PROCEEDINGS

OF THE

AMERICAN

IRON AND STEEL ASSOCIATION,

AT

PHILADELPHIA, NOV. 20, 1873.

INCLUDING THE

ANNUAL REPORT OF THE SECRETARY.

PHILADELPHIA:
CHANDLER, PRINTER, 306 & 308 CHESTNUT STREET.
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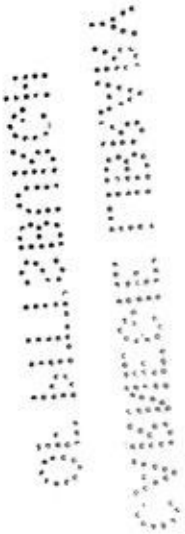

OFFICERS FOR 1873 AND 1874.

PRESIDENT.

SAMUEL J. REEVES,
410 Walnut Street, Philadelphia.

VICE-PRESIDENTS.

E. B. WARD,
Detroit, Michigan.

ABRAM S. HEWITT,
17 Burling Slip, New York.

S. M. FELTON,
125 S. 5th Street, Philadelphia.

JAMES I. BENNETT,
Pittsburgh.

JAMES PARK, JR., Pittsburgh.

SECRETARY.

JAMES M. SWANK,
522 Walnut Street, Philadelphia.

TREASURER.

CHARLES WHEELER,
Philadelphia.

EXECUTIVE COMMITTEE.

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A. S. HEWITT, 17 Burling Slip, New York.
C. S. KAUFFMAN, Columbia, Pennsylvania.
J. B. MOORHEAD, 138 S. 3d St., Philadelphia.
JAMES PARK, JR., Pittsburgh, Pennsylvania.
PERCIVAL ROBERTS, 412 Walnut St., Phila.
JAMES I. BENNETT, Pittsburgh, Pennsylvania.
R. H. LAMBORN, 125 S. 5th St., Philadelphia.
ALFRED HUNT, Bethlehem, Pennsylvania.
E. Y. TOWNSEND, 218 S. 4th St., Philadelphia.
CHARLES WHEELER, Philadelphia.
CHARLES STEWART WURTS, 218 S. 4th St., Phila.
A. B. STONE, Cleveland, Ohio.
EDWARD HARRISON, St. Louis, Mo.

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A. S HEWITT, 17 Burling Slip, New York.
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JOHN H. REED, Boston, Mass.
JAMES PARK, JR., Pittsburgh, Pennsylvania.
JOSEPH KINSEY, Cincinnati, Ohio.
C. S. KAUFFMAN, Columbia, Pennsylvania.
THOMAS S. BLAIR, Pittsburgh, Pennsylvania.
A. B. STONE, Cleveland, Ohio.
B. F. JONES, Pittsburgh, Pennsylvania.
J. T. WILDER, Chattanooga, Tenn.
CHARLES WHEELER, Philadelphia.
A. W. HUMPHREYS, 42 Pine St, New York
HORACE ABBOTT, Baltimore, Maryland.
S. J. REEVES, 410 Walnut St, Philadelphia.
J. M LORD, Indianapolis, Ind.
THOMAS BEAVER, Danville, Pennsylvania.
E Y. TOWNSEND, 218 S 4th St., Philadelphia.
JAMES I. BENNETT, Pittsburgh, Pennsylvania.
ALFRED HUNT, Bethlehem, Pennsylvania.
PERCIVAL ROBERTS, 412 Walnut St, Phila.
JAMES ROGERS, Essex, New York.
JOSEPH WHARTON, Philadelphia.
R. H. LAMBORN, 125 S. 5th St, Philadelphia.
A. B. MEEKER, Chicago, Ill.
GEO. W. HALL, St, Louis, Mo.
CHESTER GRISWOLD, Troy, N. Y.
E. B PRATT, Buffalo, New York.
ABRAM PATTERSON, Port Kennedy, Penna.
R. C. HANNAH, Chicago, Ill.

PROCEEDINGS

OF THE

ANNUAL MEETING

OF THE

AMERICAN IRON AND STEEL ASSOCIATION.

The annual meeting of the American Iron and Steel Association was held November 20, 1873, at the office, 522 Walnut Street, Philadelphia, Samuel J. Reeves, Esq., President, in the chair. Owing to the fact that very short notice was given, the meeting was not so largely attended as would have been the case under more favorable circumstances. Among those who were present may be mentioned the following gentlemen: Samuel J. Reeves, Esq., President, representing the Phœnix Iron Co., Phœnixville, Pa.; R. H. Lamborn, Pennsylvania Steel Co., Philadelphia, Pa.; Abram S. Patterson, Montgomery Iron Co., Port Kennedy, Pa.; E. B. Pratt, Buffalo Iron and Nail Company, Buffalo, New York; Paschall Hacker, Monocacy Furnace, (Wright, Cook & Co.,) Douglassville, Pa.; Hon. D. J. Morrell, Cambria Iron Co., Johnstown, Pa.; J. B. Moorhead, Merion Furnaces, Conshohocken, Pa.; James Park, Jr., of Park, Brother & Co., Pittsburgh, Pa.; James I. Bennett, Pittsburgh, Pa.; F. W. Noble, Wyandotte Rolling Mill Co., Detroit, Mich.; R. C. Hannah, North Chicago Rolling Mill Co., Chicago, Ill.; Charles Wheeler, Abbott Iron Co., Baltimore, and Pottstown Iron Co., Pa.; Wm. H. Morris, of Morris, Wheeler & Co., Philadelphia, Pa.; Joseph Wharton, Bethlehem Iron Co., Pa.; Hon. G. Dawson Coleman, Lebanon Furnaces, Lebanon, Pa.; Dr. C. S. Wurts, Cambria Iron Co., Pa.; and John H. Brown, of John H. Brown & Co., Wayne Iron and Steel Works, Pittsburgh, Pa.

The President's address occupied half an hour in delivery, and embraced a large number of topics, completely reviewing the business of the Association and the condition of the iron trade. Touching the question of iron shipbuilding, he maintained that it was the duty of Congress to protect our shipping interests from attacks of free traders, expressing his dissatisfaction with the resolution recently passed by the National Board of Trade, sitting at Chicago, in which they expressed their belief that the time had come when Congress should allow foreign-built ships to be registered by the United States. He asserted that America can supply as cheap and build as good ships as England or Scotland. In referring to our relations with Europe in the supply of iron and steel, he said we have now passed the point of dependence; we are now independent of the whole world. We have the skill, we have the ores, the coal, and the capital. If there is no adverse legislation by Congress, we will be able from this time forth to supply our own demand for iron and steel of every description, and to export these articles to our neighbors. We now make all kinds of pig iron in abundance, except spiegeleisen, and we will ultimately be enabled to dispense with its importation. An agent for the sale of railroad iron in New York city has acknowledged that his business in this country in the sale of English iron and steel rails is at an end, if our tariff laws remain as they now are. The commission men of that city are no longer opponents of the sale of American rails, for they are seeking agencies under home establishments in order to continue in the business.

He further stated that we need not invoke the aid of arithmetic to determine how many years our coal supply will continue, as our friends are doing in England. We have scarcely begun to scratch at our great deposits, and a century will roll by before we feel the necessity to economize in the use of fuel.

The proposed visit to America of the British Iron and Steel Institute was very pleasantly referred to. He hoped the Association would welcome the visitors warmly, and endeavor by all means in their power to give them a proper impression of the greatness of the iron industry of this country.

He dwelt at some length upon the desired union of the various

iron associations. It was not necessary to urge its importance. The iron interests of the country are so vast that, if united, their action would always be respected by the entire nation, and the labor of protecting themselves would thereby be greatly lessened. They could then advance in solid column with an unbroken front, without fear of danger from external opposing forces. By frequent meeting together, asperities would be softened, greater courtesy would prevail, new processes and improved methods of operating works would become more generally known, and the advantages to the trade in general, and therefore to the country at large, would be incalculable. From information in his possession, he believed the other associations were desirous to co-operate in the formation of a union society, and he would gladly do anything in his power to hasten the consummation wished for.

The Secretary, Mr. James M. Swank, read a short business report, after which his annual report was submitted to the Association. The report of the Treasurer, Mr. Charles Wheeler, was read. It shows a very satisfactory financial condition, the Association having a balance of $11,256 13 to its credit.

Hon. D. J. Morrell, referring to the President's address, said our supply of steel rails is now equal to the demand, and we will be able to control our own markets hereafter if prices in England do not so greatly recede that her manufacturers will be able to ship steel rails to this country. In view of this possible event, protection must still be continued. He also said that it was a matter of deep significance that the English government aimed through their consular system to acquaint themselves thoroughly with our progress in iron making; they even sent the second secretary of the legation at Washington on an extended tour throughout the country to observe the effect upon our industries of the recent panic.

Letters from Capt. E. B. Ward, of Detroit, Michigan, A. B. Stone, of Cleveland, Ohio, Abram S. Hewitt, of New York, and A. B. Meeker, of Joliet Iron and Steel Co., Chicago, Ill., were then read.

On motion of Mr. James I. Bennett, of Pittsburgh, the letters received, and the various subjects mentioned in the President's

address, were referred to a committee of seven, who were authorized to report resolutions. The committee consisted of Messrs. James I. Bennett, F. W. Noble, James Park, Jr., D. J. Morrell, Joseph Wharton, S. J. Reeves, and J. B. Moorhead.

The following officers were elected for the ensuing year: President, S. J. Reeves; Vice-Presidents, A. S. Hewitt, E. B. Ward, S. M. Felton, James I Bennett, and James Park, Jr.; Treasurer, Charles Wheeler; Secretary, James M. Swank; Executive Committee, S. J. Reeves, A. S. Hewitt, C. S. Kauffman, J. B. Moorhead, James Park, Jr., Percival Roberts, James I. Bennett, Robert H. Lamborn, Alfred Hunt, E. Y. Townsend, Charles Wheeler, Charles Stewart Wurts, A. B. Stone, and Edward Harrison.

Messrs. James Park, Jr., James I. Bennett, F. W. Noble and Joseph Wharton made short addresses upon the condition of the trade and the financial outlook.

Mr. James Park, Jr., then made a few remarks concerning the necessity of uniformity of duties collected on iron and steel at the various ports of entry, and asked that this subject be referred to the committee on resolutions, which was done.

On motion of Mr. Park, the clause relating to membership assessments in Art. IV. of the Constitution was amended as follows: "Upon Bessemer steel, 2 cents per ton of 2,000 lbs.; upon other steel, 2½ cents per ton."

Mr. James I. Bennett, from the committee on resolutions, made the following report, which was unanimously adopted:

Resolved, That this Association attributes the general prosperity of the iron trade of the country, which has characterized the past year and previous years, to the tariff policy of the Government, which has fostered home industry and enabled many branches of manufactures to attain a position rendering them independent of foreign rivalry.

Resolved, That the manufacturers of iron and steel in the United States do not regard themselves as in any way responsible for the present embarrassment of their industry, which they have conducted with care and economy, and they are assured that the adoption by Congress of a financial system adequate to the largely increased and increasing business needs of the country will enable them not only to supply all demands for home consumption, but also to rival older nations in the markets of the world.

Resolved, That the horizontal reduction of ten per cent. of duties, made by

the second section of the Act of Congress of June 6, 1872, was unwise and uncalled for, and that it has been detrimental to the revenues of the Government and should be repealed.

Resolved, That Congress should revise the national banking system, removing the monopoly enjoyed by existing national banks, prohibiting them from paying interest on demand deposits, and making other wholesome regulations for their government, and should devise other means for affording an adequate supply of currency and for giving it requisite flexibility.

Resolved, That the laws regulating customs duties should have equal and uniform construction and application at all the ports of the United States, and the contrary practice which now prevails should be corrected by the Secretary of the Treasury or by Congress.

Resolved, That the rapid and healthful growth of iron shipbuilding in this country has demonstrated the beneficial influences of the registry laws of the United States, and that under their protection American shipbuilders will be enabled, through the improvement and development of our manufactures of iron, to take possession of the carrying trade of the country, foreign as well as inland, thus adding greatly to the prosperity of the nation in peace, and to its strength and resources in time of war. We believe that free trade in ships would check this wholesome progress, would be detrimental to American labor, and injurious to the best interests of the country.

Resolved, That we regard the power given to a single creditor, under the present banking law, to force a debtor into bankruptcy, against the will and to the injury of all others having claims upon the estate, as unjust in principle and disastrous in practice, and in the opinion of this Association the law should be so amended as to give to three-fourths of the creditors in interest the right to control the settlement of the affairs of an insolvent, and to prevent them from being subjected to proceedings in bankruptcy.

Resolved, That this Association has learned with great satisfaction that the members of the Iron and Steel Institute of Great Britain propose to visit this country next year, for the purpose of ascertaining the extent and progress of the iron and steel industries of the United States, and that the members of this Association will extend to them a hearty welcome, and will take pleasure in showing them their several works, and in otherwise aiding them to accomplish the object of their visit.

Resolved, That the acceptance by the Executive Committee of the trust delegated to this Association, by the Executive Committee of the United States Centennial Commission, of making an adequate representative collection of the iron ores of the United States, for display at the International Exhibition of 1876, is hereby approved; and recognizing the importance and difficulty of the work, the Association asks the active co-operation of all manufacturers of iron and steel and producers of iron ores, and it further invites assistance in

the collection of samples of all the fuels, fluxes, and refractory materials used in the iron trade or likely to be of use to it.

Mr. Bennett moved that when this Association adjourns, it shall adjourn to meet in Philadelphia, on the first Wednesday in February, 1874, and that the other iron associations be requested through their secretaries to meet with us in joint convention on the following day. The motion was adopted, and the Association adjourned.

SAMUEL J. REEVES,
President.

JAMES M. SWANK,
Secretary.

FINANCIAL STATEMENT showing the amount of money received by the Treasurer of the American Iron and Steel Association from the 1st of January, 1873, to the 20th of November; the amount drawn from the Treasury by vouchers, and the balance remaining in the Treasurer's hands to the credit of the Association on the 20th of November:

1873.		Dr.	1873.		Cr
January 7,	To amount received by Treasurer,	$ 417 23	February 1,	By am't drawn as per voucher A,	$748 23
February 1,	" " " "	479 80	February 28,	" " " " B,	514 29
February 28,	" " " "	226 75	March 31,	" " " " C,	525 63
April 30,	" " " "	333 47	April 30,	" " " " D,	592 28
July 31,	" " " "	2,502 90	May 31,	" " " " E,	600 99
August 29,	" " " "	2,895 07	May 31,	" " " " F,	325 50
August 29,	" " " "	194 19	June 30,	" " " " G,	641 53
			June 30,	" " " " H,	300 00
	Total, - - - -	$7,049 41	July 31,	" " " " I,	618 63
			August 29,	" " " " K,	526 50
			Sept. 26,	" " " " L,	527 30
			October 25,	" " " " M,	478 86
				Total, - - - -	$6,399 74

Amount in Treasurer's hands November 20th, 1873.....$11,256 13

CHARLES WHEELER,

Treasurer American Iron and Steel Association.

IRON ORES FOR THE CENTENNIAL.

OFFICE OF THE U. S. CENTENNIAL COMMISSION,
904 Walnut Street, Philadelphia, October 16, 1873.

SAMUEL J. REEVES, Esq.,
President of the American Iron and Steel Association,
522 Walnut Street, Philadelphia

DEAR SIR: The Executive Committee of the Centennial Commission have received a large number of communications, emanating from prominent iron-masters, manufacturers, chemists, and business men in every section of the United States, requesting the Committee to take some action upon the proposition of Mr. J. Blodget Britton to secure a comprehensive exhibition of the iron ores of the United States in the Centennial Exhibition. The writers of these communications have, in almost every instance, assumed that to make a collection, classification, and analysis of ores is properly within the province of the Commission, and they, therefore, have suggested plans by which the proposed exhibition of ores will secure wide-spread co-operation among those interested in the development of the mineral resources of the United States.

Waiving all discussion of the importance of such an exhibition, and conceding the incalculable benefit accruing from the efforts of the people to make this collection of ores a complete display of the mineral wealth of the country, the Executive Committee of the Commission desire to state that, in their view, it is wholly impracticable for the Committee to take such charge of the work of collecting, classifying, and analyzing ores as is contemplated by the writers of the communications referred to. They will provide a place in the Exhibition building for the exhibition of specimens, and will endeavor to secure all conditions necessary to a favorable display and to afford every requisite for a satisfactory examination by visitors. But they can not take charge of the preliminary work of collection, as that would involve the employment of salaried officers, the consumption of time otherwise needed, and the entailment of heavy expenditures for the purpose of assisting in the display of but one of the many products of this favored land. Other industries may claim this attention from the Committee as well as the iron interest, and it can very readily be seen that such an extension of the powers and duties of the Centennial Commission was not contemplated by the act of Congress which called them into being, nor could it be attempted by them without a serious complication of their present heavy task. Boundless would have been their field of labor, and endless the demands upon their time, had they been made the representatives of the individual industries of the country in addition to their present duties as directors of the Exhibition.

In this view of the matter, the Executive Committee respectfully decline to assume the responsibility of making the collection of ores requested, and refer it to the American Iron and Steel Association as an organization composed of

men not only pecuniarily interested in all that pertains to iron, but also abundantly competent to assume the direction of an undertaking at once important, necessary, and laborious. The office of the American Iron and Steel Association is at Philadelphia, sufficiently near the headquarters of the Centennial Commission to insure perfect knowledge of all the requirements of the specimens to be exhibited and of the nature of the place in which they are to be shown, which is necessary to the completeness and satisfactory arrangement of the vast work here contemplated.

The Executive Committee do not make this disposition of the labor sought at their hands without a full understanding of the pecuniary burden it will necessarily impose upon the recipients. They, therefore, suggest that a fund be raised by private subscription to defray the inevitable expense of the collection of ores, and placed in the hands of the Treasurer of the American Iron and Steel Association. The Association should designate some skilled metallurgist of national reputation, marked enthusiasm, and cultivated taste, to receive the various specimens and arrange them properly in a suitable place until the time shall have arrived for their removal to the Exhibition buildings, and afterwards to superintend their collection in the place to be assigned by the Centennial Commission. To the Governors of the different States and Territories the duty of appointing suitable persons to make the local collections, and forward them to the officer designated by the Association, might be intrusted.

Local agents will be able to collect the various specimens of ores, which should in each case weigh not less than fifty pounds, as suggested by Mr. Britton, and while care should be taken to secure the best samples, analyses of the ore both by mine owners and consumers should be transmitted with them in order to make the collection interesting and its published description accurate. As nearly all the ores used have been analyzed, there need be very little expenditure for the services of chemists, and no time will be lost in waiting for the result of their investigations. In all cases a map of the locality whence the ores are procured should accompany the specimens, so that the display will be geographically perfect. To demonstrate beyond dispute the nature and extent of the deposits of ores to be represented, geological maps should also be sent, and, in case a State has made no geological survey, it should be induced to make one of its iron fields. The value of such an enterprise to the development of the resources of a State is fully shown in the benefits resulting to the State of Indiana from the admirable survey by Prof. E. T. Cox, now partially completed. These proofs of the actual wealth of the mineral deposits of each section are imperatively necessary to make the proposed collection worthy of the confidence which the capitalists of this country and our expected visitors from abroad will undoubtedly repose in it.

I am, Sir, yours very respectfully,

D. J. MORRELL,
Chairman of the Executive Committee.

CONSTITUTION

OF THE

AMERICAN IRON AND STEEL ASSOCIATION,

AS AMENDED NOVEMBER 20, 1873.

CONSTITUTION.

ARTICLE I.

The general objects of this Association shall be to procure, regularly, the statistics of the trade, both at home and abroad; to provide for the mutual interchange of information and experience, both scientific and practical; to collect and preserve all works relating to Iron and Steel, and to form a complete cabinet of Ores, Limestones, and Coals; to encourage the formation of such schools as are designed to give the young ironmaster a proper and thorough scientific training, preparatory to engaging in practical operations; and, generally, to take all proper measures for advancing the interests of the trade in all its branches.

ARTICLE II.

The affairs of the Association shall be conducted by a Board of thirty Managers, to be chosen annually by ballot, on the third Wednesday of November, by the members of the Association. They shall continue in office one year, and until others be chosen, and shall have power to fill vacancies that may occur in their body. They shall, from among their members, at their first stated meeting, elect a President, five Vice-Presidents, and a Treasurer.

ARTICLE III.

The funds of the Association shall be at all times subject to the control and disposition of the Board of Managers, but they shall have no power or authority to enter into any contract whatever, in behalf of the Association, involving any debt or liability on the part of the Association; nor are the members to be at any time accountable for any contracts, made by the Directors, beyond the funds in the hands of the Treasurer.

ARTICLE IV.

All persons, firms, or incorporated companies, interested in the manufacture of Iron or Steel, may become members of this Association by signing this Constitution. They shall be subject to an assessment of one cent per ton of 2,000 pounds of pig iron, one cent per ton of manufactured iron, in any of its forms, two cents per ton of Bessemer steel in any of its forms, and two and one-half cents per ton of other steel, made at their respective works; the assessment for each year to be reckoned on the product of the year next preceding the date prescribed for each payment. The first payment to be made on the first of January next following the date of joining the Association, and annually thereafter.

Persons not engaged in making or manufacturing iron, but whose pursuits are in harmony with the objects of this Association, may become members by being elected by the Board of Managers, and signing the Constitution under the following regulations: Individuals, companies, or firms, making machinery or other manufactures, consisting largely of iron, whose annual sales amount to 100,000 dollars, or less, 20 dollars per year, and for every additional 100,000 dollars, or fraction thereof, 10 dollars; when engaged in mining coal or iron ore, by paying 20 dollars per year, and an annual assessment of one cent per twenty tons of 2,000 pounds produced by their mines over 40,000 tons.

Persons not included in the above classes may become members by paying an entrance fee of 25 dollars, and an annual contribution of 20 dollars in advance.

All persons paying an annual assessment on the product of their

mines or manufacturing establishments shall pay for the product of the year preceding the first of January next after they become members, and annually upon the first day of January thereafter.

Honorary and corresponding members may be elected by the Board of Managers, and shall not be liable to pay any fee. All members elected by the Board shall be reported to the next meeting of the Association.

Any member who refuses or neglects the payment of his contribution for one year shall not be entitled to vote. Should payment be omitted for two years, his right of membership in the Association may be forfeited, but he shall not thereby be released from the payment of his arrears. The resignation of any member not in arrears may be accepted by the Board of Managers.

ARTICLE V.

Firms, incorporated companies, or individuals, shall be entitled to vote as follows, to wit: for an annual contribution of 50 dollars or less, one vote; if more than 50 and less than 100 dollars, two votes; and of 100 dollars and upwards, three votes.

ARTICLE VI.

The Board of Managers shall have power to make such By-Laws as may be deemed necessary, not inconsistent with this Constitution; to employ necessary officers, and to allow them such compensation as they may think proper.

ARTICLE VII.

Any alteration or amendment in these articles shall be proposed at a stated or special meeting of the Association, to be approved by two-thirds of the members present.

ANNUAL REPORT OF THE SECRETARY.

The report herewith submitted embraces the year 1872 and the larger part of the year 1873. It is proposed to supplement it at an early day with additional information for both years, but especially for 1873.

GENERAL REVIEW OF THE IRON TRADE.

The year 1871 was one of general activity in the iron business of Great Britain and the United States. With the close of the Franco-Prussian war in the summer of this year, the European demand for iron, to repair the waste of the war, to compensate for decreased iron production during its continuance, and to facilitate railroad construction, very greatly increased. Another cause of the increased European demand for iron in 1871 was the extensive substitution by European nations of iron ships for those of wood, and the tendency in various other industries besides shipbuilding to put iron to new uses. The demand from all causes was fed by the abundant capital which had been let loose at the close of the war, and now sought investment. In the United States the fever for building railroads, added to some of the causes enumerated above as influencing the European market, produced an extraordinary demand for iron in 1871. We built over 7,000 miles of railroad in that year, and we needed iron for ships, bridges, architectural work, and all the other purposes to which an inventive and prosperous people could adapt it. The unprecedented demand for iron, from all quarters, inured largely and immediately to the benefit of British ironmasters, whose furnaces and rolling mills were stimulated to their utmost capacity. Neither the Continental nations nor the United States could supply their own home demand. Prices at once advanced in the British market.

With the increased activity during 1871 in the British iron trade and in other British industries, came an increase in the cost of coal for manufacturing and other purposes, the colliery proprietors advancing the price because of the shortness of stocks and the increased demand for their product. The rise in iron began in the latter part of 1871, and the rise in coal during the following winter. Simultaneously with these advances, the British coal and ironstone miners and the ironworkers renewed the agitation for an advance in wages, and they were generally successful. The result was inevitable. The colliery proprietors still further advanced the price of coal, and the ironmasters still further advanced the price of iron. The close of 1871 found stocks of pig and finished iron reduced in Great Britain, although production had been increased during the year, while orders for the new year were far more numerous than had been usual at the close of previous years. In the United States the year closed with a buoyant tendency and prices considerably enhanced over those which ruled during the preceding spring months.

The year 1872 opened with an increased demand for iron in nearly all civilized countries. Prices advanced rapidly in all markets. The supply was unequal to the demand, although production was everywhere stimulated. In the United States forty new blast furnaces were erected, and the erection of others was undertaken—the foreign demand for British iron and the increased cost of producing that iron leading to the reasonable presumption that our people would now be able to possess their own iron markets. The rapidity with which iron rose in price in the United States is shown in the following average quotations of sales of No. 1 pig iron at Philadelphia during the years 1871 and 1872:

	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1871.....	30 50	30 90	34 75	35 37	35 50	35 50	35 75	36 25	37 00	37 20	37 50	37 50
1872.....	37 50	40 00	43 50	48 50	49 00	50 25	51 80	52 00	53 00	52 50	50 00	45 00

The average monthly prices of English rails at New York, in gold, duty paid, were as follows during 1871 and 1872:

	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1871.....	55	54½	55½	55½	55½	56	56½	57	57	57½	58	58
1872.....	58½	62½	65	72½	75½	73½	72½	72½	75½	75½	72½	71

From Mr. Henry Rylett, editor of *Rylands' Iron Trade Circular*, we have received the following quotations of monthly prices of British iron during 1871 and 1872, and the first six months of 1873, which show how remarkable was the rise in that market. They have been politely furnished at our request:

1871.	Jan.			Feb.			Mar.			April.			May.			June.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Pig-iron, Scotch	2	16	0	2	16	0	2	16	0	2	18	6	2	19	3	2	19	6
Pig-iron, Cleveland	2	9	6	2	9	6	2	9	6	2	9	6	2	9	6	2	9	6
Bar-iron, Staffordshire	8	0	0	8	0	0	8	0	0	8	0	0	8	0	0	8	0	0
Sheets, singles	9	10	0	9	10	0	9	10	0	9	10	0	9	10	0	9	10	0
Hoops	8	15	0	8	15	0	8	15	0	8	15	0	8	15	0	8	15	0
Rails, Welsh	7	5	0	6	5	0	6	5	0	6	10	0	6	10	0	6	10	0
Rails, North of England	6	2	6	6	2	6	6	2	6	6	15	0	6	15	0	6	15	0

1871.	July.			August.			Sept.			Oct.			Nov.			Dec.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	d.	s.	£	s.	d.
Pig-iron, Scotch	2	19	6	3	3	6	3	6	6	3	5	0	3	6	6	3	12	0
Pig-iron, Cleveland	2	9	6	2	9	6	2	9	6	2	9	6	2	16	6	2	19	6
Bar-iron, Staffordshire	8	0	0	8	0	0	8	10	0	8	10	0	8	10	0	9	0	0
Sheets, singles	9	10	0	9	10	0	10	0	0	10	0	0	10	0	0	10	10	0
Hoops	8	15	0	8	15	0	9	10	0	9	10	0	9	10	0	10	0	0
Rails, Welsh	6	15	0	6	15	0	6	15	0	6	15	0	6	15	0	7	0	0
Rails, North of England	6	15	0	6	15	0	6	15	0	6	15	0	7	5	0	8	0	0

1872.	Jan.			Feb.			Mar.			April.			May.			June.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Pig.iron, Scotch	3	13	0	3	16	6	3	18	0	4	10	0	4	13	9	4	15	0
Pig-iron, Cleveland	3	5	0	3	14	0	3	17	6	4	10	0	5	0	0	5	5	0
Bar-iron, Staffordshire	10	0	0	11	0	0	12	0	0	12	0	0	12	0	0	12	10	0
Sheets, singles	11	15	0	12	15	0	13	0	0	14	10	0	16	0	0	16	10	0
Hoops	10	10	0	11	10	0	12	0	0	13	0	0	13	10	0	14	0	0
Rails, Welsh	8	15	0	9	0	0	9	0	0	10	0	0	10	10	0	10	10	0
Rails, North of England	8	5	0	9	0	0	9	5	0	10	0	0	10	10	0	10	10	0

1872.	July.			August.			Sept.			Oct.			Nov.			Dec.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Pig-iron, Scotch	5	17	6	6	11	0	6	10	9	6	5	3	5	15	0	4	12	6
Pig-iron, Cleveland	5	10	0	5	15	0	6	0	0	6	0	0	6	0	0	5	0	0
Bar-iron, Staffordshire	14	10	0	15	10	0	15	10	0	13	10	0	11	10	0	11	10	0
Sheets, singles	19	10	0	21	0	0	21	0	0	18	0	0	17	0	0	14	10	0
Hoops	16	0	0	17	0	0	17	0	0	14	0	0	13	0	0	13	10	0
Rails, Welsh	10	15	0	10	15	0	11	0	0	11	0	0	11	0	0	10	0	0
Rails, North of England	11	0	0	11	0	0	11	0	0	11	0	0	11	0	0	10	5	0

1873.	Jan.			Feb.			Mar.			April.			May.			June.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Pig-iron, Scotch	6	5	0	6	16	0	7	3	0	6	0	0	6	0	0	5	16	3
Pig-iron, Cleveland	5	10	0	6	0	0	6	0	0	6	0	0	6	0	0	6	0	0
Bar-iron, Staffordshire	12	0	0	13	0	0	15	0	0	15	0	0	15	0	0	15	0	0
Sheets, singles	17	0	0	18	0	0	20	0	0	20	0	0	20	0	0	20	0	0
Hoops	14	0	0	15	0	0	17	0	0	17	0	0	17	0	0	17	0	0
Rails, Welsh	10	15	0	10	15	0	11	0	0	12	0	0	12	0	0	11	10	0
Rails, North of England	11	10	0	12	0	0	13	5	0	13	15	0	13	15	0	13	0	0

Since July prices have receded somewhat from those given above for first six months of 1873.

The following table, compiled from authentic data, shows the average prices of English bars for the last sixty years:

	£	s.	d.		£	s.	d.		£	s.	d.
1806	17	0	0	1826	9	15	10	1846	9	13	4
1807	16	0	0	1827	9	7	6	1847	9	13	4
1808	14	10	0	1828	7	18	4	1848	6	12	6
1809	15	0	0	1829	6	16	8	1849	5	17	6
1010	14	10	0	1830	6	3	9	1851	6	0	0
1811	14	0	0	1831	5	13	9	1853	11	0	0
1812	13	10	0	1832	5	13	4	1854	10	0	0
1813	13	6	8	1833	6	12	11	1855	11	0	0
1814	13	18	4	1834	6	18	9	1856	9	0	0
1815	13	13	4	1835	6	10	0	1858	8	0	0
1816	12	2	6	1836	10	12	6	1859	7	10	0
1817	10	12	6	1837	9	1	3	1862	7	0	0
1818	12	1	8	1838	9	4	7	1864	9	10	0
1819	12	5	0	1839	9	15	0	1865	8	10	0
1820	10	13	4	1840	8	7	6	1867	7	10	0
1821	8	18	4	1841	7	5	0	1869	7	0	0
1822	8	1	3	1842	5	17	6	1870	8	0	0
1823	8	0	0	1843	5	2	6	1871	8	10	0
1824	8	19	2	1844	6	2	6	1872	14	0	0
1825	12	14	2	1845	9	5	0	1873 (July)	14	0	0

Until 1872, the price had not reached £14 since the year 1825. In the latter year the highest price reached was £15. The average price during the last twenty years has been a trifle over £8 per ton; so that present rates are even yet fully £5 to £6 over that average.

The prices at which coal has been sold in Great Britain during 1872 and 1873 have shown an advance fully as great as in the prices of iron. For the first five months of 1871 the average price per ton of coal exported was 9s. 5d., and for the same period of 1873, £1. 1s. 4d.—an advance of 126 per cent. The selling price of coal at the pit's mouth, at the Lochgelly Iron and Coal Works, Fifeshire, in 1868, was 5s. 6¼d. per ton; in 1869, 4s. 6¾d.; in 1870, 4s. 0½d.: in 1871, 4s. 3d.; in 1872, 9s. 10d.; and in July, 1873, 13s. The average price of six qualities of coal at the pit's mouth at the Manston collieries, in West Yorkshire, in 1871, was 5s. 8d.; in 1872, 9s. 3d.; and in 1873, 13s. 1d. The average wholesale price of best household coal in London, in 1869, was 18s. 8d.; in 1870, 18s. 6d.; in 1871, 19s. 3d.; in 1872, 24s., and in 1873, up to June, 32s. 6d. The maximum price received was 45s. Retail prices to consumers were much higher.

The rise in the price of coke in the North of England iron district is given by Mr. I. Lowthian Bell as follows: "In September, 1871, forge pig iron was selling with us for 50s., and coke was sell-

ing at from 10s. to 12s. a ton; pig iron rose gradually toward the end of the year to 64s., but coke was not affected up to that time. In January, 1872, pig iron rose from 64s. to 70s. 6d., and coke rose to 20s. In March, forge pig iron was 84s., and coke was 25s. In April, the pig iron rose to 94s, and the coke rose to 32s. 6d. In July, the forge pig iron rose to 110s., more than twice what it was in 1871, nine months before; and the coke rose to 37s. 6d. and 41s. per ton."

The total yield of the coal fields of Great Britain during the last few years was as follows: 1870, 110,289,722 tons; 1871, 117,186,278 tons; 1872, according to the evidence given before a select committee of the House of Commons, 123,386,758 tons.

According to the report of the "royal commissioners appointed to inquire into matters relating to coal," every thousand tons of coal raised in Great Britain is used as follows:

In paper making and tanning	6
" smelting copper, lead, tin, and zinc	8
" water works	14
" breweries and distilleries	18
" chemical manufactures	19
" railway work	20
" steam navigation	30
" articles of clay and glass, and lime kilns	31
" textile fabrics—of wool, cotton, silk, flax and jute	42
" gas works	60
" mining operations	67
" coal exported to foreign countries	92
" general purposes, chiefly steam engines	121
" domestic use	172
" iron and steel works, inclusive of that required for their steam power	300

The iron industry consumes nearly one-third of the total output. The select committee already alluded to estimates that, of the 123,386,758 tons of coal raised in 1872, the iron industry consumed 38,228,875 tons. The dependence of this important branch of British manufactures upon the coal supply will be appreciated at a glance. The closeness with which the prosperity of the coal interest of Great Britain is linked with that of the iron interest will also not escape notice.

Strenuous efforts have been made in England to reduce the price of coal, but thus far with but little success. The lowest price at which coke was sold at Middlesbrough, early in October last, was 32s. 6d. In the same month coal at London brought 30s. to 34s. As long as there is a fair demand for British iron, the high price of British coal will be maintained; when the demand from

this source slackens, coal must decline. The demand from the United States for British iron has almost ceased during the past few months: let this diminution in orders extend to other countries which are leading purchasers, and the high prices of British coal and iron will immediately recede to figures approximating those which prevailed three years ago. In such a contingency, which is extremely probable, England would again be able to send to this country *cheap iron*.

Statistics of the production of British iron and steel for 1872 are very meagre. About 400,000 tons of Bessemer steel were converted during the year. There were in operation about 700 blast furnaces, and 7,000 puddling furnaces. Twenty-one blast furnaces are now in course of erection in the North of England. The following figures show the production, shipments, &c., of pig iron in Scotland, and in the Cleveland district, for a series of years, in gross tons:

Cleveland District.	1867.	1868.	1869.
Annual production	1,148,000	1,233,000	1,460,000
Total shipments	136,378	136,806	185,777
Stock, 31st Dec	171,400	152,900	115,600
	1870.	1871.	1872.
Annual production	1,695,000	1,884,000	1,969,000
Total shipments	216,908	330,646	386,624
Stock, 31st Dec	117,345	68,331	41,628
Furnaces in blast, 31st Dec	.....	.....	130
Scotland.	1861.	1862.	1863.
Annual production	1,035,000	1,080,000	1,160,000
Total shipments and home consumption	927,000	970,000	1,105,000
Stock, 31st Dec	535,000	645,000	756,000
Furnaces in blast, 31st Dec	121	125	134
	1864.	1865.	1866.
Annual production	1,160,000	1,164 000	994,000
Total shipments and home consumption	1,156,000	1,272,000	1,136,000
Stock, 31st Dec	760.000	652,000	510,000
Furnaces in blast, 31st Dec	134	136	98
	1867.	1868.	1869.
Annual production	1,031,000	1,068,000	1,150,000
Total shipments and home consumption	1,068,000	973,000	1,098,000
Stock, 31st Dec	473,000	568,000	620,000
Furnaces in blast, 31st Dec	112	121	129
Average price for the year	52*s.* 6*d*	54*s.* 3*d.*	57*s.* 9*d.*
	1870.	1871.	1872.
Annual production	1,206,000	1,160,000	1,090,000
Total shipments and home consumption	1,161,000	1,335,000	1,386,000
Stock, 31st Dec	665,000	490,000	194,000
Furnaces in blast, 31st Dec	126	126	115
Average price for the year	51*s.* 3*d.*	73*s.*	121*s.*

It will be observed that the total consumption of Scotch pig iron has steadily increased since 1861, while the production was

only a few tons greater in 1872 than in 1861. The stock on hand, which was greatly reduced in 1872, has been still further reduced in 1873.

