Now, let us suppose that land is laid down to grass with plenty of clover-seeds; as long as it is covered with a thick coating of vegetation, the loss of nitrates will be trifling, and if the grass is fed off on the land, the surface soil will be considerably enriched, at the end of three or four years, with both ash constituents and nitrogen. The deep hunting roots of the herbage, especially of the clovers, will have collected the former from the subsoil, and they will have been returned to the surface in the dung of the animals. The nitrogen includes the accumulated receipts from the atmosphere and the subsoil during the pasture "lay out," minus the loss by drainage and the percentage assimilated by the stock that fed it off. No wonder, then, if the grain-crop that follows such treatment turns out a good one.

At Rothamsted, to quote Sir John Lawes once more, some arable land laid down to grass had gained, at the end of 33 years, 1716 lbs. of nitrogen per acre, or 52 lbs. per acre per annum! And it has been proved that, in a good crop of clover, the accumulation of nitrogen in the form of roots, stubble, and decayed vegetable matter is so considerable, that the whole of the above-ground growth may be removed as hay, and yet the land remain much richer in nitrogen than it was before, and in a state to produce an excellent crop of wheat; as is seen every season in S. E. England where wheat invariably follows clover, mown twice for hay and often a third time for green-meat, the succeeding wheat-crop being almost always— barring wireworm — the most prolific on the farm.

Loss to the land of nitrogen during a 4-course rotation. — Suppose nothing except grain and meat is sold off the farm; that there are 14 tons an acre of swedes, 40 bushels of barley; 3 tons of hay; and 30 bushels of wheat to the acre. Moreover, let us suppose that 2 bushels of wheat and the same of barley are sown to the acre; 700 lbs. of cake given to the stock that consume each acre of swedes; that the horses have 110 lbs of oats per acre per annum bought for their consumption, and that, lastly, half a ton of straw is fed per acre in the course of the rotation, and the rest used for litter

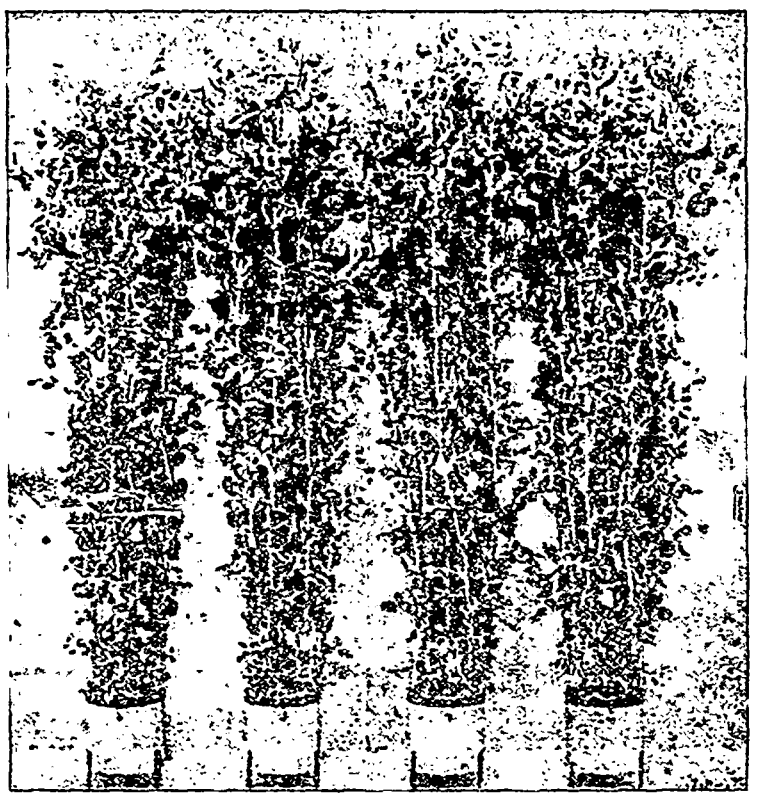
The question is: if the whole of the manure is returned, WITHOUT LOSS, to the land, the quantity of nitrogen lost during the 4-years' rotation, as excess of exports over imports, will be as follows:

	lbs.
By feeding swedes, 14 tons.....	6.8
By sale of barley, 38 bushels...	32.3
By feeding seeds, 3 tons of hay.	10.9
By sale of wheat, 28 bushels....	30.8
By feeding straw, ½ ton (1120 lbs.).....	1.2
	82.0
Deduct manure from 440 lbs oats and 700 lbs. cake.....	36.5
Total loss in the four years.....	45.5
Average loss each year.....	11.375

By the way, we may mention that, under the same conditions, the average annual loss of potash per acre is so small—2 3-4 pounds—that it may be neglected; hence, perhaps, the contemptuous way in which we often speak of that fertiliser.

(*To be continued.*)

ENG. 3.—EFFECTS OF NITROGEN ON PEASE.



I—Phosphate and potash no nitrogen. II—Phosphate and potash plus ½ gr. nitrogen. III—Phosphate and potash plus 1 gr. nitrogen. IV—Phosphate and potash plus 1½ gr. nitrogen.

