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(Illustrated articles are marked with an asterisk.)

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Scientific American Supplement

No. 1131.

For the Week Ending September 4, 1897.

Price 10 cents. For sale by all newsdealers.

THE AMERICAN IRON TRADE FOR 1896.

If a copy of the statistics of the American Iron Trade for 1896 were put into the hands of a student fresh from a course of lectures on political economy, his belief in one of the cardinal truths of this science would be liable to receive a rude shock in the first few pages of the pamphlet. If the "cost of production determines the selling price," how comes it, he will ask, that the first pages of the "statistics" are taken up very largely with an account of various influences which caused the violent fluctuations in price of the past year? The "wire nail pool" came to an end about December 1, 1896, and "prices dropped rapidly." Its fate is shared by the "billet pool," and a similar fall in prices is noted. In May the "beam pool went to pieces" and prices experienced a simultaneous fall. An examination by the author of the statistics into the causes of low prices and depression leads to the conclusion that, though some of them may be "occult and intangible," there are two that are plainly visible—the distrust of the country's future due to the silver movement, and the pressure upon prices and profits of a capacity of production which is greatly in excess of our powers of consumption. A similar cause to the last is the reckless construction of unnecessary railroads which have since become bankrupt; and the wrecking of other railroads, which were needed, by hostile State and national legislation is also noted.

It is satisfactory to note the great increase which has taken place during the last few years in both our exports and manufactures of iron and steel. This has been particularly marked in the calendar years 1895 and 1896, our exports for these years being respectively $35,071,563 and $48,670,218. In each of the last four years our exports have exceeded our imports, the aggregate exports amounting to $143,844,873 and the aggregate imports being $95,778,838. The decline in imports is due to decreased demand for foreign tin plates and to the low price of our iron and steel. Our increased exports are due to the same low prices, though this increase has brought no appreciable relief to our glutted markets.

Since the close of the civil war there have been four periods of particularly low prices for iron and steel, the first occurring after the panic of 1873. The rate given in the following table is per long ton, except for bar iron, which is quoted by the 100 pounds.

Articles.	1873-9.	1884-5.	1891-5.	1896-7.
No. 1 foundry pig iron, at Philadelphia..	$16.50	$17.50	$12.00	$11 75
Gray forge pig iron, lake ore, at Pittsburg.....	16.00	14.00	8.90	8.50
Bessemer pig iron, at Pittsburg.....	19.50	17.00	9 95	9.25
Old iron T rails, at Philadelphia	18.00	16.50	11.00	11.50
Best bar iron, at Pittsburg.....	1.60	1.50	1.10	1.05
Steel rails, at mills, in Pennsylvania	40.00	26 00	22.00	17 00

There is a decrease in the production of all kinds of material except open hearth steel. There was a decrease of 5 per cent in the amount of iron ore mined; the output of pig iron decreased 8·7 per cent; Bessemer steel ingots, 20·1 per cent; other steel than open hearth decreased 13·6 per cent; structural shapes, 4·3 per cent; Bessemer rails, 14 per cent; wire rods, 21·1 per cent; wire nails, 19·1 per cent; cut nails, 24·1 per cent; open hearth steel (the one exception) showing an increase of 14·2 per cent. The following table gives the totals of production for the years 1895 and 1896:

	Total production. 1895.	1896.
Pig iron.....	9,446,308	8,623,127
Bessemer steel ingots.....	4,909,128	3,919,906
Structural shapes.....	517,920	495,571
Open hearth steel.....	1,137,182	1,298,700
Crucible steel.....	67,666	60,689
Bessemer rails.....	1,299,628	1,116,958
Wire rods.....	791,130	623,986
Wire nails.....	5,841,403 kegs	4,719,860 kegs
Cut nails.....	2,129,894 "	1,615,870 "

Although there has been a decrease of nearly a million tons in the total production of pig iron, it is noteworthy that the growth of the industry in the Southern States continues, Alabama, Virginia and Tennessee coming fourth, fifth and sixth in the list. Pennsylvania, of course, stands first, its output being 4,024,166 tons or 46 per cent of the total production of pig iron in 1896; Ohio produced 14 per cent; Illinois and Alabama each produced over 10 per cent of the total, and Virginia over 4 per cent. All the other States fell below 3 per cent. The largest falling off is in Pennsylvania, where the decrease was over 675,000 tons.

