15s. in five weeks. The lowest price which Scotch warrants ever touched was in 1888, namely, 37s. 1d.

The *London Iron* gives the following summary of the course of the Continental iron trade in 1890. Since the beginning of 1891 the adverse conditions of 1890 have been intensified.

Never before, perhaps, were expectations strung so high as at the commencement of 1890, and never were hopes more completely disappointed. This may be said to be the net outcome of the iron trade on the Continent during the past twelve months. The year began well everywhere—in Austria, Belgium, France, and Germany—and, with the exception of Austria, it has closed indifferently. Work was plentiful at

its beginning, prices were remunerative, and prospects were good; but as the year grew each successive month made it clearer that trade had once more begun a downward course, and when the depression in the English iron market came to have its full effect on those of the Continent all hope of an early improvement passed away.

Owing to exceptionally favorable conditions the Austrian iron trade, as already stated, formed an exception to the general dullness. It continued to flourish to a degree not easily attained to by other countries. Like its predecessors 1890 was a very good year for the Austrian iron trade, the demand being of a steady and increasing nature, and prices keeping up in correspondence therewith. With the exception of a few slight variations the close of the year found values of iron and steel almost on a level with those ruling twelve months ago.

The course of business in the Belgian iron trade during 1890, on the contrary, was marked by a depression which was just as pronounced as the rise of the previous year had been emphatic. Belgium largely depends upon her export trade for her prosperity, and in this respect 1890 was not at all satisfactory. It was but natural that with a falling-off in that trade prices should decline, although it may be doubted whether any one was prepared for the great drop which took place in all descriptions of iron and steel. If to this be added that fuel was exceptionally dear in Belgium throughout the year no surprise will be felt when it is stated that the trade at last became completely disorganized, from which condition it has not yet emerged.

If we were to judge by the production of iron and steel in France during the first six months of 1890, and the favorable nature of her foreign trade returns, we should arrive at the conclusion that last year was an exceptionally good one for the French iron trade. As a matter of fact, notwithstanding favorable statistics, the French iron trade has shared to some extent in the depression ruling in other markets, although not to the extent experienced elsewhere. The course of prices indicates that there was a scarcity of work in the latter half of the year and that manufacturers were only too willing to take orders at steadily declining rates.

Finally, as regards Germany, while 1889 was a year of buoyancy and of extravagant prices in the German iron trade the year just closed was quite the reverse, values having dropped in 1890 almost to the same extent as they rose in the previous year. In fact, for some classes of iron the fall has been even more abnormal. It is true the increase in the production was larger than in 1889, but it must be remembered that the trade of the latter year was seriously interfered with by the great coal strike in May. The foreign trade of Germany did not show a favorable standard, and when to this is added the fact that the home trade likewise showed a considerable falling-off the depression which prevailed for the greater part of the year is fully explained.

European iron and steel manufacturers are now confronted with the continued high cost of fuel and the enhanced cost of labor.



## PRODUCTION OF BASIC STEEL.

In the following table we give the official statistics of the production by countries of basic steel in the last four years.

Countries—Gross tons.	1887.	1888.	1889.	1890.
England.....	364,526	408,594	493,919	503,400
Germany, Luxemburg, and Austria.....	1,102,496	1,276,070	1,481,642	1,695,472
France.....	176,500	222,333	222,892	240,638
Belgium, Russia, and United States.....	60,959	46,237	76,599	163,573
Total.....	1,704,481	1,953,234	2,274,552	2,603,083

The increased production of basic steel in 1890 over 1889 was 328,531 gross tons. The total production of basic steel since the invention of the basic process down to the close of last year was 13,448,000 gross tons.

Of the total production of basic steel in 1890 there were made by the basic Bessemer process 2,232,639 tons and by the basic open-hearth process 370,444 tons. Of the basic Bessemer production 1,593,148 tons contained under .17 per cent. of carbon, and of the basic open-hearth production 298,867 tons contained under .17 per cent. of carbon.

