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Statistical Study of Wheat Cultivation and Trade, 1881-1910: Discussion

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It lies beyond the scope of the present paper to extend a discussion of possibilities, but it is hoped that the various data here presented may in some degree aid in that "intelligent anticipation of the future," which is the concern of statesmen even more than of the geographers to whom they must turn for their facts.

The writer desires to acknowledge his indebtedness to Mr. G. G. Chisholm, who kindly read the manuscript and made several valuable suggestions which are now incorporated in this paper.

Sir ATHELSTANE BAINES (after the paper): I am afraid that I have not gone sufficiently into the paper to discuss its wider bearings, but the excellent summary and lantern-slides have provided me with one point, at all events, upon which I can offer a few remarks—I mean the supply of wheat from India as a factor in the world's market. It strikes me that the trend of export from that country is more in an upward direction than the author anticipates. His table shows the great extension of wheat cultivation under irrigation, and there is this difference between the situation in India and that in the United States—that the amount required for local consumption in the former is not increasing in anything like the same proportion as it is in the latter. I have to speak diffidently about contemporary Indian details, seeing them darkly through the glass of twenty years' absence from that country; but in my time, when wheat-growing for export was comparatively in its infancy, there were not more than from 4 to 6 millions with whom wheat was the chief cereal food. The cultivators, shrewd enough where their own interests are concerned, grow their millet and other grain for subsistence as the autumn crop, and utilize the greater irrigation and transport facilities now accessible to them for a winter crop grown mainly for profit. I remember it was much the same years ago with cotton and seeds, when Berar found it could live on 45 per cent. of its cultivated area, and cover the rest with fibre, oil-seeds, and the like, destined for export abroad. It seems to me, therefore, that the supply of Indian wheat is likely to increase, both absolutely and in its relative importance, in our own market. It has already stepped in once most effectively, to keep down the price here when it was being violently sent up by abnormal circumstances in other producing regions, and, with greater care in fitting it for market, Indian wheat may have the same effect again.

The question of Canadian wheat is, of course, far more interesting and important, and on this I have no doubt others will speak with fuller knowledge than I possess. I can only add that I have found the paper most interesting and full of information which I hope to lay by for future use.

Mr. B. C. WALLIS: I would like to say, first of all, that I appreciate, from my own experience of the same sort of figures, the amount of work Dr. Unstead has had to do. There is one point in connection with the final table I should like to speak about. If you take Dr. Unstead's figures and percentage them, so that instead of the figures which he gives in absolute measurements you get them in relative measurements, and then if, instead of taking his final yield per acre in bushels, you divide the percentages of the yield by the percentages of the acreage, you get some very interesting facts. In the case of the United Kingdom, the numbers in the third column are 242, 242, 242; in the case of France, 147, 146, 147; Austria-Hungary, 143, 139, 135. I have not worked out the figures for all the countries; but in the case of Canada they are 140, 140, 140. Those are the chief countries where the number is above 100, and

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yet where there is little change in the three decades. In the case of Iberia and the United States the number does not change very much, and is about 100. The numbers for Russia, 69, 68, 74; Australia, 70, 63, 72, are low and do not change a great deal; but when you come to Germany, on which some stress has been laid, you get these remarkable results: 167 in the first decade, 208 in the second decade, and 216 in the third decade. This result suggested at once that it would be, perhaps, advisable to investigate Germany a little closer. It became obvious, when these numbers vary in the case of Germany and do not vary anywhere else, except in the Argentine which is negligible, that Germany was different from these other countries; so I looked up the figures for Germany, and I found, from a reference in the Statistical Abstract for Foreign Countries, that from the year 1899 onwards the people who made the estimates differed from the people who made the estimates in preceding years. The estimated total yield for Germany from 1899 to the present time is a very much higher number than anything in any preceding year. The area on which that yield was produced is lower, by a considerable amount in some cases, than during the preceding portion of the period under discussion. If you take nine-year averages instead of Dr. Unstead's, so as to get two nine periods under the old method and a third under the new method, instead of a jump of from 19 bushels per acre in the first decade to 25 and then 29, you get 19 in the first nine years, 22 in the second nine years instead of 25, and 29 in the third nine years. So if you take nine-year periods instead of decades, the evidence accumulates to such an extent as to point out that the progress to which our attention has been drawn is not a real progress. How much is real is a very debatable point, and one would have to investigate the details of the collection of statistics in Germany very closely; but it seems quite clear from the year 1899 to 1910 the statistics have been collected in so different a way as to invalidate a comparison between 1901 to 1910 and the preceding decades. I hope that this point may be investigated by some one who knows more about it than I do, and I suggest that this is a very serious difficulty in connection with the German figures.