There is a small increase in the production of Bessemer steel compared with the averages of recent years, which has been somewhat more than 3,500,000 tons. The falling off in the production of Bessemer steel rails will not surprise any one who is familiar with recent railroad history and present conditions in this country. The extraordinary activity in railroad construction between the years 1885 and 1892, when the total construction for one year alone reached a total of over 12,000 miles, will explain the enormous demand for steel rails. At the close of that period some of the ablest railroad men in the country gave warning that the country was being over-supplied and stated that most of the country contained more railroads than would meet its needs for the next quarter of a century. The disaster which speedily overtook a large proportion of the roads, and the present depressed condition of those that did not go into the hands of receivers, has verified their forecast of the situation, and explains the great falling off in the total production of Bessemer rails. The total mileage upon which rails were laid in 1895 was 1,922 miles and in 1896 it was even less, being only 1,850. These figures are the lowest since the year 1875. Pennsylvania leads the States in the production of rolled iron and steel, having made 56·8 per cent of the total production of rolled iron and steel in 1896, against 56·4 per cent in 1895; Ohio made 13·9 per cent in 1896, against 14·4 per cent in 1895; Illinois made 10·7 per cent in 1896, against 10·1 per cent in 1895; and Indiana made 3·5 per cent of the total product in 1896. No other State produced 3 per cent in that year. Texas and Iowa were the only States having rolling mills located within their borders which did not roll either iron or steel in 1896.

One of the most interesting tables in the statistics is that of the world's great pig iron producers. In 1869 the United States produced 1,711,287 tons, Great Britain 5,445,757 tons, and Germany and Luxemburg combined 1,409,429 tons. A dozen years later, in 1881, the United States produced 4,144,254 tons, Great Britain 8,144,449 tons, and Germany and Luxemburg 2,914,009 tons. In the following ten years the United States not only doubled its own output but surpassed the total for Great Britain, the respective totals being 9,202,703 and 7,904,214 tons, Germany and Luxemburg producing 4,658,450 tons. We lost the lead to Great Britain in 1894 but regained it the following year, when we reached our maximum figure of 9,446,308 tons. The figures for 1896 are: United States, 8,623,127 tons; Great Britain, 8,563,209 tons; and Germany and Luxemburg, 6,374,816 tons. Of late years the most striking fact has been the rapid advance of the industry in other countries than the United States and Great Britain. At present, out of a total world's production of about 16,500,000 tons of crude steel, the latter countries together produce more than 9,500,000 tons, while all other countries combined produce 7,000,000 tons. When we bear in mind that half a dozen years ago all other countries produced only 4,400,000 tons, it is evident that if the present rates of increase continue, the combined output of the United States and Great Britain will be less than that of the rest of the world combined.

THE BRITISH ASSOCIATION MEETING.

To all who are interested in the promotion of useful knowledge for the general benefit of the race, the annual meetings of the British Association for the Advancement of Science have come to be looked forward to as seasons of special advantage, rich alike in their unfolding to the popular eye of the progress made in many branches of science for the preceding year and the promises held out and guide marks placed for future advancement.

In our last week's issue we gave a summary of the principal papers discussed at the meeting of the American Association, working on similar lines, and held a week earlier. The British Association meeting was held at Toronto, Canada, its sessions continuing from August 18 to August 25. The fact that the meeting this year was held on this side of the Atlantic, and that it came so soon after the magnificent celebration of the Queen's Jubilee, contributed not a little, no doubt, to the splendid enthusiasm with which the visiting scientists were received by our Canadian neighbors, and which was heartily participated in as well by a large delegation of American representatives of scientific advancement. The occasion also brought vividly to mind the former meeting of the British Association at Montreal, in 1884, the first that had ever been held outside of the United Kingdom, and the ensuing series of visits then made by representative foreign scientists to various great industrial establishments and notable engineering works in the United States. It was then that, for the first time, the gigantic strides which this country was making in many lines came to be fully appreciated, and, in the iron and steel manufacture, especially, it was felt that we were not only dangerous competitors in a field where England had heretofore claimed undoubted primacy, but that we were working in a direction and with a skill likely to give us the lead. The facts then so plainly set forth have acted as a spur to foreign manufacturers ever since, and consumers everywhere have reaped the benefit in better goods at lower prices.

At the meeting this year among the eminent foreigners present were Lord Kelvin, Lord Rayleigh, Prof. Roberts-Austen, and Messrs. Preece and Lodge, the famous electricians; Lord Lister, the father of antiseptic surgery, and last year's president; Prof. William Ramsay, who was associated with Lord Rayleigh in the discovery of argon, and who alone is entitled to the glory of first finding helium in terrestrial minerals; Sir John Evans, the new president; Prof. John Milne, recently of the University of Tokio, where he investigated the phenomena of earthquakes extensively; Prof. William Cawthorne