



### PROFESSOR JOHNSON ON MANURES.

At the meeting of the Royal Agricultural Society of England at Newcastle-upon-Tyne,

Professor Johnson said, that the relation of British agriculture to the present condition of the country involved two points—the one was, how they might produce a larger amount of corn; and the second was how that corn could be produced at a cheaper rate. The first of these ends might be attained either by bringing in a greater quantity of arable land, which the meeting was aware was now exceedingly difficult, or by causing the land now under cultivation to produce a larger amount of corn. The second end, of growing corn cheaper, might also be produced in two ways; either by lowering of rent, wages of laborers, or by obtaining an increased production without an equal increase of toil. Now, if he were asked how much of the soil of this island was capable of increased production without an equal increase of toil, he should say that he believed nine-tenths of the whole land in the country, could grow more corn than it did now and at a cheaper rate. To another question which might be put—how much more could be grown?—it was difficult to give a positive answer, but there were certain facts already known which threw some light upon it. For instance, he might take two parts of the island, resting upon the same geological formation, and of course having nearly the same soil—if one of these districts grew 30 or 40 bushels per acre, then he was entitled to say that, whatever the one district did the other might do. He had lately had occasion to visit the estate of a friend of his, now dead, the late Mr. Aitchison, of Dromore, near Edinburgh, who showed him his farm books, in which the produce of his several fields had been kept with great accuracy from the beginning of the present century, and he found that in 1820 150 Scotch acres produced 54 bushels of oats per acre. And in 1832 (twelve years afterwards) 120 Scotch acres produced 40 bushels of wheat per acre, while 120 more produced 85½ bushels of oats per acre. He examined the soil, &c. of the farm, and he found nothing in it that would cause any one to expect these extraordinary crops; the land was too dry, to be sure, but it rested upon the coal measures, with an exposure to the easterly winds from the Frith of Forth. Take another case. He had no doubt many present were familiar with great crops of

turnips and oats raised in Eastern Ross, and the eastern coast of Sutherland.—Now, the land in South Wales, which the farmers there described as eating up all the dung, and drinking all the water, was precisely of the same character, and it had the advantage of climate into the bargain; why should it not be equally fertile? Then let him compare fertile soils with infertile, and he would say the great question was to bring about such a state of things as would cause the infertile soils to produce as much as the fertile soils now did. He said there was no limit which they could safely assign to the progress of agricultural skill in improving their poor lands. (Hear, hear.) Then the next question that came was, how could this increased production be brought about economically? for, let him here say once for all, that improvements were nothing to him if they did not much more than repay the farmer his outlay upon them. One way of doing this was by mechanical means, such as draining. Another way was by chemical means, involving the application of manures.—He had already alluded to Mr. Aitchison's farm; and he might add that when he asked that gentleman how he produced such great results over such breadth of land, his answer was, that while he followed a good system of rotation, and in other respects adopted the best mode of farming, he believed the secret of his success was, that he manured his lands highly. Now, it might be asked, how did high manuring act? This was to be answered by inquiring first, what the plants required, and next, of what manure consisted? The learned professor then entered into a series of elementary experiments to show what earths, gases, &c., entered into the component parts of the plant, both organic and inorganic; and that the greater part of these were drawn by the roots of the plant from the soil. It was plain, therefore, that manure must contain those substances which the plant required, and which the land in its natural state did not possess. In other words manure was the food of the plant. He would now come to another question. How could a higher system of manuring be adopted and practised? They all knew that there was a great waste of manure, not only throughout the country, but even in a great many farm yards; and one way of securing a higher system of manuring would be to husband that which now ran to waste.—They ought also to endeavour to save the waste of large towns. There were

many difficulties attending that subject; because even supposing it were saved, it would not be easy, in the present state of farming, to find a market for it. Then there were substances in all their manure-factories which might be rendered very productive. The refuse of their gas works, of their alkali, soap, and glass works might all be turned to account; but because they could be got for very little, therefore farmers would not have them. Another was by an extended use of important manures. The use of bones and of guano had gone far to revolutionise agriculture; and the latter had now in some places superseded the former—so that in Berwick, where three years ago bones were sold to the value of £20,000 annually, this last year only £1000 worth had been sold. But, then instead of the £16,000 which formerly was spent in bones, this year there had been, in the same district, no less than £30,000 on guano, because the farmers had found out that they could apply guano where they could not apply bones, though he believed a process had been discovered which would again bring bones into importance, and enable the farmer to apply them where he could not apply guano. Another means of high manuring would be the use of manufactured manure. Suppose they had nothing but sea-sand to work upon; they would then require a perfect manure, that was a manure containing everything which the plant required for its sustenance; and he had drawn up tables (which were exhibited) showing the mean results of analyses, undertaken to see how much of each substance the plants really required. As it, however, rarely happened that farmers had nothing but sea-sand to work upon, their course must be to find out what their land really required, as of course they would not need to put in, in the shape of manure, that which the land already possessed. He did not know how the farmers of the south stood in this matter; but he had predicted that the farmers of Scotland would have attained such a thorough knowledge of their land, what it possessed, and what it wanted, that in the course of the next five years they would be able to make up recipes for themselves, send them to the druggists, and say to them, make up that manure for me that I may grow my wheat. But to bring them to that point, knowledge must be diffused among the agricultural body. Certainly the next generation of farmers must be better educated than the present or the past, else they