

practice is a better guide than theory. It was not by 400-gallon balls, or by cows brought across the Atlantic on iron pens, that the average per head has been nearly doubled over the myriads sold yearly at Ballinacorney fair or Fiddletown, and the numbers increased too. These English gardeners who occasionally travel (as, happily, a largely increasing number do) may take lessons in reasonable cattle breeding in either of the sister countries; for, in consequence of their climate retarding the growth of cattle, the Irish and Scotch farmers had their attention turned to increasing the value of the annual draught of steers long before their English brethren, and the use of Short-horn balls very early prevailed. But these balls had to be of the pattern which butchers love; and the amount of paper representation could stand for a thin hide, a rail-like frame, and a want of hardiness in appearance. For the bulls had to live on the native cattle feed; and the produce had to fight for a maintenance upon heath or mountain side against a winter wind, which blew unrelentingly, and against a summer plague of flies. If Short-horns cannot face the exigencies of the national climate without protection, they cannot really benefit the national stock of cattle; and I would venture to suggest an experiment which would test the superiority of different climates to distinction far better than any auction ring.

"It is admitted that two strains have got for themselves, by general consent, a far greater amount of support than all the others. Yet there are far more than two distinct strains of Improved Short-horn blood; as the Lull and Sinking showyards this year very decidedly established. Anyone who visited these, and took the trouble to examine the pedigree of the prize animals after he got home, found some of the most successful traced back to neither of the fashionable herds, and a few had little blood from either source. And these were scarcely, if at all, inferior to the others in any of the qualifications which go to make up a first-rate cowman in the shambles; and it can never be too frequently repeated that it is to this test, as a paper currency to the stock of bullion, that all pedigrees must eventually be brought. If it cannot be shown that the pedigree animal grows on either under natural treatment, or on sooner or natural food, all the newspaper paragraphs about Short-horn intelligence will fail to support the claims of superiority or the representative of the 'Herd-Book' in the eyes of cautious agriculturists."

"But I know that the registered cattle have been found to improve all the local varieties. The half-breds shown in the different exhibitions clearly establish the truth that every breed gains in size and in earliness of maturity by a cross with the Short-horn. But this cross must be got, not from the most variegated strains, but from animals which will endure the same usage which their produce will have to bear. I would venture to suggest that some gentleman of large means might cause to be reared either two or three scores of half-bred calves, having dozens or half dozens by a bull of one strain, and dozens or half dozens by bulls of the other, and then get similar numbers of the ordinary Irish or Scotch half-breds, begotten, as they generally are, by Short-horn bulls of mixed but good pedigree upon ordinary cows, and keep the whole together, crumpled, in some large park, open to agistment, and have all wintered alive in some strawyard, as ordinary farm stock are wintered, and then sell, half to the butcher of the second summer's grass, and half to the Christmas markets, ripe fat, when under three years old, and have weights and prices of each lot carefully reported. I am sure such an one would render a far greater service to the whole community than does all the rash talk and rather badinage at such 'international contests' as Mr. Campbell's sale has been termed. The public is not interested in such rivalry as this."

"To best of which our nerves are sent;  
To best, not best, for which we wait;  
More best, and cheaper, that we want."

### The Wheat Crop of 1873.

This is the third season in succession in which I have had to report a deficient wheat crop. The deficiency in the produce per acre of the harvest of 1873 is rendered the more serious since there is not only a somewhat diminished total area under the crop, but a very much larger proportion than usual was not sown until the spring. A wet autumn was followed by a very wet winter, and there was comparatively little opportunity for autumn sowing after October. The early summer, though cold, was not unfavorable, and some fine, dry, ripening weather in July brought on the harvest much more rapidly than

had been anticipated. The weather was also favorable during the early part of August, and in the southern counties a good deal of wheat was carried in splendid condition. But from about the middle of the month the weather became very unsettled, in many localities greatly interfering with harvest operations and damaging the crop. There is, therefore, a great difference in the quality and condition of the grain harvested in different localities this season; the earlier districts being specially favored, and the later having suffered much in this respect.