The total production of pig iron in Great Britain, in gross tons, since 1867, was as follows: 1867, 4,761,023; 1868, 4,970,206; 1869, 5,445,757; 1870, 5,963,515; 1871, 6,627,179; 1872, 6,723,387. In 1862 the production was about 4,000,000 tons. Mr. I. Lowthian Bell has estimated that, at the rate of increase which has existed since 1862, the production of pig iron in Great Britain ought to reach 11,500,000 tons in 1882, and that, to meet this production and the probable extension of British malleable iron works, something like 65,000,000 tons of coal would be required, or more than one-half the total production of coal in 1872.

The total production of bar iron and steel in Great Britain in 1869 was 4,734,145 gross tons; in 1871 it was 5,566,175 tons.

The total exports from Great Britain of iron and steel and manufactures thereof during 1871, 1872, and first nine months of 1873, were as follows: 1871, tons, 3,169,219; value, £32,090,175: 1872, tons, 3,388,622; value, £44,259,639: 1873, first nine months, tons, 2,296,990; value, £36,541,278. First nine months of 1872, tons, 2,602,883; value, £32,188,231.

The high prices which have ruled for British iron during the past two years have stimulated iron production on the Continent of Europe as well as in this country. To such an extent has the development of the iron industry of the Continent progressed that Belgian, French and German iron makers are now formidable competitors with England in almost all the European iron markets, and the intelligent Sheffield correspondent of the New York *Iron Age* states it to be a fact within his own knowledge that a Belgian firm is now supplying both bridge girders and girders for buildings to English contractors at a lower price than they could be purchased in England. In August last the Belgian government received proposals for 12,000 tons of steel rails, and the successful bidders were Messrs. Schneider & Co., of Le Creuzot, France, beating both English and Belgian competitors. During the same month eighty lots of five hundred tons each of Bessemer steel rails were secured by the Bochum Works of Westphalia, their offer being lower than the offers of

English and other railmakers. It must be remarked, however, that the high price of coal in France, Germany and Belgium has of late interfered seriously with the production and consumption of iron on the Continent, temporarily retarding the growth of an industry which all European countries now see the need of encouraging.

From such trustworthy sources of information as have been accessible, the following information concerning the progress of the iron and steel industries of the Continent during late years has been condensed. We have consulted especially the *Bulletin du Comité des Forges de France*, for June, 1873; the *Zeitschrift für das Berg-Hütten und Salinen-Wesen in dem Preussischen Staate*, (1872); and the *Journal of the Iron and Steel Institute*, (1873.)

The comparative table below shows in tons of 2,000 pounds the production of iron and steel in France during the year 1869, which preceded the commencement of the war with Prussia, and the year 1872, the first year after the war during which the French people felt encouraged to resume with vigor the arts of peace. The exhibit for 1872 does not, of course, include the production of the lost provinces of Alsace and Lorraine. It is estimated that the production of iron and steel in France will not be so great in 1873 as in 1872, owing to the restriction of consumption caused by high prices.

ITEMS TABULATED.	1869.	1872.	Increase.	Decrease.
PIG IRON:				
Foundry, net tons	271,617	191,188	.....	80,429
Forge " "	1,266,734	1,108,202	.....	158,532
Total " "	1,538,351	1,299,390	.....	238,961
WROUGHT IRON:				
Rails, net tons	237,158	140,382	.....	96,776
Sheet iron, net tons	115,723	147,086	31,363	.....
All other kinds, net tons	757,428	683,921	.....	73,507
Total, " "	1,110,309	971,389	.....	138,920
STEEL:				
Bessemer rails, net tons	.....	73,705	.....	.....
" bars, angle, sheets and plates, net tons	.....	22,877	.....	.....
Total, net tons	.....	96,582	.....	.....
MARTIN-STEEL, CAST, PUDDLED, ETC:				
Rails, net tons,	.....	16,850	.....	.....
Bars, angle, sheets and plates, net tons	.....	38,977	.....	.....
Total, net tons	.....	55,827	.....	.....
Grand total, steel	.....	152,409	.....	.....

In 1865 there were in blast in France 121 coke furnaces and 208 charcoal furnaces; in 1872 there were in blast 113 coke furnaces, and 115 charcoal furnaces. In 1865 the coke furnaces yielded 224,453 gross tons, and the charcoal furnaces 377,376 tons; total, 601,829 tons.

The statistics of Prussian iron and steel production in 1872 are wanting. It is known, however, that the greatest activity prevailed throughout the empire in that year. The annexed table shows the production in 1870 and 1871, in tons of 2,000 pounds.

ITEMS TABULATED.	1870.	1871.	Increase.	Decrease.
Blast furnaces, In	245	263	18	.....
Blast furnaces, Out	99	73	.....	26
PRODUCTION OF FURNACES:				
Pig and scrap iron, net tons	1,235,765	1,292,881	57,116	.....
Castings, " "	35,385	35,053	.....	332
Total, " "	1,271,150	1,327,934	56,784	.....
Coke pig-iron, " "	1,156,290	1,229,960	73,670	.....
Charcoal pig iron, " "	76,055	73,066	.....	2,989
Charcoal and coke pig-iron, net tons	38,804	24,907	.....	13,897
PRODUCTION OF WROUGHT IRON:				
With coal, net tons	675,103	714,025	38,922	.....
With charcoal, net tons	15,586	22,031	6,445	.....
Total, net tons	690,689	736,056	45,367	.....
Sheet iron, net tons	88,946	101,209	12,263	.....
Wire, " "	46,415	60,008	13,593	.....
Sum of all, " "	826,050	897,273	71,223	.....
PRODUCTION OF STEEL:				
Pig-iron for the direct production of steel, net tons	153,413	160,856	7,443	.....
Crude steel, including Bessemer:				
With coal, net tons	34,116	35,923	1,807	.....
With charcoal, net tons	1,181	2,618	1,437	.....
Total, net tons	35,297	38,541	3,244	.....
Cast steel, net tons	132,573	162,983	30,410	.....
Refined steel, net tons	5,823	9,843	4,020	.....

The value of these products for the years named was as follows:

PRODUCT.	Value in 1870. (Gold.) U. S. Money.	Value in 1871. (Gold.) U. S. Money.	Value per net ton in 1870. (Gold.)	Value per net ton in 1871. (Gold.)	Increase per net ton in 1871. (Gold.)
Pig-iron	$17,328,808 62	$20,557,751 27	$16 00	$18 32	$2 32
Pig-iron for steel	2,802,127 17	3,808,218 37	18 27	23 68	5 41
Castings	11,434,127 97	14,619,876 57	43 90	47 01	3 11
Wrought iron, rails, &c.	27,698,867 87	32,514,035 12	40 09	43 55	3 46
Sheet-iron	4,533,962 22	5,643,611 70	50 96	55 76	4 80
Wire	2,467,559 97	3,303,805 42	53 16	55 24	2 08

Extraordinary efforts have been made in Prussia to supply the railroads of the country with engines and rolling stock exclusively of home manufacture, and Prussian establishments have even competed with British makers in supplying the Russian roads. The two largest railway works in Berlin completed one hundred and fifty-eight locomotives in 1870, and one hundred and fifty-seven in 1871. They also made 2,522 railway carriages in 1870, and 2,345 carriages in 1871.

In July last the official tables of the Austrian iron trade for five periods were published, a summary of which is below. A very large increase in consumption is shown in 1870 and 1871, and an important gain in production in 1871.

	Production. Cwts.	Import. Cwts.	Export. Cwts.	Consumpt'n. Cwts.
1848	3,865,038	25,616	266,801	3,623,843
1860	6,251,098	934,109	582,217	6,602,990
1865	5,847,263	684,125	606,367	5,925,021
1870	3,223,578	9,130,363	624,610	16,720,323
1871	8,634,997	9,819,295	691,520	17,883,872

The course of the Belgian iron trade for the last three years is given in the following table, in metrical tons. A metrical ton is equivalent to 2,200 pounds.

	1872.	1871.	1870.
Importation of iron ores in metrical tons	7,969,162	5,944,051	5,685,712
Exportation " " "	1,751,591	1,625,658	1,798,671
Importation of cast and wrought iron of all descriptions in metrical tons	1,632,546	923,912	913,434
Exportation of iron in metrical tons	2,908,675	2,607,232	2,506,676
Importation of steel of all descriptions in metrical tons	144,167	96,737	54,385
Exportation of steel in metrical tons	30,621	45,194	8,534

The importation of iron into Belgium is mainly of pig from England, and the importation of iron ore is principally from Germany and France. Germany is the principal customer of Belgium for finished iron; after which come the Netherlands, England, France, the United States, Russia, Turkey, and Austria, in the order named. The exports to the United States in 1870 were 119,243 metrical tons; in 1871, 197,611 tons; in 1872, 219,545 tons. In 1872 the coal product of Belgium was 14,000,000 tons of

2,240 pounds. The Danks puddler and Louth's three-high rolls have been successfully introduced into Belgium this year.

Sweden has been greatly benefited by the increase in iron consumption during the past few years. The superiority of its iron is well known. The following statistics show the production, in gross tons, of iron and steel and iron ore in the five years ending with 1871:

	1867.	1868.	1869.	1870.	1871.
Iron ore from mines	475,076	524,768	580,027	604,511	607,316
Iron ore from the lakes	17,434	11,007	6,134	13,476	15,449
Cast iron	248,522	257,884	286,356	294,319	292,850
Wrought iron	167,098	168,617	176,068	189,972	183,989
Steel and manufactured iron	22,413	25,202	31,304	32,343	34,888

There were two hundred and seven blast furnaces in operation in Sweden in 1871, producing an average of about four tons each daily. The quantity of ore exported in 1871 was 11,660 gross tons. The export of pig iron amounted to 40,000 tons. In 1872 the production and exportation of Swedish iron were much greater than in 1871. Below is a list of home prices, per gross ton, of Swedish charcoal pig iron during the last eleven years:

	£ s. d.		£ s. d.		£ s. d.
1863	4 00 0	1867	3 16 0	1871	3 12 0
1864	3 19 0	1868	3 15 0	1872	5 15 0
1865	3 19 0	1869	3 13 0	1873 (July)	9 00 0
1866	3 19 0	1870	3 10 0		

Since 1871 the prices of Swedish ore and charcoal have kept pace with the advance in iron.

The iron resources of Russia are but little understood in this country, but from such statistics as have met our notice it is clear that they are of great value. The Russian railway system is very extensive, and this and other forms of national enterprise, which annually demand a large supply of iron, furnish a strong inducement to embark in its manufacture. This manufacture is now encouraged by a wise governmental policy, and its healthy development can not long be delayed. At the Vienna Exposition the display of Russian iron products was very creditable, and embraced nearly every branch of iron manufacture. There are now three rail rolling mills in Russia. One of these mills produces 40,000 tons

of rails annually. The number of blast furnaces in operation in 1870 was two hundred and forty-five, and the number of other iron and steel works was two hundred and fourteen. There is an abundance of excellent ore in Russia, and recent discoveries have established the existence of extensive coal fields, at least one of which is anthracite. Companies have been formed to develop this coal supply and to diminish the importation of foreign coal. The production of cast iron in the Ural district of Russia in the decade ending with 1867 was 201,303 gross tons, and of wrought iron, 129,380 tons.

In Italy the manufacture of iron is a weak and struggling industry. The country possesses ore of good quality, but there has heretofore been a scarcity of fuel. There is a prospect, however, that this want will soon be supplied, owing to recent discoveries of bituminous coal. From 1867 to 1870 the average annual production of iron ore, and cast and wrought iron, in the kingdom, was as follows:

Iron ore exported to other countries	32,800	gross	tons.
Iron ore smelted in Italy	22,500	"	"
Cast iron produced in Italy	11,000	"	"
Wrought iron from Italian pig iron	9,000	"	"
Wrought iron from foreign pig iron	10,000	"	"

Spain might manufacture iron largely if it would, but its people prefer to buy their iron abroad and send away their rich iron ore. Since the close of 1869 the manufacture of iron in Spain has been on the decline. Mr. J. Jooris, the Belgian Minister *ad interim* to the Spanish Republic, reports to his government the causes of this decline. He says: "Three causes have been instrumental in bringing about this deplorable result: one, high coal; two, high wages; and three, *duty free import for railroad purposes.*" The manufacture of steel has also declined. The shipments of iron ore to Great Britain alone amounted to several hundred thousand tons in 1872. In exact figures, the export of ore to Great Britain has increased from 88,000 tons in 1868 to 631,000 tons in 1872. In addition to British requirements, there is a constant and large demand for Spanish ore from Germany, France and Belgium. In the early part of 1873 the shipments increased, but since then the civil dissensions of the country have interfered with the working of the principal mines.

Throughout the Continent much interest is manifested in the increase of the supply of coal for manufacturing purposes, and it is to be expected that Russia, Austria, Sweden, and some other nations will make much progress in this direction within the next few years.

The iron ore mines of Algeria are being worked with much energy by French and English capitalists. The ore is generally of the richest quality, and much of it is adapted to the manufacture of Bessemer pig. The same is true of most of the Spanish ore. England imported 55,000 tons of Algerian ore from one mine during the first eleven months of 1872. The total quantity of ore exported from Algeria to all countries during the four years from 1867 to 1870 was 800,000 tons. France imported 155,608 tons in 1871. The production of ore in 1872 was 334,924 tons. There are no blast furnaces in Algeria, but it is proposed to begin their erection, and, in the absence of native fuel of all kinds, to use coal which may be taken by steamers as return cargoes. It has been found to be profitable to ship Algerian ore to the United States, a cargo having been received at New York last summer. It was purchased by Cooper, Hewitt & Co. and the Bethlehem Iron Company. A small cargo of Spanish ore from Bilbao was bought during the present year by the Pennsylvania Steel Company, which analyzed about fifty-three per cent., and proved to be every way of excellent quality.

Iron ore is found in Australia, Tasmania, and New Zealand, and, as either bituminous coal or charcoal may also be obtained, local and English capitalists are giving attention to the feasibility of establishing iron works in these countries.

PRESENT CONDITION OF THE IRON TRADE.

The high prices for iron of all descriptions which had prevailed in the United States in 1872 gradually declined during the latter part of that year, and this decline, with some effort at a rally in January, continued during 1873. It was not sufficient, however, to restrict production, jeopardize the interests of producers, or compel

a reduction of wages. The causes of the decline may be found, first, in the natural tendency of high prices to restrict consumption, and thus bring about sharper competition; and, second, in the forced subsidence at the close of 1872 of the fever for building Western railroads. Owing to these combined causes, the demand for rails and other railway material fell off greatly at the close of 1872, while in some other branches of business, usually requiring large supplies of iron, consumption was considerably curtailed at the same period. This condition of business—restricted consumption and gradually declining prices; with foreign competition still existing, and a tendency in some iron districts to accumulate stocks of pig iron—prevailed on the 18th of September, when the present financial crisis commenced by the suspension of a leading banking house largely interested in railroad securities. This crisis has deranged the whole business of the country. The prices of iron have still further declined, reaching in some lines of the trade to a point far below the cost of production. The blow has been severely felt. At the beginning of November the quoted prices of raw and manufactured iron were almost as low as at the beginning of 1871, before the rise commenced; the price of rails was fully as low; while the demand for iron for railroad construction, cars, car wheels, locomotives, iron railroad bridges, and every branch of manufactures dependent upon railroad patronage had almost ceased. At the date mentioned, the prices asked for four leading articles of American iron manufacture were as follows: Bessemer rails, at mill, $110; iron rails, at mill, $68; best No. 1 anthracite pig iron, at Philadelphia, $36; merchant bars, at Pittsburgh, 3 cents. From cash buyers even lower rates than these would readily have been accepted. English iron rails were sold at New York at $60, gold. On the 17th of September, the day before the occurrence of the crisis, the above-mentioned articles were quoted as follows: American Bessemer rails, $120; iron rails, $75; No. 1 pig iron, at Philadelphia, $42; merchant bars, at Pittsburgh, 3½ cents; English iron rails at New York, $65, gold. The average decline since September has been fully 15 per cent., with few sales transpiring, and they mostly in small lots for immediate use.

At the beginning of November many blast furnaces, bar mills,

and rail mills were idle. After a careful survey of the whole field, we are satisfied that fully *one-third* of our furnaces were then out of blast, and that by the close of the month *one-half* of all the furnaces will be blown out. Stocks of pig iron are accumulating in many districts, for which there is no sale at any price. Most of the bar and rail mills that are now running are working on short time. Rail mills especially are bare of orders, with no immediate prospect of a change for the better. The plate mills are more favored. Thousands of ironworkers, at the beginning of winter, are out of employment, while a large proportion of those who are yet employed have accepted a reduction of wages averaging 15 per cent. The mining of iron ore has sympathized with the prostration of the iron trade.

The financier or the philosopher who would undertake to predict when the above described state of the iron trade and its adjuncts will assume a more favorable aspect would be a bold man, and would likely win for himself the reputation of being a false prophet. The crisis, however, and the conditions which preceded it, have produced one result which will reach into the immediate future, and which all men may easily comprehend: the home production of all kinds of iron will be equal to the home demand, under any circumstances, for some time to come.

With prices beaten down to the lowest possible cost of production; with many thousands of ironworkers and miners out of employment, and thousands of others working at reduced wages; with idle furnaces, and rolling-mills, and foundries in every iron district and manufacturing city of the country; with large stocks of unsold iron in almost every iron market, it is a proper time to consider whether it is wise longer to encourage the importation of foreign iron by continuing the reduction of duties which Congress has twice authorized during the past four years. This reduction, it has been abundantly proved, did not reduce the cost of iron to consumers, while the Government lost the revenue on imported iron to the amount of the reduction. If the reduction is continued, encouragement is thus given to the foreign ironmaker at a time when his American competitor is driven to the wall by a combination of adverse circumstances, not the least of which is the fact

that, owing partly to this reduction, the foreign ironmaker has, within the past twelve months, sent to our shores many shiploads of iron which could have been as cheaply made in our own country. But for the heavy importations of foreign iron after the demand for American iron had commenced to slacken, there would be more general activity in the American iron trade to-day, and employers and employés would be in better heart. The aggregate value of our importations of iron and steel, and manufactures thereof, during the twelve months which ended on the 30th of June last, was *fifty-nine millions of dollars.* We now see that these importations were not needed, and have done immense harm to the home iron trade and all dependent upon it. An increase of the duty on pig iron from $6.30 to $9 a ton, and proportionally upon other classes of iron and steel, would be a wise measure of relief for Congress to enact immediately after it assembles. Better reduced revenue for the Treasury, than cold and hunger in the homes of American workingmen.

Relative to the present condition of the British iron trade, it may briefly be remarked that our financial difficulties add another to the many advantages possessed by British ironmasters for manufacturing cheap iron. The reduction of wages, and the stoppage of many of our iron works, will operate as a check to the emigration of miners and ironworkers from England, Scotland, and Wales, and will to this extent enable British ironmasters and colliery owners to reduce the wages of their workmen, when they shall find it necessary to do so. It may further be remarked of the present condition of the British iron trade, that it shows every indication that it will be as bold, as energetic, and as aggressive in the future as in the past. Little faith should be placed in the theory that the coal supply of the United Kingdom will at any time within a century be unequal to any demand that may be made upon it for manufacturing purposes. The only question connected with the fuel supply, about which British ironmasters need concern themselves, is the price at which fuel shall be furnished. Let it once become absolutely necessary that this price shall be reduced, and reduced it will be, either by a diminution of the present enormous profits of the colliery owners, or by a reduction of

the wages of the colliers. But if coal should not materially decline in price, so as to cheapen the cost of British iron, there yet remains to the British ironmaster the alternative of reducing his own princely profits rather than let them elude his grasp altogether. In a desperate struggle for the possession of the trade they now respectively hold, the colliery proprietors and the ironmasters can reduce all wages and their own profits, and thus give iron to the world almost as cheap as it was three years ago. Such a contingency is not now improbable, and may come at any time within the next few months. A financial crisis in England and on the Continent like that through which this country is now passing would precipitate such a struggle. But if not precipitated in this way, the inability or unwillingness, from any cause, of Continental nations to continue to take from Great Britain the large supplies of iron they have of late required, would most certainly result in a strong reaction in the prices of British iron. *The British iron trade has already commenced to decline. Rylands' Iron Trade Circular* for October 11th states that the official returns of foreign exports for the month of September show that of iron and steel of all descriptions there were exported 265,793 tons, value £3,465,586, as against 300,508 tons, value £3,623,325, in September of last year, or a decline of over eleven per cent. in quantity and more than four and one-half per cent in value. The decline is largely from Germany, where a reaction from the speculation of the last two years has undoubtedly commenced. The same well-informed and influential journal declares, in the same issue, that "in ordinary times" British ironmasters have little to fear from American competition; meaning by "ordinary times" a period of low prices. We are not yet done with British competition in our own iron markets.

The Middlesbrough *Iron and Coal Trades Review* of October 29th remarks that, "the state of the money market and the generally unsettled character of the principal Continental exchanges have caused the iron trade to be comparatively dull of late." It quotes pig iron as "easier in price," inquiries for finished iron "less numerous," the coal trade "not quite so active as it was a month ago," and "a general expectation of lower prices" among consumers.

THE INCREASE IN OUR EXPORT IRON TRADE.

From Hon. Edward Young, Chief of the Bureau of Statistics of the Treasury Department, we have received the following summary statement of the exports of iron and steel and manufactures thereof from the United States during the fiscal years which ended June 30, 1871, 1872, and 1873—all the articles enumerated being the production of the United States:

COMMODITIES—QUANTITIES.	1871.	1872.	1873.
IRON, AND MANUFACTURES OF:			
Pig.....cwt.	70,853	40,528	56,327
Bar.....cwt.	3,638	736	6,162
Boiler-plate.....cwt.	523	956	742
Railroad bars and rails.....cwt.	4,410	1,734	25,391
Sheet, band and hoop.....cwt.	772	2,505	1,187
Castings not specified.....	.....	.....	.....
Car-wheels.....No.	2,317	4,760	7,515
Stoves and parts of.....	.....	.....	.....
Steam engines, locomotive.....No.	38	72	58
Steam engines, stationary.....No.	29	42	46
Boilers, separate from engines.....	.....	.....	.....
Machinery not specified.....	.....	.....	.....
Nails and spikes.....lbs.	5,006,774	4,449,279	5,996,913
All other manufactures of iron.....	.....	.....	.....
STEEL AND MANUFACTURES OF:			
Ingots, bars, sheets, and wire.....lbs.	16,205	65,935	18,849
Cutlery.....	.....	.....	.....
Edge tools.....	.....	.....	.....
Files and saws.....	.....	.....	.....
Muskets, pistols, rifles, sporting guns.....	.....	.....	.....
Manufactures of steel not specified.....	.....	.....	.....

COMMODITIES—VALUES.	1871.	1872.	1873.
IRON, AND MANUFACTURES OF:			
Pig.....	$111,033	$69 331	$140,683
Bar.....	16,754	4,532	33,767
Boiler plate.....	3,096	8,047	4,589
Railroad bars and rails.....	17,445	7,167	104,054
Sheet, band, and hoop.....	4,810	13,030	6,068
Castings not specified.....	105,044	128,017	153,234
Car-wheels.....	42,791	99,826	137,458
Stoves and parts of.....	72,132	92,337	115,792
Steam engines, locomotive.....	536,746	953,881	952,655
Steam engines, stationary.....	55,720	118,312	111,507
Boilers, separate from engines.....	54,532	178,520	232,546
Machinery not specified.....	1,515,843	2,499,744	3,120,984
Nails and spikes.....	259,324	241,429	356,990
All other manufactures of iron.....	2,020,271	2,398,210	3,262,170
STEEL AND MANUFACTURES OF:			
Ingots, bars, sheets, and wire.....	2,538	8,146	3,955
Cutlery.....	114,142	58,030	47,346
Edge tools.....	424,821	577,813	846,452
Files and saws.....	9,282	16,884	10,171
Muskets, pistols, rifles, sporting guns.....	13,463,916	1,037,117	1,181,869
Manufactures of steel not specified.....	174,850	236,733	297,541
Total values.....	$19,005,090	$8,747,106	$11,119,831

Omitting "muskets, pistols, rifles, and sporting-guns," the trade in which during the fiscal year which ended June 30, 1871, was greatly stimulated by the Franco-Prussian war, our exports of the above named commodities showed a gratifying increase in the fiscal year 1872 over 1871, and a still further increase in 1873 over 1872. The most noticeable increase in the iron exports of the fiscal year 1873 over 1872 is in bar iron and railroad bars. Our export trade in railroad bars, by countries, for the calendar years 1871 and 1872 was as follows:

COUNTRIES.	1871.		1872.	
	Cwt.	Dollars.	Cwt	Dollars.
Canada	.....	.....	6,520	$23,450
Cuba	1,000	$ 3,750	10,761	45,631
Brazil	4,251	18,269	1,629	6,938
Mexico	218	1,111	145	649
England	.....	.....	60	150
United States of Colombia	.....	.....	324	1,972
Venezuela	.....	.....	3,696	14,190
Total	5,469	$23,130	23,135	$92,980

Of the exports for the fiscal year which ended on the thirtieth of June last, we are furnished the following details by the Bureau of Statistics, in advance of the publication of the Commerce and Navigation Report for the year named. The pig iron was shipped as follows: To Canada and British North American Possessions, 50,946 cwts.; to all other countries, 5,381 cwts.; *none* to the British Islands. The bar iron as follows: To Canada etc., 101 cwts.; to all other countries, 6,061 cwts. The boiler plate, 742 cwts., was all shipped to Canada and the British North American Possessions. The railroad bars and rails as follows: To Canada, etc., 6,520 cwts.; to all other countries, 18,871 cwts. The sheet, band and hoop as follows: To Canada, etc., 70 cwts.; to all other countries, 1,117 cwts.

We have emphasized the statement that no pig iron was shipped during the last fiscal year to the British Islands, because various statements have appeared in the public prints setting forth that such shipments were made. The Marquette *Mining Journal*, however, in its issue for October 9th, states that from 1,200

to 1,500 tons of Lake Superior charcoal iron have been shipped this year to Glasgow and Liverpool. It adds: "There are now strong inquiries from abroad for Lake Superior pig iron. English iron merchants are now in correspondence with our furnacemen with a view of arranging for direct shipments next year."

There should be nothing surprising in the fact that No. 1 charcoal pig iron has been shipped from Lake Superior to Great Britain. Iron of this quality is essentially necessary in the manufacture of certain iron products, but, owing to the cutting down of some of their forests, and the absorption of others by the gentry, England and Scotland now manufacture but a small quantity. It is stated that there is but one charcoal furnace now in blast in Great Britain. Swedish charcoal pig iron is now exceptionally high in price. English and Scotch founders have of late made some advances toward the adoption of the American method of making car-wheels, which requires charcoal pig iron of the best quality. It may be possible that these founders will hereafter require a part of our product for this purpose. But this demand would be entirely exceptional, and could not be regarded as at all affecting the general proposition that this country can not compete with the United Kingdom in its own markets for its own iron supply. We think it more probable that the Lake Superior pig iron which has been taken to England has been purchased at a loss, with the view of inducing the makers of Swedish pig iron to lower their prices.

It has also been alleged that American bar iron has been shipped to England this year and sold at a profit at prices lower than English-made iron of like quality could be afforded. The circumstantial statement has been telegraphed from London that one hundred tons of American bar iron were sold at Liverpool on September 15th, at £11 10s. per ton, delivered, "thus underselling the English market," which then ruled at £11 15s. It had previously been announced in the New York journals that Messrs. Jackson & Chase of that city had accepted an order from Liverpool for one hundred tons of merchant bar iron. The coincidence in these statements led to the inference that the alleged sale in Liverpool related to the order given to Jackson & Chase, and subsequent developments have established the correctness of that inference. In the Liverpool *Daily Post* of

September 18th, Messrs. W. S. & N. Caine, of that city, published a statement of all the facts relating to the alleged sale, from which we learn that the order to Messrs. Jackson & Chase emanated from them, and was induced by representations that it could be filled at lower prices than were then ruling in Liverpool for English iron of the same quality. On the morning of the day the Messrs. Caine addressed their communication to the *Daily Post*, the gentleman who had solicited from them the order received a letter from his principals, Messrs. Jackson & Chase, of which the following extract was embodied by the Messrs. Caine in their statement, putting an end to all discussion of the subject:

"NEW YORK, September 6.

"Your letter dated 21st ult. duly received, and we have delayed reply to see if we could meet your figures. Although prices are low with us, and we are anxious to fill an order for your market, yet it could not be done at £11 10s. without some loss. We regret not being able to execute your order, but will keep you advised of the probabilities of being able to meet your views. There has been no small stir in our city since it came out that we got an order from England for 100 tons of iron. All sorts of rumors have been flying about, and the newspapers got hold of it, and there has been much discussion on the subject. While we would be pleased to make such a shipment, we do not anticipate being able to do so unless prices are maintained on your side and go down on this. It is not to be expected that the condition of the trade should hold so that any extensive shipments could be made to England for some time to come. But your people should not forget that ours is a remarkable country in the matter of resources for iron production, and the home competition will keep the prices at reasonable figures in the absence of any extraordinary demand, and such we have not now by considerable."

We have been thus particular in presenting the true story of the alleged shipments of pig iron and bar iron from this country to England, because the opponents of the protective policy have energetically insisted that, if our iron manufacturers can sell iron in England at a profit, they no longer need to be protected against foreign competition. The exact truth is that, with the exception noted, the cost of making pig iron and bar iron in England is so much lower than in this country that the English ironmaster is not only able to retain command of his own home market for these commodities, but also is enabled, notwithstanding our protective duties, to maintain a vigorous hold upon the American market. Repeal these duties, and his hold upon our market would be strengthened by just the measure of the gratuity thus offered to

him. What we should strive first to accomplish is the absolute possession of our own markets for *all* kinds of pig and manufactured iron. Until that day arrives, no occasional shipments we might make of these commodities to England, to subserve any ulterior purposes of English ironmasters, or to meet a special want of English car-wheel or other manufacturers, could with any show of reason be entitled to be regarded as the establishment of an export *iron* trade with England.

There is no part of our iron export trade that more significantly expresses our progress in the manufacture of machinery, than the figures given relating to locomotives. To have sent abroad in the three fiscal years 1871, 1872, and 1873, no less than one hundred and sixty-eight locomotives, aggregating in value more than two millions and a half of dollars, is a proud achievement, when viewed in connection with the energetic European competition with which we had to contend. Presuming that it would interest the readers of this report to learn the destination of the locomotives which have been exported, we have applied to the proprietors of the Baldwin Locomotive Works, of Philadelphia, the principal exporters of American locomotives, for a statement showing the number built by them during 1872 and 1873 for foreign countries. The statement is subjoined. It will be observed that the exports of this firm for the calendar year 1873 show a large increase over the total exports of locomotives for the fiscal year 1873.

1872.	
PERU.—Ilo and Moquequa Railway	3
CANADA.—Canada Southern Railway	16
Great Western of Canada	10
RUSSIA.—Voronej-Rostaff Railway	10
BRAZIL.—Campos & San Sebastião Railway	1
FINLAND.—Hango Railway	4
Total foreign engines 1872	44

Value of Locomotives (44) exported by Baldwin Locomotive Works, 1872, $568,096 94, U. S. currency.

1873.	
CANADA.—Grand Trunk Railway	45
Canada Southern Railway	13
Hamilton & Lake Erie Railway	2
Great Western of Canada Railway	5
BRAZIL.—Campos & San Sebastião Railway	2
Don Pedro II	20
MEXICO.—Vera Cruz and Mexico Railway	2
NEW BRUNSWICK.—Government Railways	1
FINLAND.—Hango Railway	5
PRINCE EDWARD ISLAND.—Schreiber & Burpee, (contractors)	4
Total, 1873	99

Value of Locomotives (99) exported by Baldwin Locomotive Works, 1873, $1,432,800 27, U. S. currency.

RECAPITULATION.

	Numbers.	Value in U. S. currency.
Locomotives exported by B. L. W. 1872	44	$568,096 94
" " " 1873	99	1,432,800 27
Total for 1872 and 1873	143	$2,000,897 21

The preponderance of locomotives manufactured for Canada, by the Baldwin Locomotive Works, will not escape notice. Our Canadian iron trade has rapidly increased during the past few years, and this increase is a subject of anxious concern to our English rivals. The London *Times*, of July 29th last, remarks that "the increasing competition of the American iron dealers with those of England is plainly shown in Canada, where American railway iron is delivered at prices fifteen to twenty per cent. below those of Staffordshire." It mentions an order for fifteen thousand axles, "which, under ordinary circumstances, would have gone to England, but which, on account of the cheapness, was given to a manufacturer in the United States." We quote from the Boston *Advertiser* the subjoined statistics of the Canadian trade and navigation returns for the year ending June 30, 1872, exhibiting the value of hardware imported from the United States, as compared with the value of that imported from all other countries into the four old provinces of Canada:

Articles.	From U. States.	From other countries.
Cutlery	$ 64,624	$ 244,869
Britannia and metal ware	19,034	6,657
Spades, shovels hoes, &c	50,773	29,640
Spikes, nails, &c	41,544	71,205
Stoves and other castings	149,735	121,249
Other hardware	1,293,568	1,727,049
Total	$1,619,278	$2,200,669

These figures show that the United States possessed in the year named forty-two per cent. of the hardware trade of Canada.

The West Indies, Mexico, Central America, South America, and the British North American Possessions now offer to the United States a market for the sale of manufactures of iron and steel the value of which is incalculable. The enhanced cost of labor and coal to English manufacturers conspires with our recent rapid progress in the use of labor-saving machinery, our great natural resources, and the cheapness of our fuel to place us on terms of decided advantage in competing for the iron trade of these countries. With proper exertion, and the exercise of a disposition to buy liberally from them of what they have to sell, their iron trade will fall largely into our hands. We should not neglect our op-

portunity. It is high time that our iron and steel makers should look to the increase of our foreign markets for iron and steel. Soon the West will be practically self-sustaining in the supply of its own iron and machinery. The South is also making gratifying progress in the development of its iron and manufacturing resources. These two sections have heretofore constituted a ready market for the sale of most of the surplus iron products of the Eastern and Middle States. Hereafter they will not only supply themselves very largely, but they will have iron and its products to sell to others. The continued prosperity of the American iron trade, it will therefore be seen, depends greatly upon the extension of our foreign markets.

The United States, by the adoption of a fiscal policy which has stimulated invention, has been enabled to compete in the markets of the world with the cheap labor of other countries *in the supply of finished products.* By the substitution of improved mechanical appliances for high-priced hand labor, they have obtained better results than countries which have depended mainly upon cheap labor and ruder machinery. Boston exports boots and shoes made by machinery to countries which do not pay their boot and shoe makers one-half the wages her workmen are paid. The London *Times* admits that, as a result of our superior machinery, "railway fastenings, door locks, spring bars, curry-combs, tin wares, and some descriptions of edge tools are among the classes of produce in which American competition is beginning to be seriously felt in Birmingham and the South Staffordshire district." Tailors' shears are regularly exported from this country to England. American axes, made by the Douglas Company, are exported to Dublin and sold at a profit. The Ames shovel is sold in all the markets of the world. American cutlery and hardware are supplanting English cutlery and hardware in many foreign markets, and competing with them in all. Our exports of the products of our labor-saving machinery are every year increasing to Canada, South America, Mexico, New Zealand, Australia, and other countries. We place our high-priced labor against the low-priced labor of manufacturing and commercial rivals, and we win from them a part of their trade because of our superior skill and ingenuity. With all her boasted

superiority, England uses to-day, in many of her manufactures, tools and machinery far inferior to American inventions which meet similar requirements.

The question may be asked, How does protection stimulate invention? The answer would seem to be, that protection directly tends to an increase of wages; high wages increase the cost of production; increased cost of production leads to the substitution of machinery for hand labor, and the demand for machinery that shall be labor-saving quickens the inventive faculties of mechanics and others. The extensive use of machinery enables the country which pays high wages to compete successfully with those countries which pay low wages and use but little machinery. It is also true that, the greater the mechanical resources of a nation, the greater will be the competition between its own artisans for the supply of the home market, and the less will be the tendency to the creation of monopolies and high prices for manufactured products.

In the use of improved machinery, which enables us to supply our own markets and to export our finished products to other countries, lies our great strength as a manufacturing nation. It would be no jewel in our crown—nothing to be proud of—if we were to send pig iron to England and sell it at a profit, for we did that once before, more than a hundred years ago, but it is a present and a lasting glory for American manufacturers that they have become large exporters to England and to other countries of wares and fabrics which have required skill and ingenuity in their production, while the workmen that produced them have been paid the highest wages the world has ever known. We need only to keep on as we have commenced, and, by maintaining our present comparatively high rates of wages, which attract the skilled labor of other lands, and by still further improving our machinery, we will in a brief time become the first among the nations in the exportation of finished products, the only exportation which adds to the strength, culture, and permanent prosperity of a people.

OUR IMPORTS OF IRON AND STEEL.

From the same source from which we have received the statistics of our exports of iron and steel for the last three fiscal years, we have received the following figures representing our imports of these commodities during the same periods. It should always be remembered that the fiscal year ends on the 30th of June.