In the production of 2,603,083 tons of basic steel in 1890 there were also produced 623,000 tons of slag, containing about 36 per cent. of phosphate of lime, nearly the whole of which was used as a fertilizer.

## GREAT BRITAIN.

*Coal.*—The production of coal in Great Britain in 1890 reached the enormously large figures of 181,614,288 gross tons, against 176,916,724 tons in 1889, and 169,935,219 tons in 1888. In the following table we give the production of coal in Great Britain from 1873 to 1890, in gross tons.

Years.	Gross tons.	Years.	Gross tons.
1873.....	128,680,131	1882.....	156,499,977
1874.....	126,590,108	1883.....	163,787,327
1875.....	133,306,485	1884.....	160,757,779
1876.....	134,125,166	1885.....	159,351,418
1877.....	134,179,968	1886.....	157,518,482
1878.....	132,612,063	1887.....	162,119,812
1879.....	133,720,393	1888.....	169,935,219
1880.....	146,969,409	1889.....	176,916,724
1881.....	154,184,300	1890.....	181,614,288

The production of coal in 1890 shows an increase of 52,934,157 tons over that of 1873. The total number of persons employed in



and about the coal mines of Great Britain in 1890 was 613,233, of whom 4,206 were females working above ground. In and about all the mines of Great Britain 674,434 persons were employed in 1890, of whom 5,890 were females employed above ground.

*Iron Ore.*—The production of iron ore in Great Britain and Ireland in 1889 was 14,546,105 gross tons, against 14,590,713 tons in 1888. The production in 1890 has not yet been ascertained. The imports of iron ore into Great Britain amounted to 3,552,408 gross tons in 1888, 4,023,620 tons in 1889, and 4,469,390 tons in 1890. The following table gives the production of iron ore in Great Britain from 1876 to 1889, in gross tons.

Years.	Gross tons.	Years.	Gross tons.
1876.....	16,841,000	1883.....	17,383,000
1877.....	16,692,000	1884.....	16,137,887
1878.....	15,726,000	1885.....	15,417,982
1879.....	14,300,000	1886.....	14,110,013
1880.....	18,026,000	1887.....	13,098,041
1881.....	17,446,000	1888.....	14,590,713
1882.....	16,627,000	1889.....	14,546,105

*Pig Iron.*—The production of pig iron in Great Britain in 1889 is officially reported by Her Majesty's Inspectors of Mines to have amounted to 8,322,824 gross tons, against 7,998,969 tons in 1888. The production in 1890 has not yet been ascertained, but English statisticians estimate it to have been about 8,000,000 tons, which figures are probably too high. The following table gives the production of pig iron in Great Britain and the United States from 1882, when Great Britain reached its maximum, until 1890.

Years—Gross tons.	Great Britain.	United States.
1882.....	8,586,680	4,623,323
1883.....	8,529,300	4,595,510
1884.....	7,811,727	4,097,868
1885.....	7,415,469	4,044,526
1886.....	7,009,754	5,683,329
1887.....	7,559,518	6,417,148
1888.....	7,998,969	6,489,738
1889.....	8,322,824	7,603,642
1890 (estimated for Great Britain).....	8,000,000	9,202,703

*Blast Furnaces.*—The total number of blast furnaces in Great Britain at the close of 1890 was 788, of which 346 were then in blast, against 393 on September 30th, 413 on June 30th, 455 on March 25th, and 460 at the close of 1889. On the 31st of March last there were 361 furnaces in blast. These figures not only

indicate a decreased production of pig iron in 1890 but the probability of a still greater decrease in 1891, notwithstanding the recent blowing in of some Scotch furnaces which were idle in the last quarter of 1890 in consequence of a strike among the workmen.

