visit may be the begining of a new state of things, as regards science, in Montreal.

ARTHUR R. JENNER FUST.

## Dissolved and undissolved Phosphate.

Lord Tweeddale's experiments on these two manures will be in the memory of my readers. In 1880, at Yester, the crop of turnips from the soluble phosphates was 50 p.o. greater than the crop from the simply finely ground phosphates. This year the difference is more striking still. The experiment was repeated, and the following is the result :

*	•	0	Undi	Undissolved		Dissolved	
<b>D</b>			Tons	cwts,	Tons	cwts,	
Bone	mcal	*******	1	10	10	12	
Groun	d coprolite	s	1	18	12	8	
Groun	d curaçoa	phosphate	••	14	12	2.	
			-				

Average...... 1  $7\frac{1}{3}$  11 14 The crop, even with the dissolved phosphate, was but a poor one, but the season was very unfavourable. The trial, however, of the two years cannot but settle the question as regards the soil of Yester, at all events. The plots were  $\frac{1}{2}$ an acre each, and the soluble and insoluble phosphates were applied on alternate ridges in the middle of a turnip field whose soil was fairly uniform. The amount of phosphorie acid applied was, in each case, 80 lbs. per acre.

At the Highland Society experimental stations, at Harelaw and Pumpherston, a very great and important result has been arrived at. In the oat crop, the dissolved phosphates increased (1881) the bulk of grain about  $8\frac{1}{2}$  bushels per acre, which is an increase of nearly 25 p. c., and at Harelaw  $11\frac{1}{2}$  bushels per acre or 17 p. c. Thus:

Pumpherston. bus	h. weight p	er busb
Average produce of undissolved phosphates plots per acre	s 34.2	42.8
Average produce of dissolved phosphates plots per acre	s . 42.7	· 43.7
In favour of dissolved phosphates	8.5	
Average produce of undissolved phosphate: plots per aore	s 66.75	42.70
plots per acre	78.25	44.00
In favour of dissolved phosphates	11 50	1.2

So, not only in bulk, but in weight per bushel, does the dissolved phosphate hold its own, and this is an important fact, for in consequence of this two fold superiority, there is an increase in the weight of heavy grain at Pumpherston of 392 lbs. per acre, and at Harelaw of 560 lbs. per acre; in other words, taking the average weight of oats at 40 lbs. per bushel, the increase of the dissolved phosphates over the undissolved is in one case 9.8 bushels, and in the other 14 bushels per acre.

Again, every one knows that a most desirable quality in a manure is the amount of grain it produces in proportion to the straw. Here, too, the manufactured scientific article beats the retrogressive one :

Proportion of straw to grain.

For 1 cwt.	of straw the	ere was	produced of	grain.		
	At Pumpl	At Pumpherston.		At Harelaw.		
	Undissolved	Dissolved	Undissolved	Dissolved		
Bone ash.	523	64.5	74.7	102.1		
Coprolites.	51.5	68.5	67.1	101.8		
Bone meal.	68.3	73.5	95.5	107.4		

			•
Phosphatic Guano. 67.5	71.2	91	878
(1) Mineral phosphates. 70.8	75.7	96	103
و حجه المعالي			

Average... 62.1 707 86.9 100.4 At Pumpherston the increase of the proportion of grain to straw is nearly 14 p. c., at Harelaw it is 15½ p. c., and at this latter station it would have been nearly 20 p. c. but for the great falling off on plot 8, where a very insoluble form of nitrogenous manure had been employed at the commencement of the rotation, four years previously.

The increase in the proportion of grain to straw has a very important meaning. Not only does it mean the production of a crop which is in itself more valuable, but it means also that the time of the filling of the cars has set in carlier, and that the crop has arrived scorer at maturity, thus confirming the observation frequently made at the Highland Society's stations, that one marked effect of the use of dissolved phosphates is to hasten the time of ripening, and to advance the harvest by from 10 to 14 days. (2)

The upshot of these experiments is this : the unmanured plot 27 produces  $13\frac{1}{2}$  bushels per acre, showing that the land is really in an exhausted state and fit for trials. The next lowest yield is plot 22, where *potash* is applied yearly; the produce is only  $14\frac{1}{2}$  bushels per acre of which the extra bushel may or may not be due to the potash. Number 12 has *bone ash* every season, and yields three bushels more than the unmanured plot. The two manures potash and bone ash together give only  $18\frac{1}{2}$  bushels, phosphates a shade more only, but when nitrogen, in the form of nitrate of soda is given, the grain jumps at once to 34 bushels per acre Lastly, when the whole are combined into one well-balanced manure containing phosphates, potash and nitrogen, the highest results in grain and straw are reached. A. R. J. F.

A very large Silver Medal has been awarded to the Montreal Horticultural Society for their noble contribution of fruit to the exhibition of the American Pomological Association, at Boston. I know how much pains the Committee and Secretary of the Montreal society took about their exhibits, and I congratulate them heartily on the success of their effors to show their country in a favourable light abroad.

A. R. J. F.

## OUR ENGRAVINGS.

Jersey bull.-This lovely medium-size bull is themost perfect double of the Sultan of Mr. Ed A. Barnard's herd at Vareznes. Curious, the hollow back in both of the Channel islands breed ! Tail set on a little too high, but head charming.

Clydesdale stallion.—A useful example of a useful breed.

Oxford ram.—Good enough, but head and legs a little too dark. A profitable breed of sheep, but the type, I should say, hardly fixed enough for crossing purposes. They only date from 1838. (3.)

Holstein cow.—Not knowing anything about the breed, ercept from hearsay, I will merely mention that the English breeders pay no attention, as yet, to the milk mirror, which this cow is putting herself to great inconvenience to display.

A subscriber to the *French Journal* is anxious to know whether sheep are profitable stock or not. A large subject to enter upon, but I will try and answer the enquiry briefly, though I am afraid I must dogmatise considerably in so doing.

(1) The ground undissolved Apalile seems to be thrown aside altogether : there is no mention of it, anywhere, this year. These mineral phosphates, then, do not include Apalile.

(2) A most important fact, if settled ! E. A. B.

(3) See Dr. McEachran's article on Percherons in this number p. 28. It takes a long time to fix a type fit for crossing.