COMMODITIES—QUANTITIES.	1873.	1872.	1871.
IRON AND STEEL, AND MANUFACTURES OF:			
Pig-iron.....lbs...	482,711,889	554,465,164	399,031,453
Castings.....lbs...	729,680	866,285	4,406,073
Bar-iron.....lbs...	166,016,035	236,454,061	203 503 170
Boiler-iron.....lbs...	1,174,165	1,401,951	1,098,838
Band hoop, and scroll iron.....lbs...	25,660,711	23,416,191	22,441,187
Railroad bars or rails, of iron.....lbs...	481,009,481	944,730,303	1,026,045,340
Sheet-iron.....lbs...	29,887,746	29,509,665	20,977,572
Old and scrap iron.....tons...	204,078	230,763	155,805
Hardware.....	.....	.....	.....
Anchors, cables, and chains, of all kinds.....lbs...	11,599,462	11,010,613	11,050,088
Machinery.....	.....	.....	.....
Muskets, pistols, rifles, and sporting-guns.....	.....	.....	.....
Steel ingots, bars, sheets, and wire.....	.....	.....	.....
ƒ Railroad bars or rails, of steel.....lbs...	320,083,100	245,911,554	.....
Cutlery.....	.....	.....	.....
Files.....	.....	.....	.....
Saws and tools.....	.....	.....	.....
Other manufactures of iron and steel not elsewhere specified.....	.....	.....	.....

ƒ Previous to July 1, 1871, reported under some more general class.

COMMODITIES—VALUES.	1873.	1872.	1871.
IRON AND STEEL, MANUFACTURES OF:			
Pig-iron.....	$7,203,769	$5,122 318	$3,106,490
Castings.....	32 113	34 333	32.679
Bar-iron.....	5,288,481	5,153,472	4,058 126
Boiler-iron.....	55,030	57 392	31 284
Band hoop, and scroll iron.....	846,973	573,457	506 501
Railroad bars or rails, of iron.....	10 541,036	15 778 941	17,360,297
Sheet-iron.....	1.287.072	1,116,200	610 809
Old and scrap iron.....	6 643,512	6,040,678	3,782,526
Hardware.....	371,518	204,992	141,495
Anchors, cables, and chains, of all kinds.....	675,184	490 275	472.782
Machinery.....	1,693 966	1,054 045	907.371
Muskets pistols, rifles, and sporting-guns.....	822 119	711,858	706 988
Steel ingots, bars, sheets, and wire.....	4,155,234	4,033,508	3.750,702
ƒ Railroad bars or rails, of steel.....	9,199,666	6,277,694	.....
Cutlery.....	2.234 347	2.143,708	1,956 351
Files.....	770,986	583 058	604,153
Saws and tools.....	265,637	542,377	514,346
Other manufactures of iron and steel not elsewhere specified.....	7,221,745	5,621,882	4,883,075
Total values.....	$69,308 388	$55,540,188	$43,425,975

ƒ Previous to July 1, 1871, reported under some more general class.

There was an increase of the quantity and value of our imports in the fiscal year 1872 over 1871, but in the fiscal year 1873 the

tide turned, owing to high prices abroad, and, although there was an increase in value over 1872, there was a very great decrease in quantity. This decrease was most marked in the latter half of the fiscal year 1873, continuing up to the close of September last, as will be seen by the following table of exports of iron from Great Britain to the United States during the first nine months of the calendar years 1872 and 1873: tons of 2,240 pounds.

ARTICLES.	QUANTITIES.		VALUES.	
	1872.	1873.	1872.	1873.
	Tons.	Tons	£	£
Pig-iron	168,933	87,958	861,816	595,478
Bar, angle, bolt and rod	53,599	21,958	590,709	292,382
Railroad of all sorts	378,053	151,972	3,737,493	1,967,872
Hoops, sheets and plates	25,551	16,913	342,253	275,855
Cast or wrought	9,969	13,828	214,470	286,742
Steel, unwrought	17,506	15,173	552,685	552,767
Total	653,611	307,802	£6,299,426	£3,971,046

The decrease in the quantity of iron and steel imported from Great Britain during the first nine months of 1873, compared with the same period of 1872, was 345,809 tons; the decrease in value was £2,328,380. The decrease in tonnage was fifty-three per cent.; in value, thirty-seven per cent. For the remaining three months of the current year, there is every reason to believe that the decrease in our iron and steel imports will be still more rapid than during the first nine months.

The figures given in the preceding table have been compiled from the Report of the British Board of Trade for September last, and relate only to iron and steel in their coarser forms. It is in these forms, however, that most of our imports are made. In the table which gives our iron and steel imports for the past three fiscal years, it will be observed that our imports of iron and steel in their more finished forms are also given. In response to our request, the Chief of the Bureau of Statistics of the Treasury Department has sent us the following table, showing our iron and steel imports from all countries during the calendar years 1871 and 1872.

IRON AND STEEL, AND MANUFACTURES THEREOF.	1872.		1871.	
	QUANTITIES.	DOLLARS.	QUANTITIES.	DOLLARS.
Pig-iron.....lbs...	591,934,780	$7,269,850	491,070,514	$3,797,298
Castings.....lbs...	814,265	38,564	883,140	28,210
Bar-iron.....lbs...	179,152 436	4,837,532	245,131,870	5,024 186
Boiler-iron.....lbs...	1,369,158	59,993	645,550	27,351
Band, hoop, and scroll iron...lbs...	24,759,754	748,509	26,196,088	594,166
Railroad bars or rails of iron..lbs...	762,128,379	14,498,012	1,132,403,518	19,132,361
" " " steel...lbs...	299,571,265	8,207,013		
Sheet-iron.....lbs...	20,298,100	1,263,112	24,095,785	857,895
Old and scrap iron.....tons...	248,444	7,617,463	196,732	4,845,092
Anchors, cables, chains, of all kinds.....lbs...	11,751,141	622,908	10,878,838	460,116
Hardware.....	.....	325,268	134,427	134,427
Firearms.....	.....	811,872	.....	599,388
Steel ingots, bars and wire.....	.....	4,106,087	.....	3,460,735
Cutlery.....	.....	2,272,467	.....	2,051,750
Files.....	.....	676,814	.....	595 539
Saws and tools.....	.....	476,927	.....	695,275
Other manufactures not specified..	.....	6,743,183	.....	5,615,589
Total imports.....	.....	60,575,514	.....	47,919,928

In the appendix to this report will be found a table showing the total exports of iron and steel from Great Britain to all countries during 1871, 1872, and first nine months of 1873. In this table will be found the items of British exports to the United States in the periods named.

The importation of old rails from England and other countries is of recent origin, very few having been imported prior to 1867. Below is a table of monthly prices of double-headed rails from that year to the present time, based upon sales made at Philadelphia by Edward Samuel and Edward J. Etting, iron commission merchants. "T" rails fifty cents per ton less.

YEARS.	Jan.	Feb.	Mar	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov	Dec.
	$	$	$	$	$	$	$	$	$	$	$	$
1867 Currency,.....	.....	.....	.....	.....	.....	.....	.....	.....	48 50	49 00	.....	.....
1868 "	.....	.....	.....	47 00	.....	.....	.....	.....	49 50	48.00	48.00	.....
1869 "	48 50	49.00	48 00	48.00	48.00	50.50	49 00	48.00	49 00	49.00	48.00	47 00
1870 Gold,.....	36.00	37 00	37.50	39 00	39.00	39.50	39.50	39 50	39 50	39.50	39.50	39.50
1871 "	39 25	39.00	39 25	40 00	40.25	40 25	39.75	39.75	39.50	39.50	39.75	40 00
1872 "	42 00	44 50	48.50	52.00	53.00	50 50	50.50	51.50	57 00	48.25	46 50	46.50
1873 "	49.00	49.50	52 00	50 25	46 50	46.00	44.25	44.25	44 00	40.00	.....	.....

PRODUCTION OF RAILS IN THE UNITED STATES.

The total number of net tons of iron and steel rails made in the United States in 1872, as reported to this office by the makers, is 941,992, or 841,064 gross tons. This aggregate was produced in the following States, the production of which is given in comparison with the production in 1871:

STATES.	1871.	1872.	Per cent. of total for 1872.
Pennsylvania	335,604	419,529	44.53
Ohio	75,782	121,923	12.94
Illinois	91,178	106,916	11.35
New York	87,022	82,457	8.75
Wisconsin	28,774	37,284	3.95
Massachusetts	28,864	29,242	3.14
Maryland	44,941	26,472	2.81
Indiana	12,778	23,893	2.53
West Virginia	5,000	20,100	2.13
Missouri	8,200	15,500	1.65
Tennessee	9,667	14,620	1.55
Maine	13,383	14,058	1.49
Michigan	14,000	9,883	1.04
New Jersey	6,700	9,185	.98
Georgia	7,840	6,930	.74
Kentucky	6,000	4,000	.42
Total	775,733	941,992	100.00

This aggregate of production includes only such rails as are made for the use of freight and passenger railways, and excludes an ascertained production of 15,000 tons of street rails, and all mining rails made during the year. Adding these to the above aggregate, the total production of rails of all sorts in the United States in 1872 was undoubtedly *one million net tons*. More mining rails are made by bar mills than by rail mills, and they are frequently classified as bar iron; hence the impossibility of ascertaining exactly the production of this class of rails in any year. Were the fact otherwise, however, we but follow the precedent of this office in excluding from our tabulated statistics of rails any estimate of the production of mining rails, as well as the ascertained production of street rails.

By this table it will be observed that, in 1872, Pennsylvania

made 419,529 tons, or 44½ per cent. of the whole. Ohio comes second in the list, taking the place which Illinois held in 1871. Illinois is the third State in the list, and New York the fourth. In the production of steel rails, the relative position of these four great iron producing States is almost the same—Pennsylvania producing 38,463 tons; Ohio, 22,000 tons; Illinois, 15,930 tons; and New York, 17,677 tons; total, 94,070 net tons. No other States made Bessemer rails in 1872. The largest production of both iron and steel rails by a single mill must be credited to the Cambria Iron Works, at Johnstown, Pa., which made a total of 81,006 net tons. This magnificent result was accomplished during a year in which a large part of the works was destroyed by fire—a calamity which it is proper to state, however, was almost immediately overcome by the extraordinary energy and resources of the Company.

The following table exhibits the production of rails in the United States from 1849 to 1872, inclusive, together with the growth of the railway system of the country during the same period:

YEARS.	Total Rails made in United States. Tons of 2,000 lbs.	Total Rails imported. Tons of 2,000 lbs.	Total Consumption of Iron and Steel Rails.	Miles of Railroad built in U. States in each year.
1849	24,318	69,163	93,481	1,369
1850	44,083	159,080	203,163	1,656
1851	50,603	226,350	276,953	1,961
1852	62,478	294,750	357,228	1,926
1853	87,864	358,794	446,658	2,452
1854	108,016	339,439	447,455	1,360
1855	138,674	153,019	291,693	1,654
1856	180,018	186,594	366,612	3,643
1857	161,918	215,166	377,084	2,486
1858	163,712	90,894	254,606	2,465
1859	195,454	83,958	279,412	1,821
1860	205,038	146,610	351,648	1,846
1861	187,818	89,388	277,206	651
1862	213,912	10,186	224,098	864
1863	275,768	20,506	296,274	1,050
1864	335,369	142,457	477,826	738
1865	356,292	63,327	419,619	1.177
1866	430,778	117,878	548,656	1,742
1867	462,108	184,840	646,948	2,449
1868	506,714	300,160	806,874	2,979
1869	593,586	336,500	930,086	5,118
1870	620,000	472,403	1,092,403	5,525
1871	775,733	566,202	1,341,935	7,779
1872	941,992	530,850	1,472,842	6,427

The production of rails in the United States in 1871 was 775,733 net tons; in 1872 it was 941,992 tons. Increase, 166,259 tons, or 21½ per cent. The importation of foreign rails in 1871 was 566,202 net tons; in 1872 it was 530,850 tons. Decrease, 35,352 tons, or 6¼ per cent. The net gain of the American railmaker in 1872 over his foreign rival was therefore 201,611 net tons.

Of the total production of 941,992 net tons of rails in 1872, 94,070 tons were Bessemer steel rails. In 1871 there were produced 60,042 net tons of steel and steel-headed rails. Increase, 34,028 tons, or 56⅔ per cent. Of the 530,850 net tons of rails imported in 1872, 149,786 tons were steel rails. In 1871 it is estimated that there were imported 83,887 net tons of steel rails. Increase, 65,889 tons, or 78½ per cent.

It will be seen that, while the importation of rails of all kinds was 35,352 net tons less in 1872 than in 1871, the importation of steel rails increased 65,889 tons. The reduction in the importation of all iron rails was, therefore, 101,241 tons.

The total consumption of iron and steel rails in 1871 was 1,341,935 net tons; in 1872 it was 1,472,842 tons. Increase, 130,907 tons. This increased consumption was more than equaled by the increased production of American mills, which was 166,259 tons, as above stated.

The importation in 1872 of old rails for remanufacture is carefully estimated at 170,000 gross tons. The customs regulations do not separate old rails from scrap iron; hence the necessity of estimating the quantity of each imported. The total importation of old and scrap iron in 1872 was 248,444 gross tons, valued at $7,617,463, gold, of which Great Britain sent 108,181 tons, valued at $3,203,746. In 1871 Great Britain sent us 139,812 tons, valued at $3,255,849.

During the year ended December 31, 1872, the aggregate value of the imports of iron and steel, and manufactures thereof, as reported to this office by Hon. Edward Young, Chief of the Bureau of Statistics, Treasury Department, was $60,575,514, gold, of which $22,705,025 represents the value of new iron and steel railroad bars—$14,498,012 of iron, and $8,207,013 of steel.

During the year 1871, the export from the United States of

American railroad bars and rails was 306 net tons; during 1872 the export was 1,296 tons. Increase, 323 per cent. These figures of our export trade are comparatively unimportant, but they show progress in the right direction.

The following table shows the average price per ton of American iron rails from 1860 to 1873, and of British and American steel rails to 1873. The average price of gold for the same years is also given. The quotations in the column of prices of British steel rails are averaged from invoices of actual sales made by a heavy importing firm; those in the column of prices of American steel rails are averaged from invoices of actual sales and shipments made by the Pennsylvania Steel Company. The premium on gold is calculated from daily quotations in the *Banker's Magazine.*

YEARS.	Average price per ton of 2,240 lbs. of American Iron Rails.	Average Price of British Steel Rails from 1863 to 1873, in Gold. Gross Tons.	Average Price of American Steel Rails from 1867 to 1873, in Currency. Gross Tons.	Average Price of Gold from 1860 to 1873.
1860	48	.....	.....	100
1861	42⅜	.....	.....	100
1862	41¼	.....	.....	113
1863	76⅞	$150	.....	145
1864	126	140	.....	202
1865	98⅝	120	.....	157
1866	86½	120	.....	140
1867	83½	118	$160	138
1868	78⅝	104	158½	140
1869	77¼	90	132½	136
1870	72½	87½	106½	115
1871	70⅜	97½	102½	112
1872	85⅝	108	112	112
1873	*80	*113½	*119¾	*112

* Average price for first eight months of 1873.

The first importation of steel rails was made in 1863. Steel rails were made in the United States prior to 1867, but it was not until this year that American steel rails can properly be said to have had a marketable value. Most of the rolling prior to this year was done in the way of experiment, and a very costly experiment it proved to many establishments. Very few American steel rails were made in 1867.

The steady and gratifying growth of the rail industry of this country is shown in the table of yearly production. In 1850

we manufactured 44,083 tons of 203,163 tons consumed, or 21.7 per cent. In 1860 we manufactured 205,038 tons of 351,648 tons consumed, or 58.3 per cent. In 1870 we manufactured 620,000 tons of 1,092,403 tons consumed, or 56.7 per cent. In 1872 we manufactured 941,992 tons of 1,472,842 tons consumed, or 63.9 per cent. During the whole period of twenty-four years, from 1849 to 1872, inclusive, we have manufactured more than one-half of all the rails that have been consumed in the country. During the last fifteen years, beginning with 1858, we have every year made more rails than we have imported. Our dependence upon the foreign market has decreased with the growth of the home supply. It ought to disappear altogether after this year. The capacity of the home mills, which in 1872 produced 941,992 tons, is equal to the production, when fully employed, of an increase of 20 per cent upon that product, or 1,130,390 tons in all. As the consumption of rails will not maintain the rate of increase that has existed during the past ten years, it may be safely affirmed that, if existing mills work closely up to their capacity, and if we make reasonable allowance for the enlargement of old mills, and the starting of new mills now in course of erection, the home supply of rails will be equal to any possible home demand after the first day of next January. Indeed, there exists a very strong probability that, even if there had been no financial panic in September, which impeded the progress of all railroad construction, American mills would this year have made all the rails that American railroads would have needed. As matters are, they have made more than they can take. England will send us this year about 150,000 tons, but it is exceedingly probable that there will be just this quantity of rails on hand and unsold in the country on the thirty-first day of December next, with many American mills standing idle the whole or part of the year. The American make during the year will be about 850,000 net tons, (less than last year), of which about 120,000 tons will be Bessemer rails.

In this connection it is a pertinent thought that the rails needed for the construction of our vast network of railways could not have been obtained if their manufacture in American mills had not been encouraged by the imposition of high duties on foreign rails. No

other country could have provided the rails which were made at home; nor, if it could have provided them, with our vast army of ironworkers out of employment, or engaged in less productive pursuits, would we have been able to buy them at any price. We may carry the thought farther, and assert that, without our magnificent production of rails in the last few years, we would not have needed to build the railroads we have. With our iron industry undeveloped, and thousands of ore and coal mines unopened; with a lessened demand for skilled labor, and a consequent cheapening of agricultural products; with a resulting decrease in the immigration from Europe of skilled workmen, and of other workmen in search of homes on our western prairies; with fewer towns and cities built up through the instrumentality of iron manufactures and the industries to which they give birth and encouragement, the building of railroads would not have been profitable, and European capital would have sought other fields of investment.

The situation during the past two years has been especially significant of the close and dependent relationship which exists between American railroads and American rail mills. With England's limited iron product, and our own rail mills either idle or unfinished, we could scarcely have replaced from her mills the worn-out rails upon our far-reaching and never-ending lines of railroad, and we certainly could not have procured from the same source new rails for any considerable increase in our railroad development. The London *Colliery Guardian* of March 14th, 1873, made the following admission: "If the Americans had only Great Britain to rely upon as regards their rail supplies, the construction of American railroads would probably have now to be in a great measure suspended." And for the rails that England *could* have furnished us in the absence of American competition, we would have had to pay just such a price as her ironmasters would have demanded.

RAILROAD PROGRESS IN THE UNITED STATES.

The railroad first undertaken in the United States for the transportation of freight and passengers was the Baltimore and Ohio, of which 23 miles were opened for use in 1830. The following table will show the number of miles constructed each year since that date. The total mileage has more than doubled since 1863.

Year.	Miles in Operation.	Annual Increase of Mileage.	Year.	Miles in Operation.	Annual Increase of Mileage.	Year.	Miles in Operation.	Annual Increase of Mileage.
1830	23		1845	4,633	256	1860	30,635	1,846
1831	95	72	1846	4,930	297	1861	31,286	651
1832	229	134	1847	5,598	668	1862	32,120	834
1833	380	151	1848	5,996	398	1863	33,170	1,050
1834	633	253	1849	7,365	1,369	1864	33,908	738
1835	1,098	465	1850	9,021	1,656	1865	35,085	1,177
1836	1,273	175	1851	10,982	1,961	1866	36,827	1,742
1837	1,497	224	1852	12,908	1,926	1867	39,276	2,449
1838	1,913	416	1853	15,360	2,452	1868	42,255	2,979
1839	2,302	389	1854	16,720	1,360	1869	47,373	5,118
1840	2,818	516	1855	18,374	1,654	1870	52,898	5,525
1841	3,535	717	1856	22,017	3,643	1871	60,677	7,779
1842	4,026	491	1857	24,503	2,486	1872	67,104	6,427
1843	4,185	159	1858	26,968	2,465			
1844	4,377	192	1859	28,789	1,821			

The following table will show the number of miles of railroad constructed in each of the United States and Territories of the United States prior to December 31, 1872.

States.	*Miles.*	*States.*	*Miles.*
Maine,	871	Wyoming Territory,	459
New Hampshire,	810	Utah Territory,	349
Vermont,	710	Dakota Territory,	234
Massachusetts,	1,658	Colorado Territory,	483
Rhode Island,	136	Indian Territory,	279
Connecticut,	868	Virginia,	1,537
New York,	4,925	North Carolina,	1,250
New Jersey,	1,378	South Carolina,	1,290
Pennsylvania,	5,369	Georgia,	2,160
Delaware,	254	Florida,	466
Maryland and Dist. Columbia,	1,012	Alabama,	1,566
West Virginia,	561	Mississippi,	990
Ohio,	4,108	Louisiana,	539
Michigan,	2,889	Texas,	1,078
Indiana,	3,649	Kentucky,	1,266
Illinois,	6,361	Tennessee,	1,520
Wisconsin,	1,878	Arkansas,	450
Minnesota,	1,906	California,	1,220
Iowa,	3,643	Oregon,	241
Kansas,	2,341	Nevada,	611
Nebraska,	1,051	Washington Territory,	65
Missouri,	2,673	Total,	67,104

The above tables are taken from Poor's Railroad Manual for 1873, the most comprehensive and reliable railroad authority in the United States. At the date of preparing this report, October 1st, we estimate the mileage of new track for the year at only 3,000 miles, a decrease since last year of more than fifty per cent. The year 1871 witnessed the culmination of railroad construction in this country. The number of miles built in that year was 7,779. The reaction commenced in 1872, when 6,427 miles were built.

Mr. W. W. Nevin, a competent authority, states the number of miles of narrow gauge (three feet) railroad which have been actually built and are now in operation in the United States to be 921½. The completion of the roads of which these 921½ miles form a part involves a total projected mileage of 3,428 miles. The same authority gives the names of other narrow gauge enterprises, which will probably within a few years add 2,000 miles of completed road to the above total.

In Mr. Poor's classification of the 67,104 miles of railroad constructed in the United States up to the first of January, 1873, 5,053 miles are located in New England, 13,499 in the Middle States, 32,303 in the Western States, 14,112 in the Southern States, and 2,137 in the Pacific States. It will be seen that about *one half* of the total mileage is in the Western States, embracing Ohio, Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Kansas, Nebraska, Missouri, and Wyoming, Utah, Dakota, and Colorado Territories. It is in these States and Territories that there is to-day the greatest falling off in railroad building, and it is because of this great reaction in the West that we believe we are justified in estimating the railroad construction of 1873 at less than one half the mileage of 1872. It is there that railroad building has advanced beyond the legitimate wants of trade, and in many instances has proved to be disastrously unprofitable. It is in the West that the financial stringency of the past year has been most severely felt, making it difficult for Western railroad corporations to negotiate their bonds, either among Eastern capitalists or in Europe. In the West the farmers' movement, which is one of hostility to existing railroads, and favorable to the construction of ship canals and other competing routes to the seaboard, has obtained most

headway, making capital timid of ordinary railroad investments. Lastly, the forced suspension in September last of several large banking houses, which were largely interested in Western railroad enterprises, caused a check to the further prosecution of those enterprises from which they can not soon recover. All these causes combine to bring the railroad development of the West to a temporary stand, and it is reasonable to assume that, with the exception of a few short lines already in progress, there will be no new railroad enterprises of moment in that section prosecuted during this year or the next. But this reaction will have its compensations. It will probably lead to the strengthening of favorably located single track trunk lines in the West, by the construction of double tracks and the increase of rolling stock, and to the development of mines and manufactures along *all* existing routes. This last result will tend greatly to improve the condition of the people of the West, as well as to give freight and passenger traffic to the railroads, for it will furnish something else to sell besides raw agricultural products, which, far removed from Eastern and European consumers, can have, as compared with the products of cheese factories, woolen mills, coal and iron mines, blast furnaces and rolling mills, etc., but little marketable value. The railroads of the East have almost uniformly paid a greater percentage of profit than those of the West, because they have either passed through sections of country already blessed with a diversification of industries, or they have given substantial aid and encouragement to the promotion of adjacent mining and manufacturing enterprises. The West will now profit by this example. Instead of pushing railroads into the wilderness, where there is neither population nor trade to sustain them, the hidden resources of long settled States and Territories will be developed. It is clear that railroad building in the West has been wildly overdone, and that Western people, while looking to the railroads for cheaper freights on agricultural products, have bestowed too little attention upon the development of other sources of wealth than agriculture. It does not follow, however, that the present lull in railroad progress in the West is in any sense an evil, or that it is significant of anything else than a period of needed rest and reflection, to be followed by

a vigorous and healthy awakening. The railroad development of the West has been much too rapid, but that is no reason why it should cease altogether, or why favorably located lines should not be more profitable than ever.

As illustrative of the extent to which the business of building railroads has been carried in sections of the country which lack the population and the trade necessary to sustain them, it may be mentioned that a branch of the Chicago and Northwestern Railway was opened in September last to Lake Kampeska, in Dakota Territory, a distance of six hundred and thirty-one miles northwest from Chicago. The opening of this new route was signalized by an excursion over the road by a party of railroad officials, newspaper reporters, and others. From a report of the journey and the features of the road, which we find in a Chicago newspaper, we learn that "the new road is built upon a grant of land made by the Government to the Northwestern Company," and that it is completed according to the conditions that Congress imposed, and reaches far beyond the limits of civilization. It is not probable that trains will run for years unless a connection is made with the Northern Pacific, for there is no present use for track or cars. *There is no timber or coal to bring down, and nobody up there to carry freight to.*" The reporter adds that the train "ran mile after mile, hour after hour, without passing a house or a human being. The noise of the cars frightened immense flocks of birds from their covers, and once in a while an antelope would spring out of a tuft of grass to test his speed with the train." After more than forty hours' travel from Chicago, the train reached Lake Kampeska, the terminus, which the reporter informs us is "a beautiful sheet of water, lying like an oasis in the vast grassy desert of Dakota. A squatter had arrived before us and erected his tent—a lone habitant of a wild waste."

In the East, the great double track trunk lines have not abated their energies during the present year, for their immense traffic and great resources have given them no cause to do so. Some of these have contemplated arrangements for trebling and even quadrupling their tracks, and for extending their connections, which must necessarily, however, be modified by financial derangements

affecting the business of the whole country, and which threaten to interfere seriously with the realization of all projects demanding large expenditures of capital. It is probable, therefore, that the year 1874 will witness the construction of few new tracks upon Eastern trunk lines already having double tracks, but most new lines of short length already undertaken in the East may be expected to be prosecuted with energy to completion. The rapidity with which the lumber, petroleum, coal, iron ore, and other resources of this section are being developed renders the speedy construction of many such lines a pressing necessity. We estimate the total railroad construction of 1874 at 3,000 miles, the same mileage as the estimate for 1873.

During the years 1872 and 1873 great progress has been made in the substitution, by established lines doing a heavy business on heavy grades, of steel rails in place of the ordinary iron rails. The President of the Philadelphia and Reading Railroad Company, Franklin B. Gowen, in his annual report for 1872, says that a liberal quantity of steel rails has been laid at points where heavy grades, sharp curves, or constant switching of trains subjects the roadway to very great wear. Of the three thousand three hundred and fifty tons of solid steel rails laid on this road since 1867, less than fifteen tons have been removed from the track, and these have been taken from places where the life of iron rails had been found not to exceed four months. The increasing popularity of steel rails is further illustrated in a statement made in the report of the officers of the Baltimore and Ohio Railroad Company for 1872. They say: "It will be seen that 9,118 tons of steel rails have been used during the past year upon the main stem; 256 miles of the road are now laid with this durable and safe material. Contracts have been made for 16,000 tons, to be laid during the next year." The Chicago and Northwestern Railway Company has during the present year replaced the iron rails of its Milwaukee Division with steel rails, and it proposes to place steel rails on all its main lines. Ten thousand tons have been ordered for immediate delivery. The report of the Auditor General of Pennsylvania, for 1872, states the number of miles of railroad in the State laid with steel rails to be 1,434. The Lehigh Valley Railroad had,

on the first of January last, ninety-three miles laid with steel rails, and it is officially stated that the steel rails laid on Beaver Meadow Division in May, 1864, present a most favorable appearance. Our space will only permit these few references to the growing use and popularity of steel rails in this country.

Steel rails are also coming largely into use on Canadian railways. The main line of the Great Western Railway has been laid with 154 miles of these rails, and seventy-five additional miles will be laid this year. The first steel rails laid down three years ago on its heavy grades are still wearing satisfactorily, while the iron rails formerly used on the Copetown Incline failed before they had been twelve months on the track. The directors of the Grand Trunk Railway propose to equip their main line with steel rails throughout its entire length, and will make decided progress in carrying out this resolve during 1873 and 1874. It is expected that, by November, 1873, the line between Toronto and Montreal will be laid with steel rails to the extent of 260 miles, and by the close of 1875 it is intended that the whole road shall be of steel, a large quantity having been already laid west of Toronto and east of Montreal in addition to the central district. Canadian railway authorities agree that greater economy and greater safety are secured by the substitution of steel for iron rails—the intense cold of their winters causing the breakage of a much larger percentage of the latter than of the former. The directors of the Great Western Railway state that the cost of maintenance of way in the last half of 1872 is only £93,180 against £105,691 in the corresponding period of the previous year, although the traffic was larger and the trains more numerous. The percentage of the maintenance has fallen to 15.64 per cent. of the receipts, against 20.04 per cent. This reduction was accomplished by the use of steel instead of iron rails. It is proper to add, however, that the iron rails heretofore in use in Canada have been, in the main, inferior English rails, and below the standard of American iron rails.

The following statement from Poor's Manual shows the mileage, cost, gross earnings, etc., of 57,323 miles of the railroads of the United States in 1872, compared with similar returns of the railroads of Great Britain in 1871:

Groups for Comparison.	Rail Road Mileage.	Cost of Roads.	Cost per Mile.	Earnings.	Earnings per Mile.	Percentage of earnings to cost.	Percentage of net earnings to cost.	Earnings per head of population.
New England States,	4,574	$230,609,794	$50,418	$ 48,519,835	$10,636	21.10	6.26	$13 53
Middle States,	11,617	922,700,774	79,427	169,205,702	14,565	18.30	6.40	15 86
Western States,	28,778	1,472,625,232	50,550	193,826,252	6,735	13.10	4.57	13 76
Southern States,	10,986	401,913,267	36,575	47,788,539	4,350	11.80	4.09	4 31
Pacific States,	1,368	131,573,990	98,300	13,900,727	10,161	10.50	6.00	17 00
United States,	57,323	3,159,423,057	55,116	473,241,055	8,256	15.00	5.20	11 76
Great Britain,	15,376	2,763,400,535	178,720	244,463,900	15,900	8.49	4 65	7 70

About 44 per cent. of the earnings of the English roads in 1871 was from passenger traffic, and 56 per cent. from freight. On the American roads in 1872 the percentage of earnings from passengers was 28, and from freight it was 72. The English roads are almost without exception double track, while a majority of the roads in the United States are single track.

The total mileage of the railroads of England, Scotland and Ireland at the close of 1872 amounted to 15,814 miles. In 1850 the mileage was 6,621 miles; in 1860, 10,433. The gross earnings of the British roads for 1872 amounted to $250,440,000. Their length has doubled since 1853. Of the present lines, England and Wales have 11,136 miles, Scotland has 2,587, and Ireland 2,091.

An event of interest in connection with our railroad progress was consummated on the fourth of October of this year. The change of the gauge of the Grand Trunk Railway of Canada, from the English gauge of 5½ feet to the American gauge of 4 feet 8½ inches, was then completed. It is expected that by this change the Grand Trunk Railway will be enabled to interchange rolling stock with most American railroads.

The opening of the Chesapeake and Ohio Railroad, which connects the Atlantic Ocean and the Ohio River, passing through Virginia and West Virginia coal fields and iron ore deposits, is an event of the year which will greatly influence the future of the iron trade of the country.

PRODUCTION OF STEEL IN THE UNITED STATES.

The manufacture of cast steel in the United States, which may be said to be yet in its infancy, is restricted to a very few establishments. They have had a hard struggle for existence, but the excellent reputation of American steel and the cheapness with which it can be manufactured are sure to secure for these establishments the home trade to which they are entitled if our present tariff laws be continued and importations under fraudulent undervaluations be prevented by custom-house officials. It is an industry which should be liberally encouraged, for the various manipulations to which steel is subjected give employment to large numbers of workmen, and the more steel we make at home the greater will be the inducement to make our own cutlery, saws, files, tools, etc. Our production of steel has rapidly increased within the past few years. As a consequence, our importation of the finished products of steel has not sensibly increased, while our exports of these articles have increased steadily. The following table shows the production of cast steel in the United States since 1865, as nearly as can be ascertained, in tons of 2,000 pounds:

Years.	*Tons.*	*Years.*	*Tons.*	*Years.*	*Tons.*
1865	15,262	1868	21,500	1871	37,000
1866	18,973	1869	23,000	1872	32,000
1867	19,000	1870	35,000	1873	28,000

The production of pneumatic or Bessemer steel in the United States since 1868 has been as follows in tons of 2,000 pounds:

Years.	*Tons.*	*Years.*	*Tons.*
1868	8,500	1871	45,000
1869	12,000	1872	110,500
1870	40,000	1873	*140,000

* Estimate for the whole year.

About 85 per cent of the Bessemer steel that is now converted in American works passes into rails; the remainder is used in various ways, no two establishments apparently pursuing the same policy in dealing with rail ends, scrap, or ingots that are not

rolled into rails. Very few rail ends are reconverted into ingots, as the process is too expensive to be profitable. Some rail ends and ingots are rolled into bars, which are used in the manufacture of agricultural implements, other machinery, tools, etc., to which this kind of steel has been found to be admirably adapted. Rail ends and scrap steel are used in the manufacture of car-wheels by the Hamilton process, and for conversion into crucible steel. Bessemer wire is an established article of American manufacture. A large manufactory of Bessemer wood screws went into operation at Cleveland in January last, which will employ 300 workmen when running to its full capacity, and will make 15,000 gross daily. There is no longer any doubt that the uses to which Bessemer steel may be applied are as various as the uses of wrought iron itself, while its great superiority over wrought iron for many purposes is equally apparent. With cheap Bessemer steel, which we are now getting, thanks to a protective tariff which has taken from England her monopoly of the supply of this product to our country, all that has ever been claimed for Bessemer's great invention would seem to be on the point of realization through the agency of American enterprise and skill.

The total quantity of pig metal converted in this country by the pneumatic process, in the year 1872, was 125,361 gross tons. During the first nine months of 1873 the total quantity converted was 127,384 tons.

The production of steel in the United States by the Siemens-Martin process aggregated only a few thousand tons in 1872. The business was confined to seven establishments. As this quality of steel can not be so cheaply produced as Bessemer steel, it is difficult to estimate the extent to which its production will be carried in future years, but we hear of one new enterprise in its manufacture having been inaugurated this year.

The rapid development of the Bessemer steel industry in the United States justifies us in presenting here the following historical facts, for most of which we are indebted to Z. S. Durfee, Esq., of New York, Secretary of the American Pneumatic Steel Association:

The first Bessemer steel rails ever rolled in this country were rolled at the North Chicago Rolling Mill, on the twenty-fourth day

of May, 1865, from hammered blooms made at the Wyandotte Rolling Mill, from ingots of steel made at the Experimental Steel Works at Wyandotte. The American Iron and Steel Association was in session at Chicago at the time, and several of its members witnessed the rolling of these rails. One of the rails was taken to the hall occupied by the Association, and exhibited, and subsequently was placed on exhibition in the lobby of the Tremont House. The Experimental Steel Works, at Wyandotte, were the first works started in this country for conducting the pneumatic, or Bessemer process. The rolls upon which the blooms were rolled at the North Chicago Rolling Mill were those which had been in use for rolling iron rails, and, though the reduction was quite too rapid for steel, the rails came out sound and well shaped. Several of these rails were laid in the track of one of the railroads running out of Chicago, and are still in use.

The first steel rails rolled in the United States upon order, in the way of regular business, were rolled by the Cambria Iron Company, at Johnstown, Pa., in August, 1867, from ingots made at the works of the Pennsylvania Steel Company, at Harrisburg, Pa., and by the Spuyten Duyvil Rolling Mill Company, at Spuyten Duyvil, N. Y., early in September of that year, from ingots made at the Bessemer Steel Works, at Troy, N. Y., then owned by Messrs. Winslow & Griswold.

Bessemer works, for the conversion of steel and the rolling of rails, are now in operation at the following places: Troy, N. Y.; Johnstown, Pa.; Harrisburg, Pa.; Bethlehem, Pa.; Newburg, Ohio; Chicago, Illinois (two separate establishments); and Joliet, Illinois. The Pennsylvania Steel Works, at Harrisburg, are building a new plant, to be completed in 1874, which will double their present capacity. The Edgar Thomson Steel Works, near Pittsburgh, Pa., are in course of erection, and it is expected will be finished in 1874.

The total annual capacity of the eight Bessemer works now in operation is about 170,000 net tons of rails; to which add Edgar Thomson, and new plant of Pennsylvania Steel Works, and the total capacity of the Bessemer Works of the United States at the close of 1874 may be placed at 222,000 net tons of rails.

AMERICAN SHIPBUILDING.

The revival of American shipping and of American shipbuilding is one of the gratifying events of the past two years. There has been an increase in the percentage of tonnage carried in American vessels, and very great activity in all American shipyards. At Philadelphia, Chester, Wilmington, and other places on the Delaware, and at New York, at least twenty large iron steamers, besides other iron vessels, were built or building in the year which ended on the 30th of June last. They were for the Atlantic, Pacific, South American, Asiatic, and coasting trade, and in cheapness, swiftness, staunchness, and every other quality they have rivaled the best of the Clyde steamers. At various shipyards on the lakes there has been equal activity in the building of iron-bottomed steamers for the lake trade. At Pittsburgh there have been built iron vessels for the South American river trade. No iron ship is believed to have ever been built in this country of foreign iron. Iron shipbuilding in the United States may be said to have had its beginning in the year 1868, when 2,801 tons were built.

The building of wooden ships in the Maine shipyards was never so active as in 1873, and the tonnage of 1872 was almost equal to that of the year 1861, the busiest year the New England shipyards ever knew. In the Maine shipyards there were built in 1872 one hundred and seventy-three wooden vessels, the aggregate tonnage of which was 40,635.46 tons. This tonnage will be exceeded in 1873.