The following table shows the produce of wheat in 1873 from the same selected and differently manured plots, as usual, in the field at Rothamsted, which has now grown the crop for thirty years in succession. It gives also, for comparison, the produce for each of the preceding ten years, the average for eleven years—1853-73, and the average for twenty-two years—1852-73:—

BUSELS OF DRESSED CORN PER ACRE.							
Har- vest.	Without manure.	Largest manured Plot.	Artificial Manures.			Means of 11 years 7, 8, 9.	Means of 22 years 6, 7, 8, 9.
			Plot 7.	Plot 8.	Plot 9.		
1853	17½	44	53½	55½	55½	54½	37½
1854	17½	43	45½	42½	41	49	35½
1855	17½	37½	46½	47½	44	49½	31
1856	17½	34	39	32½	32½	31½	25½
1857	17½	37½	21½	30½	29½	27½	21½
1858	17½	41½	30½	45½	47½	44½	31½
1859	17½	33½	28½	31½	39	31½	23½
1860	17½	33½	40½	41½	45½	40½	31½
1861	17½	33½	21½	27½	34½	28½	25½
1862	17½	32½	23½	35½	40½	35½	26½
1863	17½	26½	22½	27½	30½	28½	22½
Av. 11 years.	13½	36	34	39	41½	38½	29½
Av. 22 years.	14½	35½	34½	37½	37	36½	28½

WEIGHT PER BUSHEL OF DRESSED CORN (LBS.)

Har- vest.	Without manure. Plot 6.	Largest manured Plot 2.	Artificial Manures.			Means of Plots 7, 8, 9.	Means of Plots 2, 3, 4, 5, 6, 7, 8, 9.
			Plot 7. Plot 8. Plot 9.				
			Plot 7.	Plot 8.	Plot 9.		
1853	62.7	63.1	62.5	62.5	62.1	62.3	61.7
1854	63.0	62.5	63.1	63.5	62.6	63.1	61.5
1855	62.6	61.5	61.6	61.4	61.1	61.4	61.2
1856	61.3	61.7	61.0	60.1	60.6	60.6	61.2
1857	61.1	61.4	61.0	61.7	60.9	61.5	60.4
1858	61.0	61.6	61.1	62.7	61.1	61.4	61.3
1859	61.1	60.9	61.4	61.2	61.1	61.2	60.8
1860	61.7	62.1	63.3	63.0	62.7	63.2	61.9
1861	61.8	62.0	63.6	67.7	63.6	67.6	67.5
1862	63.0	60.7	63.2	60.4	60.0	63.2	63.0
1863	67.0	67.1	68.1	66.9	67.1	67.0	67.4
Av. 11 years.	63.2	61.0	60.4	60.5	60.3	60.4	60.21
Av. 22 years.	57.6	60.0	60.2	60.0	58.4	58.0	58.8

\* Equal to 51 bushels, at 61 lbs. per bushel.

† Equal to 43 bushels, at 61 lbs. per bushel.

‡ Equal to 37 bushels, at 61 lbs. per bushel.

In my letter published in the *Times* of September 29, last year, I stated that the season of 1870-71 was, for artificial manures, much less favorable; but, for farmyard manures, considerably more favorable than the average; and that, consequently, the calculated average from my produce, which is considerably influenced by the results obtained by artificial manures, would probably give a figure too low for the average produce of the country at large in 1871; while, on the other hand, as the season of 1871-2 was, compared with the average, more unfavorable for farmyard than for artificial manures, the figure derived directly from the experimental results of 1872 would probably be too high for the average yield of the country in that year. A correction was accordingly made, and the imports of the year have shown that the estimate of the average crop of the country so arrived at must have been extremely near to the truth.

In the present season the unmanured produce is higher than in 1872, and considerable higher than in 1871. On the other hand, reducing the produce in each case to bushels of 61 lbs., that by farmyard manure is nearly 7 bushels per acre lower than in 1872, and nearly 13 bushels lower than in 1871; and the mean produce of the three artificially manured plots is more than 6 bushels below that of last year, but almost identical with that of 1871.

Taking the mean of the produce without manure, with farmyard manure, and of the three artificial manures taken as one, we have 22½ bushels of grain per acre,

of 57.4 lbs. per bushel, which, reckoned at 61 lbs. per bushel, represents only 21 bushels. This is from 4 to 5 bushels less than the average taken in the same way last year, and nearly 7 bushels less than the average of twenty-two years. In fact, the produce by farmyard manure and by the various artificial manures agree very closely with that under the same conditions in the very bad season of 1867.