*The Great Scotch Strikes.*—One of the longest and most serious strikes in British industrial history occurred in Scotland early in October, 1890, when all the active furnaces in that part of the United Kingdom except six were either damped down or blown out because the workmen at the furnaces insisted on extra pay for Sunday work and resisted a reduction in wages. About eighty furnaces ceased to produce pig iron. The strike lasted until late in February, 1891, nineteen weeks, when the men yielded and some of the furnaces were again blown in. The strike caused a reduction in the total output of pig iron in Scotland of 200,000 tons in 1890, the production in that year being 798,333 gross tons, against 998,928 tons in 1889. But the Scotch ironmasters lost nothing. The strike checked the accumulation of stocks.

Just before Christmas another serious strike in Scotland occurred among the employés on the Caledonian and the North British railways. The men demanded a working day of ten hours and better treatment generally. This strike paralyzed all traffic on the affected roads for five weeks, when the men surrendered after certain guarantees had been given them.

*Shipbuilding.*—Notwithstanding the falling off in orders for iron and steel ships in British yards in 1890, and particularly in the latter part of the year, the year's tonnage, owing to the carrying forward of orders in 1889, was almost as large as in the year last mentioned. The total tonnage for 1890 was 1,283,333 tons, against 1,300,933 tons in 1889. Included in the figures for both years are a few sailing vessels. Steel was more used in 1890 as a substitute for iron than in any previous year. A large part of the business of the year was the filling of Continental and other foreign orders. The greatest tonnage ever launched in British shipyards was built in 1883, amounting to 1,329,604 tons.

*Tinplate Prices in 1890.*—We copy from the *London Iron and Steel Trades Journal* for January 10, 1891, the following summary of the fluctuations in the prices of tinplates in South Wales in 1890, the year of the McKinley tariff.

Tinplate participated in the inflation of prices which characterized the end of 1889 and the beginning of 1890. In January, 1890, 16s. 6d. was the current quotation for common cokes; but the price gradually dwined

dled away, and in May and June buyers hesitated to pay even 13s. In August, as the time for the settlement of the new tariff approached, the market improved on American buying, and from 14s. the market rapidly rose to 16s. 6d. This figure was firmly maintained up to the end of the year, and many makers were refusing to sell their cheapest brands under 17s. at Swansea. The whole of the mills are fully engaged, and will be in full swing at least during the first six months of the new year. After the increased duty comes into force in July there will be dull times in the tinplate trade until accumulated stocks are worked off in America.

The same paper for January 31, 1891, says:

The tinplate market is very firm, and, without any excitement, prices are easily maintained, and the makers are doing a large business. Several idle works have been restarted, and some of the recently erected ones have got to work. Ordinary cokes are selling at 17s. and charcoals at 18s. 6d. per box, f. o. b. Liverpool.

On February 28, 1891, the same paper printed the following:

The market for tinplates shows no marked feature generally speaking, and were it not for the outside buyers, especially for Russian consumption, there would be really nothing to report. The home trade shows some slight improvement, but our American customers seem to be playing a waiting game. There is still much uncertainty with regard to the effect of the McKinley tariff, and in some directions hopes are held out that when the new American Congress meets the Democrats may possibly be able to pass bills which will upset the whole act.

At the present time the Welsh tinplate manufacturers, having overstocked the American market with tinplates, are restricting production. It is announced that they will close their works for one month, beginning on July 1st.

*Exports of Iron and Steel.*—The exports of iron and steel from Great Britain in 1890 were almost as large as in 1889, amounting to 4,001,579 tons, against 4,186,182 tons in 1889. The following table gives the total exports of iron and steel from Great Britain to all countries in the twenty-one years from 1870 to 1890.