We subjoin the principal dimensions of the four iron steamships of the American Steamship Company, launched during 1873 from the shipyard of the Messrs. Cramp & Sons, Philadelphia :

The vessels are exactly alike in every particular. Length over all, 355 ft.; length from forward part of stem to stern-post, 343 ft.; from forward part of stem to propeller, 336 ft.; beam, extreme, 43 ft.; depth of hold from top of floors to top of spar deck, 32 ft. 6 in.; hold, molded, from spar deck stringer-plate to top of keel, 33 ft. 6 in.; depth of floor plates, 2 ft.; hold, from top of floors to top of lower deck, 16 ft. 8 in.; from top of lower deck to top of middle deck, 8 ft. 4 in.; from top of middle deck to top of spar deck, 7 ft. 6 in.; from top of keel to top of spar deck, 34 ft. 6 in Tonnage, O. M., 3,016; capacity of coal bunkers, 720 tons. Cargo space—middle between decks, 65,101 cubic feet, at 40 cubic feet per ton, 1,627 tons; after hold, 24,107 cubic feet, 602 tons; forward, 42,082 cubic feet, 1,052 tons; upper between decks, 22,946 cubic feet, 573 tons; total, 154,236 cubic feet, 3,854 tons. Capacity for a cargo

of compressed cotton, at 30 cubic feet per bale, 5,141 bales. The draft will not exceed 20 ft. 6 in. in fresh water, with coal bunkers full, and a dead-weight cargo of 1,740 tons (2,240 lbs.) or a measurement cargo of 3,854 tons (40 cubic ft.), also a full complement of saloon and steerage passengers, officers and crew, all necessary stores and outfit on board.

Shipbuilding on the Clyde was unusually active in 1872, although the number of vessels on the stocks at the close of the year was much less than at the same time in 1871. We subjoin a record of iron vessels built on the Clyde since 1859:

Years.	Delivered.	Measuring Tons.	On the Stocks, December 31.	Measuring Tons.
1859	78	35,705	52	35,950
1860	88	47,833	46	44.900
1861	88	66,801	62	41,752
1862	122	69 967	86	82,212
1863	171	123,262	147	135.804
1864	222	163,338	162	117,493
1865	229	146,692	152	129,682
1866	201	136,445	84	70,689
1867	181	97,900	113	112.361
1868	193	166,356	118	133,958
1869	204	183,210	95	123,000
1870	200	177,153	123	155,345
1871	233	211,856	193	307,909
1872	195	226,682	131	268,391

Statistics of iron shipbuilding in the United States are now being collected, and will be published at an early day.

PRODUCTION OF PIG IRON IN THE UNITED STATES.

During the past summer this office has consumed much time and expended much labor in striving to accomplish two important purposes: first, the preparation of a classified list of *all* the blast furnaces in the United States, something which the iron trade has greatly needed for several years; and, second, the collection of the statistics of production of pig iron in the United States during the year 1872, and, as far as possible, in 1873. Both of these purposes have been accomplished. A complete list of blast furnaces, properly classified, is printed as a supplement to this report. It gives by States the name of each furnace, the name of the proprietor or lessee, location, post-office address, height of stack, width of bosh, date of erection, in blast in 1872 or not, and kind of fuel used.

It also embraces the names of abandoned furnaces that have been erroneously classed among those in blast, and memoranda of projected furnaces. The information contained in this list has been obtained almost entirely through direct correspondence with the owners or lessees of the furnaces.

The statistics of production are printed herewith. They show the make of 1872 in each State, the make of first six months of 1873, and the estimated make of the whole of the year 1873. They are calculated from returns made directly to this office and its agents, by the owners or lessees of all the furnaces in the country, with the exception of *twenty*, and the production of these twenty has been carefully estimated by experts familiar with their ordinary operations. Of the estimate for the last six months of 1873, it may be remarked that in the main it was made by the owner or lessee of each furnace after the commencement of the present financial crisis, and that, *in all cases*, every possible effort has been made, by correspondence and personal inquiry, to obtain accurate information concerning the extent to which the crisis has affected production. We believe that the statistics for 1872 are *absolutely correct*, and that the estimate for 1873, which is based partly upon *actual* returns for the first six months of the year, will vary but slightly from the exact figures which we hope to obtain after the close of the year.

From the tables which follow it will be seen that the production of pig iron in the United States in the year 1872 was 2,830,070 net tons, or 2,526,848 gross tons. This quantity was produced in twenty-one States. The same tables show the ascertained production during the first six months of 1873 to be 1,393,075 net tons, and the estimated production for the whole of the year 1873 to be 2,695,434 net tons, or 2,406,637 gross tons. The number of States which made pig iron this year was twenty-two—Maine having reentered the list after a long rest. The excess of production in 1872 over the estimated production of 1873 is 134,636 net tons. If the financial crisis had not occurred, we believe that the production of 1873 would have exceeded 3,000,000 net tons. The estimated annual capacity of all the furnaces in the United States is 4,371,277 net tons.

PRODUCTION OF PIG IRON IN 1872 AND 1873, BY STATES.

STATES.	Whole number of completed Stacks.	Completed in 1872.	Completed in 1873.	Building or Projected in 1873.	Make in 1872. Tons of 2,000 lbs.	Make first six mos, 1873. Tons of 2,000 lbs.	Estimated make in 1873. Tons of 2,000 lbs.	Estimated annual capacity of completed Furnaces. Tons of 2,000 lbs.
Maine	1	.....	.....	.....	.....	36	1,600	2,500
Vermont	2	.....	.....	.....	2,000	2,500	4,445	6,500
Massachusetts	5	.....	.....	.....	17,070	10,239	19,467	24,600
Connecticut	10	1	.....	.....	22,700	11,420	21,422	27,800
New York	48	1	1	12	291,155	153,704	279,553	394,770
Pennsylvania	261	18	14	32	1,401,497	723,480	1,310,577	2,038,156
Maryland	22	.....	.....	3	63,031	29,426	57,355	86,000
Virginia	34	2	1	9	21,445	9,644	29,297	48,370
West Virginia	3	2	.....	4	20,796	8,159	20,105	33,800
Kentucky	21	1	.....	5	40,908	24,459	51,147	87,925
Tennessee	22	.....	2	6	42,454	24,433	48,578	94,050
North Carolina	10	.....	1	4	3,073	2,010	4,996	14,300
Georgia	6	.....	2	2	2,945	2,180	6,010	15,200
Alabama	10	.....	3	6	12,512	7,730	19,210	38,000
South Carolina	2	.....	.....	.....	.....	.....	.....	.....
Texas	1	.....	.....	.....	619	303	303	2,600
Ohio	86	6	3	17	399,743	151,824	372,180	662,447
Indiana	8	2	.....	.....	39,221	21,321	34,909	69,475
Illinois	7	.....	.....	2	78.627	24.534	42,489	96,000
Missouri	17	1	3	9	101,158	40,878	72,873	171,160
Michigan	34	4	7	6	100,222	47,877	110,299	194,524
Wisconsin	13	1	4	1	65,036	39,263	82,582	107,400
New Jersey	13	2	1	4	103,858	57,655	106,037	155,700
Total	636	41	42	122	2,830,070	1,393,075	2,695,434	4,371,277

CHARCOAL.

STATES.	Whole number of completed Stacks.	Completed in 1872.	Completed in 1873.	Building or Projected in 1873.	Make in 1872. Tons of 2,000 lbs.	Make in first six months, 1873. Tons of 2,000 lbs.	Estimated make in 1873 Tons of 2,000 lbs.	Estimated annual capacity of completed Furnaces. Tons of 2,000 lbs
Maine	1	.....	.....	.....	.....	36	1,600	2,500
Vermont	2	.....	.....	.....	2,000	2,500	4,445	6,500
Massachusetts	4	.....	.....	.....	12,820	6,951	13,600	16,600
Connecticut	10	1	.....	.....	22,700	11,420	21,422	27,800
New York	14	.....	1	.....	19,812	11,972	26,854	42,540
Pennsylvania	39	.....	1	.....	45,033	17.758	41,582	62,700
Ohio	37	.....	.....	.....	95,622	25.426	89.220	133,447
Michigan	28	2	7	6	86,616	43,917	91,365	148,024
Wisconsin	10	1	3	1	27,790	19,987	41,249	52,400
Missouri	8	.....	1	7	45,589	16,695	35,812	54 160
Maryland	14	.....	.....	1	29,044	13,339	26,067	40,060
Virginia	31	2	.....	7	21,445	7.637	22.045	33,650
West Virginia	1	1	.....	1	950	192	1,022	1,800
Kentucky	20	1	.....	4	39,699	17,099	38,703	73,925
Tennessee	19	.....	.....	2	34,094	18,013	38,356	54,050
North Carolina	9	.....	1	3	1,073	1,010	3,218	12,300
Alabama	10	.....	3	6	12.512	7,730	19,210	38,000
Georgia	5	.....	1	2	2.945	2,180	4,676	7,700
Texas	1	.....	.....	.....	619	303	303	2,600
South Carolina	2	.....	.....	.....	.....	.....	.....	.....
Total	265	8	18	40	500,363	224,165	520,749	810,696

ANTHRACITE.

STATES.	Whole number of completed Stacks.	Completed in 1872.	Completed in 1873.	Building or Projected in 1873.	Make in 1872. Tons of 2,000 lbs.	Make in first six months, 1873. Tons of 2,000 lbs.	Estimated make in 1873. Tons of 2,000 lbs.	Estimated annual capacity of completed Furnaces. Tons of 2,000 lbs.
Massachusetts	1	.....	.....	.....	4,250	3,288	5,867	8,000
New York	34	1	.....	12	271,343	141,732	252,699	352,230
New Jersey	13	2	1	4	103,858	57,655	106,037	155,700
Penn'vania, Lehigh	47	3	2	6	449,663	218,459	380,084	530,000
Penn'vania, Schuylkill	40	3	3	9	232,225	119,628	215,725	325,200
Penn'vania, Upper Susquehanna	25	3	.....	4	127,259½	70,974	108,055	183,900
Penn'vania, Lower Susquehanna	37	1	4	6	159,305½	89,390	159,308	276,256
Virginia	1	.....	.....	.....	.....	2,007	5,474	6,720
Maryland	4	.....	.....	.....	21,908	9,500	16,444	25,000
Total	202	13	10	41	1,369,812	712,633	1,249,673	1,863,006

BITUMINOUS COAL AND COKE.

STATES.	Whole number of completed stacks.	Built in 1872.	Built in 1873.	Building or Projected in 1873.	Make in 1872. Tons of 2,000 lbs.	Make first six months 1873. Tons of 2,000 lbs.	Estimated make in 1873. Tons of 2,000 lbs.	Estimated annual capacity of completed Furnaces. Tons of 2,000 lbs.
Pennsylvania, Shenango Valley	31	5	2	3	160,188	79,125	158,443	315,500
Pennsylvania, Miscellaneous	42	3	2	4	227,823	128,146	247,400	344,600
Ohio, Hanging Rock	6	1	.....	8	23,169	12,919	27,721	36,000
Ohio, Mahoning Valley	28	2	1	.....	200,785	73,861	154,007	325,500
Ohio, Miscellaneous	15	3	2	9	80,167	39,618	101,232	167,500
Indiana	8	2	.....	.....	39,221	21,321	34,909	69,475
Illinois	7	.....	.....	2	78,627	24,534	42,489	96,000
Michigan	4	.....	.....	.....	13,382	3,960	10,667	29,000
Missouri	9	1	2	2	55,569	24,183	37,061	117,000
Maryland	4	.....	.....	2	12,079	6,587	14,844	21,000
West Virginia	2	1	.....	3	19,846	7,967	19,083	32,000
Kentucky	1	.....	.....	1	1,209	7,360	12,444	14,000
Tennessee	3	.....	2	4	8,360	6,420	10,222	40,000
North Carolina	1	.....	.....	1	2,000	1,000	1,778	2,000
Georgia	1	.....	1	.....	.....	.....	1,334	7,500
Virginia	.....	.....	.....	1	.....	.....	.....	.....
Total	162	18	12	40	922,425	437,001	873,634	1,617,075

ANTHRACITE COAL AND COKE—HALF AND HALF.

Wisconsin	3	.....	1	.....	37,246	19,276	41,333	55,000
Michigan	1	1	.....	.....	.....	.....	6,667	15,000
Total	4	1	1	.....	37,246	19,276	48,000	70,000

PEAT AND CHARCOAL.

Michigan	1	1	.....	.....	224	.....	1,600	2,500

CHARCOAL AND BITUMINOUS COAL.

Virginia	2	.....	1	1	.....	.....	1,778	8,000

RECAPITULATION.

Charcoal	265	8	18	40	500,363	224,165	520,749	810,696
Anthracite	202	13	10	41	1,369,812	712,633	1,249,673	1,863,006
Bituminous coal and coke	162	18	12	40	922,425	437,001	873,634	1,617,075
Anthracite coal and c ke	4	1	1	.....	37,246	19,276	48,000	70,000
Peat and charcoal	1	1	.....	.....	224	.....	1,600	2,500
Charcoal and bituminous coal	2	.....	1	1	.....	.....	1,778	8,000
Total	636	41	42	122	2,830,070	1,393,075	2,695,434	4,371,277

The foregoing tables are so comprehensive that extended comment is rendered unnecessary. The total number of new furnaces finished and put in blast in 1872 was forty-one; finished and put in blast in 1873, forty-two; total number of new furnaces put in blast in the last two years, eighty-three. Many of these are among the largest in the country. By the erection of these eighty-three furnaces, the furnace capacity of the country has been increased fully one-fourth. The new furnace of the Lackawanna Iron and Coal Company, at Scranton, Pa., finished in 1873, is sixty-seven feet high, and the bosh is twenty-three feet in diameter. The new furnace of the Franklin Iron Company, in Sussex County, N. J., completed in 1873, is also sixty-seven feet high, and twenty-three feet in diameter at the bosh. Of the new furnaces at Pittsburgh, four stacks, completed in 1872, deserve special mention because of their large size and great capacity. The Lucy furnace of Kloman & Carnegie Brothers is seventy-five feet high by twenty feet diameter of bosh. Its capacity is five hundred and seventy-five tons a week. The two Isabella furnaces are both seventy-five feet high, while the diameter of bosh of one is eighteen feet and of the other twenty feet. Their united capacity is nine hundred tons a week. They are owned by the Isabella Furnace Company. The Soho furnace, Moorhead, McCleane & Co., proprietors, near Pittsburgh, is sixty-five feet high by eighteen feet bosh. Its capacity is about five hundred tons a week.

Pennsylvania still maintains her position at the head of the States which make pig iron. In 1872 and again in 1873 her furnaces produced very nearly *one-half* of the total yield of the whole country. The three Western States of Michigan, Wisconsin, and Missouri, with sixty-four furnaces, have this year made *one-tenth* of the total yield.

It will be observed that there is one furnace in Texas which is making pig iron this year. It is situated near Jefferson, Marion county. A letter to this office from Mr. H. C. Hynson, of Jefferson, states that extensive and valuable iron mines exist near that place, which can be bought for five dollars an acre. Coal can be obtained at fair prices, and excellent railroad facilities exist. The Texas and Pacific Railroad will undoubtedly open up rich deposits of both iron ore and coal in Texas. Over two hundred miles of this road are now finished and in operation.

It is somewhat remarkable that there is no furnace in Delaware. Forty years ago there were many charcoal furnaces and other iron works in Sussex county, in this State, which produced iron of the best quality. There is yet an abundance of excellent ore in the county, and both anthracite and bituminous coal can easily be obtained for smelting it.

We append a table showing in tons of 2,000 pounds the production of the various kinds of pig iron in this country from 1854 to 1873, inclusive. The figures for 1872 and 1873 have already been given, and their claim to confidence has been stated. The figures for preceding years were prepared in the office of this Association, and have heretofore been published with its sanction.

Years.	Anthracite.	Charcoal.	Bituminous Coal and Coke.	Total.
1854	339,435	342 298	54 485	736 218
1855	381,866	339,922	62,390	784,178
1856	443,113	370,470	69,554	883,137
1857	390,385	330 321	77,451	798,157
1858	361,430	285,313	58 351	705,094
1859	471,745	284,041	84,841	840,627
1860	519 211	278,331	122,228	919 770
1861	409 229	195,278	127 037	731,544
1862	470 315	186,660	130 687	787,662
1863	577.638	212,005	157 961	947,604
1864	684 018	241,853	210,125	1,135,996
1865	479 558	262,342	189.682	931,582
1866	749 367	332,580	268,396	1,350,343
1867	798.638	344,341	318.647	1,461 626
1868	893,000	370,000	340.000	1,603,000
1869	971,150	392 150	553,341	1,916,641
1870	930 0 0	365,000	570 000	1,865,000
1871	956,608	385,000	570 000	1,912,608
1872	1,369,812	* 500,587	† 959,671	2,830,070
1873	1,249,673	‡ 524,127	¶ 921,634	2,695,434

* Includes 224 tons of peat pig iron.
† Includes 37,246 tons of mixed anthracite and coke pig iron.
‡ Includes 1,600 tons of mixed peat and charcoal pig iron, and 1,778 tons of mixed charcoal and bituminous coal pig iron.
¶ Includes 48,000 tons of mixed anthracite and coke pig iron.

PRODUCTION OF ROLLED AND FORGED IRON.

It has not been proposed to embrace in this report the statistics of the production in 1872 and 1873 of the various forms of rolled and forged iron. Facilities for the collection of these statistics in a satisfactory manner did not exist. Having, however, in this report and its supplement given to the members of the Association and the American iron trade complete and detailed information concerning the production, situation, capacity, etc., of the rail mills and blast furnaces of the country, we now propose to undertake immediately the work of preparing a complete directory of all the bar mills, forges, bloomaries, etc., and to supplement such work with accurate statistical tables showing the production in 1872 and 1873 of these establishments.

An estimate of the production in 1872 and 1873 of the merchant bar mills, plate mills, and other rolling mills, exclusive of rail mills, can be made with some approach to accuracy. Observing the classification heretofore in use in this office, we submit the following figures for 1872 and 1873, in tons of 2,000 pounds. Wm. E. S. Baker, Esq., Secretary of the Eastern Ironmasters' Association, has courteously assisted us in making this estimate.

	1872.	1873.
Merchant bar and rod	500,000	400,000
Sheet and plate	200,000	250,000
Hoop	30,000	30,000
Nails and spikes	175,000	200,000
Axles, etc	95,000	100,000
Total net tons	1,000,000	980,000
Add iron and steel rails	941,992	850,000
Total of rolled iron, net tons	1,941,992	1,830,000

The estimated production in 1871 of rolled iron other than rails was given by this office at 710,000 net tons.

The product of the forges and bloomaries of the country, strictly so-called, is estimated at 58,000 net tons in 1872, and 50,000 tons in 1873.

—The iron industry of the country has become so extensive and varied during the past few years that it is annually becoming more and more difficult to procure its statistics through private channels. The national census should be taken every five years.

SUMMARY OF IRON AND STEEL PRODUCTION.

Below is a summary in net tons of the ascertained and estimated production of iron and steel in the United States in 1872 and 1873:

	1872.	1873.
Iron and steel rails	941,992	850,000
Other rolled and hammered iron	1,000,000	980,000
Forges and bloomaries	58,000	50,000
Cast steel	32,000	28,000
Bessemer steel	110,500	140,000
Siemens-Martin steel	3,000	3,500
Pig iron	2,830,070	2,695,434

THE IRON MANUFACTURES OF PITTSBURGH.

The rapid growth and vast proportions of the iron industry of Pittsburgh, the first of American cities in the manufacture of iron and steel, are set forth in the census of 1870, as follows—the figures embracing the suburbs of the city:

PITTSBURGH AND ALLEGHENY COUNTY.	Establishments	H'nds employ'ed	Capital.	Wages.	Materials.	Products.
			Dollars	*Dollars.*	*Dollars.*	*Dollars.*
Iron, blooms	7	714	1,125,000	430,570	2,356,190	2,923,460
forged and rolled	33	7,076	12,755,847	4,502,463	13,190,125	20,101,664
bolts, nuts, washers, &c	5	704	579,500	357,450	821,566	1,463,795
nails, spikes, cut, &c	10	1,132	1,668,500	577,980	2,417,054	3,229,131
pipe, wrought	3	177	335,000	96,000	469,800	617,000
pigs	4	464	1,250,000	286,000	1,494,590	2,324,000
castings (not specified)	37	1,726	2,556,000	921,465	2,316,907	3,802,911
stoves, heaters, &c	9	321	580,000	178,108	329,362	717,670
Steel, cast	6	1,009	1,830,400	753,841	1,717,925	3,485,413
forged	1	45	200,000	60,000	120,913	200,000
springs	2	51	65,000	45,000	210,314	303,000
Machinery (not specified)	19	510	857,500	230,821	546,719	924,216
engines and boilers	31	1,142	1,453,639	575,597	1,115,823	2,027,357
Total	167	15,071	$25,256,386	$9,015,295	$27,107,288	$42,119,617

This is a grand exhibit, but were a census of the iron industry of the city to be taken to-day it would present still more flattering results. There were four blast furnaces in 1870; now there are eleven, four of which are among the largest in the country. The consumption of pig iron in 1872 was over 400,000 gross tons, of which about 100,000 gross tons were produced by the blast furnaces of the city. The following summary, from the Pittsburgh *Commercial* of January 29, 1873, of the receipts by rail of pig iron, blooms and iron ore in the four preceding years will show the progress the city has made in that time:

RAILROADS.	1869.	1870.	1871.	1872.
	Tons.	Tons.	Tons.	Tons.
Pittsburgh, Fort Wayne & Chicago R. W...	88,510	112,400	174,490	151,500
Cleveland & Pittsburgh Railroad.....	41,750	60,810	61,600	108,190
Pennsylvania Railroad	58,180	68,620	58,240	86,385
West Pennsylvania Railroad	120	1,900	6,180	27,440
Allegheny Valley Railroad.....	7,670	8,180	14,710	19,900
Pitt-burgh & Connellsville Railroad.....	1,580	4,050	11,540	21.010
Pittsburgh, Cleveland & St. Louis Railroad	.....	.....	4,160	10,090
Total tons.....	197,810	255,960	330,920	424,515

The receipts of pig iron and blooms by river during the same periods were comparatively unimportant. The receipts of iron ore alone during late years were as follows:

	1870.	1871.	1872.
Iron Mountain, tons.....	not stated	36,390	67,430
Lake Superior, "	44,900	48,080	81,630

From June to December, 1872, there were received 20,580 tons of Lake Champlain iron ore and 4,010 tons of native ore. The ore from Lake Champlain was the first ever used in Pittsburgh.

The receipts of iron ore at Pittsburgh for the year 1873 will be very largely in excess of the receipts for 1872. In 1872 the receipts aggregated 173,650 tons. For the first seven months of 1873 the receipts amounted to 181,475 tons, being 7,825 tons more than were received during the whole of 1872. Nearly all of this ore, as in 1872, was brought from Lake Superior and other sources of supply distant from Pittsburgh, but it is probable that, hereafter, a greater percentage of native ores, obtained in Western Pennsylvania and the Virginias, will be used in the manufacture of pig iron at Pittsburgh and vicinity. In August last a local iron journal stated that a number of furnaces were already using these native ores, and others were about to do so.

It may be assumed as a fact that never before has there been so much interest manifested in the development and supply of native ores of Pennsylvania and the Virginias as at present. This is as it should be. These ores may not be the richest in the world, but they are far from being inconsiderable in quantity or insignificant in value. *Every* State will find its true policy to be to develop to the utmost its own mineral resources. What they lack in richness

may be more than compensated by a saving in freight and commissions.

It is a fact well established, however, that none of the native ores of Pennsylvania and neighboring States equal in value for certain purposes those of Lake Superior and Missouri; hence the manufacturers of pig iron at Pittsburgh and elsewhere are enlarging their investments in ore lands in those sections, preferring to do this rather than to pay the high prices now charged for these ores. These prices were as follows on the first of September last: Lake Superior specular, delivered at Cleveland, ten dollars a ton, one-third cash, balance in four months; Iron Mountain ore at St. Louis, ten dollars; Beaver Creek ore and Iron Ridge ore at St. Louis, eight dollars; Pilot Knob ore at St. Louis, six dollars.

LAKE SUPERIOR IRON AND IRON ORE PRODUCTION.

We are indebted to the editor of the *Marquette Mining Journal* for the following statement in gross tons of the production of ore and pig iron in the Lake Superior district from 1856 to 1872, inclusive, together with the aggregate value. To the items in the iron ore column must be added the quantity of ore consumed in the production of the pig iron of the district, the figures in that column representing shipments.

YEAR.	Iron Ore.	Pig Iron.	Ore and Pig Iron.	Value.
1856	7,000	.....	7,000	$ 28,000
1857	21,000	.....	21,000	60,000
1858	31,035	1,629	32,664	249,202
1859	65,679	7,258	72,937	575,529
1860	116,908	5,660	122,508	736,496
1861	45,430	7,970	53,400	419,501
1862	115,721	8,590	124,311	984,977
1863	185,257	9,813	195,089	1,416,935
1864	235,123	13,832	248,955	1,867,215
1865	196,256	12,283	208,539	1,590,430
1866	296,972	18,437	315,409	2,405,960
1867	466,076	30,911	496,987	3,475,820
1868	507,813	38,246	540,059	3,992,413
1869	633,238	39,003	672,241	4,968,435
1870	856,471	49,298	905,769	6,300,170
1871	813,379	51,225	864,604	6,115,895
1872	952,055	63,195	1,015,250	9,188,055
Total	5,545,413	357,880	5,875,722	$44,373,833

The following table exhibits in gross tons the total product of each mine from 1856 to 1872, inclusive.

Mines.	Gross Tons.	Mines.	Gross Tons
Jackson	1,197,225	Republic	11,025
Cleveland	1,025,261	M. & P. Rolling Mill	6,772
Marquette	52,998	Allen	8,707
Lake Superior	1,275,919	Wilcox & Bagaley	4,426
New York	450,780	Mather	2,288
Lake Angeline	295,747	Green Bay	7,633
Edwards	121,077	Franklin	2,007
Iron Mountain	16,594	Albion	1,100
Barnum	126,977	Pittsburgh & Lake Superior	1,160
Foster	73,781	Michigan	1,227
New England	108,809	Quartz	718
Washington	308,919	Excelsior	756
Champion	234,867	Williams	447
Cascade	39,240	Shenango	197
Grand Central	14,755	Pendill	127
McComber	44,153	Michigamme	141
Parsons	1,896	Carr	18
Winthrop	25,027	Harlow	83
Saginaw	19,160	Shelden	7
Negaunee	11,687		
Iron Cliffs red ore	874	Total	5,508,030
S. C. Smith	13,445		

The excess of 37,383 tons—the difference between the footing of the yearly amounts reported and the amounts reported for each mine—is accounted for by the fact that some small mines were early abandoned, and are not now on record, while the amount of their production has been preserved.

Up to the 18th of October last, the total shipments of ore and pig iron from the Lake Superior district, for the year 1873, as compared with the same period of the year 1872, were as follows, in gross tons:

IRON ORE.

	1873.	1872.	Increase
Marquette	484,517	327,985	156,532
Escanaba	447,567	402,727	44,840
L'Anse	68,031	.....	68,031
Total	1,000,115	730,712	269,403

PIG IRON.

	1873.	1872.
Marquette	21,793	25,259
Escanaba	8,062	7,313
Total	29,855	32,572

Up to the 5th of November, the total shipments of ore and pig

iron from the district were 1,099,033 gross tons. Shipments for the season had almost closed at that date.

The Lake Superior mine now leads in the amount of ore shipments, closely followed by the Cleveland, after which the Jackson, Republic, Champion, and New York, in the order named—these companies being all that have sent away over 50,000 tons.

From Messrs. H. B. Tuttle & Co., extensive dealers in iron ore and pig iron, at Cleveland, Ohio, we learn that most of the shipments of Lake Superior ore are received at that port, and that the blast furnaces using this ore are distributed as follows: New York, 4; Pennsylvania, 53; Ohio, 48; West Virginia, 1; Indiana, 6; Illinois, 4; Wisconsin, 11; Michigan, 30; total, 157, or more than one-fourth of all the blast furnaces in the country.

The *Marquette Mining Journal* states that the producing capacity of the Lake Superior mines is this year double that of last year. We also have the authority of the same paper for the statement that the supply of first-class Lake Superior specular ore was not equal to the demand from Pittsburgh and other localities on the first of September. Ore of this class and quality contains sixty-six per cent. of pure iron. Second-class Lake Superior specular ore contains fifty to fifty-two per cent. of iron, and the hematite of the same region about forty-six per cent. These so-called inferior but really very superior ores have not been in much demand, although they can be supplied in unlimited quantities.

THE MINERAL RESOURCES OF THE SOUTH.

The political condition of the South since 1860 has not been favorable to the development of its mineral or other resources. The war withdrew its people from all except the most imperative productive pursuits. Since it closed, the demoralization of labor and the dissatisfaction with which the results of the struggle have been accepted by a large portion of the white population, joined to the lack of capital and the want of familiarity by Southern people

with occupations requiring mechanical skill, have militated greatly against the much needed work of recuperation and development. Passing by other industrial indications as not being within the scope of this report, it is a gratifying fact, however, that much interest has been manifested within the past year or two in the mineral wealth of the Southern States, particularly with regard to iron and coal. This interest, it is believed, is of a healthy and not merely speculative character. It has already been productive of much good, as the numerous blast furnaces and rolling mills of the South will attest. Virginia, West Virginia, Kentucky, Tennessee, North Carolina, Alabama, and Georgia, are rich in iron ore, much of it of the best quality, while all except North Carolina, which has uncounted acres of hard wood forests, possess vast deposits of bituminous coal. Labor is abundant and cheap; access to iron markets is not difficult; so that, with sufficient capital, enterprise and skill, the manufacture of pig iron and bar iron may be pursued successfully and profitably in each of the States named. Arkansas also possesses coal and iron ore, and so does Texas. The railroads that are being built through these two States will bring their wealth of iron and coal to public notice, and it is not by any means an improbable event that in less than five years they will make their own iron and send coal to their neighbors. Texas is now making pig iron from its own ore, and at Houston, one of its principal cities, are manufactured steam engines, pile drivers, and other iron machinery, and the manufacture of stoves is about being established. All of the States mentioned would greatly advance their material interests if they would cause more thorough geological surveys to be made of their mineral regions.

Kentucky should make more iron than she does. She has all the requirements necessary to produce it, including railroads and capital. Louisville should be a great iron manufacturing city. Tennessee is manifesting considerable spirit in the extension of her iron manufactures. Before the war much iron was made within her limits, and after its close she was the first of the Southern States to see the wisdom of mining ore and coal as well as growing cotton. Chattanooga, which the war rendered famous as a strategic point, is destined to become more famous as the leading iron city

of the South. A block of coal from Roane county, weighing 3,500 pounds, was sent to the Vienna Exposition, and deservedly received one of its prizes. Tennessee, however, must first have more railroads before she can profitably work many of her ore and coal mines. Alabama has an abundance of excellent coal within short distance of her navigable rivers, and with cheap water transportation to the Gulf it is certain that she will be called upon to supply a large foreign demand for this product. The West Indies and South America are natural markets for Alabama coal. This State is also rich in iron ore. Georgia has both coal and iron ore, and at Rome is centered a large iron manufacturing interest. Northwestern Georgia, Northeastern Alabama, and Southeastern Tennessee, with Chattanooga and Rome as centres, constitute a section of the South which has been bountifully endowed by nature for the manufacture of iron.

While it would be better for the South that it should smelt its own iron ore with its own coal or charcoal, it is obvious that, until her mineral wealth is better known and capital becomes more abundant within her borders, much of the iron ore to be mined by her people will be sent to other sections of the country for the supply of blast furnaces already established. The numerous railroad enterprises of the South are rapidly affording facilities for cheap transportation, thus removing a serious barrier that has heretofore existed to her mineral development. Virginia and West Virginia have gained by the extension of their railroad facilities during the present year. Pennsylvania is sure to require large quantities of their iron ore within a brief period, and in time a large trade is equally certain to be established between her manufacturers and the owners of their coal mines. North Carolina only awaits better railroad communication within her own limits than she now possesses to enable her to ship her rich iron ore to the North. In the meantime we hope she may be tempted to build more blast furnaces for the manufacture of the charcoal iron she can produce so cheaply.

Considerable quantities of Alabama and Georgia ores are shipped to the North by rail. This trade began in 1872. An effort has been made to procure full statistics of the trade, but with only

partial success. Mr. George H. Hull, of Louisville, writes us that he has sold this year about 25,000 tons of Alabama brown hematite, mined on the Selma, Rome and Dalton Railroad, and about the same number of tons of red fossiliferous, from near Birmingham, Alabama. These ores went to furnaces in Indiana and on the Ohio River. In addition to the above, Mr. Hull has sold about 3,000 tons of brown hematite, mined in Lyon county, Kentucky. The following statement of shipments by the Alabama Iron Company, whose mines are four miles south of Birmingham, Jefferson county, Alabama, is furnished us by the superintendent, Mr. W. S. McElwaine. They are included in Mr. Hull's figures:

Lafayette Iron Co	Brazil, Indiana	4,470 tons.
Western Iron Co	Knightsville, Indiana	2,616 "
Yandes, Root & Garlick	Brazil, Indiana	200 "
Roane Iron Co	Chattanooga, Tennessee	10 "
Vigo Iron Co	Terre Haute, Indiana	200 "
Bartelle & Co	Memphis, Tennessee	10 "
Vulcan Works	Chattanooga, Tennessee	10 "
Mingo Iron Works	Mingo Junction, Ohio	2,826 "
Spalding, Woodward & Co	Steubenville, Ohio	380 "
Indianapolis Rolling Mill	Harmony, Indiana	1,140 "
Daniel Cram	Pensacola, Florida	200 "
George H Hull	Louisville, Kentucky	127 "
George S. Moore & Co	Louisville, Kentucky	300 "
Total tons		12,489

The Red Mountain Iron and Coal Company, at Pratt, Jefferson county, Alabama, Mr. L. S. Goodrich, superintendent, have shipped to Mr. Hull 1,300 tons of their ore. On the 20th of September this company had contracts for 16,000 tons of ore to be sent forward. Major Thomas Peters, of Birmingham, writes us that Messrs. Boyle & Kelly had on the 20th of September 10,000 tons of ore awaiting transportation to the railroad, which was three-fourths of a mile distant. Of the ore of Northern Alabama he says that it is all red hematite or fossiliferous, and is found in a vein ten to thirty feet thick and one hundred or more miles in length. The yield of metallic iron will average forty-five to fifty per cent.

Some Tennessee ores have also been shipped North, but particulars are wanting.

THE COAL TRADE OF THE UNITED STATES.

The iron trade of the country is so intimately blended with the coal trade that we are justified in presenting below some facts concerning coal which will be of interest to the readers of this report.

The total number of gross tons of anthracite coal shipped to market in 1872 is stated to be 19,026,125, but this does not include the consumption in the coal region, which is estimated at 3,110,000 tons, making a total of 22,136,125 tons produced in 1872 —a quantity exceeding the total shipments of Cumberland coal from 1842 to 1872, inclusive, which was 21,253,688 tons. The quantity of anthracite coal sent to market in 1872 was exactly double that sent in 1863, nine years before. The shipments of Cumberland coal during the past few years have increased in a still greater ratio, having doubled since 1867. It is estimated that the production of anthracite coal in 1873 can not exceed the production of 1872 more than 2,000,000 tons, and it is the opinion of the *Pottsville Miners' Journal* and other authorities that 25,000,000 tons a year is destined to be the maximum of production for shipment outside of the counties composing the anthracite district. To produce this quantity for shipment will require a total production of at least 30,000,000 tons a year. It is alleged that there is but little new territory to develop, and that, while it is being developed so as to make possible the production annually of 8,000,000 tons more than the yield of 1872, many of the collieries in the shallow basins will gradually become exhausted. If this view of the resources of the anthracite region be correct, there will undoubtedly soon be a "coal problem" in this country as well as in Great Britain, for the use of this kind of coal is daily increasing. Happily, however, our "coal problem," when it comes, can be much more easily solved than that of Great Britain, for we have in bituminous coal a substitute for the more favored anthracite, and of this substitute our supply is practically without limit and mostly near at hand.

The shipments in 1872 of bituminous coal other than Cumberland were largely over the Pennsylvania Railroad. The total coal

tonnage of this road in 1872 was 3,669,071 tons of 2,000 pounds, of which 2,496,555 tons, or 2,229,068 gross tons, were bituminous coal, and 359,900 gross tons were coke. The remainder was anthracite. The shipments of Cumberland coal in 1872 aggregated 2,355,471 gross tons, making the total shipments of bituminous coal over eastern lines of transportation amount to 4,584,539 gross tons in 1872. The quantity of bituminous coal produced in 1872 which was not shipped over eastern lines is estimated at 15,000,000 tons. We summarize the foregoing facts and estimates as follows:

Anthracite coal sent to market in 1872, gross tons	19,026,125
Consumed in the coal regions in 1872, gross tons	3,110,000
Total anthracite produced in 1872, gross tons	22,136,125
Cumberland coal shipped in 1872, gross tons	2,355,471
Bituminous coal shipped over the Pennsylvania Railroad in 1872, gross tons	2,229,068
Bituminous coke shipped over same road in 1872, gross tons	359,900
Estimated bituminous production of 1872 not included in the above, gross tons	15,000,000
Total bituminous production in 1872	19,944,439
Total anthracite production in 1872	22,136,125
Total coal product in 1872, gross tons	42,080,564

The total number of tons of coal of all kinds produced in the census year of 1869–'70 is stated in the census report to have been 32,863,690 tons of 2,000 pounds. Reducing this product to gross tons, we have 29,342,580 tons as the product of the census year. The increase in the two and a half years ending with 1872 was therefore, according to the above estimate, 12,737,984 gross tons, or forty-three per cent.