With regard to the New Zealand figures, to which Dr. Unstead has not referred in detail, some years ago I had to look at these, and I have come to the conclusion that New Zealand was a country on the margin of cultivation. The figures fluctuate very remarkably, and when you put these fluctuations by the side of a series of figures relating to production elsewhere, you find that a world shortage caused in New Zealand a tremendous outburst of wheat cultivation in the next year; that was followed by a failure to sell the produce, much of which, therefore, rotted on the ground; then there was an immediate decline in acreage, so that New Zealand exhibits a continuous succession of ups and downs, and that succession is reflected by the fact that it makes the consumption in New Zealand something like 9 bushels per head. That is very fictitious, because so much of the wheat has not been used for food at all.

In the case of our own country the margin of cultivation has been mentioned. I have by me some statistics relative to the county of Nottingham. The Board of Agriculture have been good enough to let me have values for small areas within the county of Nottingham. These areas are based upon the geological formation. The best wheat-producing part of the county is the Keuper; the other formations do not yield such good returns of wheat. During the period 1870 to 1901, wheat cultivation declined for the whole county of Nottingham in much the same ratio as wheat cultivation throughout England declined; but in the smaller areas the poor wheat-growing formations show a greater decline than the average for the county, while the Keuper shows a much

smaller decline than the average. Consequently, in reference to the county as a whole, the withdrawal of land which is on the margin of cultivation does not affect the relative statistics; but this withdrawal becomes obvious in regard to the smaller areas, which are about 12 square miles in area.*

Mr. N. F. MACKENZIE: Two points I wished to bring forward with regard to India. The first, as to the possibility of increased export, has already been dealt with, and I agree with the previous speaker. The second point was about the figures themselves. The total area under wheat is practically constant for the whole of the thirty years—about 26 million acres. In these thirty years there has been a great increase in irrigation. In 1881 the total area irrigated from Government works was 11 million acres; in 1891, 14 million; in 1901, 19 million; and in 1911, 22½ million acres. Now, most of that extension of irrigation has been in Upper India and particularly in the Punjab. If the total irrigation from Government works has doubled, and if most of the increase has taken place inside the wheat area, I think it reasonable to suppose that the irrigation of wheat has more than doubled during the thirty years. One would expect to find a reflection of that increase of irrigation in the out-turn per acre, but it does not appear, and the figures require explanation. I believe the explanation is that there is very little unirrigated wheat in India. That does not agree with statistics, but it depends on what one means by unirrigated wheat, which I take to be wheat entirely dependent on rainfall. To take a concrete example from Sind, out of a total cultivated area of 4 million acres some half a million is returned as unirrigated, and much of that is wheat. The rainfall is only 5 inches or less in Sind, and you cannot grow wheat under those conditions, so where does it come from? The unirrigated wheat is grown on a double-cropped area. In the hot weather millets and cotton are grown. They are irrigated from the inundation canals. The land is saturated with water, and retains sufficient moisture for the cold weather wheat to be sown and come to maturity without any further irrigation. That wheat is returned as unirrigated, but it is entirely dependent on the heavy irrigation of the hot-weather crops. I think, therefore, the explanation of the rather remarkable figures Dr. Unstead has given in his statistics of India lies in the fact that there is very little unirrigated wheat grown.