Years.	Tons.	Years.	Tons.	Years.	Tons.
1870.....	2,825,575	1877.....	2,344,651	1884.....	3,496,991
1871.....	3,171,581	1878.....	2,299,223	1885.....	3,128,401
1872.....	3,382,762	1879.....	2,879,884	1886.....	3,389,197
1873.....	2,975,813	1880.....	3,792,993	1887.....	4,143,028
1874.....	2,487,162	1881.....	3,829,315	1888.....	3,966,563
1875.....	2,458,306	1882.....	4,350,297	1889.....	4,186,182
1876.....	2,224,470	1883.....	4,044,273	1890.....	4,001,579

While the quantity of iron and steel exported in 1890 was nearly

as large as the quantity exported in 1889 the values were much larger. In 1889 they amounted to £29,142,129, and in 1890 to £31,582,172. Since the beginning of 1891 the exports have greatly declined.

The total exports of iron and steel from Great Britain to the United States in 1890 amounted to 522,942 gross tons, against 575,708 tons in 1889, 649,393 tons in 1888, and 1,294,807 tons in 1887. Of the exports in 1890 tinplates alone represented 318,108 tons.

The exports of iron and steel from Great Britain to the Argentine Republic in 1890 amounted to 361,840 gross tons, against 414,595 tons in 1889, 376,306 tons in 1888, and 150,762 tons in 1887. Of the exports in 1889 railroad material of all sorts amounted to 263,135 tons, against 251,602 tons in 1888. Of the exports in 1890 there were 273,931 tons of railroad iron and steel.

The following table shows in detail the quantities of iron and steel which have been exported from Great Britain to all countries in the last four years, not including hardware and cutlery, machinery, engines and boilers, etc.

Articles—Gross tons of 2,240 pounds.	1887.	1888.	1889.	1890.
Pig iron.....	1,158,174	1,086,319	1,190,371	1,145,912
Bars, angles, bolts, and rods.....	263,546	297,527	252,382	222,281
Railroad iron and steel, all kinds.....	1,011,779	1,020,002	1,089,892	1,037,241
Wire, except telegraph wire.....	46,463	64,114	55,896	61,451
Hoops, sheets, and plates.....	351,041	411,357	385,723	336,683
Tinplates and sheets.....	353,506	391,361	430,650	418,725
Cast and wrought iron.....	369,307	428,112	463,526	454,046
Old iron and steel for remanufacture...	289,312	144,972	146,719	150,213
Steel unwrought.....	286,320	153,250	149,882	149,607
Manufactures of steel or steel and iron..	13,580	19,549	21,141	25,420
Total exports.....	4,143,028	3,966,563	4,186,182	4,001,579
Total values.....	£24,992,314	£26,416,666	£29,142,129	£31,582,172

The exports of machinery, engines and boilers, hardware and cutlery, tools, etc., in 1890 aggregated £20,518,823, against £19,516,191 in 1889.

#### GERMANY.

*Coal.*—The production of stone coal in Germany in 1888 was 65,386,000 metric tons, and the production of lignite was 16,574,000 tons, making a total of 81,960,000 tons. The production of stone coal in 1889 is unofficially reported to have been 67,341,337 tons, and of lignite to have been 17,631,000 tons.

The exports of coal from Germany in 1889 amounted to 8,860,217 tons, and the imports into Germany and Luxemburg amounted to 4,573,209 tons. In 1890 the exports of coal were fully maintained and about a million tons of coke were also exported.

*Iron Ore.*—The production of iron ore by Germany and Luxemburg in 1889 amounted to 11,002,000 metric tons, against 10,664,307 tons in 1888, and 9,351,100 tons in 1887.

The imports of iron ore into Germany and Luxemburg, chiefly from Spain, amounted to 1,522,180 metric tons in 1890, against 1,234,789 tons in 1889, and 1,163,373 tons in 1888; and the exports, chiefly from Lothringen and Luxemburg, amounted to 2,208,122 tons in 1890, against 2,179,836 tons in 1889, and 2,211,820 tons in 1888.

*Pig Iron.*—The production of coke pig iron in Germany and Luxemburg in 1890 was 4,563,025 metric tons, against 4,387,504 tons in 1889, and 4,229,484 tons in 1888. A small quantity of charcoal pig iron is also annually produced in Germany.