The receipts of coal at Pittsburgh for the last three years are given by the *Commercial* of that city as follows: In 1870, 67,388,-725 bushels; in 1871, 96,785,635 bushels; in 1872, 115,065,146 bushels. Of coke the receipts in the same periods were as follows: In 1870, 11,594,000 bushels; in 1871, 23,357,400 bushels; in 1872, 43,927,965 bushels. The receipts of coal alone during the last three years were by river and by rail as follows:

	Coal	Total.
1870—By river, bushels	44,260,000	
1870—By rail, bushels	23,128,725—	67,388,725
1871—By river, bushels	50,864,600	
1871—By rail, bushels	45,921,035—	96,785,635
1872—By river, bushels	57,708,800	
1872—By rail, bushels	57,356,346—	115,065,146

The following table shows the quantity of bituminous coal shipped out of the Monongahela river since 1844:

Year	Bushels.	Year.	Bushels.
1844	737,150	1859	28,286,671
1845	4,605,185	1860	37,947,732
1846	7,778,911	1861	20,865,722
1847	9,645,127	1862	18,583,956
1848	9,819,361	1863	26,444,252
1849	9,708,507	1864	35,070,917
1850	12,297,967	1865	39,522,792
1851	12,521,228	1866	42,615,300
1852	14,630,841	1867	30,072,700
1853	15,716,367	1868	45,301,000
1854	17,331,946	1869	52,512,600
1855	22,234,009	1870	57,596,400
1856	8,584,095	1871	48,621,300
1857	28,973,596	1872	54,208,800
1858	25,696,669		
Total			737,931,101

The rapid growth of the coke trade of Pittsburgh and its vicinity is a most significant illustration of our industrial development. Of this trade, what is known as Connellsville coke forms a large part and will continue to do so. It will be observed that the trade almost doubled in 1871, and again in 1872, increasing in geometrical progression.

As an indication of the growth of the coal trade of the West, it is worthy of mention that the consumption of coal in Chicago in 1872 was about 1,200,000 tons. Of this quantity about 615,000 tons arrived by the lake, of which about 450,000 tons were anthracite. The remainder was received principally from Illinois and Indiana. The whole may be classified as follows: bituminous coal, 750,000 tons; anthracite coal, 450,000 tons; total, 1,200,000.

The following analyses of several samples of anthracite coal from the three great basins in which it is found in Pennsylvania, and also of a sample of Connellsville coke, were recently made by Mr. J. Blodget Britton, an eminent metallurgical chemist of Philadelphia,

and published in *The Iron Age*, of New York. Proprietors of blast furnaces, and gentlemen connected with other branches of the iron business, will find them to be worthy of careful consideration:

AVERAGE RESULTS OF ANALYSES OF NINE FAIR AVERAGE SAMPLES OF GOOD ANTHRACITE FROM WYOMING VALLEY.

Moisture	1.38
Volatile combustible matter	3.52
Ash	3.24
Fixed carbon	91.86
	100.00
Sulphur .220 } Included in the above.	
Phosphorus .011 }	

AVERAGE RESULTS OF ANALYSES OF SIX FAIR AVERAGE SAMPLES OF GOOD ANTHRACITE FROM THE SCHUYLKILL REGION.

Moisture	1.35
Volatile combustible matter	3.78
Ash	5.81
Fixed carbon	89.06
	100.00
Sulphur .300 } Included in the above.	
Phosphorus .024 }	

AVERAGE RESULTS OF ANALYSES OF NINE FAIR AVERAGE SAMPLES OF GOOD ANTHRACITE FROM THE LEHIGH VALLEY.

Moisture	1.30
Volatile combustible matter	3.05
Ash	3.54
Fixed carbon	92.11
	100.00
Sulphur .240 } Included in the above.	
Phosphorus .005 }	

RESULTS OF ANALYSIS OF A SAMPLE OF CONNELLSVILLE COKE—AN AVERAGE OF FORTY-NINE DIFFERENT PIECES.

Moisture	.490
Ash	11.332
Sulphur	.693
Phosphoric acid (phosphorus, .013)	.029
Carbon	87.456
	100.000

The ash of the coke contained 47 per cent. of silica and 47 per cent. of alumina.

Within the last two years there has been a large increase in the development of the block coal fields of Indiana. Concerning the value of this coal, Professor E. T. Cox, State Geologist of Indiana, makes the following statement in his report for 1872: "The reputation of the block coal for smelting iron ores continues to be fully sustained by its excellent behavior in the blast furnaces that are using it." The coal is found in several of the western counties of Indiana, but thus far it has been mined principally in Clay county. A letter addressed by this office to J. J. Schrack, Esq., Secretary of the Clay County Coal Association, whose office is at Brazil, elicited the following information relative to the quality, sales, etc., of the coal produced in the district of which Brazil is the centre:

There are supplied with fuel (block coal) from this district, iron manufacturing establishments located as follows: Four blast furnaces and one muck mill in this immediate neighborhood; two blast furnaces and one nail mill at Terre Haute; one nail mill at Greencastle; two rolling mills at Indianapolis; two blast furnaces, two rolling mills and one Bessemer steel works at Chicago; one Bessemer steel works at Joliet, Illinois; one rolling mill at Decatur, Illinois, and one rolling mill in Evansville, Indiana. The following railroads get all or a portion of their supply of fuel from this district: The

St. Louis, Vandalia, Terre Haute and Indianapolis Railroad; the Jeffersonville, Madison and Indianapolis Railroad; the Indianapolis and St. Louis Railroad; the Louisville, New Albany and Chicago Railroad; the Cincinnati, Lafayette and Chicago Railroad; the Lake Shore and Michigan Southern Railroad; the Michigan Central Railroad, and the Tug Association of Chicago. Coal has also been shipped from this place to the blast furnaces of St. Louis, and in time of low water in the Ohio River to Cincinnati and Louisville. There are two veins of coal; the upper vein, averaging about three feet ten inches in thickness, and the lower one, averaging about four feet. The roof is principally sand rock, slate, and slate and sand rock mixed. Fire and potters' clay of good quality underlie the coal. The average depth to the first vein is about forty-five feet from the surface, and the second or lower vein is found about thirty feet under the first, or at an average depth of seventy-five to eighty feet. The coal is free from slate and sulphur, and can not be surpassed for furnace purposes, and is excellent for steam and domestic purposes. It burns freely and leaves a soft, fine white ash, similar to wood ash, and no clinkers. It has been decided to use it in the public schools of Chicago and Indianapolis, on account of its purity and freedom from sulphur. For domestic and steam purposes this coal is largely used in Chicago, Illinois, Indianapolis, Indiana, Kalamazoo, Michigan, and the towns and stations along the lines of most of the above named railroads. Pig iron made with this coal is particularly adapted to the manufacture of Bessemer steel. The coal field is being developed very rapidly, but we yet lack capital to erect more mills and blast furnaces, as well as other manufacturing establishments, which will insure a large and steady home consumption. A donation of fifteen acres of land has been made to the city for the purpose of a reservoir for water, which will speedily be constructed with a view of inducing manufacturers to locate their establishments here, where they will have the advantage of close proximity to the coal. The price now paid for mining is one dollar per ton. Coal is worth on the cars two dollars and fifty cents per ton, but will go up to three dollars in the winter, except to manufacturers. There are many farms here which are underlaid with coal yet untouched, awaiting the capital necessary to open their riches to the light.

From the same source we have received a complete list of the mines opened and being opened in the Brazil district, with the names of their owners and the daily capacity of the mines. Twenty-eight firms are operating thirty-six mines, the daily capacity of thirty of which is 5,350 tons. The six remaining mines had not been fully opened at the date of our informant's communication. Altogether the mines in this district alone will probably yield 1,800,000 tons of coal this year. This estimate does not include the yield of the block coal mines of Indiana outside the limits of the Brazil district, and of which no statistics are obtainable.

The Louisville, New Albany and Chicago Railroad Company propose to build branches to the coal fields in Martin, Owen and Greene counties, Ind., and the iron deposits in Martin, Monroe, Putnam and Greene counties, purchasing mineral lands and operating them on their own account. They also propose to establish

blast furnaces at New Albany and extensive coal yards at New Albany and Louisville to supply Indiana coal.

The following analyses of the coals of Indiana, by Professor Cox, include the block coal of the Brazil district:

COUNTIES.	Specific Gravity	Wt. of Cubic foot	Coke.	Volatile Matt'r	Ash.	Fixed Carbon	Water	Gas.
		lbs.						
CLAY COUNTY.								
Star Mine, Planet, Furn. Block coal I	1.264	79.0	64.0	36.0	2.5	61.5	3.5	32.5
Knightsville, T. H. & I. R. R.	1.176	73.5	60.1	39.9	0.3	59.8	9.0	30.9
" " "	1.167	72.9	59.0	41.0	2.0	57.0	8.0	33.0
Garlick & Collins, Brazil	1.23	76.9	60.5	39.5	3.0	57.5	8.5	31.0
North of Brazil, McClelland	1.28	79.9	56.2	43.8	1.5	54.7	5.0	38.8
Barnet's, south of Brazil	1.25	78.1	58.2	41.5	1.5	57.0	4.0	37.5
Stanton coal L, 7 feet	1.32	83.0	53.3	46.7	6.0	47.3	7.0	39.7
GREEN COUNTY.								
McCissick's coal A, 3 feet	1.19	74.3	64.5	35.5	2.0	62.5	3.5	32.0
Babbit's coal A, 2 feet	1.24	77.3	61.4	38.6	1.5	59.9	3.0	35.6
Bledsoe's coal L	1.25	78.2	63.5	36.5	0.5	63.0	7.0	29.5
PARK COUNTY.								
Buchanan, I, 4 feet	1.23	77.0	64.5	35.5	2.0	62.5	4.5	31.0
Batty's coal K	1.23	77.0	58.5	41.5	2.5	56.0	3.0	38.5
FOUNTAIN COUNTY.								
Thomas's coal K	1.28	77.0	64.3	35.7	6.5	59.8	3.0	32.7
VERMILLION COUNTY.								
Mill Bank, L	1.29	80.5	52.2	47.8	4.5	47.7	3.5	44.3

Block coal, which only a few years ago was supposed to be confined to the Shenango and Mahoning valleys, is now ascertained to exist in several States. It is an excellent fuel for iron smelting, and wherever it is found the iron business may be regarded as having received an additional impetus. Central Michigan is reported to contain this coal. It is claimed that Kentucky possesses as good block coal as can be found anywhere. Recently a vein of excellent coal of this kind was found at Pine Hill, on the Knoxville branch of the Louisville and Nashville Railroad, the discovery of which should impart a stimulus to the iron industry of that section of the State. In Jackson county, in Southwestern Illinois, is found the Big Muddy block coal, so termed, although, as Professor Macfarlane observes, "its character as block coal is not fully established." It is, however, an excellent coal for iron smelting, and large quantities of it are used for this purpose at two blast furnaces in Jackson county, and at St. Louis iron works.

THE FARMERS AND THE RAILROADS.

Late in the past year (1872) the farmers of the West renewed with much vigor the agitation of the question of cheap transportation of agricultural products. The discussion and excitement soon became general in all the Western States, and thus far there promises to be no abatement of interest in the subject among those who are directly or remotely interested in the result of the controversy. The farmers claim that the rates of transportation heretofore charged by the railroads upon Western produce seeking Eastern or European markets have been so high that agricultural labor—the growing of wheat and corn especially—has ceased to be profitable; the railroads and the numerous middlemen who stand between the producer and the consumer receiving profits which belong of right only to the producer. As a partial remedy for this alleged injustice, they have demanded that, in default of satisfactory concessions by the railroads, the State governments shall enact such laws as will reduce the rates of transportation now charged on local freight, and that the National Government shall give encouragement to the building of a cheap freight railroad from the West to the East, and shall lend its aid to the improvement of the Mississippi river and other natural highways to the Atlantic Ocean. They also demand that the National Government shall pass a general law prescribing the maximum rates of freight on all inter-State railroads, basing such demand upon that clause of the Constitution which gives to Congress the authority to regulate commerce between the States. In preferring these demands the farmers have acted in most harmonious concert, mainly through their secret organization known as the Patrons of Husbandry, but it does not appear that the railroads have been induced by their action to materially modify their freight schedules, and the whole question, therefore, remains an open one, to be incorporated with our controversial politics and to be made the subject of State and Congressional legislation. Legislative action has already been taken by the State of Illinois, but it has not given satisfaction to the farmers within its limits, who insist

upon such supplementary legislation as will work a redress of their grievances.

Having thus fully and fairly stated the complaint of the Western farmers, and the legislative remedy they propose for one of the alleged evils from which they suffer, we will be pardoned if we restate a remedy for all their troubles which lies nearer home and is more easily secured than any legislation. This remedy is a home market for their surplus agricultural products. If the Illinois or Iowa farmer had a market near to his farm for the agricultural products he has to sell, he would be rendered independent of the Eastern or foreign market; but without such a home market, he is compelled to take for his wheat and corn whatever he can get for them at a distance, or permit them to rot in his fields. A home market would take from him all the cereals, fruits, vegetables, grasses, poultry, eggs, butter, live stock, etc., that his farm will produce; but if his dependence is upon a distant or foreign market, it will take from him little else than wheat and corn, which are among the heaviest and bulkiest crops of the farm, besides being the most exhaustive of the soil's fertility—a fertility which they never return when sold abroad.

Especially would Western farmers do well to remember that the American home market, whether located in the Mississippi Valley or in the Eastern or Southern States, has heretofore been their chief reliance for the disposal of their surplus products. The Commissioner of Agriculture estimates the wheat crop of 1873 at 260,000,000 bushels, and that, of this quantity, only 40,000,000 bushels can be spared for export. The home market for wheat is thus shown to be five and a half times as large this year as the foreign market. The Chicago *Inter-Ocean* has shown from the reports of the Treasury Department that, during the forty years from September 30, 1820, to July 1, 1860, the whole foreign demand for our flour, wheat, corn, oats, rye, barley, mess beef and pork, tallow, lard, butter, and cheese, with other produce and provisions, was exceeded in value by two of our successive *corn* crops (for the years 1869 and 1870) in the sum of $253,420,495. In 1860 we manufactured flour to the value of $206,000,000, and sent abroad only to the value of $15,448,507.

The frequent fluctuations in the demand for what flour and grain we send to Europe form a strong objection to the policy of depending upon foreign markets to take our agricultural products. The foreign demand for our breadstuffs has increased in 1873, but in 1874 favorable harvests in Europe may make its people independent of our farmers. In 1864 the total export of wheat to European countries amounted to 16,826,342 bushels; but in 1865 it dropped without warning to 3,102,055 bushels, declining still further in 1866 to 1,589,321 bushels.

It may not be known to all thoughtful Western farmers how earnestly many of their own leaders have urged upon them, before the present agitation began, the same policy we have commended to their consideration. We have before us two volumes which any Western farmer would be proud to have in his library—one, the report of the Transactions of the Wisconsin State Agricultural Society for 1870, and the other the report of the Transactions of the Iowa State Agricultural Society for 1871, in both of which the value of home markets and home manufactures is most forcibly taught. At the annual exhibition by the Wisconsin State Agricultural Society, at Milwaukee, in September, 1870, Governor Austin, of Minnesota, delivered an address. Referring to the lack of prosperity among Western farmers, he said:

> Another thing in the way of prosperity is the want of manufacturing establishments in our midst. There is not a threshing machine manufactured in the State of Minnesota. Probably a million of dollars a year are paid out for agricultural implements, and but a very few are manufactured in the State. The consequence is, that the country is drained of its money, which is carried off to other places, and paid for these things. Every farmer in Minnesota who buys one of Case's threshers, manufactured in Racine, or others manufactured still further east, pays eighty or ninety dollars freight on his machine, besides profits and the cost of the machine. This want of manufacturing enterprise drains the country of vast sums of money.

At the annual exhibition by the Iowa State Agricultural Society, held at Cedar Rapids, in September, 1871, E. R. Shankland, Esq., the President of the Society, delivered an address, from which the following sentences are extracted:

> The sooner every city and village in our State has more manufacturing from the raw material produced in the vicinity, whether of hides, wool, flax, wood for cabinet or wagon work or agricultural implements, the better for such community and for the State at large. It is a wrong policy to pay

freight both ways on the raw material and manufactures, with the cost largely increased, and with, perhaps, half a dozen commission charges added, when so much could be saved, or, at least, our own citizens have the profit. There should be more manufactures of woolen goods, of machinery and tools and other articles of home commerce. More of our beautiful rivers and streams should be made to turn more water-wheels as they move onward to the ocean. More of our cheap coal should be used to create the motive power of steam. All the people should everywhere encourage every manufacture for which the raw material is produced in their own county. This would increase immigration, especially of the classes of operatives and mechanics, and thus increase the demand for food supplies in all our home markets.

On the 28th of September of the same year, President Magoun, of Iowa College, delivered an address before the Central Agricultural Society of Poweshiek county, in which the following views were expressed:

Introduce into any region of country a thousand mechanics and manufacturers, and you add a thousand consumers and their families, and enlarge the market and raise the prices of the farmer. There is one thing better than getting near the market, viz., having the market itself brought near you. Why should we be dependent on others for woolen and cotton goods, iron and wooden manufactures, which we can make for ourselves, and save great cost of freight? Where manufactures abound the farmer can combine his efforts for all the objects he desires; the young men can find more various and congenial occupations—for everybody has not a genius for farming—and diversified pursuits, besides spreading wealth and comfort, do something more valuable—develop and increase various intellectual powers. A railroad near a man's farm is good and necessary, as things are, but a large manufactory which he could reach with his products in his own wagon would be better. When every Iowa farmer wears the wool of his own sheep, woven in the looms of his own county, he will not have to sell his other products in distant markets, and see the profits of his labor shrink in proportion to their distance. There is no reason why we should not begin at once to furnish ourselves and the country west with fabrics of iron and wood and wool, and thus enlarge the markets of our farmers; and the day of our highest agricultural prosperity will only dawn when from the chimneys of a thousand forges and factories, driven by Iowa coal, the smoky banners of civilization shall darken the air.

Governor Carpenter, of Iowa, in his inaugural address in 1872, asked the question: "How shall the products of the soil be made to yield the largest returns by the producer?" and thus answered it:

To bring the manufactured articles required by our people, and the products of their industry, nearer together, in my judgment, is of paramount importance. That the producer would be materially benefited if the wagon, reaper, plow, and cultivator, with which he plies his industrial enterprises, and the cloth he wears, were manufactured at his market town, whither he could carry his surplus products and exchange them for these necessities, saving cost of transportation long distances both ways, is a proposition so self evident that it needs no support by argument.

THE WEST AND IRON MANUFACTURES.

Having quoted from the published opinions of leading Western men, whose knowledge of the true interests of Western farmers can not, we presume, be questioned, it is a pleasure to be able to say that the advice of these men has already been largely followed in the Western States. Manufacturing industry is receiving encouragement heretofore denied it. A glance at the tables of iron and iron ore production accompanying this report will show how firmly the iron business has become implanted on Western soil. Michigan produces one-fourth of all the iron ore that is mined in this country. Ohio is second and Illinois third in the list of the States which make railroad bars. Indiana, Michigan, Wisconsin and Missouri are already large producers of pig iron, and formidable competitors with other States in the manufacture of the various forms of rolled iron. The great wealth of Missouri in iron ores of the richest quality is well known. The ore product of the State, in 1873, will amount to about 500,000 tons, worth at least three millions of dollars. In various branches of finished iron manufacture, and of general manufacturing industry into which iron enters largely as an element, the West has of late made astonishing advances. The annual report of the Cincinnati Board of Trade for 1872 places the total value of the manufactures of the city for that year at $143,400,000, of which $25,750,000 were of iron. The increase in this branch over the production of 1871 was $3,500,000—much greater than the increase in any other branch in the same time. In 1871 Cincinnati received 59,758 tons of pig iron. In 1872 this had increased to 112,753 tons. The iron business is now the leading industry of Cleveland. Some of the largest manufactories of sewing machines and of architectural iron work are in Western cities. The manufacture of stoves is now a leading specialty in certain portions of the remote West where it was until recently wholly unknown. At Quincy, on the Mississippi river, are foundries which cast $530,000 worth of stoves in 1872, and paid $156,000 for labor alone. At Moline, also on the Mississippi, are some of the largest plow manufactories in the country. Plows are made here for California and Texas. At Dubuque,

another thriving young city on the Mississippi, which only a few years ago marked the northern limit of settlement on that river, are situated the Iowa Iron Works, at which were constructed this year two large iron steam yachts, forming the fifth and sixth iron steamboats built at that city. There are extensive iron manufactures at Council Bluffs, Iowa, 500 miles west of Chicago. Milwaukee, St. Louis, Minneapolis and Chicago are manufacturing centres which make heavy machinery a specialty. At Milwaukee are located the Reliance Iron Works, covering five acres of ground, which manufacture all kinds of grist-mill and saw-mill machinery, steam engines, pile-drivers, dredges, hoisting machines, steam pumps, gas and water pipes, etc. The iron manufactures of St. Louis are extensive and varied, so much so that a very strong claim has been made that this city will in the near future become the "iron centre" of the country. The near proximity of extensive iron and coal deposits, the enterprise of its business men, and its favorable location are the reasons assigned for making the claim. The city can boast the possession of nine blast furnaces. Of the $14,000,000 worth of manufactured goods which Minneapolis, a city not twenty years old, produced in 1872, the articles having iron as a basis represented a value of $1,482,000, composed principally of steam engines, boilers, flour-mill and saw-mill machinery, and agricultural implements. We have the authority of a leading journal in Chicago for the statement that there are to-day in that city fifteen establishments devoted to the manufacture of boilers and steam engines. They employ 885 skilled workmen at an average monthly compensation of $57,920, or $786 per annum per man, and consume annually 24,555 tons of iron. Their products are sent to all sections of the country, and to Cuba and Canada, and are not excelled in quality or workmanship by manufactures of a similar character in any part of the world. The Vulcan Iron Works, of Chicago, are making dredging machines for the Pennsylvania Railroad Company, to be used at Erie, and elevator machinery for the Baltimore and Ohio Railroad Company, for an elevator at Baltimore. Two rolling-mills in Chicago represent $3,800,000 in capital, and support 7,000 persons.

All over the West all kinds of iron manufactures are springing up with marvelous rapidity, giving employment to thousands of skilled workmen, and affording farmers a home market for their products and an opportunity for their sons to engage in a variety of congenial, profitable and elevating pursuits. Shall these and other branches of manufactures be hindered in their growth and crippled in their usefulness because of free trade clamor against the policy of protection, which has built up these very industries? Shall the fires of the furnaces and rolling-mills and foundries and machine shops of the West be now put out, after they have given employment to thousands of mechanics who have paid most of their wages to neighboring farmers for the necessaries of life? Rather let the farmers of the West reflect that, of the $156,000 paid for labor by the stove manufacturers of Quincy in 1872, the larger part undoubtedly found its way into the pockets of the farmers around that city, for meat, flour, corn, vegetables, milk, fruit, etc., who were thus directly benefited by the establishment of this industry in their midst. Rather let them open wide their eyes to the fact that, wherever, as at Joliet and Milwaukee, manufactures have been established, there the farmer finds the most promising opportunities for his children and the best market for his produce, while the farm itself increases most in value.

THE PANIC AND THE WORKINGMEN.

The financial revulsion from which this country is now suffering has had a depressing effect upon most manufacturing enterprises. Many workmen have been compelled to submit to a reduction of wages, while many others have been temporarily thrown out of employment altogether. The iron business is more depressed than any other. In this emergency the temptation to complain of "hard times" is very great and entirely excusable, but with this temptation comes also the opportunity to contrast the condition of the average American workingman, even under present adverse circumstances, with the uniform condition of European working classes. The contrast should go far toward reconciling our countrymen to temporary privations, for it will show them how

vastly superior is the life they are permitted to lead to that of the workingmen and workingwomen of Europe. It should excite a keener appreciation of the advantages which our people possess in high wages, cheap and abundant food, low taxes, common schools, comfortable homes, and opportunities for social advancement; and it should create a corresponding distrust of those agitators who would imperil these advantages by a crusade against the enterprise and capital which have made them possible. In the days of a pinching but fleeting adversity we may profitably consider whether we have been sufficiently mindful of the sources of the prosperity we have enjoyed through many unbroken years, and which our fathers and fathers' fathers knew nothing of.

It should never be forgotten that immigrants come to this country from the manufacturing nations of Europe that they may *better their condition.* Europe has been paying better wages to her workingmen during the last two years than she has ever paid before, and yet the rewards of labor on this side of the ocean have been so superior during this period that never before in her history has there been so strong a disposition among her people to leave her shores. In 1872 there emigrated from England alone 113,763 men, women and children, nearly all of whom came to the United States. Joseph Arch, the leader of the agricultural laborers of England, has visited our country, to make arrangements for a large exodus of his class. Foreigners come to this country because poverty is practically unknown here to all who are willing to work. It is not so in Merry England, where thirty-six cents a day was all the wages Joseph Arch, with a family to support, could get for a long day's work. London is the first of English manufacturing cities, and the first in the world. During the year 1872 and the year 1873 its manufacturing establishments have been remarkably busy; as much so as those of Boston, New York, and Philadelphia; yet, of its population of 3,000,000, one out of every thirty was a declared pauper in May of this year. Here are the official figures, from the London *Times* of May 29th. They constitute the regular weekly report of the pauperism of the metropolis, made by Mr. Frederick Purdy, Chief of the Statistical Department of the Local Government Board. They tell a story which received no

comment from the *Times*, for its columns had long been familiar with just such publications as this:

METROPOLITAN PAUPERISM.

The following is a return of the number of paupers (exclusive of lunatics in asylums, and vagrants) on the last day of the third week of May, 1873:

UNIONS.	PAUPERS.			
	Indoor.	Outdoor.		Total third week May, 1873.
	Adults & Children.	Adults.	Children under 16	
WEST DISTRICT.				
Kensington	1,040	890	547	2,477
Fulham	350	639	461	1,450
Paddington	589	1,074	631	2,294
Chelsea	707	535	270	1,512
St. George's	1,869	2,038	1,261	5,168
Westminster	809	393	339	1,632
Total of the West District	5,454	5,569	3,509	14,532
NORTH DISTRICT.				
St. Marylebone	2,453	1,990	937	5,380
Hampstead	149	100	55	304
St. Pancras	2,297	3,730	2,635	8,662
Islington	1,064	1,764	1,317	4,145
Hackney	817	1,830	1,436	4,083
Total of the North District	6,780	9,414	6,380	22,574
CENTRAL DISTRICT.				
St. Giles and St. George, Bloomsbury	934	420	500	1,854
Strand	864	299	215	1,378
Holborn	2,338	2,740	2,155	7,233
City of London	2,359	2,846	1,772	6,977
Total of the Central District	6,495	6,305	4,642	17,442
EAST DISTRICT.				
Shoreditch	1,125	1,043	913	3,081
Bethnal Green	1,461	702	494	2,657
Whitechapel	1,043	404	335	1,782
St. George-in-the-East	1,034	766	612	2,412
Stepney	830	410	179	1,419
Mile-end Old-town	656	531	468	1,655
Poplar	963	1,472	1,128	3,563
Total of the East District	7,112	5,328	4,129	16,569
SOUTH DISTRICT.				
St. Saviour's, Southwark	2,113	2,471	2,180	6,764
St. Olave's, Southwark	1,363	1,677	1,439	4,479
Lambeth	1,493	3,020	2,254	6,767
Wadsworth and Clapham	741	1,442	1,248	3,431
Camberwell	908	1,264	1,062	3,234
Greenwich	1,195	1,920	1,325	4,440
Woolwich	670	1,493	1,226	3,389
Lewisham	226	467	264	957
Total of the South District	8,709	13,754	10,998	33,461
Total of the Metropolis	34,550	40,370	29,658	104,578

Boston, New York, and Philadelphia present no array of pauperism at all comparable to that of the first of England's manufacturing cities.

This year there was an exposition of the industry of all nations at Vienna, the chief city and the capital of Austria. It was attended by many visitors. But some of the sights in Vienna outside the exposition were not of a nature to inspire awe or excite enthusiasm in the minds of American visitors. In Vienna many thousands of women mix mortar and carry the hod! The mortar they carry in buckets on their heads to the men who handle the brick. For this service and for carrying the hod they receive twenty-eight cents a day. At noon they swarm into the shops to purchase a piece of brown bread and fat bacon and a mug of beer, which form their dinner, and it is eaten on the curbstones. At night many of these poor women, having no homes, sleep on shavings about the buildings they are helping to rear, or in barns and sheds. Yet Vienna is a manufacturing city and one of the most beautiful cities in the world.

The American workingmen, especially those who are engaged in manufacturing industries, may well reflect that no panic, no temporary derangement of business, that has ever occurred in this country has reduced them to the condition of the English farm laborer, surrounded them with an army of paupers, or compelled them to witness homeless women carrying the hod. Such glimpses of European life as have been presented pointedly suggest that the blessings which the American workingmen have long enjoyed and which yet remain with them, despite the results of the financial panic, should be more highly prized than they have ever been; while the evil effects of the extravagance and fast living which helped to cause that panic teach them that, if they will only study more closely the arts of a wise economy, they may perpetuate these blessings for their children and their children's children. What the American workingman needs most to do to-day is to be contented with his lot and to lessen his expenses. Let him help to keep the mill and the factory running, by accepting without complaint such wages as his employer may be able to pay him. If these wages are not what they have been, he may reasonably expect that the expenses of living will in time be correspondingly reduced.

THE GREAT WELSH STRIKE AND ITS LESSON.

During the latter part of December, 1872, and the early part of January, 1873, there occurred a general strike of the colliers of South Wales, through which about sixty thousand colliers and ironworkers were thrown out of employment, bringing them and at least two hundred and eighty thousand women and children face to face with want and starvation. The cause of the strike was a difference about wages. The coal miners, to the number of about ten thousand, demanded that their wages should be increased about ten per cent, to which demand the employers replied that, so far from acceding to the request, they would insist upon a reduction of ten per cent upon existing rates. The men struck, and the result was a general stoppage of the iron business as well as of coal mining in South Wales. A correspondent of the London *Times* gives the following history of the strike and its cost:

It appears that the strike affected nine works, owned by five different proprietors, in Monmouthshire. The number of collieries, exclusive of ironstone mines, which were included in the movement in Glamorganshire, was sixty; blast furnaces, sixty-seven; puddling and mill furnaces, seven hundred and thirty-six; and rolling mills, forty-three. In Monmouthshire there were fifty-eight collieries, sixty-two blast furnaces, seven hundred and eighty puddling and mill furnaces, and thirty-five rolling mills brought to a standstill. The number of hands employed, inclusive of men, lads, and women and girls, at the works in Glamorganshire was, in round numbers, 34,000; and in Monmouthshire the number was 31,500. The totals are one hundred and eighteen collieries, one hundred and twenty-nine blast furnaces, fifteen hundred and sixteen puddling and mill furnaces, and seventy-eight rolling mills—including bar rolls and rail mills—at which 65,500 persons found employment. Out of that number probably 5,000 men continued at work upon repairs, &c., after the twenty-eighth of December, so that it may be said, without erring greatly on one side or the other, that on that date and on the fifteenth of January, when the Dowlais colliers struck, 60,000 men, boys, and girls ceased working and took to a temporary life of idleness. The strike lasted eleven weeks at all the works except those of the Llynvi Iron Company, where it terminated on the fifteenth of February, having lasted seven weeks. If these works had remained in the same condition as the others to the end of the struggle, the loss of trade throughout the district from the twenty-eighth of December last until the end of the strike would have reached the enormous total of over £2,000,000. Deduct £50,000 as the estimated value of the coal sold and iron manufactured by the Llynvi Iron Company since the fifteenth of February, and the net loss to capital is about £1,950,000 sterling. Now let us see what the workmen have lost. The gross amount of the actual weekly payments in wages at the iron-works where the strike existed exceeded £75,000, which gives an average for every person employed of nearly twenty four shillings per week, and the figures under this head show a loss of over £800,000 sterling, after deducting the sum paid to the Llynvi

workmen during the four weeks that they have been working. Against that we have to set £40,000 distributed in the shape of strike pay by the colliers' union, and about £5,000 subscribed in various ways for the relief of sufferers; so that, after every allowance has been made, the loss which this strike has entailed upon the workingmen alone amounts to no less than three-quarters of a million of pounds sterling. When we consider, moreover, that, after causing and suffering the enormous losses above shown, the workmen returned to their labor without having gained any advantage whatever, no comments are needed to show the enormity of the folly of which they were guilty.

The lesson of all strikes has often been told, but the lesson of this strike is so clear and so typical that it merits the special attention of all who would foment or encourage strikes in this country of high wages and fair play for all classes. First, it should be observed that not more than one-sixth of all the men engaged in the strike, if so many, desired that it should take place. To the extent, therefore, that the one-sixth coerced the five-sixths, the strike, in the middle of winter, was unjust and cruel and wholly indefensible. Whenever, as in this case, the few strike for higher wages and compel the many who are satisfied with their wages to strike also, the provocation must be great indeed which can justify such action. In this case the provocation was not sufficient to justify the extreme measures which were adopted. Next, it should be observed that the strike was undertaken without reasonable hope of success, and in this respect it was certainly unwise. The colliery owners and the ironmasters were masters of the situation, and could afford to stop production while the strikers could not. The right of workingmen to strike for higher wages or for any other cause is not to be denied, so long as they do not seek to bind their non-participating fellows by their action, but to strike for higher wages when employers can better afford to cease production than to grant the advance asked for is foolishness. Low wages are better than none at all. Lastly, it should be noted that, even if this strike had been successful in accomplishing its object, the time lost from work by the men, and the habits of dissipation and idleness engendered or promoted, could not have been compensated by the increase in wages. We say nothing about the loss to the proprietors, and to Wales, caused by the stoppage of the works: the men themselves could not have gained anything if, at the end of a long struggle, they had conquered.

The sympathies of all right-thinking men must always be with the efforts of workingmen to better their condition and that of their families, provided that these efforts are lawful and do no violence to the rights of others; but it should never be forgotten that a strike is a declaration of war, to be resorted to only in a desperate emergency, and when all other means of redress have failed. The great law of supply and demand may be better trusted to regulate equitably the wages of labor than coercive measures by workingmen. If skilled labor is in demand, it will receive its reward without the intervention of strikes; if it is not in demand—if the work to be done is limited and the workmen are many, wages will necessarily be low and no strike can avail to increase them. Unskilled labor fares badly everywhere, but it seldom strikes. When it does, it generally presents stronger claims to popular sympathy than skilled labor under similar circumstances. The strike of the English agricultural laborers is one that deserves to succeed. As a rule, however, it has been demonstrated that strikes do not accomplish their object, while friendly conferences between employers and their workmen generally result in mutual satisfaction. Labor is a mailed giant, but Capital dwells in an entrenched fortress. The lesson of the Welsh strike and of most strikes is that peace is better than war.

THE BRITISH IRON AND STEEL INSTITUTE.

The American Institute of Mining Engineers, at its May meeting in Philadelphia, tendered an invitation to the members of the British Iron and Steel Institute—the leading iron and steel association in Great Britain—to visit the United States in 1874 and hold one of their regular meetings here. At the meeting of the British Institute at Liége, Belgium, in August last, Professor R. W. Raymond, the President of the American Institute, was present and personally renewed the invitation, which was virtually accepted by the adoption of the following preamble and resolution:

The members of the Iron and Steel Institute have received with much pleasure and satisfaction the invitation of the American Institute of Mining

Engineers to hold a meeting in the United States, and hereby desire Professor Raymond to accept the best thanks of the Institute for his invitation.

RESOLVED, That the Council of the Institute be requested to consider at an early day the feasibility of organizing a visit to America in the autumn of 1874.

The Council were to hold a meeting about the first of October, for the consideration of the above resolution. The proceedings have not yet reached us, but of the nature of the action of the Council there can be little doubt, and the honor of a visit in 1874 from the first of European iron associations may therefore be confidently relied upon. It is incumbent upon the ironmasters of the United States and especially upon this Association that such action be promptly taken, with the concurrence of the Institute of Mining Engineers, as will enable our guests to derive the utmost possible gratification from their visit, and to afford the widest opportunities for mutual comparison of views, and for mutual instruction. This country has yet much to learn from the scientific investigations of our English rivals, while they need to appreciate yet more fully than they have ever done the vast extent of our mineral resources and development and the ingenuity and skill of our ironworkers. That the members of the Iron and Steel Institute stand ready to cement and perpetuate an era of good feeling and mutual benefits between the iron trades of the two countries has been abundantly manifested by the favor with which they have received many American metallurgical inventions, but is yet more strikingly exhibited in the adoption at the meeting at Liége of the following resolution:

The members of the Iron and Steel Institute assembled at Liége, being deeply sensible of the good feeling that has at all times been shown toward the Institute by gentlemen connected with the Continental and with the American iron and steel trades, hereby resolve that the Council be requested to make the requisite arrangements for holding an international meeting of the iron and steel trades in Great Britain during the year 1875.

The foregoing reference to a probable event of great significance leads to the remark that this country does not yet possess an association corresponding to the British Iron and Steel Institute. This association, which embraces in its membership such honored names as Henry Bessemer, I. Lowthian Bell, and C. W. Siemens, holds four sessions a year, of two or three days' duration each, to

hear and discuss papers wholly relating to the scientific and economic aspects of the iron trade. No trade discussions are permitted. These meetings are regarded with the greatest interest by the members, who number several hundred of the leading ironmasters of the United Kingdom. The proceedings are published in quarterly journals of large size, and the few volumes that have been issued since the organization of the Institute constitute to-day the freshest, most pertinent, and every way the most valuable contributions to the literature of iron and steel metallurgy that are anywhere procurable. We have no such exclusive organization in this country. The American Institute of Mining Engineers is the closest approximation we have to the British Institute, but differs from it in being wider in its scope, including every subject connected with the economical production of all the useful minerals and metals. It embraces, therefore, geologists, mining engineers, and metallurgists in its membership. The American Iron and Steel Association has for its principal objects the collection of the statistics of the iron trade and the maintenance of a bureau of general intelligence and cooperation for American ironmasters. It is not a scientific organization, nor can it properly be made such.

