

The World's Average Wheat Yields

(Written for the Journal of Commerce by ERNEST E. GODFREY,
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There are two directions in which the present production of wheat throughout the world may be materially increased: One is by expansion of the area under cultivation and the other is by an increase in the average yields per unit of surface cultivated. The extent to which new lands in the various countries of the world may in future be opened up to the cultivation of wheat must remain for the present largely conjectural. The same is true to a certain degree as regards the possibility of increased productivity; but here the experience of the past may serve as a rough sort of guide for the future. It is proposed therefore to call attention now to the second of these possible sources of increase, and by at least a cursory examination of what has been accomplished already point to the possibility of increased yields in the future. In making this examination we are dependent upon statistical records, and these for some countries have been taken for comparatively short periods. Only during the latter part of the last century did many of the principal countries enter systematically upon the collection of annual agricultural statistics.

Intensive Versus Extensive Cultivation.

The cultivation of wheat is generally conducted upon one or two alternative systems. One is the intensive system where thorough cultivation, heavy manuring and carefully devised rotations play their part in extracting the maximum yield per acre consistent with a sufficient return as profit. This system requires labor abundant and cheap. The other system is one of extensive cultivation wherein the profit accrues mainly from the large area cultivated with freedom from heavy expenditure for fertilisers on soils of high virginal fertility, with also exemption of heavy taxation and with ease of access to remunerative markets.

Normal Yield on Unmanured Land.

We may first ask the question, What is the normal wheat yield on land continuously cultivated without the addition of manures? That is to say, what is the yield on land which has lost its virginal fertility, and upon which no live stock can be kept for the supply of farmyard manure. An answer to this question has been furnished by the wonderful series of experiments at Rothamsted, experiments begun by the late scientific investigators, Lawes and Gilbert, in 1843, and continued annually without interruption until the present time. After allowing for the lapse of the land to a natural condition by the working out of the manures applied before the experiments began, it has been shown that for a series of 61 years ended 1912 the annual average yield per acre of wheat upon unmanured land was 12.6 bushels. The yield has varied with the season, but taking one year with another the average mentioned has been maintained, and it is believed that this average may be almost indefinitely prolonged under the conditions at Rothamsted; in other words that the fertility of the land is never likely to fall below a point which will not yield on the average 12½ bushels per acre. It is significant that this Rothamsted average was for many years about the same as was obtained over the large wheat area of the United States — the decennial average in that country being 12.3 bushels for the period 1876-1885 and 12.7 bushels from 1886-1895.

Average Yields of Wheat-Growing Countries.

In the following statement are shown the actual annual average yields per acre in 30 of the principal wheat-growing countries of the world, the averages being based upon the records of the decade 1905 to 1914 for countries of the northern hemisphere and 1905-06 to 1914-15 for countries of the southern hemisphere; they are translated from the International Year Book of Agricultural Statistics published by the Institute at Rome:

No.	Country	Bushels per acre
1.	Denmark	44.90
2.	Belgium	36.43
3.	Holland	35.53

4.	Great Britain and Ireland	32.41
5.	Switzerland	31.82
6.	Germany	30.63
7.	Sweden	30.63
8.	New Zealand	29.88
9.	Egypt	26.32
10.	Norway	24.53
11.	France	22.22
12.	Luxemburg	22.15
13.	Austria	19.92
14.	Japan	19.33
15.	Canada	19.03
16.	Hungary	18.44
17.	Chile	17.55
18.	Bulgaria	15.46
19.	United States	14.72
20.	Italy	14.42
21.	Serbia	13.53
22.	Spain	12.94
23.	India	11.44
24.	Australia	11.30
25.	Argentina	10.26
26.	Russia in Europe	9.81
27.	Algeria	9.52
28.	Russia in Asia	9.36
29.	Uruguay	8.33
30.	Tunis	4.46

Here, the first five leading countries are small in area with a highly developed agriculture and intensive farming. Little Denmark leads with a yield of nearly 45 bushels to the acre, Belgium and Holland come next with 36½ and 35½ bushels and Great Britain is fourth with near 32½ bushels. Canada is 15th with 19 bushels and the United States 19th with 14¾ bushels. The large wheat growing countries of India, Argentina and Russia, are relatively low down as regards yield per acre, their yields being respectively 11.44, 10¼, and between 9 and 10 bushels respectively.

Increase in Averages as Revealed by Statistical Records.