In the following table is shown the produce of twenty-two varieties of wheat, grown side by side, in the same field. The previous cropping had been sainfoin in 1870 and 1871, and mangolds with dung in 1872. The whole of the land was treated in the same way; the different wheats were all sown at the same time, and all were top-dressed with nitrate of soda in the spring, at the rate of 1½ cwt. per acre. For comparison there is also given the produce of most of the same varieties in 1872 and 1871. It should be stated that a different field is taken for this experiment each year, but that each year the treatment is alike for all:—

DRESSED CORN PER ACRE (BUSHEL).				
Description of Wheat.				
	1871.	1872.	1873.	
1. White Corn (red)	—	—	40½	
2. Rivett's (red)	—	—	48½	
3. Chas. Wheat (red)	28½	40	85½	
4. Red Corn (white)	32½	37	53½	
5. Brown's (red)	37½	42½	50½	
6. Red Wonder	61½	42½	57½	
7. Darwell (old red Lemmas)	51½	41½	32½	
8. Bristol Red	19½	41½	39½	
9. Red Nursery	34½	40½	27½	
10. Red Lamphun	30½	40½	34½	
11. Woolly Ear (white)	31½	42½	57½	
12. Harrogate (white)	—	—	46½	
13. Golden Broom (old, Harrogate)	39½	40½	44½	
14. Victoria White, Harrogate	32½	40½	38½	
15. Harrogate White, Harrogate	26½	39½	35½	
16. Original Red, Harrogate	30	39½	50½	
17. White Chiddam	26½	38½	51½	
18. Red Potent	37	—	46½	
19. Garry's White	19½	42½	57½	
20. Golden Broom (new) (red)	43	49½	38½	
21. Hole's Prolific (red)	38½	42½	45½	
22. Club Wheat (red)	35	45½	47½	
Means	32½	42½	38½	

Of these two varieties of wheat, grown side by side, and all treated alike, the produce ranges 2, 3, or more bushels above, and of many 2, 3, or more bushels below the average of the whole; and there is a variation of about 20 bushels between the highest and lowest produce. The weight per bushel also varied from 53½ to 61½ lbs., the average of all being 57½ lbs. Such results obviously very much increase the difficulty of forming a correct estimate of the produce of the country at large.

Reduced to 61 lbs. per bushel, the average produce of the selected plots in the experimental wheat field in 1873 is about 21 per cent. below the average of twenty-two years. Much of this great deficiency is due to the fact that there was, in all, about double the average fall of rain during the four months of October, November, December, and January; the effect of which would be to wash beyond the reach of the roots a large amount of the nitrogenous manure which had been applied in the autumn. It is established that that most important and costly constituent of manure, nitrogen, especially when applied in the soluble form of ammonia, is largely converted into nitrates in the soil, and is, in that condition, washed away into the drains or the subsoil when there is an excess of rain. The loss of effect thus arising is strikingly illustrated by a comparison of the produce of the two plots, No. 7 and No. 9. Both received the same amount of nitrogen per acre, which was applied as ammonia salts in the autumn to plot 7, and as nitrate of soda in the spring to plot 9. The result was that while the autumn-sown ammonia salts yielded only 22 bushels, the spring-sown nitrates yielded nearly 33 bushels. Again, another plot, which received the same amount of ammonia salts as plot 7, but applied in the spring instead of the autumn, yielded nearly 33 bushels.

The loss of the nitrogen of manure by winter drainage would be the greatest where guano, ammonia salts, or other very soluble nitrogenous manure was sown in the autumn, less where farmyard manures was employed, and less still where wheat was grown after.

As the deficiency on the manured plots this year is greater than it otherwise would be, in consequence of the washing out by the winter rains of the nitrogen of manure chiefly applied in the autumn, and as the unmanured produce, which represents much of the poor and badly cultivated land of the country, shows a deficiency of only about 13 per cent. compared with the average of twenty-two years, I am disposed to conclude that the yield per acre of the United Kingdom will be about, but probably not more than, 20 per cent. below the average.

The agricultural returns, just published, show that the area under wheat in Great Britain was, in the season just past, only about 3 per cent. less than in