counterweight, closes a cock and stops the supply of water altogether.

It will be seen that these instruments are not adapted for shifting about from place to place in order to observe different temperatures, but rather for following the variations of temperature at one and the same place. For many purposes this is of great importance. They have been used with great success in porcelain furnaces, both at the famous manufactories at Sèvres and at another porcelain works in Limoges. From both these establishments very favorable reports as to their working have been received.—Ex.

THE COMPARATIVE VALUE OF LABOUR.

The future commercial position of England depends upon her power to undersell other nations in neutral markets. The frontiers of each European country are so defended by protective tariffs, which exhibit a tendency to increase rather than diminish, that it is idle to suppose we shall ever be in a position to compete with the native manufacturers on better terms than we do now, and, indeed, he must be of a sanguine disposition who believes that we can maintain our present footing. As wealth and population accumulate, and means of communication improve, knowledge and skill tend to become equalised, and the advantages which have hitherto existed in a pre-eminent degree in Great Britain become more or less diffused in other countries. We may not be ready to admit that English enterprise, energy, and skill will ever, taken as a whole, be equalled in other lands, but they do not form the only elements in obtaining commercial supremacy. The price of material and the cost of labor are most important factors, and there is an uneasy feeling that the falling off in the value of our exports is due to the ill-advised action of the workmen in seeking to limit the hours of labor and to raise unduly the standard of wages. So long as the British workman is able, by his superior skill or strength, to turn out as much work for a given sum in wages and a given outlay for plant, as the foreigner, the capitalist can scarcely lay the blame of failing trade on his shoulders. But the great question is, can he do this ? An answer to this question has been essayed by Mr. J. S. Jeans, the able secretary of the Iron and Steel Institute, in a paper read before the Statistical Society on December 16th; and he finds that in most occupations the native workman can produce a greater output than any of the rivals. But all through his paper Mr. Jeans never ceases to insist upon the paucity of the materials at his command in making the comparison, and the numberless causes which conspire to falsify the conclusions to which the figures apparently point. Beginning with the cotton trade, which, he says, employs a larger number of hands than any other industry except agriculture, he divides the number of spindles in each country by the number of people employed and gets the following result :

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India	•••••	••••••	•••••
Averag	7A		

But this, as he points out, makes no distinction between the employed and unemployed spindles, and what is of more importance, it classes all spindles as alike. But coarse spinning requires far more "minding" than fine spinning, and at the same time demands leve skill. Now in India there is nothing but coarse spinning, and in the United States and the Continent the average "counts" are decidedly below our own, so that it is certain that the 54 per cent. superiority the Table gives to Great Britain over the average, would be considerably reduced if the inquiry could be carried further In 1851 the number of spindles per operative in this country was 63, in 1861 it was 67, in 1871 it was 77, and in 1875 it was 79. How much of the increase is due to improved machinery and how much to greater skill it would be difficult to tell, but it is certain that it must be divided between the two. The number of spindles in each mule has steadily increased, and at the same time the keen competition of later years has enforced a sharper discipline in the mills and the exhibition of greater assiduity and attention.

In the wool and worsted industries we do not head the list, which stands thus :

TABLE I.					
Country.	No. of Operatives.	No. of Spindles.	No. of Spindles to each Workman.	No. of Looms.	No, of Looms to each Workman.
United Kingdom France United States	$\begin{array}{r} 265,269 \\ 110,904 \\ 86,504 \end{array}$	6,408,695 3,037,837 1,756,746	24 28 30	$\substack{143,337\\78,676\\55,625}$	0.5 0.7 0.4

Let us now follow the author into his statistics of the iron and coal trades. There again we are met with difficulties from the mining operations being carried on under vastly different conditions in various parts of the world, in thick veins, thin veins, shafts, galleries, drifts, and open cuttings. These are not equally averaged in all countries, and it would require a knowledge of all the local circumstances before the figures of the following Tables could be turned to much practical account.

TABLE II.—Total Number of Miners Employed in the Iron-stone Mines of different Countries, with the total Production of Iron Ore, and the Average Annual Output per Miner in each country.

	Year.	Number of Miners in Iron Mines.	Total Production of Iron Ore.	Average Annual Output per Miner.
England Scotland Ireland	1881 1881 1881	26,110 10,473 504	tons. 14,591,000 2,595,000 260,000	tons. 559 248 516
United Kingdom	1881	37,087	17,446,000	470
Germany United States France. Austria. Luxembourg. Spain	1882 1980 1881 1880 1881 1882	38,783 31,412 8,623 4,414 3,423 14,795	$\begin{array}{r} 8,263,000\\ 7,162,000\\ 3,032,000\\ 628,000\\ 2,161,000\\ 3,565,000 \end{array}$	213 228 352 142 631 240

TABLE III.—Total Number of Persons Employed in the Production of Coal in Different Countries, with Aggregate Quantities Produced, and Average Annual Output per Person Employed.

Country.	Number of Persons Employ- ed in and about Coal Mines.	Aggregate Output of Coal.	Average Annual Output per Person Employed
England and Wales. Scotland Ireland	381,763 53,741 844	tons. 133,233,000 20,823,000 127,585	tons. 349 387 151
United Kingdom	436,352	154,184,000	353
United States: Bituminous Anthracite Germany* Austria:	100,116 7(),748 186,335 35,990	37,400,000 25,550,000 48,688,000 5,378,604	374 361 261 149
Brown coal {	27,165	7,905,000	291
France elgium (Liége)	106,410 23,456 3,763	19,765,983 3,823,000	186 163
Nova Scotia	3,455	1,124,000	325
New South Wales	4,857	1,485,000	306

This part of the subject concludes with an extract from a paper contributed by Mr. Charles O. Bridge to the Institution of Civil Enginners, giving the amount of work done in a given time, and the cost per unit of work done, by natives of different countries at heavy manual employments, such as that required on earthwork, bricklaying, masonry, and painting. In each case the Englishman beats other Europeans, as regards the amount, in the proportion of 100 to 80 or 90, but as regards the cost, the foreign labour is the cheaper in about the same proportions.

Having settled, as far as the material at command permits, the relative capacities of various races of labourers, Mr. Jeans turns to their average earnings. He shows that for fifteen of

•In Germany, and to a large extent also in France, a considerable staff is employed about the mines in washing the coal, which does not apply, at any rate not to anything like the same extent, in other countries. Were these workmen left out of the account, the average output would, of course, be higher.