The need of a more intimate acquaintance with the metallurgy of iron and steel will be conceded by all American ironmasters, and encouragement should be given to the establishment of an association which would give special attention to this subject, especially to new processes of manufacture, and to the most economical and productive methods of managing all kinds of iron works. The American Iron and Steel Association can not take up this work, because it does not require scientific qualifications as a condition of membership, and because its present duties absorb all the means and time at the disposal of its officers. All of the other iron associations of the country are *trade* organizations, and the discussion of scientific questions and the prices of iron would not harmonize very well at a quarterly meeting. A society of scientific gentlemen who are directly or indirectly engaged in the iron trade, to be modeled after the American Institute of Mining Engineers or the Franklin Institute, is plainly what is needed, and greatly needed.

IRON AND THE CENTENNIAL EXHIBITION.

For more than two years the project of an International Industrial Exhibition, at Philadelphia, in 1876, in connection with the proposed Celebration of the One Hundredth Anniversary of the Declaration of American Independence, has been before the American people, and its claims to popular approval and support have been elaborately and frequently set forth. The project has received the indorsement of this Association, through the columns of its *Bulletin*, and through the same channel the advantages which would accrue to the iron interest of the country through a complete display of our iron ores and of the products of our iron manufacturing establishments have been fully stated. The value to this interest of a complete collection, accompanied by reliable analyses, of all the iron ores of the country is incalculable, and it is earnestly to be hoped that the iron manufacturers and the owners of iron ore deposits will co-operate in the work of securing such collection and analyses. The editor of the New York *Iron Age* has tersely presented in the following sentences the reasons why there should be a full display of our iron ores at the proposed Exhibition:

"It has been urged as a reason for making a creditable display of our iron ores at the Exhibition, that we should take advantage of the opportunity to show the representatives of other nations the extent, variety and value of our iron resources. A still better reason is found in the fact that we ourselves want to know what our resources are. In a country of such vast extent, and so sparsely populated in proportion to territory, as compared with other and older countries, no comprehensive or accurate geological survey has been possible. New discoveries of great interest and importance are made almost daily, and it is impossible for the best informed person to gain more than a general and very imperfect idea of what ores are or may be mined in sections of the country with which he is not personally familiar. It is literally true that we do not know what our own resources are, and it is especially desirable that we should know."

A letter has been addressed by Hon. Daniel J. Morrell, Chairman of the Executive Committee of the Centennial Commission, to the President of this Association, in which the collection of iron ores for the Exhibition is referred to the Association. This trust has been accepted by the Executive Committee of the Association, and we feel authorized to say that no unnecessary delay will be permitted to interfere with its proper and satisfactory discharge.

PERSONAL AND HISTORICAL MENTION.

Among the deaths of the past two years which have invaded the ranks of the iron trade of this country, and its friends, may be mentioned that of Hon. Horace Greeley, in the latter part of 1872—a distinguished and life-long advocate of the doctrine of protection to American industry. Also the death in May, 1872, of Joseph H. Scranton, Esq., President of the Lackawanna Iron and Coal Company, located at Scranton, Pa. Also the death of Col. James M. Cooper, of Pittsburgh, in October, 1872, a gentleman who had been long and prominently identified with the practical manufacture of iron and steel in that city, and with the defense of the same policy which Mr. Greeley labored so hard to establish. Also the death in August, 1873, at Johnstown, Pa., of George Fritz, an engineer and iron metallurgist of rare attainments and wide reputation, and at the time of his death and for many previous years in charge of the mechanical department of the Cambria Iron Works. Charles S. Wood, Esq., the President of the Cambria Iron Company, died suddenly in Philadelphia on the 27th day of May, 1873. Mr. Wood, Mr. Scranton, and Mr. Cooper were at the time of their death Vice Presidents of this Association, and members of its Executive Committee.

During the year 1873 occurred the Exposition of the industry of all nations at Vienna, at which, it is much to be regretted, the United States did not bear so honorable a part as its enterprise and skill in scientific and mechanical pursuits entitled it. This was wholly the fault of Congress, which delayed too long to make suitable provision for the transportation, classification and display of articles for exhibition by American inventors, manufacturers, and others. On the 8th day of January last this Association appealed to American ironmasters to make as creditable a display of their products at Vienna as was then possible. To show how meagre was the display of American products at the Exposition, it may be stated that, at its close, there were distributed over four hundred diplomas of honor,—the only prize which conferred a really valuable distinction, of which only eight were awarded to this country. Of these, four were awarded to the

group of education, and four to individuals. The list is as follows: Education—Smithsonian Institution, National Bureau of Education, State of Massachusetts, City of Boston; Individuals—Samuel S. White, of Philadelphia, for dental instruments and artificial teeth; Walter A. Wood, Hoosac Falls, New York, mowing and reaping machines; William Sellers & Co., Philadelphia, puddling furnace and tools, and George H. Corliss, New York, for perfection of steam-engines. Among the minor prizes distributed to American exhibitors, we notice many for improvements and excellence in machinery. American iron ores, iron products and coal were not wholly unrepresented, or overlooked in the distribution of prizes.

During the third session of Congress, commencing December 2, 1872, and ending March 4, 1873, there was no tariff legislation affecting the iron and steel industries of the country.

Of the iron and steel enterprises undertaken or completed during the year 1873, the following are worthy of mention: In January the Bessemer department of the Joliet Iron and Steel Works, at Joliet, Illinois, was successfully started, and in October that of the Bethlehem Iron Works, at Bethlehem, Pa., made its first blow and first rail with gratifying results. Early in 1873 ground was broken for the erection of the Edgar Thomson Steel Works, near Pittsburgh, for the manufacture of Bessemer steel and rails, work upon which has been rapidly pushed during the year. The Pennsylvania Steel Company have commenced the extension of their works at Baldwin Station, near Harrisburg, Pa., which will double their present capacity when completed. The fine rolling-mill at Evansville, Indiana, for the manufacture of iron rails, was completed in June last and started under most favorable auspices.

An event of much significance to the iron trade of the United States was the establishment in 1873 of the line of large iron steamers owned by the American Steamship Company. These steamers are four in number; they were built at Philadelphia by Cramp & Sons, wholly with American capital, and are to ply regularly between Philadelphia and Liverpool. They constitute the only line of transatlantic steamers owned wholly in this country. Its estab-

lishment proves that the revival of American commerce has commenced under circumstances which show that American maritime enterprise and mechanical skill are equal to any emergency without the aid of subsidies and drawbacks. Philadelphia may well be proud of this magnificent line.

During the past year friendly correspondence has taken place between this Association and other associations and individuals representing like and allied industries. The virtual if not formal federation of home industries, for mutual help and protection, and the harmonizing of interests, is necessary to the general prosperity, and this Association is prepared to give its encouragement and assistance to the accomplishment of closer industrial unity. It has conceived and presented a plan for a substantial union of all the iron and steel associations of the country, which has met with favorable consideration. It has heretofore co-operated harmoniously with the textile, coal, copper, and other large producing interests, and it has manifested antagonism to none. This policy it will aim hereafter to pursue without variation or exception.

The Silk Association of America, now scarcely one year old, is one which we take special pride in mentioning as among the associations with which we have friendly relations, because it was only through the application by Congress to the silk industry of the country of the policy of protection for which this Association has always contended that it was possible for the industry to become established on a firm foundation. It is now in a flourishing condition. There are one hundred and forty-seven firms and corporations engaged in the manufacture of silk in the United States, representing a capital of $15,316,414. In 1872 the value of the total product of these establishments was $25,073,201, and the amount of wages paid was $4,878,054 to 11,713 operatives, most of whom were women and girls. In addition to the one hundred and forty-seven firms above mentioned, there are in the United States fifty-three other firms which use a limited amount of silk in connection with other material, making two hundred firms in all, arranged in five divisions: Maryland has 2, Pennsylvania 26, New England 37, New Jersey 35, and New York 100.

On Thursday, September 18th, the great financial panic of 1873,

the effects of which are still apparent in every branch of productive business, commenced in Philadelphia by the suspension of a banking firm which had acted as the fiscal agent of the Northern Pacific Railroad Company. This company, having secured a large grant of public land, had undertaken to construct a railroad 2,000 miles long from Lake Superior to Puget Sound. On the 18th of September, five hundred miles of this road had been constructed, eighty miles more were expected to be finished by the 1st of January, 1874, and a further addition of two hundred miles in the year 1874 was regarded as probable. One effect of the business failure alluded to was the stoppage of work on the road in question; but while the work has been arrested, and the credit of the company has been impaired by that failure, it should not be inferred that the road will not be built. It may not be greatly needed to-day, but it will become a necessity before many years. Its route is marked out by nature for a great commercial highway, and such it is destined to become.

—In closing this report, we take pleasure in adding the expression of our indebtedness to George W. Cope, Esq., our only assistant, for intelligent and valuable services rendered in the work of this office during the past nine months.

Respectfully submitted.

JAMES M. SWANK,
Secretary.

To
SAMUEL J. REEVES, Esq.,
President of the American Iron and Steel Association.

APPENDIX.

PRICES IN PHILADELPHIA OF No. 1 ANTHRACITE FOUNDRY PIG IRON, FOR THIRTY YEARS, FROM 1842 TO 1873.

TONS OF 2,240 LBS.

Compiled by Wm. G. Neilson for the American Iron and Steel Association.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average.*	Year.
1842.....	.....	.....	.....	.....	27	27	26⅛	24½	25⅛	25	25	25	.....	1842
1844.....	24	24	24	24	24	26⅛	26½	26½	27¼	28	27½	26¾	25¾	1844
1845.....	26¾	26½	27¾	33⅛	34½	33	31	28½	27	26⅞	28½	28	29¼	1845
1846.....	28	28	28¼	28	28½	28	29	26½	27¼	27	28½	28½	27⅞	1846
1847.....	28½	28¼	28⅝	29	29	28⅝	28	28½	30½	33¾	35⅝	33⅝	30¼	1847
1848.....	31	28½	27¼	26⅝	26½	26½	25¾	25⅝	25½	25	25	24⅞	26⅛	1848
1849	25	24½	24⅜	24	†23½	23	†22¾	22½	†21⅝	21½	20	21	†22⅝	1849
1850.....	21	21	20⅝	20⅞	20⅝	20⅛	20	20⅝	21	21	21	21¾	20⅞	1850
1851.....	21½	22	22	22	21½	21½	21	21	21	21	21	21	21⅜	1851
1852.....	21½	21¼	20¾	20⅜	20½	20½	20¼	21¼	23¼	26½	27¾	28¼	22⅝	1852
1853.....	32¾	36⅞	35⅝	35⅞	35⅞	36	36	36	36½	37½	37½	36⅜	36½	1853
1854.....	37	36¼	37	38	38	38	38	38	37¾	36½	35½	32½	36½	1854
1855.....	31⅛	29½	27½	26¾	26½	26⅛	26⅛	26½	28	28½	28½	27¾	27¾	1855
1856.....	27½	27½	27⅝	28	28	27⅝	27	27	27	26⅞	26	26	27½	1856
1857.....	26¼	26½	26⅝	27¾	27⅝	27¾	27¼	26¾	26⅜	25¾	23½	23¾	26½	1857
1858.....	23½	22½	22¼	22½	22½	22½	21⅜	21½	22	21½	21⅜	22¼	22¼	1858
1859.....	23⅜	23⅝	24½	23⅞	23½	23½	23	23½	22¾	23¼	23½	23½	23½	1859
1860.....	23	23	23⅜	23⅜	23⅜	23⅜	23¼	22½	22½	22¾	22½	22½	22¾	1860
1861.....	22⅛	21¾	21¼	21⅜	21⅛	20½	19⅞	18⅝	18¾	†18½	18½	19⅝	‖20¼	1861
1862.....	20	20¾	20¾	21½	21½	22⅜	24	24⅝	24½	25½	30½	31½	23⅝	1862
1863.....	32	33¼	35½	36	34⅝	33½	32⅜	31⅝	33	35⅜	41½	43½	35¼	1863
1864.....	43½	48⅝	50½	54½	57½	57⅝	60⅛	‡73⅝	72¼	63⅜	61½	59⅛	¶59¼	1864
1865.....	58½	‡53⅛	50⅝	45½	39½	35	35⅜	40½	44½	49⅞	51	50¾	46⅝	1865
1866.....	50⅝	49	46½	41¾	41⅝	43⅞	46½	47¼	48½	48¾	49½	49½	46⅞	1866
1867.....	48¾	46½	44⅜	41	42¾	43	43½	44	44½	44½	43¾	42½	44½	1867
1868.....	38⅜	38¾	37⅜	38⅛	37	37	38½	39½	40½	41⅝	42½	43½	39½	1868
1869.....	42	40¼	41½	40	39½	40⅞	41⅝	41½	40⅝	40½	39⅝	39¼	40⅝	1869
1870.....	36¼	34½	34½	33¼	33¼	32½	32⅜	33½	33½	32½	31½	31½	33½	1870
1871.....	30½	30⅞	34½	35⅜	35½	35	35¾	36	36½	36⅜	37¼	37¼	35½	1871
1872.....	37	40¾	47	49½	49½	53⅜	51½	52¾	53⅞	53⅛	51¼	47⅝	48⅝	1872
1873.....	45⅛	48	48⅜	47¾	46	45	43¾	43½	42½	38	.....	.....	44¾	1873

* Average for year to nearest *eighth*.

† Uncertain.

‡ Lowest average for month, $18⅜—October, 1861.

‖ Lowest average for year, $20¼—1861.

¶ Highest average for month, 73⅝—August, 1864.

¶ Highest average for year, 59¼—1864.

☞ From 1842 to July, 1866, averaged monthly from weekly quotations in Philadelphia and New York prices current. From July, 1866, to 1873, averaged from weekly quotations in Bulletin of the American Iron and Steel Association.

PRICES OF AMERICAN IRON RAILROAD BARS IN PHILADELPHIA FOR TWENTY-SIX YEARS, FROM 1847 TO 1873.

AVERAGED MONTHLY FROM WEEKLY QUOTATIONS.

TONS OF 2,240 LBS.

Compiled by WM. G NEILSON for the American Iron and Steel Association.

Year.	January.	February.	March.	April.	May.	June	July.	August.	September.	October.	November.	December.	Average.	Average price of Gold.
1847...	.....	71⅜	70⅛	70	70	70	69½	69⅛	67⅛	67	67⅛	67½	.....	100
1848...	63	63	63	63	63	63	63	61⅞	61⅛	61	61	61	62¼	100
1849...	61	57⅛	53¾	53⅓	54¼	53⅛	53½	53⅛	52	51½	51½	51⅛	53⅜	100
1850...	47	47½	48	49	49	50	46	46⅜	47½	48	48	†48	†47⅞	100
1851...	43	†45	47⅛	45	45	48	46	45½	45	45	46	†46¼	†45⅝	100
1852...	46⅛	46⅛	46½	46⅛	46⅜	46⅛	46½	46½	47¾	49⅓	51	61	48⅝	100
1853...	74⅛	77½	77½	77½	77½	77½	77½	77⅛	77½	77½	77½	77½	77⅛	100
1854...	81	81	81	81	81	81	81	81	81	81	77½	73½	80½	100
1855...	70	65	62⅛	62½	60	58⅓	59½	59½	64⅛	65	65	63	62⅝	100
1856...	62⅛	62⅛	63⅜	65	65	65	65	65	65	65	65	64	64⅜	100
1857...	65½	65½	64½	65¾	67	67	67	67	67	67	58½	50	64¼	100
1858...	50	50	50	50	50	50	50	50	50	50	50	50	50	100
1859...	493⅛	491⅛	491⅛	501⅛	501⅛	501⅛	493⅛	483⅛	483⅛	483⅛	483⅛	483⅛	493⅛	100
1860...	483⅛	483⅛	483⅛	483⅛	483⅛	483⅛	483⅛	46	47	47½	47½	46½	48	100
1861...	44	44	44	44	44	44	44	43½	43	41⅜	‡36¼	‡36½	42⅜	100
1862...	‡36½	‡36½	41½	41½	41½	41½	41½	41½	43	43¾	46	46	‖41¾	113
1863...	72½	69½	72¼	73½	73½	78¾	81½	73⅜	72½	79½	87½	87½	76⅞	145
1864...	94	101½	105	111	120	127½	141½	152½	‡153¾	140	133¾	132	¶126	202
1865...	125⅝	121¼	116¼	108½	90¼	84¼	82½	86¼	90	92½	95	91	98⅝	157
1866...	90	90	87½	84⅝	84	85¾	86⅝	87	87⅝	87⅜	85	85	86⅝	140
1867...	85	85	84¼	82⅞	82½	82½	82½	82½	82½	82½	82½	82½	83¼	138
1868...	81⅜	79	79	79	79	79	79	79	79	78¼	76	74¾	78⅜	140
1869...	76¾	76	76	76	76	76	76	80	78½	78½	78½	78½	77¼	136
1870...	74	72½	72½	72½	72½	72½	72½	72½	72½	72½	70½	70	72¼	115
1871...	68¼	69	69	69½	71	71	71	71	71	71	71	71	70⅜	112
1872...	71½	75⅝	81⅛	83⅞	90¼	90	89	87¾	88¾	88¾	88¾	85½	85½	112
1873...	83⅓	83	83	82	80	78	76	75	75	70	....	.....	78½	112

From 1847 to 1866 from Philadelphia Prices Current, except for years 1850 and 1851, for which estimates were furnished by Mr. S. J. REEVES. From 1866 to 1873 from Bulletin of the American Iron and Steel Association, averaged from weekly quotations.

☞ Prices averaged for years to nearest *eighth*.

* For latter part of 1857 prices were probably only nominal. † Uncertain.

‡ Lowest months, $36½ — { November and December, 1861. / January and February, 1862 ‖ Lowest year, $41¾ — 1862.

¶ Highest year, $126 — 1864.

§ Highest month, $153¾—September, 1864.

☞ The annual premium on gold is calculated from daily quotations of gold sales in the *Banker's Magazine*.

PRICES OF ANTHRACITE COAL FOR FORTY-SEVEN YEARS, FROM 1826 TO 1873.

Prices of Schuylkill White Ash Lump Coal by the Cargo at Philadelphia. Averaged monthly from mean of weekly quotations in Prices Current, Philadelphia. Tons of 2,240 lbs.

Prepared for the American Iron and Steel Association by WM. G. NEILSON and ISRAEL W. MORRIS.

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Average for year.
1826...	.....	.....	.....	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.50	7.80	.....
1827...	7.00	7.00	7.00	7.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
1829...	.....	.....	.....	.....	.....	.....	.....	.....	.....	7.50	7.50	*7.25	.....
1830...	*7.25	*7.25	*6.00	*5.75	5.75	5.75	5.75	5.75	5.75	5.75	.....	.....	.....
1833...	.....	.....	6.00	5.50	5.25	5.25	5.25	5.25	5.17½	4.87½	4.87½	4.87½	.....
1834...	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.50	4.84
1835...	4 56	4.56	4.56	4 56	4.60	4.63	4 63	4 68	4.88	4 90	5.03	6.47	4.84
1836...	7.70	7.44	7.31	6.58	5 38	5 50	5 50	6.19	6.41	6.50	7.13	8 05	6.64
1837...	8.25	*8.25	8.04	6 78	6.50	6.38	6.10	6.00	6.00	6 09	6.13	6 13	*6.72
1838...	6.13	5.91	5.28	5.25	5.16	5.13	5.13	5.13	5 10	5.00	5.00	5 00	5 27
1839...	5·00	5.00	5.00	5.00	5.00	5.00	5 00	5.00	5.00	5.00	5.00	5 00	5 00
1840...	5.00	5.00	5.00	5.00	5.00	4.63	4.63	4.63	4.66	4.95	5.06	5.34	4.91
1841...	6 40	7.00	6 44	5.88	5.69	5.17	5.13	5.27	5 56	5.63	5.63	5.63	5.79
1842...	5.63	5.56	5 06	4 38	4.03	3.88	3.83	3.60	3.56	3.51	3.56	3.56	4.18
1843...	*3 50	*3 25	*3.25	3.25	3 25	3.25	3.25	*3.25	3 25	*3.25	3.25	3 25	*3.27
1844...	3.50	3.33	3.10	3.02	3 00	3.03	3.13	3.21	3 26	3.26	3.27	3.26	‖3 20
1845...	3.26	3.26	3.27	3.31	3.31	3 31	3.44	3.44	3.59	3.74	3 76	3.81	3.46
1846...	3.81	3.75	3.72	3.84	3.87	3.97	4.00	*3.94	3.96	3.88	4 00	*4.00	*3 90
1847...	3.88	3.81	3.81	3 81	3.60	3.63	3 69	3.83	3.95	3 88	3.88	3.88	3.80
1848...	3.90	3.90	3.58	3.44	3.37	3 29	3.33	3.56	3.46	3.41	3.39	3.36	3.50
1849...	3.36	3 36	3.45	3.62	3.62	3.86	3.88	3.81	3.75	3.69	3.57	3 50	3.62
1850...	3.50	3.50	3.40	3 31	3.25	3.25	3.25	3.25	†4.25	4 25	4.25	4.25	3.64
1851...	4.28	4 13	3.56	3.31	3.10	3.00	3 00	3.05	3 17	3 20	3.25	3.00	3.34
1852...	3.18	3.47	3.40	3.44	3.44	3 45	3 45	3.40	3 56	3.56	3.56	3.50	3.46
1853...	3.42	3.44	3.45	3.47	3.47	3.47	3.47	3 64	4 03	4.19	4.19	4.10	3.70
1854...	4.50	4.50	4.25	4.39	4 81	5.16	5 55	6.00	6.00	5.81	5.68	5.60	5.19
1855...	5.60	5 28	4.53	4.50	4.50	4.45	4 28	4.19	4.19	4.19	4.15	4.06	4 49
1856...	4.06	4.25	4.25	4.25	4.05	4.00	4 00	4.00	4.12	4.13	4.10	4.08	4.11
1857...	3 92	3.92	3.92	3.89	3.85	3.85	3.88	3.87	3.85	3.82	3 82	3.82	3.87
1858...	3.83	3 83	3.77	3.47	3 22	3 23	3.35	3.25	3 32	3.32	3.32	3.30	3.43
1859...	3.28	3.38	3.34	3.20	3.20	3.20	3.20	3.20	3.19	3 20	3.34	3.29	3 25
1860...	3.28	3.29	3.30	3.30	3.23	3.31	3.36	3.39	3.50	3.53	3.62	3.63	3.40
1861...	3 63	3 63	3 50	3.24	3.23	3.29	3.37	3.40	3.35	3.33	3.33	3 33	3.39
1862...	3.33	3.33	3.11	‡2.78	‡2.78	3.64	4 58	4.85	4.98	5.22	5.50	5.63	4.14
1863...	5.38	5 25	4.63	4 75	5.50	5.80	6.25	6.50	6.75	7.25	7.50	7.13	6 06
1864...	7.10	6.75	6.69	7.20	7 88	8.34	9 78	§10.75	10 13	8 90	8.88	8.38	¶8.39
1865...	8 38	8.88	8.63	8.10	6.75	6.25	6.03	6.50	8.32	9.93	8.81	8.25	7.86
1866...	7 94	7.75	5.40	5.25	5.13	5 53	5.88	5.68	5 47	5.34	5 25	5 05	5.80
1867...	5.06	5.06	4 47	4.50	4 44	4.38	4.28	4.07	4.09	4 01	4.00	4 00	4.37
1868...	4 00	3.13	3.13	3.22	3 25	3.25	3.25	3.25	4 10	4.50	5.22	6.00	3.86
1869...	5.15	5.01	4.15	3.81	3.90	5.00	6.59	7.17	6.15	6.00	5 87	5.12	5.31
1870...	5.07	4.79	4.79	4 50	4.50	4.44	4 31	4.44	4 33	4.19	3 69	3 55	4 39
1871...	4.05	**	**	**	**	4.52	4.45	4.25	4.35	4.68	4.72	4 63	4.46
1872...	4.63	3.78	3 50	3.50	3 50	3 50	3 50	3.59	3.71	3.90	3.90	3.90	3 74
1873...	3.90	3.90	4.00	4.00	4.10	4.20	4.40	4.40	4 50	4 60	.....	.....	4.16

PRICES OF LEHIGH COAL in Philadelphia, from Grotjan's Public Sale Report:—1822, May to December, $8.40; 1823, January to August, $10; September, $9 50; October to December, $8.40; 1824, January to April, $8.40.

* Uncertain.

† Rise due to freshet.

‡ Lowest average for month, $2.78—April and May, 1862.

§ Highest average for month, $10.75—August, 1864.

‖ Lowest average for year, $3 20—1844.

¶ Highest average for year, $8 39—1864.

** Owing to the long strike there was no Coal in first hands for sale during these months.

PRICES OF CUMBERLAND COAL FOR TWENTY YEARS.

Average Price, per ton of 2,240 lbs., of Cumberland Coal, delivered on board vessel at Baltimore, Md., from 1853 to 1873, together with the average freight to Boston.

Prepared for the American Iron and Steel Association by ISRAEL W. MORRIS, of Philadelphia, and Messrs. BORDEN & LOVELL, of New York.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average for year.	Average freight to Boston.	Average cost delivered in Boston.
1853...	.....	.....	.....	.....	3.15	.....	3.15	3.15	.....	3.15	3.62	3.50	.....	2.80	.....
1854...	3.50	.....	.....	.....	.....	.....	.....	4.00	4.25	.....	4.25	4.25	.....	2.25	.....
1855...	4.25	4.25	4.25	4.00	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.89½	2.17	6.06
1856...	.....	.....	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	.....	3.75	2.37	6.12
1857...	4.35	4.35	4.35	4.50	4.28	4.24	4.23	4.15	4.23	4.25	4.25	4.25	4.28	1.84	6.12
1858...	....	.....	3.80	3.75	3.50	3.73	3.62	3.75	3.62	3 75	3.75	3.75	3.70	1.73	5.43
1859...	4.12	3.75	3.37	3.18	4.07	3.65	3.45	3.93	3.42	3 55	3.55	3.55	3.63	1.83	5 46
1860...	.....	3.50	3.75	3.45	3.37	3.50	....	.....	.....	3.50	3.25	3.50	3.49	2.55	6 04
1861...	3.00	3.66	3.42	3.50	3.50	3.50	3.50	.....	.....	.....	.....	.....	3.44	2.25	5.69
1862...	.....	.....	.....	4.00	4.00	4 25	4.11	4.33	4.25	.....	.....	.....	4.23	2.42	6 65
1863...	5.50	6 00	6.00	5.66	5.50	5.50	5.50	5.50	5.50	5.25	5 50	5.50	5.57	3.28	8.85
1864...	5.75	5.75	5.83	6.00	6.14	6.21	.....	7.41	.....	8.36	8.36	8.63	6.84	3.39	10.23
1865...	8.56	.....	10.25	9.01	8.00	6.50	6.75	7.00	7.00	6.75	6.75	6.75	7.57	3.79	11.36
1866...	6.35	7.00	6.00	6.00	6.00	6.00	5.75	5.66	5.62	5.66	5.62	5.66	5 94	3.53	9.47
1867...	.....	.....	5.25	5.13	5.08	4.88	4.92	4.88	4.92	4.88	4.88	4.88	4.97	2.68	7 65
1868...	5.00	5.00	4.87	4.75	4.70	4.70	4.68	4.67	4 70	4.75	4.83	4 83	4.71	3.21	7.92
1869...	5 00	5.00	5.00	4.96	4.96	4.96	4.96	4.96	4.96	5.00	5.00	4 96	4.97	2.83	7.80
1870...	4.72	4.72	4.72	4.72	4.72	4.72	4 72	4.72	4.72	4.72	4.72	4.72	4.72	2.64	7.36
1871...	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	.....	4.72	2.73	7.45
1872...	4 70	4.65	4.62	4.64	4.64	4.64	4 64	4.64	4.64	4.64	4.75	4.75	4.66	3.06	7.72
1873...	4.75	4.75	4.83	4.93	4.93	4.85	4.85	4.85	4.88	4.88	.....	.....	4.85	3.05	7.90

THE COAL PRODUCT OF THE UNITED STATES IN THE CENSUS YEAR 1869-70—TONS OF 2,000 POUNDS.

Compiled from the Census of 1870, by the *Pottsville Miners' Journal*, and revised by the Census Office.

States.	No. of Counties.	No. of Collieries.	No. of Engines.	Power of Engines.	No. of Men.	No. of Boys.	Capital Invested.	Wages Paid.	Value of Materials Furnished.	Tons Produced.	Value of Product.	Average Value at Colliery.
Pennsylvania.												
Anthracite	8	229	829	48,809	43,943	9,078	$50,936,785	$22,982,813	$3,596,440	15,650,275	$38,436,745	$2.53
Bituminous	26	359	69	1,851	16,517	334	16,974,918	8,995,495	604,691	7,798,518	13,921,069	1.77
Total for Pennsylvania	34	588	898	50,660	60,460	9,412	$67,911,703	$31,978,308	$4,201,131	23,448,793	$52,357,814	
Illinois	37	322	92	2,645	6,166	135	4,286,575	3,192,977	399,334	2,624,163	6,097,432	2.33
Ohio	28	307	76	3,363	7,246	321	5,891,813	3,381,108	252,447	2,527,285	5,482,952	2.16
Maryland	2	22	7	431	2,672	55	23,891,600	1,473,325	166,479	1,819,824	2,409,208	1.33
Missouri	18	56	33	2,308	1,878	.....	2,587,250	1,277,804	316,082	621,930	2,011,820	3.24
W. Virginia	12	41	10	177	1,043	97	1,434,800	619,376	48,564	608,878	1,035,862	1.70
Indiana	13	46	22	771	1,299	70	554,442	664,592	61,890	437,870	988,621	2.26
Iowa	18	96	5	145	1,341	13	618,332	580,157	73,102	263,487	874,334	3.32
Kentucky	15	30	4	125	676	38	717,950	278,411	27,828	150,582	446,795	2.97
Tennessee	6	11	2	51	399	20	313,784	187,383	15,945	133,418	330,498	2.47
Virginia	4	6	15	1,297	642	.....	779,200	168,120	20,312	61,803	226,114	3.66
Kansas	5	20	.....	.....	252	.....	106,430	89,191	2,601	32,938	114,278	3.47
Michigan	2	3	3	82	85	8	176,500	58,400	7,550	28,150	104,200	3.70
Rhode Island	1	2	2	140	70	5	80,000	33,000	4,100	*14,000	59,000	4.21
Alabama	2	2	.....	.....	57	.....	26,000	23,970	351	11,000	39,000	3.54
Nebraska	1	3	.....	.....	6	2	850	2,950	1,450	1,425	8,550	6.00
Wyoming	1	1	1	20	150	15	250,000	225,000	48,000	50,000	800,000	16.00
Washington	1	1	2	80	80	.....	300,000	70,869	13,394	17,844	107,064	6.00
Utah	2	6	1	15	25	.....	44,800	2,550	5,985	5,800	14,950	2.58
Colorado	2	3	.....	.....	16	.....	36,000	9,000	2,410	4,500	16,500	3.66
Total	238	1,566	1,173	62,310	84,563	10,191	$110,008,029	$44,316,491	$5,668,955	32,863,690	$73,524,992	

RECAPITULATION.

Capital invested in collieries in the United States	$110,008,029	Value of the same at mines	$73,524,992
Wages paid in 1869	44,316,491	Number of men employed	84,563
Supplies furnished at mines in 1869	5,668,955	" boys "	10,191
Production of coal in 1869—Anthracite	15,664,275		94,757
" " " Bituminous	17,199,415	Number of steam engines used in mining	1,173
		Horse-power of ditto	62,310
Total production in 1869	$32,863,690	Number of collieries worked	1,566
		Number of counties in which collieries were worked	238

* Anthracite.

THE ANTHRACITE COAL TRADE OF PENNSYLVANIA.

FROM ITS COMMENCEMENT. (SHIPMENTS ONLY.)

TONS OF 2,240 POUNDS.

By P. W. SHEAFER, Engineer and Geologist, Pottsville, Pa.

Year.	Lehigh. Tons.	Schuylkill. Tons.	Wyoming. Tons.	Total Tons.
1820.....	365	.....	.....	365
1821.....	1,073	.....	.....	1,073
1822.....	2,240	1,480	.....	3,720
1823.....	5,823	1,128	.....	6,951
1824.....	9,541	1,567	.....	11,108
1825.....	28,393	6,500	.....	34,893
1826.....	31,280	16,767	.....	48,047
1827.....	32,074	31,360	.....	63,434
1824.....	30,232	47,284	.....	77,516
1829.....	25,110	79,973	7,000	112,083
1830.....	41,750	89,984	43,000	174,734
1831.....	40,966	81,854	54,000	176 820
1832.....	70,000	209.271	84,000	363,271
1833.....	123,001	252,971	111,777	487,749
1834.....	106,244	226,692	43,700	376,636
1835.....	131,250	339,508	90,000	560,758
1836.....	148,211	432,045	103,861	684,117
1837.....	223.902	530.152	115.387	869,441
1838.....	213,615	446 875	78,207	738,697
1839.....	221.025	475,077	122,300	818,402
1840.....	225.313	490,596	148,470	864.379
1841.....	143 037	624,466	192.270	959,773
1842.....	272,540	583.273	252,599	1,108,412
1843.....	267,793	710,200	285,605	1,263,598
1844.....	377,002	887,937	365,911	1,630,850
1845.....	429,453	1,131,724	451.836	2,013,013
1846.....	517,116	1,308,500	518,389	2,344 005
1847.....	633,507	1,665,735	583,067	2,882.309
1848.....	670.321	1,733.721	685,196	3,089,238
1849.....	781,656	1,728,500	732.910	3,242,966
1850.....	690,456	1,840,620	827.823	3.358 899
1851.....	964,224	2,328,525	1,156,167	4,448,916
1852.....	1.072.136	2,636,835	1,284,500	4,993,471
1853.....	1,054,309	2,665,110	1,475,732	5,195,151
1854.....	1,207,186	3,191,670	1,603,478	6,002,334
1855.....	1.284,113	3,552.943	1,771,511	6,608,567
1856.....	1,351,970	3,602 999	1,972,581	6,927,580
1857.....	1,318,541	3,373,797	1,952,603	6.644 941
1858.....	1,380,030	3,273.245	2,186,094	6.839,369
1859.....	1,628.311	3.448,708	2,731,236	7,808,255
1860.....	1,821,674	3,749,632	2,941.817	8,513,123
1861.....	1,738.377	3,160.747	3,055,140	7,954,264
1862.....	1,351,054	3,372 583	3,145,770	7,869,407
1863.....	1,894,713	3.911 683	3,759,610	9 566.006
1864.....	2,054.669	4,161.970	3,960.836	10,177.475
1865.....	2,040,913	4,356.959	3.254,519	9 652,391
1866.....	2,179,364	5.787.902	4,736 616	12 703.882
1867.....	2,502.054	5.161,671	5,325,000	12 988.725
1868.....	2,507,582	5.335,731	5,990,813	13.834.132
1869.....	1,929,523	5,725,138	6.068,369	13,723 030
1870.....	3,172,916	4,851,855	7.825,128	15,849,899
1871.....	2,116,683	6,314,422	6,682,302	15.113,407
1872.....	3,743.278	6,469,942	8,812.905	19,026,125

THE

CUMBERLAND

COAL TRADE,

From its Commencement. (Shipments only.)

—

Tons of 2,240 pounds.

—

Compiled from official sources, by C. BLACK, Esq., Mount Savage, Md.

Years.	Tons.
1842.....	1,708
1843.....	10,082
1844.....	14,890
1845.....	24.653
1846.....	29,795
1847.....	52 940
1848.....	79.571
1849.....	142,449
1850.....	196,848
1851.....	257,679
1852.....	334,178
1853.....	533.979
1854.....	659,681
1855.....	662,272
1856.....	706.450
1857.....	582,486
1858.....	649.656
1859.....	724,354
1860.....	788.909
1861.....	269.674
1862.....	317,634
1863.....	748,345
1864.....	657,996
1865.....	903,495
1866.....	1,079,331
1867.....	1,193,822
1868.....	1,350,443
1869.....	1,882,669
1870.....	1,717,075
1871.....	2,345,153
1872.....	2,365.471
	21,253,688

THE BRITISH IRON EXPORT TRADE.

FOR 1871, 1872, AND FIRST NINE MONTHS OF 1873.

From British Board of Trade Returns. Tons of 2,240 pounds.