*Steel.*—The production of steel of all kinds in Germany in 1889, not counting puddled steel, which is classified with wrought iron, was 2,095,000 metric tons, against 1,862,667 tons in 1888.

#### AUSTRIA AND HUNGARY.

*Pig Iron.*—The production of pig iron in the Austro-Hungarian Empire in 1889 was 816,156 metric tons, against 790,227 tons in 1888, and 703,530 tons in 1887. Of the output in 1889 Austria produced 593,262 tons and Hungary produced 222,894 tons.

*Steel.*—The production of steel ingots in Austria and Hungary in 1889 was 398,156 metric tons, against 355,038 tons in 1888, and 276,670 tons in 1887.

#### FRANCE.

*Pig Iron.*—The production of pig iron in France in 1890 was 1,970,160 metric tons, against 1,733,964 tons in 1889, 1,683,349 tons in 1888, and 1,567,622 tons in 1887. It will be seen from these figures that France greatly increased her production of pig iron in 1890. In 1883, however, which was her year of greatest production, she exceeded the production of 1890, the figures for 1883 being 2,069,430 tons.

*Finished Iron.*—The production of finished iron in France in 1890 was 823,360 metric tons, against 808,724 tons in 1889, 811,953 tons in 1888, and 771,610 tons in 1887. The year of great-

est production of finished iron in France was 1882, when the figures reached 1,073,021 tons.

*Finished Steel.*—The production of finished steel, including rails, in France in 1890 was 566,197 metric tons, against 529,302 tons in 1889, 517,294 tons in 1888, and 493,294 tons in 1887. The production of steel in 1890 was the largest that France has yet attained.

#### BELGIUM.

*Coal.*—The production of coal in Belgium in 1890 was 20,343,495 metric tons, against 19,869,980 tons in 1889, and 19,218,484 tons in 1888.

*Pig Iron.*—The production of pig iron in Belgium in 1890 was 781,958 metric tons, against 832,226 tons in 1889, and 826,850 tons in 1888.

*Manufactured Iron.*—The production of manufactured iron in Belgium in 1890 was 506,957 metric tons, against 577,204 tons in 1889, and 547,818 tons in 1888.

*Steel.*—The production of steel ingots in Belgium in 1890 was 239,266 metric tons, against 254,397 tons in 1889, and 231,000 tons in 1888. The production of rails and other finished steel in 1890 was 216,129 metric tons, against 214,561 tons in 1889, and 185,417 tons in 1888.

#### SPAIN.

*Iron Ore.*—The shipments of iron ore from Bilbao in 1890 were the largest ever attained. They amounted to 4,272,918 metric tons, against 3,901,511 tons in 1889, 3,631,593 tons in 1888, and 4,193,696 tons in 1887. The shipments of iron ore from Bilbao to the United States in the last four years have been as follows: 152,077 tons in 1887; 14,778 tons in 1888; 3,748 tons in 1889; and 89,335 tons in 1890. Great Britain annually takes nearly three-fourths of the shipments from Bilbao. Germany is the next largest consumer of Bilbao ore, followed by France and Belgium. The shipments of ore from Bilbao during the first three months of 1891 show a decrease of 330,000 tons as compared with the first three months of last year, and are the least since the year 1882. Prices have fallen.

*Steel.*—It is stated that there are now five Bessemer and open-hearth steel works in operation in the provinces of Asturias, Biscay, and Navarre, besides several plants for the production of steel by the puddling and cementation processes. The open-hearth plants are operated by the basic process. Spain is now an active producer of Bessemer pig iron and Bessemer steel.

## SWEDEN.

The official statistics of the iron and steel industries of Sweden from 1885 to 1889 are as follows. They do not include Norway.