Mr. J. WRIGLEY: It is rather difficult to speak on such important figures at a moment's notice, but I should like to point out the larger yield in Canada than the yield in the United States. I believe it is a fact that the further north you go up to a certain point, not only is the quantity larger, but the quality is better. That is an important question for Canada, because the southern part is now getting settled up, and no doubt the quantity and probably the amount per acre will increase. How far north wheat can be grown becomes important, as Canada goes up into the Arctic regions. If in high latitudes the quality and quantity be found to be good, that fact may prove of great value.

Dr. UNSTEAD: In regard to the probability of increased export from India, I am afraid I did not give sufficient emphasis to the sentence in the paper which referred to "the extension of irrigation which may bring new land into cultivation in the drier areas." I had added this as a qualification to the preceding

* Since the meeting at which Dr. Unstead's paper was read, I have been informed that the German authorities have themselves issued corrected values for wheat production and acreage, and have thereby admitted the fact that the original records for the period before 1898 are not comparable with those for the period since that year.—B. C. W.

sentence suggesting that the acreage under wheat might not be increased to any marked degree, and I am glad to have the opinions of Sir Athelstane Baines and Mr. Mackenzie that irrigation is, as a matter of fact, likely still further to increase the export from India to a considerable extent. Also the point made by Mr. Mackenzie is of considerable importance, when he suggests that wheat land returned as unirrigated is in reality irrigated by water supplied to a preceding crop. Sir Athelstane Baines and Mr. Wallis have both referred to an aspect of the export trade in wheat which is well worth more consideration than I could give in this paper, namely, the extent to which certain countries, although not on the average exporting great amounts, yet occasionally supply a very appreciable quantity when production elsewhere has fallen below the normal. In certain years both India and New Zealand have sent amounts to the United Kingdom far in excess of the average quantities shown in the tables here presented. Mr. Wallis's explanation of the high figures of consumption per head in New Zealand is very welcome, and affords some confirmation of the suggestion made as to the similar figures for Canada. Also his study of the changes in the wheatlands in Nottingham is an interesting confirmation of the view here stated that the decline in acreage in Britain has been a potent factor in eliminating the poorer wheatlands, and therefore in raising the average of the yield per acre. In regard to the altogether extraordinary increase in the yield per acre in Germany as shown in the tables, Mr. Wallis suggests that it may be fictitious and due to the difference in the mode of compilation which occurred in 1899. The point is pertinent, and certainly demands further study. I have, therefore, to thank Mr. Wallis and the other speakers for their helpful suggestions.

Mr. YATES THOMPSON: It only remains for me to ask you to pass a vote of thanks to Dr. Unstead for his paper.

Addendum by Dr. UNSTEAD: In regard to the statistics relating to the German Empire, references have been kindly furnished by Mr. Wallis, and these have made it possible to revise Table VII. The estimates of production for the earlier years were certainly too low, and it appears probable that they should be increased by about 12 per cent. The following table gives the results:—

Period.	Area.		Produce.		Net imports.		Consumption.		
	Sown with wheat.	Per acre.	Total.	Reqd. as seed.	Wheat and flour.	Percentage of milled flour in net imports.	Total (as food).	Per head.	Percentage of supplies imported.
	Million acres.	Bushels.	Million bushels.	Million bushels.	Million bushels.		Million bushels.	Bushels.	
1881-90	4.7	22	104	12	18	0	110	2.3	16
1891-00	4.9	25	125	12	41	0	154	2.9	27
1901-10	4.6	29	133	11	70	0	192	3.1	36

The statements in the text have therefore to be slightly modified: the production seems to have increased 30 per cent., not 50 per cent.; the increase in yield is from 22, not 19, bushels to 29 bushels per acre; the percentage of supplies imported has increased from 16, not 18, to 36 per cent.; and the consumption per head has increased from 2.3, not 2.1, to 3.1 bushels per head. But in no case is the change great enough to affect the general truth of the statements, and the conclusions drawn from the statistics also seem to be unaffected.