PRINCIPAL ARTICLES. TO ALL COUNTRIES.	Twelve months ended 31st December.			
	QUANTITIES.		VALUE.	
	1871.	1872.	1871.	1872.
	Tons.	Tons.	£	£
Pig-iron	1,057,458	1,332,726	3,229,408	6,721,966
Bar, angle, bolt and rod	349,084	313,876	2,921,777	3,635,558
Railroad of all sorts	981,197	947,548	8,084,619	10,237,768
Wire of iron and steel (except telegraph) galvanized or not	26,200	33,605	446,159	674,743
Hoops, sheets, boiler and armor plates	200,337	208,423	2,399,203	3,430,970
Cast or wrought, and all other manufactures (except ordnance,) unenumerated	243,298	269,614	3,588,364	4,778,785
Iron, old, for re-manufacture	139,812	108,181	672,696	661,931
Steel, unwrought	39,189	45,285	1,198,428	1,491,240
Manufactures of steel, or steel and iron combined	13,038	11,130	682,855	614,842
Total of iron and steel	3,169,219	3,388,622	26,124,134	36,060,547
Steam engines	.....	.....	2,064,004	2,603,390
Other machinery and mill-work	.....	.....	3,902,037	5,595,702

PRINCIPAL ARTICLES. TO ALL COUNTRIES.	Nine months ended 30th September.			
	QUANTITIES.		VALUE.	
	1872.	1873.	1872.	1873.
	Tons.	Tons.	£	£
Pig-iron	1,038,436	896,635	5,018,894	5,595,034
Bar, angle, bolt and rod	245,513	221,644	2,742,703	2,871,131
Railroad of all sorts	720,970	591,596	7,511,121	7,783,382
Wire of iron and steel (except telegraph wire) galvanized or not	25,606	22,484	489,100	526,610
Hoops, sheets, and boiler and armor plates	153,311	156,448	2,404,874	2,846,078
Cast or wrought, and all other manufactures (except ordnance,) unenumerated	196,804	220,747	3,382,817	4,288,270
Iron, old, for re-manufacture	85,805	51,673	520,392	341,122
Steel, unwrought	33,068	30,330	1,066,485	1,121,284
Manufactures of steel, or steel and iron combined	8,412	8,008	453,081	542,814
Total of iron and steel	2,602,883	2,296,990	26,590,681	29,144,217
Steam engines	.....	.....	1,809,657	2,223,106
Other machinery and mill-work	.....	.....	3,787,893	5,173,955

PRINCIPAL ARTICLES. TO UNITED STATES.	QUANTITIES.			VALUES.		
	1871.	1872.	1873.*	1871.	1872.	1873.*
	Tons.	Tons.	Tons.	£	£	£
Pig-iron	190,183	193,957	87,958	594,086	1,012,441	595,478
Bar, angle, bolt and rod	64,301	64,995	21,958	534,205	747,101	292,332
Railroad of all sorts	512,277	472,760	151,972	3,976,857	4,863,677	1,967,872
Hoops, sheets, boiler and armor plates	41,520	31,448	16,913	409,686	437,363	275,855
Cast or wrought, unenumerated	10,671	13,444	13,828	180,005	308,004	286,742
Steel, unwrought	21,133	24,051	15,173	620,537	779,878	552,767
Total	840,085	800,655	307,802	6,315,376	8,148,464	3,971,046

* Nine months ended 30th of September.

PROCEEDINGS

OF THE

AMERICAN

IRON & STEEL ASSOCIATION,

AND OF THE

CONVENTION OF

IRON AND STEEL MAKERS,

HELD IN PHILADELPHIA,

February 4th and 5th, 1874.

PHILADELPHIA:
RINGWALT & BROWN, STEAM-POWER BOOK AND JOB PRINTERS,
Seventh Street, below Chestnut.
1874.

PROCEEDINGS

OF THE

AMERICAN IRON AND STEEL ASSOCIATION,

February 4th, 1874.

The Association met at eleven o'clock on Wednesday morning, February 4th, at its rooms, No. 265 South Fourth Street, Philadelphia, the President, Sam'l J. Reeves, Esq., in the chair. The Secretary, Mr. James M. Swank, read the minutes of the last meeting, which were approved. A few remarks were made by the President in relation to the objects of the meeting, having special reference to the desired union of the iron associations of the country, after which the report of the Secretary was submitted to the consideration of the members present, among whom were Messrs. James I. Bennett, of Graff, Bennett & Co., Pittsburgh, Pa.; Thomas S. Blair, of Shoenberger, Blair & Co., Pittsburgh, Pa.; Robert G. Bushnell, of Park, Brother & Co., Pittsburgh; Percival Roberts, of A. & P. Roberts & Co., Phila.; W. E. C. Coxe, representing the Philadelphia and Reading Rolling Mill, Reading, Pa.; W. S. Mead, of Knoxville Iron Co., Knoxville, Tenn.; C. E. Coffin, of Muirkirk Iron Co., Muirkirk, Md.; Chester Griswold, of John A. Griswold & Co., Troy, N. Y.; John Rogers, of J. & J. Rogers Iron Co., Blackbrook, N. Y.; Wm. G. Neilson, and H. G. Townsend, of Logan Iron and Steel Co., Lewistown, Pa.; G. B. Stebbins, of Wyandotte Rolling Mill Co., Detroit, Michigan; Z. S. Durfee, of Pneumatic Steel Association, New York; W. H. Morris, of Morris, Wheeler & Co., Phila.; E. Y. Townsend, D. J. Morrell and Cyrus Elder, of Cambria Iron Co., Johnstown, Pa.; S. M. Felton and Chas. S. Hinchman, Pennsylvania Steel Co., Phila.; Alfred Hunt and Joseph Wharton, of Bethlehem Iron Co., Bethlehem, Pa.; Wm. Jones, of Alliance Rolling Mill Co., Alliance, Ohio; J. B. Moorhead, of J. B. Moorhead & Co., Conshohocken, Pa.; T. F. Miner, Jagger Iron Co., Albany, N. Y.; G. W. Barr, of Miller, Barr & Parkin, Pittsburgh, Pa.; S. A. Fuller, of Cleveland Iron Co., Cleveland, Ohio; Orin C. Frost, of Northern New York Iron and Mining Co., Watertown, N. Y.; Frederick J. Slade, New Jersey Steel and Iron Co., Trenton, N. J.; and Samuel J. Reeves, of Phœnix Iron Co., Phœnixville, Pa.

On motion of Mr. Wharton, the President appointed a committee, consisting of Messrs. Morrell, Moorhead, Roberts, Coxe, Stebbins, Elder and Rogers, to whom resolutions were to be referred for consideration. To this committee Messrs. Wharton and Reeves were added by the desire of the gentlemen present. A memorial to Congress, and several resolutions concerning the proposed union of iron associations and relating to national finances, were referred to the committee, who were authorized to meet like committees from the other iron associations and to unite in a report to be submitted to the general meeting to be held at the Continental Hotel on the 5th inst.

A piece of finely polished cold-twisted steel rail, presented by the Joliet Iron and Steel Co., was submitted to the inspection of the members, after which Mr. Thomas S. Blair exhibited some excellent specimens of cast steel converted by his new direct process for the manufacture of homogeneous iron and steel, which he explained. Samples of rich iron ore and coal from Alabama were presented by Mr. G. B. Stebbins. The President urged the members to attend the union meeting at the Continental Hotel on the 5th inst., after which the Association adjourned.

SPECIAL REPORT OF THE SECRETARY.

Mr. President and Gentlemen:

Since the annual meeting of the Association, on the 20th of November last, the office has been removed to more commodious and tasteful apartments at No. 265 South Fourth Street, Philadelphia. This change was resolved upon in consequence of the increased general business of the Association, and especially in view of the necessity which existed for providing accommodations for the scientific commission which had been called to assist us in the work of collecting, classifying, and analyzing iron ores, fuels, etc., for the approaching International Exhibition. Public announcement has been made of the appointment of this commission, and the producers and consumers of the minerals alluded to have been requested to contribute to the fund proposed to be created for the payment of its necessary expenses, and to meet such other pecuniary liabilities as the Association may incur in discharging the trust confided to it. The services of the commission are to be rendered gratuitously. It is expected that it will meet for organization during the present month.

THE IRON AND STEEL INSTITUTE OF GREAT BRITAIN.

From unofficial information received, it is now rendered probable that the members of the Iron and Steel Institute of Great Britain will postpone their contemplated visit to this country until the year 1876, when the Centennial Exhibition will be held, which will afford the members a better opportunity to compare the iron manufactures of the United States with those of their own country.

IRON AND STEEL ASSOCIATIONS.

At the mass convention of iron and steel manufacturers, which is to be held on the day following the present meeting of this Association, it is probable that the subject of forming a more perfect union of all the iron and steel organizations of the country will be introduced. In view of this probability, it is proper to call attention to the fact that, on the 7th of December, 1872, a formal proposition to form a federative union was made by this Association; that a conference of delegates representing three of the iron associations, our own included, was held on the 9th of January, 1873, to consider this proposition; that, in compliance with the instructions of this conference, a constitution for the government of the proposed union was subsequently prepared and submitted to all of the delegates and to others; and that, up to the present time, no communication has been received by this Association intimating that any action whatever has been taken upon the proposed constitution by any of the other organizations. The reasons for concerted and harmonious action are just as cogent now as ever, and if any of the other organizations should submit a plan of union, this Association is prepared to give it prompt and careful consideration.

Presuming that more united action between the different branches of the iron trade of the country is possible and desirable, we venture the suggestion that the duties of this Association and of similar associations should be carefully defined by some committee which shall be jointly constituted. Application to manufacturers for the statistics of their business, to be published for the benefit of the iron trade and for the information of the country, should emanate from only *one* association, and requests for these statistics from all other sources should be refused and condemned. Much annoyance to manufacturers has been caused by the frequency with which they have been asked to reveal the details of their business to various agencies, and much confusion and uncertainty have resulted in consequence of the numerous and conflicting statements that have been prepared and published—wholly or in part—from information thus obtained. The general interests of the iron trade should be intrusted to only one association, for obvious reasons. The association which cares for the general interests of the trade and collects its statistics should have nothing to do with the adjustment of prices of product, wages of labor, and other matters of interest only to special branches of the iron industry. These subjects should be committed to strictly *trade* organizations. There can certainly be no objection to the creation, if need be, of as

many associations of this character as there are branches of the iron trade or districts of iron production. Individual members of these associations could be members of the general body, and it should be the policy of such a body, having care of all the iron interests, to divide the management of its affairs among the different branches of the trade. If it should be deemed necessary for the association representing general interests to publish a periodical, provision should be made for the insertion in its columns of papers of interest relating to every branch of the trade.

IRON AND STEEL METALLURGY.

In this connection we are induced to repeat the suggestion heretofore made that the iron trade of this country greatly needs an organization which can accomplish a work similar to that of the Iron and Steel Institute of Great Britain. That body was organized a few years ago "to afford a means of communication between members of the iron and steel trades upon matters bearing upon the respective manufactures, excluding all questions connected with trade regulations;" and it was expressly stipulated that it should "arrange periodical meetings for the purpose of discussing practical and scientific subjects bearing upon the manufacture and working of iron and steel." This scientific purpose has from the first constituted the leading and most valuable feature of the Institute, and it is this feature which no iron association of this country has ever fully possessed. This fact is not creditable to the enterprise, the intelligence, and the *esprit de corps* of American manufacturers of iron and steel; although the truth is that no class of manufacturers anywhere has exhibited more fertility than they in the adaptation of means to ends, more genius in the invention of new processes, more skill in their application, or more generosity in sharing with each other the knowledge they possessed. But, owing to the vast extent of territory over which the iron industry of this country is scattered, and the wide areas which separate iron manufacturers, it must happen that, without an organization specially devoted to collecting and preserving the fruits of study and investigation of technical and scientific questions, much of the good that might be done by an interchange of ideas and comparison of experience must necessarily be lost. If it has been found profitable for the leading ironmasters of England to meet together frequently for the discussion of scientific questions, surely the inducements for American ironmasters to do the same can not be of trifling significance. We urge, therefore, upon the attention of the members of this Association the propriety of considering whether it would not be wise to give encouragement to the organization of a scientific department of the Association which could give special and undivided attention to the cause of American iron metallurgy. Years ago, in the adoption of the organic law of the Association, this work was declared to be necessary. It was stated to be one of its objects "to provide for the mutual interchange of information and experience, both scientific and practical." This declaration stands unrepealed to-day. But it has never brought forth ripe fruit. The Association has had and still has too many other important interests to care for, and it has not encouraged a scientific membership. May it not now properly lead the way to the realization of its own aspiration, while leaving to others the performance of the work?

CONGRESS AND THE FINANCIAL SITUATION.

Since the annual meeting of the Association in November last, the first session of the Forty-third Congress has convened, and many propositions relative to the financial situation of the country have been laid before it. While it may be assumed that Congress will wisely legislate upon a question of such momentous interest to every branch of American industry, it is plainly the privilege of organizations which represent important industries to make public declaration of their views and wishes concerning it, to the end that legislators may receive all needed light upon a problem of great perplexity and difficulty. That this Association should propose to Congress a complete solution of this problem is not, we presume, contemplated;

but that it should avail itself of the privilege to state the probable effects upon the iron and steel industries of any proposed measures of relief is a duty which it can not and dare not disregard. Especially can it not afford to ignore this duty when the fact is considered that the enemies of American industry are active and united in pressing upon the attention of Congress a financial policy which would narrow the opportunities and lower the wages of American labor, and make what capital we have so timid of investment in all progressive enterprises that the material resources of the country would experience no further development, and existing schemes of great pith and moment would be abandoned. The policy which aims to secure a further contraction of the currency, or to continue the existing contraction, may be honestly believed in by some true friends of American industry, but it is a most significant fact that the supporters of this policy mainly come from the ranks of the importers and non-producers of the country and their agents. We speak plainly when we say that there is probably not in the country one importer of foreign merchandise, or one clamorous petitioner for lower duties, who is not also in hearty accord with the policy of contracting the currency. The foreign manufacturer could secure no greater advantage over his American rival than would be afforded him by the adoption of a policy which would check all American enterprise by withholding the water to move its wheels and the fuel to feed its fires.

It has been conclusively shown from official figures, by one of the most eminent statisticians of the country, that from the first of July, 1868, to the first of July, 1873, five years, the withdrawal from actual circulation of the paper currency issues of the National Treasury amounted to three hundred millions of dollars. During this time the currency requirements of the country greatly increased. Is it any wonder that we have had a great panic, or that the blasting effects of that panic are still visible wherever there is a rolling-mill, a blast furnace, a woolen factory, or other monument of the genius of a great people? The fact is not overlooked that many persons assert that this panic was caused by over-speculation—by pushing the development of the country's resources beyond the demands of the time. But those who assert this forget that the enterprise which builds railroads, opens mines, and establishes manufactories is the enterprise which has made us a great and powerful nation, given steady employment at good wages to millions of our countrymen who possessed no capital but their strong arms, and encouraged the emigration from other lands of a sturdy population to fill up our waste places. A wise policy is not to be condemned because the foolish or the dishonest may pervert it, nor is the enterprise which marks the progress of a nation to be discouraged because a railroad is occasionally built where there is no present business to sustain it.

TARIFF LEGISLATION.

Closely related to a proper solution of the financial problem, and in large degree forming a part of it, is the question of tariff legislation. It can not be doubted that the importing interest is not only extremely active in the advocacy of low duties, but that its hopes of accomplishing a reduction have of late been greatly encouraged. The partial disintegration of parties in the West is doubtless one of the causes of this encouragement, but it is certain that a principal cause is the general supineness in matters relating to legislation of the manufacturing interests of the country. Recent and trustworthy information leaves no doubt that the present session of Congress will not be suffered to adjourn without having urged upon it more than one scheme for encouraging the importation of foreign merchandise. It is incumbent upon all the productive industries of the country that they advise Congressmen fully and at once of the evils which would certainly follow a reduction of duties; but it is especially necessary that the manufacturers of iron and steel should do this, for no interest is more virulently opposed and persistently menaced than theirs.

It is probably not known to many manufacturers that there is now pending before the House of Representatives a bill emb

ing the most mischievous consequences, and which opens up the whole subject of duties on imports. It is a bill for the revision and codification of all the statutes of the United States, including those which relate to the revenues of the Government. This is a measure of the utmost importance, and the greatest care should be exercised in its consideration. Its purpose is to condense into one statute or code all the laws which have been enacted since the foundation of the Government, and are now in force. If the bill were a correct transcript of existing statutes, and if it were not liable to amendment while on its passage, there could perhaps be no reason to fear that injurious consequences would follow its enactment. But it is not a correct transcript, nor has it been suffered to receive the consideration of the House without having added to it many amendments which affect the letter of the original statutes. The errors in compilation are very numerous, and are of a character utterly destructive of all confidence in the bill. That portion which relates to revenue is filled with errors, and if it were possible that it could take the place of our present revenue laws, very great confusion and loss to individuals and the Government might certainly be apprehended. It is hoped that its passage in its present imperfect form is not possible. To guard, however, against any possibility of such a result, it is necessary that Congressmen be fully informed upon those technical clauses which relate to duties on imports. Other bills directly relating to revenue are either pending before Congress or in course of preparation, and at least one of these contemplates a serious reduction in the duties on iron and steel.

THE TEN PER CENT REDUCTION OF DUTIES.

In calling attention to apprehended changes in the present rates of duty which would be injurious to the manufacturing interests of the country, we desire also to call attention to an important change which has already been effected. The Act of June 6th, 1872, reducing duties ten per cent., was substantially a free-trade victory, although not intended as such by many who voted for it. Its effect has been to reduce the revenue of the Government about fifteen millions of dollars, while it has probably not reduced the cost to consumers of any imported goods, certainly not of iron and steel, as the high prices of the last two years abundantly attest. The money lost to the Government by this reduction of duties was gained by somebody, and if the consumers did not get it, the foreign manufacturers must have added it to their other profits. It need not be asked whether it is wise to continue a policy so wanting in beneficial results to our own countrymen, and so productive of princely profits to our commercial and manufacturing rivals. The plain duty of Congress is to repeal the law, and thus place the duties where they were prior to its passage. This action would serve the double purpose of increasing the revenues and protecting American workingmen against the grave danger of a continued reduction of wages.

Positive and incontrovertible testimony is not wanting that the industries of the country have been injured by the ten per cent. reduction. Upon some lines of home manufactured goods the profits for years have been so small that only a slight reduction of duty on foreign-made competing goods was necessary to give to the foreigner the virtual control of our market. To illustrate: Two and three years ago very few heavy woolen goods were imported at any American port; now the supply is mostly imported, and American mills oppose to it but slight competition. Philadelphia was once largely engaged in the manufacture of these goods; now who makes them?

It was a shrewd device of the common enemy to secure even a slight concession to his demands. American productive industries were prosperous at the time; the National Treasury was not in need of funds to meet current engagements; hence only a mild protest was made against the ten per cent. reduction. Now, when our manufacturers need the protection afforded by that ten per cent., and when the Treasury needs the revenue it has lost by the reduction, the short-sightedness of the act of twenty months ago is made painfully manifest. The enemy was consistent with himself; we were not

true to our own interests. His policy has ever been to chip off the tariff in detail, while ostensibly not disturbing it—here a little and there a little. We warn the friends of home industry in Congress and the members of this Association that the same line of policy will be pursued at Washington this winter with a vigilance that never sleeps.

BRITISH COMPETITION.

That British ironmasters expect a still further reduction of duties on their exportations to this country is evident from the tone of leading English journals. The Liverpool *Albion* not long ago declared that the development of the iron industry of the United States was produced "under the fostering and paternal care of a protective tariff, *which must sooner or later either be greatly amended or entirely abolished*, and then English iron will easily win its way with 'a fair field and no favor.'" The Middlesbrough *Iron and Coal Trades Review* of January 14th of the present year contains the declaration that "the time may come when English iron will be *no longer weighted with a heavy protective tariff* in the struggle against American manufacture, and then the issue may not be so doubtful as it seems at present." Another leading English iron journal, the London *Mining Journal*, of December 27th, 1873, is yet more hopeful, for it sees no cause for alarm in the present duties. It says: "It does not appear likely that the shipments of our railway material to our Transatlantic cousins will experience a further contraction. It is not improbable an appeal will be made to Congress to increase the duty now levied on English iron imported into the United States; and, as the Washington Treasury stands in need of additional revenue, it is quite on the cards that the American Legislature may endeavor to raise some of that extra income *at the expense of British industrials*." That many British ironmasters can well afford to pay our present duties rather than lose our market entirely is shown by the statements of extraordinary profits realized by them in 1873. The London *Colliery Guardian* of January 2d, 1874, referring to the British iron trade of 1873, which had been exceptionally prosperous, stated that "the pig-iron aristocracy of Scotland have been able, during the last two years, to net a profit of at least £2 per ton over their whole production, and the profits of some of the better situated firms have been much greater." In the same article it declared that "the average value of Cleveland pig for 1873 may be put down at 110s. per ton, or fully 25s. per ton more than the average of any preceding year. At this figure, pig-iron makers were, of course, able to make enormous profits. Those who worked their own ironstone and coal could manufacture the crude metal at less than 60s. a ton over the whole year, and as some firms in this category, such as Messrs. Bell Brothers, Bolckow, Vaughan & Co., and the Rosedale and Ferryhill Iron Company, each manufacture from 3000 to 5000 tons of pig per week, their profits must have varied from £6000 to £10,000 weekly."

From the foregoing citations it plainly appears that our British rivals mean to continue the struggle for the possession of our iron markets; that they expect a reduction of duties in their favor; and that, whether duties are reduced or not, they can well afford to reduce their profits and continue shipments. It is not at all probable that the cost of manufacturing iron and steel will be as high in Great Britain in 1874 as in 1873, yet in the latter year, which was our panic year, British ironmasters sent to this country 371,164 tons of iron and steel, valued at $25,000,000. This was exclusive of the manufactures of iron and steel we imported from Great Britain. Thus was well illustrated the policy of free-trade advocates. While many of our blast furnaces and rolling mills were standing idle, and thousands of our countrymen were unemployed and their families in need of bread, we took $25,000,000 worth of British iron and steel at prices which American manufacturers would have been glad to accept.

Such figures are most significant. Taken in connection with the declarations and admissions above quoted, the members of this Association, and we hope the members of Congress, will see at a glance that this is no

time to reduce duties on foreign iron and steel, but rather a most fitting time to increase them.

UNIFORM CONSTRUCTION OF REVENUE LAWS.

The importance of uniform construction and application at all the ports of the United States of the laws regulating customs duties received the attention of this Association at its last annual meeting. The subject is here referred to, that opportunity may be afforded to present the following table showing large diversions of steel exports to Boston, which may be regarded as *prima facie* evidence of the existence at that port of some advantage in valuation which does not exist elsewhere. The shipments of cast steel from Liverpool to leading ports of the United States have been as follows since the 1st of October last:

For the week ending—		To New York.	To Portland.	To Boston.	To Philadelphia.	To Baltimore.	To Charleston.	To New Orleans.	To Galveston.
October 4, 1873,	Tons.	6	0	105	0	2	0	0	0
" 11, "	"	0	0	49	0	0	0	0	11
" 18, "	"	81	0	53	0	0	63	0	0
" 25, "	"	0	0	129	0	0	0	40	0
November 1, 1873,	"	61	0	7	4	0	0	0	0
" 8, "	"	62	0	107	16	0	0	0	0
" 15, "	"	3	0	0	4	0	0	0	0
" 22, "	"	†	0	13	94	0	0	0	0
" 29, "	"	*	*	*	*	*	*	*	*
December 6, "	"	*	*	*	*	*	*	*	*
" 13, "	"	46	0	47	0	0	0	3	0
" 20, "	"	51	0	31	0	0	0	0	0
" 27, "	"	*	*	*	*	*	*	*	*
January 3, 1874,	"	16	0	30	0	0	0	0	0
" 10, "	"	*	*	*	*	*	*	*	*
" 17, "	"	1	1	30	0	0	0	0	0
Total.....		327	1	601	118	2	63	43	11

* No shipments reported. † 187 tons Bessemer steel shipped, but no cast steel.

We make no imputation upon the integrity or intelligence of the collector or appraisers of the port of Boston, but there must be some cause for this diversion, and a different mode of valuing steel imports from that which prevails at other ports must be this cause. Formerly New York imported fully three-fourths of all the steel sent to us from Liverpool, and Philadelphia and Baltimore took large quantities, but since the 1st of October Boston has received more than one-half of all the steel imported.

We are credibly informed that foreign steel of really best quality, which is sold as such in our various markets, is often imported as second quality at a valuation which involves payment of a less duty than the rate paid by best cast steel correctly invoiced.

To prove that we do not speak unadvisedly upon this subject, we quote the following statement from an article in the Boston *Commercial Bulletin* of January 31st: "Boston enjoys the advantage of appraisers who interpret the tariff on steel at a saving of ten per cent. in duty against that charged by either New York or Philadelphia custom officials. It seems, too, that Sheffield manufacturers sell steel to English and European buyers at 60 shillings per cwt., and *consign* similar goods to their American *agents* at 50 shillings. By this operation the tariff on steel, costing 10 cents per pound, and paying 3½ cents and 10 per cent., is dodged, and 2 cents per pound is saved in invoiced value, making the duty only 3 cents. This at least is a generous discrimination in favor of the American consumer."

THE EFFECTS OF THE PANIC UPON THE AMERICAN IRON TRADE.

Since the opening of the new year the efforts of this office have been largely directed toward the collection of accurate information showing the effects of the panic upon the home iron trade. At the beginning of the panic, in September last, no industry in the country was so injuriously affected as the manufacture of iron and steel. Later in the year other industries partly revived, but no signs of a revival in the iron trade were apparent until near the close of December, when large quantities of pig iron changed hands at very low figures, some of them certainly not representing the cost of manufacture. Many of these sales were entirely speculative. These transactions gave encouragement to the belief in some minds that the effects of the panic upon the trade had been spent, and that business in the future would continue steadily to improve. These anticipations have not been realized. January was a very dull month in every branch of the iron business, and February opens with no brighter promise. At the end of almost five months of panic, the general iron trade of the country is very little nearer to a condition of health and pros-

perity than at the beginning. The reasons for this unfavorable situation will appear at a glance.

The quantity of iron of all kinds—railroad, bar, and pig—which has annually been required by the railroads of the country during the past few years has been more than *one-half* of the total iron production and importation of the country. This quantity has been required for new track, for relaying old track, for locomotives, cars, car-wheels, bridges, etc. The panic almost stopped the construction of new railroads and repairs to existing roads, and it compelled railroad companies to be so economical of their resources that few orders for new locomotives, cars, and bridges have since been given out. Here is the principal cause of the continued dullness in the iron market, and until railroad companies re-enter the market for the supply of all kinds of railway material there can be no general improvement in any branch of the iron business. How soon they will do this does not now appear. Other but subordinate causes of the continued dullness of the iron trade may be found in the interruption caused by the panic to all business operations largely requiring iron, such as the construction of iron buildings, agricultural implements, sewing machines, stoves, ranges and heaters, mill-machinery, etc., and to the enforced economy of the people in dispensing with minor articles of iron manufacture which they could temporarily do without.

Having in general terms stated the effects of the panic upon the iron trade of the country, we now proceed to present detailed information showing the condition of the trade at the beginning of January. This information has been derived directly from correspondence with the manufacturers of pig iron and railroad iron, the two most important branches of the trade. The figures which we shall present concerning these branches will serve as a correct index to the situation of the merchant bar manufacture, the next most important branch.

Rail Mills.—Of 57 rail mills in the country, which are prepared to make rails of heavy sections, returns have been received during January from 50. Of the seven not heard from, one is certainly known to be idle, leaving only six from which no information has been received. Of these six, four are mills of small capacity. From the 50 reporting mills the following information has been received :

Whole number of rail mills	57
Number of mills making returns	50
Number of mills running December 31, 1873	17
Number running full time	10
Number running half time	7
Number standing	33
Number proposing to resume in January	10
Number uncertain about resuming	23
Number of hands wholly unemployed	11,490
Number of hands employed half time	10,150
Number of mills selling rails	13
Number of mills not selling rails	37
Net tons of rails on hand and unsold Dec. 31	36,744

Blast Furnaces.—At the close of 1873 there were 650 blast furnaces in the country which were either making pig iron or were prepared to make it. Returns have been received during the month of January from 385 of these furnaces, or about three-fifths of the whole number, showing the number of stacks in blast, the number out of blast, the number of tons of pig iron on hand and unsold on the 1st of January, and the number of hands then out of employment. These returns are tabulated below:

Bituminous Coal and Coke Furnaces.

States.	Stacks heard from.	Stacks in blast.	Stacks out of blast.	Stock on hand. Net tons.	Hands unemploy'd.
Penna. { Shenango Valley	21	13	8	38,143	291
Penna. { Miscellaneous	27	20	7	8,491	663
Maryland	3	1	2	2,366	50
West Virginia	2	2	0	3,675	79
Kentucky	2	1	1	3,114	
Ohio. { Hanging Rock	6	4	2	4,879	115
Ohio. { Mahoning Valley	15	6	9	15,729	741
Ohio. { Miscellaneous	11	7	4	9,953	363
Indiana	7	0	7	10,378	500
Illinois	5	1	4	11,710	200
Michigan	1	0	1	none	none
Missouri	5	1	4	8,976	285
Total	105	56	49	117,414	3,287

Anthracite Coal and Coke Furnaces.

Wisconsin	3	1	2	3,000	100
Michigan	1	1	0	5,000	65
Total	4	2	2	8,000	165

Bituminous Coal and Charcoal Furnaces.

Virginia	3	1	2	600	175

Anthracite Blast Furnaces.

States.	Stacks heard from.	Stacks in blast.	Stacks out of blast.	Stock on hand. Net tons.	Hands unemploy'd.
Massachusetts	1	1	0	298	45
New Jersey	11	5	6	12,332	60
New York	24	19	5	27,592	336
Penna. Lehigh	26	15	11	14,822	793
Penna. Schuylkill	19	12	7	7,275	435
Penna. Up. Susquehanna	16	9	7	7,220	293
Penna. Lower "	24	17	7	9,398	354
Maryland	4	4	0	3,703	320
Virginia	1	1	0	700	50
Total	126	83	43	83,340	2,686

Charcoal Furnaces.

Maine	1	1	0	400	none
Vermont	2	1	1	500	80
Massachusetts	1	0	1	238	none
Connecticut	7	6	1	3,632	78
New York	9	7	2	3,524	46
Pennsylvania	19	14	5	6,332	590
Maryland	8	7	1	4,732	303
West Virginia	3	3	0	580	100
Virginia	17	7	10	5,670	642
North Carolina	1	0	1	none	60
Georgia	3	3	0	773	50
Alabama	8	6	2	6,249	210
Kentucky	9	7	2	9,036	300
Tennessee	12	6	6	9,615	500
Ohio	16	15	1	17,236	1,679
Michigan	16	11	5	15,254	601
Wisconsin	10	6	4	3,805	370
Missouri	5	5	0	10,500	600
Total	147	105	42	99,076	6,209

Complete Table by States.

Maine	1	1	0	400	none
Vermont	2	1	1	500	80
Massachusetts	2	1	1	536	45
Connecticut	7	6	1	3,632	78
New York	33	26	7	31,116	382
New Jersey	11	5	6	12,332	60
Pennsylvania	152	100	52	91,681	3,419
Maryland	15	12	3	10,801	673
Virginia	21	9	12	6,970	867
West Virginia	5	5	0	4,255	179
North Carolina	1	0	1	none	60
Georgia	3	3	0	773	50
Alabama	8	6	2	6,249	210
Kentucky	11	8	3	12,150	300
Tennessee	12	6	6	9,615	500
Ohio	48	32	16	47,797	2,898
Indiana	7	0	7	10,378	500
Illinois	5	1	4	11,710	200
Michigan	18	12	6	21,254	666
Wisconsin	13	7	6	6,805	470
Missouri	10	6	4	19,476	885
Total	385	247	138	308,430	12,522

Recapitulation.

Charcoal	147	105	42	99,076	6,209
Anthracite	126	83	43	83,340	2,686
Bituminous coal and coke	105	56	49	117,414	3,287
Coke and anthracite coal	4	2	2	8,000	165
Bituminous coal and charcoal	3	1	2	600	175
Total	385	247	138	308,430	12,522

From the foregoing tables it will be seen how severely the two leading branches of the iron trade were affected by the panic at the beginning of the new year. Over 30,000 hands were wholly unemployed, and over 10,000 were employed only a part of their time. From a trustworthy source we also learn that there were in New York at the beginning of the year over 40,000 tons of foreign rails unsold. Statistics in our possession also show that the wages of all iron workers had been largely reduced, and that such few mills as had been able to make sales of rails had been compelled to accept offers averaging twenty-five per cent. below the prices which had prevailed before the panic. These figures do not require comment at our hands, but they should receive the careful consideration of Congress and the country.

IRON ORE STATISTICS.

The quantity of iron ore shipped from the Lake Superior region during the year 1873, according to the *Marquette Mining Journal*, was 1,178,879 gross tons, against 952,055 gross tons in 1872. Increase, 226,824 tons. These figures only represent shipments, and do not include the ore consumed in the production of 63,195 gross tons of pig iron in the district in 1872, and 71,507 tons in 1873. It should not be inferred that the difference between the ore *product* of 1872 and 1873 is correctly expressed by the figures above given; for nearly all of the ore produced in 1872 was shipped to greedy buyers, so great was the demand for pig iron, but much of the ore actually mined in 1873 was not shipped, owing to the panic and other causes. Much of the ore shipped in 1873 is now on the wharves at Cleveland, unsold.

Four mines unitedly shipped over 500,000 gross tons of ore in 1873: Lake Superior, 166,666 tons; Cleveland, 132,082 tons; Jackson, 113,892 tons; and Republic, 105,452 tons. These were closely followed by the Champion mine, 72,782 tons, and the New York mine, 70,882 tons. Shipments were made from forty-two mines during the year. The estimated value at the ports of shipment of all the ore shipped was $8,141,000.

The price at Cleveland of first-class Lake Superior specular ore at the beginning of 1873 was about $12. After the panic the price fell to $10. The probability is that the price for 1874 will be about $9.

The statistics of the production of Missouri ore are withheld by the operators. The price of Iron Mountain ore delivered at St. Louis was $10 in 1873 prior to the panic. It is announced that the price of the same ore for 1874 has been fixed at $8, delivered at St. Louis.

MILES OF RAILROAD IN OPERATION, JANUARY 1, 1874.

From Mr. H. V. Poor, editor of Poor's Manual, we have received the following table showing the number of miles of railroad in operation January 1, 1874. From those States marked with a star official returns have been received.

STATE.	Miles	STATE.	Miles
Maine	915	Wyoming Territory	459
New Hampshire	877	Utah*	372
Vermont*	721	Dakota	234
Massachusetts*	1,755	Colorado*	603
Rhode Island*	159	Indian Country	279
Connecticut	897	Virginia	1,573
New York	5,165	North Carolina	1,265
New Jersey	1,418	South Carolina	1,378
Pennsylvania	5,550	Georgia	2,260
Delaware	264	Florida	466
Maryland and D. C.	1,046	Alabama*	1,722
West Virginia	578	Mississippi	990
Ohio*	4,258	Louisiana	539
Michigan*	3,350	Texas	1,578
Indiana	3,714	Kentucky	1,320
Illinois*	6,589	Tennessee	1,620
Wisconsin	2,203	Arkansas	700
Minnesota	1,950	California	1,290
Iowa	3,736	Oregon	251
Kansas*	2,100	Nevada	629
Nebraska	1,051	Washington Ter'y	105
Missouri*	2,858		
		Total	70,785
Total, 1872			66,826
Increase			3,959

The total number of miles of railroad constructed in 1872 was 6,427; in 1873 there were only 3,959 constructed. There will be fewer miles built in 1874 than in 1873, unless Congress comes to the aid of railroad enterprises of national importance, work upon which has been almost wholly suspended.

BRITISH IRON PRODUCTION.

The quantity of pig iron produced in Scotland in 1873 was 993,000 tons, which was 97,000 tons less than the production of 1872, which was 1,090,000 tons. The stock on hand at the close of the year was 120,000 tons, or 74,000 tons less than the stock on hand at the close of 1872. The average price of Scotch pig iron for 1873 was 117s. 3d., or about 15s. above the average for 1872. Notwithstanding the high prices obtained, the make was not only greatly restricted below the product of 1872, but the quantity exported to foreign countries, owing to the prevalence of these high prices, was only 398,850 tons, against 616,933 tons in 1872. The decreased production of Scotch pig iron during the past three years is due partly to labor complications, but mainly to the increased scarcity of the splint coal and blackband ironstone, which have given this iron its excellent reputation. The product has very greatly fallen off since 1870, when the maximum production of 1,206,000 tons was obtained.

The Cleveland district of England produces about one-third of all the pig iron of Great Britain. In 1873 the product of this district was 1,999,491 tons, showing only a slight increase upon the make of 1872, which was 1,968,072 tons. The average price of Cleveland pig iron in 1873 was about 110s. a ton, against an average of 100s. in 1872. The stock of Cleveland pig iron in makers' hands on the 31st of December last was 80,328 tons, an increase of 40,000 tons over the total stock on hand at the close of 1872.

During the latter part of the year 1873 there was a slight decline in the cost of fuel and labor in the iron districts of Great Britain, and this decline at the date of our latest advices promised to be permanent. The year 1874 will doubtless witness lower prices for iron in British markets than prevailed in 1873. This view is strengthened by the downward tendency of prices on the Continent.

The statistics of the British iron trade for the past seven years have been admirably summarized by Messrs. Wm. Fallows & Co., of Liverpool, and will be found below:

Year.	Production of pig iron in Great Britain.	Average price of Scotch pig iron.	Total stock, Dec. 31, in Scotland and North of England.	Total exports of Iron of all kinds.	
				Quant'y	Value.
	Tons.		Tons.	Tons.	£
1867.	4,761,023	52s. 6d.	644,345	1,958,025	15,050,391
1868.	4,970,206	52s. 9d.	720,927	2,041,852	15,036,398
1869.	5,445,757	53s. 3d.	735,607	2,675,331	19,519,201
1870.	5,963,515	54s. 4d.	782,345	2,825,575	24,038,090
1871.	6,627,179	59s. 0d.	558,331	3,169,219	26,124,134
1872.	6,741,929	101s. 10d.	235,628	3,382,762	35,996,167
1873.	6,850,000*	117s. 3d.	200,328	2,959,314	37,779,586

* Estimated.

The number and location of all the blast

furnaces of Great Britain are copied below from the Middlesbrough *Iron and Coal Trades Review*:

DISTRICTS.	BUILT.	IN BLAST.
Cleveland	104	98
Northeast of England	37	35
Northwest of England	84	64
South Staffordshire	166	109
North Staffordshire	42	31
Shropshire	29	21
Yorkshire—West Riding	49	33
Derbyshire	52	45
Northampton and Lincoln	28	17
Gloucester, Wilts, etc.	18	12
North Wales	15	8
South Wales and Monmouth	191	126
Scotland	154	122
Total	969	721

SHIPBUILDING ON THE CLYDE.