Articles—Metric tons.	1885.	1886.	1887.	1888.	1889.
Iron ore.....	873,362	872,479	903,186	959,540	985,904
Pig iron, all made with charcoal.....	464,737	442,457	456,625	457,052	420,665
Iron and steel bars and rods.....	257,369	237,130	255,383	253,090	274,734
Bessemer iron and steel.....	52,021	54,121	68,199	68,620	80,324
Martin iron and steel.....	26,743	22,361	41,898	44,712	55,487
Other kinds of steel.....	1,786	1,749	1,468	1,205	2,010
Plates.....	16,494	13,579	12,394	19,701	27,389
Nails.....	10,577	10,289	10,239	10,683	12,072
Number of furnaces in blast.....	179	164	164	162	150
Total time for all furnaces in blast, days	42,460	39,777	40,582	39,840	35,859
Average daily product per furnace, tons	10.95	11.12	11.23	11.47	11.73
Average time per furnace in blast, days	237	242.5	247.5	246	239

## ITALY.

This country is beginning to furnish statistics relating to its iron and steel industries which are interesting and surprising.

*Coal.*—The production of coal in Italy, principally brown coal, in 1889 was 390,320 metric tons, against 366,794 tons in 1888, and 327,665 tons in 1887.

*Iron Ore.*—The production of iron ore in Italy in 1889 was 173,489 metric tons, against 177,157 tons in 1888, and 230,575 tons in 1887.

*Pig Iron.*—The production of pig iron in Italy in 1889 was 13,473 metric tons, against 12,538 tons in 1888, and 12,265 tons in 1887.

*Steel.*—The production of steel ingots in Italy in 1889 was 157,899 metric tons, against 117,785 tons in 1888, and 73,262 tons in 1887.

*Finished Iron.*—The production of finished iron in 1889 was 181,623 metric tons, against 177,019 tons in 1888, and 172,834 tons in 1887.

## NEW SOUTH WALES.

*Coal.*—The production of coal in New South Wales in 1889 was 3,655,632 gross tons, against 3,203,444 tons in 1888.

*Steel.*—A recent issue of the *Australian Mining Standard* says:

Although the attempt to establish extensive locomotive works in New South Wales proved a failure, the government, not deterred, have now come forward with another proposal which involves a new and important departure. It has decided to invite tenders for the supply of 175,000 tons of steel rails under special conditions. The rails are to be made



from material to be entirely manufactured and finished in the colony out of iron ore raised in New South Wales and from other necessary minerals the natural product of the colony, and with coal, coke, or other fuel smelted and raised within New South Wales. Delivery is to commence in January, 1893, and will be spread over a period of five years, computed from the first day of that month.

#### CHINA.

It is announced by the *North China Herald* that the erection of two large blast furnaces, a Bessemer steel works, a Siemens-Martin open-hearth plant, and extensive rolling mills, under the auspices of the government, has actually been commenced in China, on the northern slope of the Hanyang hills, between the ridge and the Han river, opposite to the city of Hankow, and thus close to the Yangtze, with which the works will afterwards be connected. This enterprise will be watched with great interest. The government has withdrawn its opposition to the building of railroads in China, and a road about 100 miles long is now in operation, connecting the coal mines at Tongsan with Lutai on the Peh Tang Ho, and extending to Tientsin, the port of Pekin.

#### CANADA.

*Coal.*—The production of coal in Canada in 1889 was 2,719,478 net tons, of which Nova Scotia produced 1,967,032 tons; British Columbia, 649,409 tons; and the Northwest Territories and New Brunswick the remainder.

*Iron Ore.*—The production of iron ore in Canada in 1889 was 84,181 net tons, of which Nova Scotia produced 54,161 tons; Quebec, 14,533 tons; and British Columbia, 15,487 tons.

*Pig Iron.*—The production of pig iron in Canada in 1889 amounted to 25,921 net tons.

*Steel.*—Incomplete returns (two firms not reporting) show a production in Canada in 1889 of 27,873 net tons of steel.

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