

Moved by Mr. Rand that the pedigree of Short Horn Bull, Duke of Brunswick, be accepted and placed on the new Register. The motion was not seconded.

Moved by Mr. Matheson, seconded by Mr. Ross:

"That the Secretary be directed to take immediate steps to obtain accurate information respecting the Short Horn Bull Duke of Brunswick, so that his pedigree may, if possible, be completed and verified, and should the results of enquiry prove satisfactory, the Secretary be authorized to record the bull in the New Register accordingly."

The motion was put to the meeting and passed.

The pedigree of the Short Horn Bull Young Weatherby was authorized to be registered in the New Register, with a star.

Mr. Ross and the Secretary were requested to continue the examination of applications for registration, and to refer all cases of which they had any doubt to the Executive Committee or the full Board.

SOLUBLE AND INSOLUBLE PHOSPHATES.

BY PROFESSOR BALDWIN.

Have our scientific agricultural authorities been misleading us for forty years? Was Liebig mistaken when he suggested that bones should be dissolved in sulphuric acid? Has Lawes been wasting energy, intelligence and capital in the manufacture of superphosphate of lime?

There are five millions sterling invested in these islands in the manufacture of artificial manures. The leading feature of the trade is the conversion of insoluble into soluble phosphate of lime by the use of sulphuric acid. Is all this capital misapplied? Are the able, respectable men engaged in the trade pursuing a business which is based on unsound principles? Are they, by their ignorance, imposing a heavy tax on the landed interests by selling, at a high price, soluble phosphate of lime which is not as judicious an investment as the insoluble or raw phosphate from which it is made? All these questions have been suggested by reports made by the Aberdeenshire Agricultural Association. That body has been in existence for four years. Among the active members of it are several public-spirited men, who have promoted it in the public interest. The chemist to the Association is Mr. Thomas Jamieson, F. C. S. He has made experiments at stations placed at his disposal by members of the Association, and he has published several reports. According to my reading of the earlier reports, Mr. Jamieson would answer all the questions I have put above in the affirmative.

At first, agricultural chemists, well informed farmers, put aside Mr. Jamieson's

reports; but, after a time, farmers here and there began to ask questions concerning those Aberdeenshire experiments. Chemists had to answer those questions at agricultural meetings. And at last we have a paper on the subject from the pen of Dr. Voelcker, F. R. S., consulting chemist to the Royal Agricultural Society of England. In this paper Dr. Voelcker has directed attention to the results of published experiments which are "diametrically opposed to those of Mr. Jamieson, and which conclusively prove the economy and beneficial effects of dissolved phosphatic manures in comparison with the raw material from which they are manufactured."

The result of six experiments brought forward by Dr. Voelcker was published by Mr. Lawes as far back as '44. Three cwt. ground apatite (a mineral phosphate) gave per acre 3 tons 1 cwt. turnips. Three cwt. of superphosphate, made by dissolving two cwt. of apatite in acid, gave 6 tons 15 cwt. 3 qrs. of turnips per acre.

These figures carry conviction to most people who know Mr. Lawes personally or by reputation. Many other experimenters got equally convincing results in favour of dissolved phosphates.

The publication of Dr. Voelcker's paper in the last number of the Journal of the Royal Agricultural Society of England has called forth from Mr. Jamieson what purports to be a reply, and it has appeared in all the weekly agricultural journals. The reply does not throw any new light on the subject. It is written in a fair spirit, and in that spirit I shall briefly refer to it.

The reply gives summaries of the results of the Aberdeenshire experiments. In one of these summaries we are told that on the Marquis of Huntley's estate in Aboyne the following results were arrived at:—

	Yield per acre.	
	No phosphate.	Coprolites.
1876.....	5 tons.	19
1878.....	5 "	14
Average.....	5	16½

In the interests of Irish farmers and of agricultural science, I ask Mr. Jamieson if he believes that these figures can be relied upon for our guidance in the purchase of artificial manures for turnips anywhere.

Does not Mr. Jamieson, in his reports, which I admire for the fulness of details, give us information which shows that many of the results he has summarised are not to be relied upon?

Pending Mr. Jamieson's reply, I tell Irish farmers that they will be grievously disappointed if they expect any such results from undissolved coprolites as

these figures would lead them to expect. I repeat here the results of an experiment of my own made not long since:—

	Tons. Cwt.	
On land which received no manure the yield was.....	10	4 of turnips per acre.
Ground coprolites gave.....	11	16 " "
Superphosphate from same.....	13	7 " "

I have applied ground and dissolved coprolites to all crops. Several years have elapsed since I published the results of some of these experiments, which shewed that finely ground coprolites have a positive manurial value; but not such a high one as would justify me in recommending them in preference to well-made superphosphate of lime.

In his paper in the Royal Agricultural Society's Journal, Dr. Voelcker refers to a previous report, in which he gave experimental evidence of the varying degree of solubility of phosphate of lime in various substances, and admits that no phosphate of lime—not even the hardest and most crystalline variety—is absolutely insoluble in water, especially when the water is charged more or less with carbonic acid.

Mr. Jamieson quotes a passage from another paper of Dr. Voelcker's, in which he stated that "coprolites, apatite, rock guano and other varieties of mineral phosphates scarcely produce a visible effect, even when they are applied in a finely powdered condition and in large quantities."

We have here two statements made by Dr. Voelcker which are apparently inconsistent. But he must have always known that the so-called insoluble phosphate of lime of coprolites and other bodies is not absolutely insoluble. He knew also that insoluble phosphate of lime is not as efficacious a manure or so judicious an investment as superphosphate. He has been enforcing this truth sometimes in words which has led me to think that he under-estimates the extent to which insoluble phosphates may, under certain circumstances, become active in the soil. Any man who writes much on this subject, or any kindred subject which is capable of being elucidated by experimental research, must appear occasionally inconsistent.

In Mr. Jamieson's reports I see evidence of this view. In his report, dated March, 1877, he states that "the most economical phosphatic manure for turnips is probably insoluble phosphate of lime, from any source, ground down to an impalpable powder."

Subsequent experience has induced him to modify this opinion. I do not say that he has been inconsistent: all that fair criticism justifies me in saying is that the statement was premature.—*From the Farmers' Gazette, Dublin.*