The following figures show the number and tonnage of vessels built on the Clyde during the past four years:

Year.	Vessels.	Tons.
1870	234	189,800
1871	231	196,200
1872	227	224,000
1873	194	261,500

It will be noticed that the number of vessels built in 1873 was much less than in any of the three preceding years, but that the tonnage exhibited a considerable increase. The number of vessels contracted for at the close of 1873 was, however, considerably smaller than that for either of the two preceding years. It embraced 140 vessels of 216,000 tons. Of the vessels launched in 1873 many were of very heavy tonnage—vessels of 3,000, 3,200, 3,500, 4,000 and 4,250 tons being common, while vessels measuring 4,700, 4,800 and 4,820 tons were also built. A vessel of 5,000 tons for the Inman line is now in hand. There was an increase during 1873 in the number of iron sailing vessels launched.

THE BRITISH COAL TRADE OF 1873.

The circular of Mr. C. E. Muller, dated January 14th, 1874, has the following information: "The drift of the coal trade during 1873 has just been a reflex of the iron trade. Best coal in January was 18s. per ton, advancing in spring to 21s. and 23s. per ton, subsiding again towards midsummer, and closing about 18s. in December. Unscreened coal for manufacturing purposes is about 16s. per ton. Coke in January last was 39s. per ton, advancing in March, April, and May, to as high as 45s. In June the fall commenced by a drop of 5s. per ton, continuing gradually till, at close of the year, the price was 30s. to 32s. 6d. at the furnaces."

BRITISH IRON EXPORTS.

The subjoined table exhibits the course of the British iron trade during the three memorable years just passed—1871, 1872, and 1873: compiled from the British Board of Trade Returns: tons of 2240 pounds.

PRINCIPAL ARTICLES. To all countries.	QUANTITIES. 1871.	1872.	1873.
	Tons.	Tons.	Tons.
Pig iron	1,057,458	1,331,143	1,139,664
Bar, angle, bolt and rod	349,084	313,600	288,422
Railroad of all sorts	981,197	945,420	786,800
Wire of iron and steel (except telegraph) galvanized or not	26,200	33,540	29,884
Hoops, sheets, boiler and armor plates	200,337	207,495	201,437
Cast or wrought, and all other manufactures (except ordnance) unenumerated	243,298	269,607	282,165
Iron, old, for remanufacture	139,812	107,521	60,478
Steel, unwrought	39,189	44,969	39,488
Manufactures of steel, or steel and iron combined	13,038	11,384	10,508
Total of iron and steel	3,169,219	3,382,762	2,959,314
Steam engines			
Other machinery and mill work			

PRINCIPAL ARTICLES To all countries.	VALUE. 1871.	1872.	1873.
	£	£	£
Pig iron	3,229,408	6,712,579	7,075,478
Bar, angle, bolt and rod	2,921,777	3,632,818	3,749,765
Railroad of all sorts	8,084,619	10,225,492	10,425,727
Wire of iron and steel (except telegraph) galvanized or not	446,159	672,914	702,
Hoops, sheets, boiler and armor plates	2,399,208	3,414,906	3,736,769
Cast or wrought, and all other manufactures (except ordnance) unenumerated	3,588,364	4,772,364	5,544,028
Iron, old, for remanufacture	672,696	656,262	400,131
Steel, unwrought	1,198,428	1,478,737	1,463,857
Manufactures of steel, or steel and iron combined	682,855	623,122	728,726
Total of iron and steel	26,124,134	35,996,167	37,779,586
Steam engines	2,064,004	2,594,996	2,952,879
Other machinery and mill work	3,902,037	5,606,116	7,041,290

It will be observed that the quantity of iron and steel exported from Great Britain in 1873 was less than in either of the years 1871 and 1872, while the value was almost forty-five per cent. greater than in 1871 and almost five per cent. greater than in 1872. Undoubtedly 1873 was a more prosperous year for the iron trade of Great Britain than 1872, notwithstanding the fact that fuel was higher in price

and labor was more imperious in its demands Nevertheless, the year which witnesses a decrease in the quantity of iron exported can not be regarded as an auspicious one for the British iron trade, for the customers once lost may never be regained. The following table presents a comparative statement of the shrinkage in quantities of certain articles exported in 1873 as compared with 1872:

Commodities.	Quantities.		
	1871.	1872.	1873.
Pig Iron.	Tons.	Tons.	Tons.
To United States	190,183	195,151	102,624
" Germany	203,284	310,597	261,642
" Holland	246,092	352,895	330,398
" France	71,265	90,234	89,156
" Other countries.	346,634	382,266	355,844
Total to all countries	1,057,458	1,331,143	1,139,664
Bar, angle, bolt and rod.			
To United States	64,301	64,583	23,006
" British N. America	45,146	46,536	31,339
Total to these countries	109,447	111,119	54,345
Railroad of all sorts.			
To United States	512,277	467,304	185,702
" Germany	50,287	50,105	41,984
" Austria	24,260	7,989	816
" British N. America	61,961	77,255	54,573
" Brazil, Peru and Chili	60,911	59,909	29,361
Total to these countries	709,696	662,562	312,436
Steel unwrought.			
To United States	21,133	23,821	19,262
" France	1,764	3,204	2,544
" Other Countries	16,292	17,944	17,682
Total to all countries.	39,189	44,969	39,488

The diminished exports of bar, angle, bolt and rod to the United States and British North America in 1873 are fairly balanced by the increased demand from Germany, Holland, Italy, British India, and other countries. The shrinkage in the shipments of railroad iron to the countries named above is partly compensated by the increased shipments to Russia, Sweden and Norway, Holland, Australia, and some other countries. The Russian demand for British railroad iron has been somewhat remarkable. In 1871 there were imported 78,367 tons; in 1872 there were imported 106,939 tons; in 1873 there were imported 162,275 tons, or more than double the quantity taken in 1871. But for the large Russian demand it will be seen that there would have been a positive collapse in British railroad iron in 1873.

Notwithstanding the fact that the year 1873 was a prosperous one for British ironmasters, they must have regarded with some alarm the statistics of the iron export trade for the last month of the year. Compared with the month of December of 1872, the exhibit is far from encouraging. The following table shows a decrease of exports in both quantity and value in almost every item mentioned:

Principal Articles.	Month of December.			
	Quantities.		Value.	
	1872.	1873.	1872.	1873.
	Tons.	Tons.	£	£
Pig iron	101,235	67,402	572,634	400,479
Bar, angle, bolt, etc.	19,385	19,269	243,316	257,003
Railroad	65,938	49,550	809,686	677,444
Wire (except teleg'ph	2,753	2,306	62,413	54,971
Hoops, sheets and plates	16,982	13,077	300,312	247,670
Cast or wrought	22,059	18,159	413,483	387,421
Old iron	9,049	1,791	53,776	12,132
Steel, unwrought	3,684	2,262	131,246	89,432
Manufactures of steel or steel and iron	763	728	47,566	52,001
Total of iron and steel	248,829	182,038	2,861,636	2,407,102
Steam engines	.....	.....	224,738	206,371
Other machinery and mill work	.....	.....	506,773	545,405

The exports of iron and steel from Great Britain to the United States during the years 1871, 1872, and 1873 are given in the following table:

Principal Articles. To United States.	Quantities.		
	1871.	1872.	1873.
	Tons.	Tons.	Tons.
Pig iron	190,183	195,151	102,624
Bar, angle, bolt and rod	64,301	64,583	23,006
Railroad of all sorts	512,277	467,304	185,702
Hoops, sheets and plates	41,520	31,407	18,291
Cast or wrought	10,671	13,468	22,279
Steel, unwrought	21,133	23,821	19,262
Total	840,085	795,734	371,164
Principal Articles. To United States.	**Value.**		
	1871.	1872.	1873.
	£	£	£
Pig iron	594,086	1,017,123	693,794
Bar, angle, bolt and rod	534,205	745,681	308,238
Railroad of all sorts	3,976,857	4,812,866	2,428,061
Hoops, sheets and plates	409,686	427,603	303,916
Cast or wrought	180,005	308,551	439,897
Steel, unwrought	620,537	769,858	705,302
Total	6,315,376	8,081,682	4,879,208

Proceedings of the Union Conference.

In accordance with previous arrangement, committees representing various national iron and steel associations met in Parlor C, of the Continental Hotel, Philadelphia, at 9 o'clock, P. M., February 4th, for the purpose of forming a union of all the associations. Wm. Firmstone, Esq., was called to the chair, and Wm. E. S. Baker and James M. Swank were chosen secretaries. The following committees were present:

Representing the National Association of Iron Manufacturers—Messrs. James I. Bennett, Oliver Williams, J. C. Lewis, Wm. E. S. Baker, Nathan Rowland, George L. Reis, Charles L. Bailey, Clement B. Smythe.

Representing the American Pig Iron Manufacturers' Association—Messrs. Wm. Firmstone, J. H. Maxson, Charles J. Nourse, George Fuller, C. B. Herron, and Chester Griswold.

Representing the American Iron and Steel Association—Messrs. Daniel J. Morrell, Joseph Wharton, Samuel J. Reeves, Cyrus Elder, John Rogers, J. B. Moorhead, G. B. Stebbins, Percival Roberts, and W. E. C. Coxe.

The following proposition for consolidation was presented for consideration by the committee representing the American Iron and Steel Association:

Whereas, The business of collecting and publishing statistics of production, and information concerning new inventions and processes, in all branches of iron and steel manufacture, and of caring for the general interests of the whole trade and contributing and dependent industries, can best be performed by a single association, which shall be national in name and character: therefore

Resolved, That the several associations of iron and steel manufacturers be asked to commit to the American Iron and Steel Association the general duties above referred to, and that their members are cordially invited to become members of the American Iron and Steel Association, with the understanding that the reorganized body will be made generally representative of all iron and steel interests.

Mr. Bennett, on behalf of the committee of the National Iron Association, offered the following resolution, which, after discussion, was unanimously adopted by a yea and nay vote of all the gentlemen representing the two associations which had been requested to unite with the American Iron and Steel Association:

Resolved, That the National Association of Iron Manufacturers and the American Pig Iron Manufacturers' Association unite with the American Iron and Steel Association upon the terms proposed by its committee.

After the adoption of this resolution, Mr. Bennett submitted the following series of resolutions, which were separately adopted by a unanimous vote of all the committees participating in the conference:

Resolved, That the union of the National Association of Iron Manufacturers, the American Pig Iron Manufacturers' Association, and the American Iron and Steel Association be now formally declare to be complete under the name of the American Iron and Steel Association.

Resolved, That the Secretary of the National Association of Iron Manufacturers, and the Secretary of the American Pig Iron Manufacturers' Association be requested to give to the Secretary of the American Iron and Steel Association the names of members in good standing in their respective associations, to be entered as members of the American Iron and Steel Association.

Resolved, That the constitution of the American Iron and Steel Association be formally adopted as the constitution of the reorganized body.

Resolved, That the American Iron and Steel Association meet on Thursday, Feb. 5, at the Continental Hotel, for the transaction of business, and that all other iron and steel manufacturers in the city be invited to be present.

After the adoption of the resolutions, a committee representing the National Association of Nail Manufacturers entered the Parlor, and through their chairman, Mr. R. E. Blankenship, announced that their Association had this evening under consideration the propriety of uniting with the other national associations, and had concluded that it was not expedient to unite at present, but that the subject would receive their further consideration. The committee was composedas follows-

Messrs. R.E. Blankenship, James C. Lewis, H. P. Tobey, Andrew Wheeler, and Charles L. Bailey.

The draft of a proposed memorial to Congress was submitted by Mr. Morrell for the consideration of the conference, and after discussion was ordered to be [reported to the Association at its meeting on the following day. On motion, the conference adjourned.

Meeting at the Continental Hotel.

At eleven o'clock, on the morning of the 5th inst., the Association assembled at the Continental Hotel, the spacious Parlor C having been secured for this purpose. There were also present many members of other iron and steel organizations, who had been requested to meet with the Association in joint convention on this day. The venerable David Thomas, of Catasauqua, was called upon to preside over the temporary deliberations of the assembly, and James M. Swank was appointed Secretary.

In order to perfect the union formed on the preceding evening, Mr. Bennett moved the adoption of the following resolution:

Resolved, That a standing committee of five persons be selected by the persons present to represent each of the branches of the iron and steel industry embraced in this Association, whose duty it shall be to take charge of all matters relating to their respective interests, and who shall have power to call meetings of their respective branches whenever deemed necessary.

The resolution was adopted, and the following standing committees were at once designated by the members of the various branches:

Committee on Bar Iron—James C. Lewis, Pittsburgh, Pa.; O. Williams, Catasauqua, Pa.; R. McCarthy, Syracuse, N. Y.; Nathan Rowland, Philadelphia; George L. Reis, Newcastle, Pa.

Committee on Pig Iron—C. J. Nourse, Columbia, Pa.; G. Fuller, Boonton, N. J.; J. H. Maxson, St. Louis, Missouri; A. B. Cornell, Albany, N. Y.; H. N. Braem, Poughkeepsie, N. Y.

Committee on Plate Iron—James I. Bennett, Pittsburgh, Pa.; Dr. Charles Huston, Coatesville, Pa.; C. H. Ashburner, Baltimore, Md.; C. L. Bailey, Pottstown, Pa.; W. R. McIlvaine, Reading, Pa.

Committee on Railroad Iron—Daniel J. Morrell, Johnstown, Pa.; Captain E. B. Ward, Detroit, Mich.; S. A. Fuller, Cleveland, Ohio; Chester Griswold, Troy, N. Y.; W. E. C. Coxe, Reading, Pa.

Mr. Williams moved the adoption of the following resolution:

Resolved, That the organization of the American Iron and Steel Association be now thoroughly perfected by the election of the present officers of that organization to serve as officers of the new Association for the current year.

The resolution was unanimously agreed to, whereupon Mr. Reeves, President of the Association, took the chair which Mr. Thomas had vacated upon the adoption of this motion. After a few remarks by the President, expressing the pleasure he experienced at his being selected to preside over the united associations, and uttering the hope that hereafter these great branches of the iron industry of the United States might work in perfect unison, the Association proceeded to the consideration of matters of business.

On motion of Mr. Wharton, the members of the several committees representing the various interests embraced in the American Iron and Steel Association were added to the Executive Committee of the Association.

At the suggestion of Mr. Moorhead, a general invitation was extended to all persons present, interested in the manufacture of iron or steel, to participate in the discussions of the Association, and to vote upon all questions submitted for decision.

Hon. Henry C. Carey having entered the room, Mr. Stebbins offered the subjoined resolution in compliment to the distinguished visitor:

Resolved, That we gladly recognize in our meeting and welcome to our deliberations Henry C. Carey of Philadelphia, the wise, learned, and humane political economist, the early and steadfast friend of our iron and steel industry, as well as of every other industry of our country.

The resolution was adopted with hearty expressions of approval. Mr. Morrell called up the consideration of the memorial to Congress, which, after slight amendment, was unanimously adopted as follows:

To the Honorable the Senate and House of Representatives of the United States of America, in Congress assembled:

The undersigned, representatives of all the iron and steel industries of the United States, in convention assembled, beg leave to address briefly your honorable bodies upon questions of public interest now awaiting your consideration and action, in which, as managers of

a large amount of invested capital, and employers of many workmen, they feel a most profound concern. In common with other manufacturers, they were seriously embarrassed and obliged to partially or wholly suspend operations by the financial panic of last September, which overtook them at a time when they were making satisfactory progress, and were in apparent enjoyment of assured prosperity. It inflicted upon them great direct loss, and they must for a long time suffer from its injurious consequences. Though money is again becoming plentiful and business is reviving, the iron and steel industries are still seriously embarrassed, and in some branches which suffered most no improvement is yet manifested. Your memorialists, believing in the duty of self-help, have studied to introduce economies, and, as far as possible, to adjust their operations to the changed condition of affairs. They endure patiently the season of general calamity, asking no special sympathy or aid, but awaiting with confidence such measures of general relief as Congress, in its wisdom, may devise for the benefit of the country. They believe that you will be willing to be aided in this important labor by such advice as their observation and experience suggest, and therefore express their views touching certain projects of legislation without reserve.

A bill has been introduced into the House of Representatives to repeal the second section of the act of June 6, 1872, which made a reduction of ten per cent. in the duties on a large number of staple articles, and which tended to discourage home production, while affecting most injuriously the public revenue. Your memorialists strongly urge the passage of this repealing act, not merely as a protective measure, but for the benefit of the national Treasury. Though it may not be directly helpful to them, this action will be morally encouraging to manufacturers and workingmen, as showing that the Government prefers to make up the deficit in its revenues from the profits of foreign traders rather than by taxes upon its own citizens.

The propositions presented for your consideration to amend the tariff laws, by excluding the cost of packages and shipping charges from the invoice value of foreign goods, upon which duties are to be assessed, and allow appraisers to take the cost of goods at the place of shipment, as a basis of valuation, should not be regarded with favor, and your memorialists, representing that these proposed changes would disturb regulations which are well understood, and would prove injurious to the revenue, and to all domestic industries, most earnestly protest against their adoption.

Your memorialists adopt and reaffirm the resolution of the American Iron and Steel Association at its last annual meeting, that the power given to a single creditor under the present bankrupt law to force a debtor into bankruptcy, against the will and to the injury of all others having claims upon the estate, is unjust in principle and disastrous in practice, and the law should be so amended as to give to three-fourths of the creditors, in interest, the right to control the settlement of the affairs of an insolvent, and to prevent them from being subject to proceedings in bankruptcy.

Your memorialists feel much anxiety concerning the bill embodying the revised and codified laws of the United States now pending in the House of Representatives. They have learned that it is not an exact transcript of existing statutes, and they fear that the slightest changes in the schedules of customs duties may be most injurious to business interests and the public revenue. They respectfully suggest that the tariff laws should be omitted from the revised code, until reformed by the passage of the repealing act, hereinbefore prayed for, by the conversion of ad valorem into specific duties, and the enlargement of the free list in so far as it can be effected without detriment to the industries of the country. If this delay can not be granted, they would ask that so much of the revised code as relates to duties and taxes may be examined by competent experts, and published for the information of the country before it is finally adopted.

Your memorialists, sympathizing with the general wish that the Government may be brought into more intimate relations with

the people, which has suggested the erection of executive bureaus of labor, transportation, etc., and of a department of commerce, would recommend the creation of a department of industry, having for its head a Cabinet officer to be entitled the Secretary of Industry, which department shall contain bureaus of agriculture, manufactures and commerce. These three natural grand divisions of human labor should have equal regard bestowed upon them, and their harmonious organization as above suggested seems as necessary as it is symmetrical. Under it, every business question which becomes a subject of national concern may have appropriate reference, Congressional committees will be relieved of some part of their most onerous labors, and there will be less danger of partial or negligent legislation.

Your memorialists substantially concur in the opinion that legislation is needed not only for the present relief of the country and the Treasury, but also to guard as far as possible against financial troubles in future. Panics and periods of general prostration of business have occured from time to time in all commercial countries. Different financial systems seem alike liable to them, and they are quite as frequent and disastrous when coin is the standard of payment as when a mixed currency or paper alone is employed. Your memorialists believe that the history of the country, since the close of the late civil war, shows that its financial system, built up under the stress of circumstances which strained to the utmost the credit and resources of the nation, is well adapted to the needs of the Government and the people, and instead of discarding any of its elements they would preserve, reform and perfect it. To this end they would recommend the following measures, First, Limitation of the issue of legal-tender notes to $400,000,000. Second, Repeal of the limitation upon the currency, and freedom of bank circulation under the national banking laws, subject to such regulations as will tend to afford at all times and to all parts of the country an adequate supply of currency for the needs of legitimate business, and to prevent such periodical and local gluts as lead to injurious speculation. Third, Consolidation of the national debt in a loan bearing a low rate of interest, which shall be the sole basis of banking, and may be redeemed and retired only by purchase in open market by the Government.

Commending these matters to your consideration, your memorialists would further represent that the great development of their industries, which are now almost or quite adequate in productive power to the wants of the country, is directly attributable to the tariff policy of the Government, under which well rewarded labor has grown in intelligence, skill and efficiency, and improvements have been made in machinery and processes which are of inestimable value. Believing that you feel a just pride in this healthful progress, and would grieve to see it sustain even a temporary check, we trust that you will firmly adhere to that general policy of protection to home industry which has made the nation powerful and its people prosperous.

On motion of Mr. Moorhead, it was ordered that the memorial should be printed and that the officers and members of the Association should sign it.

The suggestion by Mr. Williams, that the chairmen of the standing committees representing the different branches of the Association should sign the memorial, was adopted, and on motion of Mr. Wharton, representatives of the other branches of the iron and steel trades were requested to join in signing it. [It has been found to be impossible to comply with these requests. The memorial could not be engrossed until after most of the gentlemen had left the city.]

The following resolution was presented by Mr. Stebbins:

Whereas, It is of the highest importance that the qualities of iron ores be well known in order that the quality and cost of iron made therefrom can be correctly determined; and

Whereas, The want of any accurate system in this matter, and the large demand for ores in the past few years, have led to a want of care in assorting and to a lowering of the standard of purity detrimental to all interested; therefore,

Resolved, That we urge a more careful assorting of kinds, and a more critical classification of qualities and percentage of iron in the ores, as of great importance to producer and consumer.

The resolution was adopted on motion of Mr. Durfee.

Mr. Williams offered a resolution deprecating the formation of trades unions, and expressing the hope that the time might never come when it would seem to be necessary to form a federation of employers to protect their interests, as has recently been done in Great Britain. After a prolonged and very animated discussion, the resolution was withdrawn.

Mr. Durfee presented the following resolution, moving its adoption:

Whereas, The cost of the iron in railroads and rolling stock is about one-third of the total cost of such roads; and

Whereas, The demand for iron for railroad-building is by far the largest upon which ironmasters depend for their business; and

Whereas, The mutual interdependence of the railroads and iron-makers, both as to construction on the one hand and employment on the other, is such that there can be no cessation of the one without a cessation of the other; therefore

Resolved, That a committee of this Association be appointed to consider whether the iron-makers of the country as a whole can do anything to develop new railroads and to effect a cheapening of the cost of such construction.

The resolution was referred to the Executive Committee.

Mr. Wharton moved the adoption of the following resolution, which was done:

Resolved, That each person present be requested to give his name and address to the Secretary, before leaving, in order that such names may be placed on record.

On motion of Mr. Coxe, the Association passed the appended resolution:

Resolved, That this meeting cordially approves the proposed exhibition of iron ores and products at the Centennial Exhibition, and that we promise our individual co-operation to the American Iron and Steel Association in securing a just representation of the iron resources of the country.

Mr. Bennett moved the adoption of the annexed resolutions:

Resolved, That the general policy of employing a portion of the national revenue in the improvement of natural channels of trade and transportation, and of extending governmental aid to transcontinental lines of railroad, the construction of which involves greater risks and expense than private enterprise is willing to encounter, has been beneficial to the whole country; and we advise that such further aid be extended to unfinished national lines of road as will render productive the investments already made in them by the Government, and tend to improve the Western and Southern States through which they extend, to revive business and give employment to labor now idle, with other resulting benefits to the people at large.

Resolved, That the satisfactory progress of shipbuilding in the United States, and the especial activity in the construction of iron vessels for ocean commerce, are satisfactory evidence of the beneficial operation of the registry laws, which should not be changed so as to allow free trade in ships, to the serious detriment of this growing industry, without conferring upon the carrying trade any real or permanent advantage.

The resolutions were submited separately, and, a spirited discussion having developed the existence of a strong adverse sentiment, Mr. Durfee offered as a substitute for the first resolution the following:

Resolved, That this Association recognizes as important and necessary that the General Government should initiate and carry out a general system of internal improvements tending to reduce the costs of intercommunication between the various sections of the country, for passengers, raw material and products.

Continued opposition having been manifested, the substitute and the original resolution were both withdrawn. The second resolution of Mr. Bennett, referring to shipbuilding, was then passed.

The thanks of the Association were tendered the reporters present, on motion of Mr. Williams.

Mr. Thomas S. Blair made a few remarks, congratulating the members upon the very successful meeting that had been held, asserting that it was the largest assemblage of iron and steel manufacturers that had ever been seen in the United States, and expressing the hope that future conventions would be as harmonious in their deliberations as this had been.

An adjournment *sine die* was then effected at 2.30 p. m., the convention having been in session three and a half hours.

Partial List of Persons Present at the Meeting on Thursday.

PIG IRON MANUFACTURERS AND IRON ORE MINERS.

J. B. Moorhead & Jas. E. Thropp, Merion Furnaces
J. B. Moorhead & Co., Conshohocken, Pa.
S. H. Witherbee, Cedar Point Iron Co., Fletcherville
Blast Furnace Co., Port Henry, N. Y.
E. C. Pechin, Dunbar Iron Co., Dunbar, Pa.
Thomas Struthers, Struthers Iron Co., Struthers' Station, O.
E. & G. Brooke, Keystone Furnaces, Birdsboro, Pa.

Abm. S. Patterson, Montgomery Iron Co., Port Kennedy, Pa.
Chas. E. Coffin, Muirkirk Iron Co., Muirkirk, Md.
Mason W. Burt, Mingo Iron Works Co., Mingo Junction, O.
———— Neshannock Iron Co., Newcastle, Pa.
W. McConkey, Wrightsville Iron Co., Wrightsville, Pa.
Paris Haldeman, E. Haldeman & Co., Chickies Furnaces, Pa.
I. Lord, Richland Furnace Co., Chillicothe, O.
Wm. Firmstone, Glendon Iron Co., Easton, Pa.
H. G. Blackwell, Green Pond Iron Mining Co., 113 Broadway, New York.
G. L. Smith, Ulster Blast Furnaces, Elmira, N. Y.
C. S. Kauffman, Kauffman Furnace, Columbia, Pa.
D. O. & H. S. Hitner, Wm. Penn Furnaces, Conshohocken, Pa.
Z. P. Boyer, Schuylkill Iron Co., Ringgold Iron Co., Pottsville, Pa.
Jas. I. Bennett, Graff, Bennett & Co., Pittsburgh, Pa.
Orin C. Frost, Northern N. Y. Iron & Mining Co., Watertown, N. Y.
D. McCormick, Paxton Furnaces, Harrisburg, Pa.

BAR IRON, NAIL AND BLOOM MANUFACTURERS.

Hughes & Patterson, Delaware Rolling Mill, Philadelphia.
R. E. Blankenship, Old Dominion Iron and Nail Works, Richmond, Va.
Alex. Laughlin, Jr., American Iron Works, Pittsburgh, Pa.
W. O. Fayerweather, Passaic Rolling Mill Co., Paterson, N. J.
Geo. F. McCleane, Moorhead & Co., Soho Iron Mills, Pittsburgh, Pa.
Wm. W. Wood, Wood Brothers, Wood's Falls, N. Y.
Jacob Hornbrook, Wheeling Iron and Nail Co., Wheeling, W. Va.
W. W. Holloway, Aetna Iron and Nail Co., Bridgeport, Ohio.
Geo. L. Reis, Reis, Brown & Berger, Shenango Iron Works, Newcastle, Pa.
Jas. C. Lewis, Lewis, Bailey, Dalzell & Co., Vesuvius Iron Works, Pittsburgh, Pa.
James Morrison, Cohoes Rolling Mill, Troy, N. Y.
Manuel McShain, Rohrerstown Rolling Mill, Philadelphia.
Jay Hildreth, Rome Merchant Iron Mill, Rome, N. Y.
Wm. Arthur Coffin, Pembroke Iron Co., Franconia Iron and Steel Co., Boston, Mass.
John Ralston, Tamaqua Rolling Mill Co., Tamaqua, Pa.
N. Wilkinson, Riverside Iron Works, Dewey, Vance & Co., Wheeling, W. Va.
John Peck, Samsondale Iron Works, Haverstraw, N. Y.
———— Diamond State Iron Co., Wilmington, Del.
J. H. Sternbergh, Reading Rolling Mill, Reading, Pa.
Percival Roberts, Pencoyd Iron Works, Philadelphia.
W. S. Mead, Knoxville Iron Co., Knoxville, Tenn.
Wm. G. Neilson, Logan Iron and Steel Co., Lewistown, Pa.
John Rogers, J. & J. Rogers Iron Co., Blackbrook, N. Y.
Oliver Williams, Catasauqua Manufacturing Co., Catasauqua, Pa.
Wm. E. S. Baker, Duncannon Iron Co., Philadelphia.

RAIL MANUFACTURERS.

T. G. Nock, Rome Iron Co., Rome, N. Y.
John Fritz, Bethlehem Iron Co., Bethlehem, Pa.
Fred. J. Slade, N. J. Steel and Iron Co., Trenton, N. J.
Geo. E. B. Jackson, Portland Rolling Mill Co., Portland, Maine.
Wm. Lewis, Spuyten Duyvil Rolling Mill Co., Spuyten Duyvil, N. Y.
Morris McDonald, J. Bragdon & Co., New Albany Rolling Mill, New Albany, Ind.
A. J. Dull, Lochiel Rolling Mill Co., Harrisburg, Pa.
L. Worthington, Cincinnati Railway Iron Works, Globe Rolling Mill Co., Cincinnati, O.
W. E. C. Coxe, Philadelphia and Reading Rolling Mill, Reading, Pa.
Wm. Jones, Alliance Rolling Mill Co., Alliance, O.
S. A. Fuller, Cleveland Iron Co., Cleveland, O.
S. J. Reeves, Phœnix Iron Co., Phœnixville, Pa.
T. Guilford Smith, Union Iron Co., Buffalo, N. Y.
D. J. Morrell, Cambria Iron Co., Johnstown, Pa.
Cyrus Elder, " " "
G. B. Stebbins, Wyandotte Rolling Mill Co., Milwaukee Iron Co., North Chicago Rolling Mill Co., Detroit.
Chas. S. Hinchman, Pennsylvania Steel Co., Philadelphia.
Joseph Wharton, Bethlehem Iron Co., Philadelphia.
Chester Griswold, John A. Griswold & Co., Troy, N. Y.
Robert McCarthy, Delano Iron Co., Syracuse, N. Y.
Edwin Eldridge, Elmira Rolling Mill Co., Elmira, N. Y.

STEEL MANUFACTURERS.

Jacob Reese, Reese, Graff & Woods, Pittsburgh, Pa.
G. W. Barr, Miller, Barr & Parkin, Pittsburgh, Pa.
Jos. D. Weeks, Hussey, Wells & Co., Singer, Nimick & Co., Pittsburgh, Pa.
Thomas S. Blair, Shoenberger, Blair & Co., Pittsburgh, Pa.
Robert G. Bushnell, Park, Brother & Co., New York.

MISCELLANEOUS.

Emil Wenck, Schmeisser, Wenck & Co., Baltimore.
James C. Bayles, Editor "Iron Age," New York.
Z. S. Durfee, Pneumatic Steel Association, New York.
A. L. Holley, Brooklyn.
A. H. McFadden, 1201 Beach St., Philadelphia.
Henry C. Carey, Philadelphia.
James Henderson, New York.
David Thomas, Catasauqua, Pa.
J. B. Pearse, Philadelphia.
S. T. Bodine, Royers Ford Foundry, Royers Ford, Pa.

Other Meetings.

A meeting of the National Association of Nail Manufacturers was held at the Continental Hotel on the afternoon of the 4th and on the morning of the 5th, before the assembling of the general convention. Mr. Thomas S. Blair, President of the Association, occupied the chair, and Mr. James C. Holden acted as Secretary.

Mr. Holden stated that the aggregate production of nails throughout the country for 1873 was 40,000 tons less than that of 1872, and 312,000 tons less than that of 1871, and that the stock of nails on hand on the 1st of January, 1874, was 32,000 tons less than on the 1st of January, 1873, and 30,000 more than on the 1st of January, 1872. There was a very general interchange of views as to the prospects of the nail manufacture for the present year, and it was elicited that there is a very large and increasing demand for nails in the markets of the West, while an increased demand in the Eastern markets is looked for at an early date. The general outlook was regarded as decidedly encouraging.

One very important matter affecting the nail interests was discussed and satisfactorily settled. Hitherto there has been great variation between the Eastern and Western classifications as to the lengths of different sorts of nails. It was decided to have one identical classification throughout the country, and the Western was adopted as the national classification.

The Association adjourned to meet again in Philadelphia in July next. Among the prominent nail works represented at the meeting were the Fall River Nail Works, Tremont Nail Company, East Bridgewater Iron Company, Old Colony Iron Company, Wareham Nail Company, Robinson Iron Company, Weymouth Iron Company, Somerset Iron Company, Parker Mills, Providence Iron Company, J. & J. Rogers Iron Company, Boonton Iron Works, Oxford Iron Company, Duncannon Iron Company, Birdsboro' Nail Works, Pottstown Iron Company, Chesapeake Nail Works, Harrisburg Nail Works, Old Dominion Iron and Nail Works Company, Sable Iron Works, Juniata Iron Works, Vesuvius Iron Works, Clinton Iron and Nail Works, and New Castle Manufacturing Company.

On the afternoon of the 5th several manufacturers of railroad iron met at the same place, and determined to organize an association of the proprietors of rail mills east of Pittsburgh. Dr. Edwin Eldridge, of the Elmira Iron and Steel Rolling Mill Co., presided over the organization until permanent officers were elected. Mr. W. E. C. Coxe, of the Philadelphia and Reading Rolling Mill, was chosen President, and Mr. Frederick J. Slade, of the New Jersey Steel and Iron Co., Secretary.

The only business transacted was the passage of a resolution that the members of the Association should forward to the Secretary full lists of their labor prices, to be collected by him and furnished in tabular form, for their private information, to every member of the Association.

The Blair Iron and Steel Process.

Remarks of Mr. Thomas S Blair, of Pittsburgh, in explanation of his direct process for the manufacture of homogeneous iron and steel, delivered at the meeting on Wednesday, Feb. 4th.

Mr. Blair said: I beg leave to call the attention of members to the exhibits in the room and the ingot at the door, the latter being too heavy to bring up stairs.

The specimens marked "No. 1" are iron-sponge produced from the ores of Lake Superior and the Iron Mountain Mine of Missouri. By the process employed by the Blair Iron and Steel Co., the ores can be held under treatment for any length of time requisite to produce a nearly perfect elimination of the oxygen. It is this feature which gives this one of their products its value for

all purposes to which that form of iron can be applied, and especially for the open-hearth process, where any large ratio of iron-oxide would be inadmissible.

The specimens marked "No. 2" are blooms of about 6 inches diameter and 18 inches long. That marked "A" is produced by compressing the loose sponge in a cold state. The other marked "B" is formed by heating the "A" bloom to a red heat and again compressing it. This hot-pressing is not practiced by the Company in using blooms in their own open-hearth furnace, nor is it needed except to make them stand rough handling in transportation.

The specimen "No. 3" is the ingot obtained in the ordinary open-hearth process, merely substituting the sponge bloom for the wrought iron ordinarily used.

Estimates of the cost of production accompany the specimens. In these estimates the items peculiar to the process are given specifically, while the cost of material is left to be filled in by each member, to suit the condition of his own locality, so that he may compare the results of the direct process with those at present obtained.

Connected with this subject of cost I may state that we use an open-hearth furnace which works on the principle of "continuous regeneration," as it has been called, that is, the outgoing flames pass continuously in one direction and the ingoing air and gas also pass continuously in one direction, the waste heat being recovered by absorption through the walls of the channels which confine each current within its own bounds. We find, in practice, great satisfaction in the working of this furnace, the heat being an equable one, undisturbed by the reversing of the currents.

As to the character of the ingots produced, it is only necessary to say that they offer no peculiar feature. It is the experience of all connected with open-hearth practice, that good materials are necessary to give good results. The ore employed for making the sponge should be either free from phosphorus or the latter must exist as a combination with lime, only mixed mechanically with the iron-oxide. Sulphur must be eliminated before commencing the production. In speaking of the *absence* of sulphur and phosphorus, it is meant that they must not exceed the limits recognized in the Bessemer process. But if the ore is right, the iron-sponge will be a fitter material to melt in the cast iron than any other form of wrought iron, because it presents the iron as an elementary body, having no chemical affinity for the earthy constituents of the ore, and these latter pass off to the surface as soon as fusion takes place. The pig iron employed should be good enough for use in the Bessemer process, but need not be so high in carbon, and is all the better the less silicon it contains.

The ratio of carbon is of course under the same control as in all open-hearth practice, and the product may be either hard enough for high steel or soft enough to substitute for ordinary wrought iron.

The company claim that they realize, in actual working practice, the true "direct process," by first withdrawing the oxygen from the natural iron-oxide, and second, fusing the product with other iron containing carbon enough to facilitate this fusion.

As with other fusing products, the ingot can be made of a temper to suit all steel purposes, except tool-steel; or it can be cast as homogeneous metal, an article superior in quality to every other form of wrought iron.

Officers of the American Iron and Steel Association for 1874.

Office at 265 South Fourth Street, Philadelphia.

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PLATE IRON.—James I. Bennett, Pittsburgh, Pa.; Dr. Charles Huston, Coatesville, Pa.; Chas. H. Ashburner, Baltimore, Md.: Charles H. Bailey, Pottstown, Pa., and Wm. R. McIlvaine, Reading, Pa.

PIG IRON.—C. J. Nourse, Columbia, Pa.; J. H. Maxson, St. Louis, Mo.; A. B. Cornell, Albany, N. Y.; Henri N. Braem, Poughkeepsie, N. Y., and G. Fuller, Boonton, N. J.

RAILROAD IRON.—D. J. Morrell, Johnstown, Pa.; E. B. Ward, Detroit, Michigan; S. A. Fuller, Cleveland, Ohio; Chester Griswold, Troy, N. Y., and W. E. C. Coxe, Reading, Pa.

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