We may now examine the average wheat yields of a few of the principal wheat-growing countries for which continuous annual statistics are available for any length of time with the view of ascertaining what indications there may be of tendency towards increase. For the United Kingdom produce records have only been systematically collected during the past 30 years. Before that time there are only occasional estimates and casual records. Going back to the 14th century it is on record that the yield of wheat in England varied from 8 to 12 bushels per acre and in the 16th century a contemporary writer placed the wheat yield at from 16 to 20 bushels per acre. But since the records began to be annually collected for the United Kingdom in 1885 there has been a distinct improvement in the annual average is shown in the following averages for the three decades of the 30 years: 1885-1894, 29.32 bushels per acre; 1895-1904 30.61 bushels; 1905-1914 32.34 bushels. There has been, therefore, during the last 30 years an increase in the average wheat yield of the United Kingdom amounting to 3 bushels per acre. Equivalent to nearly 8 million bushels per annum for the total acreage of about 2¾ millions. For the neighboring country of France annual records almost absolutely unbroken exist for 100 years, during which time there has been a constant progressive increase in the average yield per acre as is apparent from the following statement:

Decennial Period.	Bushels per acre.
1815-1824	10.78
1825-1834	13.71
1835-1844	14.46
1845-1854	15.32
1855-1864	16.09
1865-1874	16.23
1875-1884	16.21
1885-1894	17.12
1895-1904	19.03
1905-1914	20.22

Thus, during the 100 years the wheat yield of France has practically doubled, having risen from about 10½ bushels to nearly 20½ bushels. Hungary is another large wheat-growing country where primitive methods and low yields have given place to more

rational and intensive cultivation with average yields per acre three times as great.

On this side of the Atlantic there are annual records in the United States going back to 1866, and the following are the decennial averages:

	Bushels per acre.
1866-1875	11.9
1876-1885	12.3
1886-1895	12.7
1896-1905	13.5
1906-1915	14.8

These records thus show a progressive increase amounting to nearly 3 bushels during the half century.

Canadian Wheat Records.

Annual statistical records in Canada have not been taken long enough to admit of similar comparisons for the whole of the Dominion. The records of the Northwest provinces are also affected by the constant breaking of new land, and it will be long before agriculture in the west becomes of so settled a character as to admit of satisfactory comparisons of average yields. An exception, however, must be made as regards Ontario, one of the largest and agriculturally most important provinces of the Dominion. Here, the annual agricultural statistics of the provincial government, which date from 1882 show, as in the case of the other countries cited, a progressive increase in the yield per acre. The annual average yield per acre of fall wheat which in the decade 1882 to 1891 was 20 bushels rose to about 23½ bushels in the last ten years, an increase of 3½ bushels. And the spring wheat crop showed a similar advance from 15½ bushels to close upon 18 bushels. The importance of such an increase, if applicable to the whole of Canada, is apparent when one reflects that with an average of 13 millions an increased average yield of 3 bushels per acre would mean an increased total yield of about 39 million bushels per annum representing at 80 cents per bushel a value of \$31,200,000. The high average yields obtained by the Dominion Experimental Farms show what is possible in this direction. At the Brandon Experimental Farm, for instance, over 41 bushels per acre of Red Fife and over 45 bushels per acre of Marquis wheat have been obtained as annual averages for a period of five years. Such records, although possibly not applicable to all Canada, point the way and set up a standard which Canadian farmers may hope to approach if not attain. Whilst there are vast possibilities of increasing the Canadian wheat crop by expansion of the wheat-growing area under cultivation it is important that the possibilities of increase in the average yield per acre should not be neglected. More careful cultivation, the adoption of judicious rotations, the use of superior seed and the maintenance of fertility by mixed farming will doubtless in due time lead to the raising of the general Canadian average yield per acre, as has been the case in other countries of the world.

TRADE INQUIRIES.

The following were among the inquiries relating to Canadian trade received at the Office of the High Commissioner for Canada, 19 Victoria street, London, S.W., during the week ending January 13th, 1916:

A London firm of mineral water manufacturers are in the market for glass bottles, and ask for names of Canadian makers.

A London firm of printers, account book makers, etc., are prepared to undertake the representation of a Canadian manufacturer of loose-leaf ledgers, card index and filing cabinets, wooden and metal, and other office specialties.

A Belfast firm ask for names of Canadian whisky manufacturers.

Inquiry is made by an English engineer for names of Canadian engineering firms open to appoint an agent in London.

A Montreal firm wish to secure the representation in Canada of United Kingdom manufacturers of electrical apparatus such as transformed, watt-hour meters, motors, A. C. and D. C. generators, steam turbines, etc.

A Montreal firm seek agencies for United Kingdom chemical manufacturers wishing to develop business in Canada.

A firm at London, Ontario, are in the market for leather leggings, etc., and ask for names of United Kingdom makers.

A Canadian firm wish to secure agencies for United Kingdom manufacturers of toys, glassware and china, buttons, dyes, feathers, fancy goods, jewellery, lace, silks, children's clothing (both cotton and wool), gloves and hosiery.

A commission merchant at Halifax, N.S., wishes to secure the agency of a United Kingdom manufacturer of disinfectants.