NOTES ON THE COMPETITION OF DAIRY-PRODUCTS

AT THE

MONTREAL EXHIBITION.

The special competition of dairy-products, inaugurated this year, impressed a distinctive stamp on the dairy-department of the Provincial Exhibition held at Montreal. I examined with great minuteness the specimens of butter and cheese, and convinced myself that the results of this competition will be of great value, in that it showed most clearly the need of an organisation to superintend the manufacture with a view to render our goods more uniform from year to year, as well as to serve the specific demands of the trade in each of the divisions of our extensive province.

A competition of this kind is both calculated to indicate the defects of the organisation, and to suggest by that very fact the means to be adopted to remedy them. As superintendent of the Dairy-school, I unreservedly approve this innovation, but with some restriction. This competition of syndicates asked for exhibits of export butter and cheese. To guide them in their work, our makers, and even the inspectors, have only one ideal type; therefore, I think it would be necessary, for the inspectors at least, to be able from time to time, to examine samples of butter and cheese that are recognised, by the authorised representatives of the associations of dealers in dairy-goods, as possessing, in the highest possible degree, the qualities of flavour, texture, colour, and general appearance that are required by the trade. In support of this opinion, I will bring forward a well known fact: it is, that one becomes familiar with the objects that one has constantly before one's eyes, and, consequently, the ideal type, after which one is called upon to judge, changes without the change being observed, through the quasi obligation one feels to submit the goods to daily comparison, no longer with the ideal type itself, but with the goods immediately surrounding them. Whence comes this difficulty, that great and important firms are sometimes compelled to recall their buyers, who are making bad selections, in order to lay before them the style of goods required, and to show them over again the type of the products required by the firms that employ them.

As regards packing, would it not be possible to give our syndicates a model cheese-box of uniform shape, and a regular type of tubs, boxes, and casks for butter? A sample of colour, too, might, I think, be given to the inspectors. And we must not forget that uniformity is a most important point, one that, to attain, we must neglect no possible means.

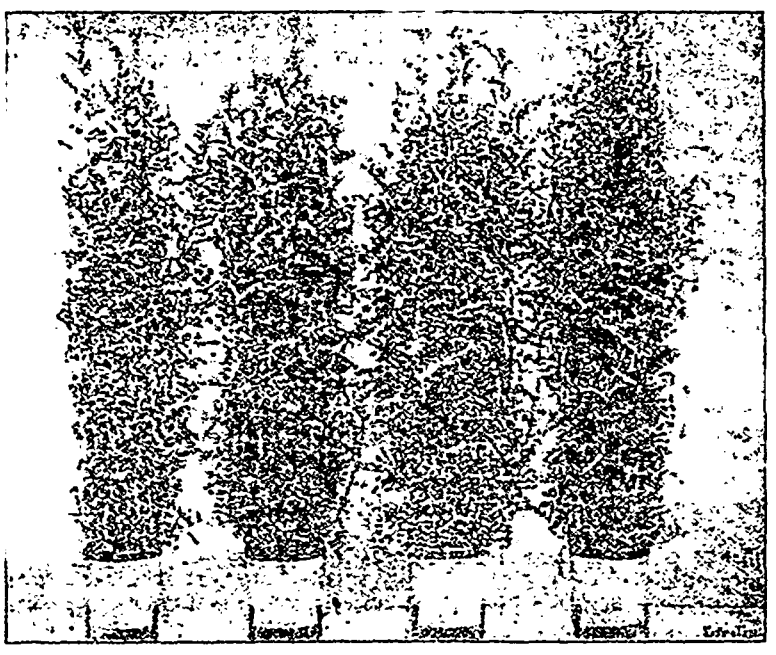
After a rigorous examination of the prize butter, it struck me that the *standard* of flavour laid down at first, must have been slightly departed from; I may be deceived, and have been the victim of the error I have been animadverting upon; so I will not attempt to invalidate the decision of the judges.

As to the butter, the Dairymen's Association conceived the happy idea of asking Prof. Robertson to send for some samples of the butter that fetched the highest price on the English markets. It is always highly satisfactory to have one's competitors in the lists before the jousts begin. The discovery of a weak point in the dreaded opponent's armour may have results totally unforeseen, and utterly change the position. Of course it was not possible to institute a rigorous comparison between foreign butter and our own, for the conditions were not equal. Butter is an article of such perishable nature, that it should never be put into comparison except with samples of the same age, made and kept under conditions as nearly similar as possible. But making to these foreign butters every allowance as regards their age and their voyage, I do not think I am presumptuous in affirming that we generally exaggerate the difficulty we have to encounter when competing with them on the English market.

The competition of the syndicates would have looked much better had the place been suitable to the disposition of the butter in the same manner in which the cheese was set out.

Among the samples of butter that I examined carefully, some were certainly good enough to satisfy the tastes of the most delicate palates; but it must be confessed that a great number of tubs were far from meriting the same praise; and in this respect, I cannot but remind the makers that it is impossible for them to be too peremptory in refusing to accept any milk the flavour of which is not perfect, on account of its having been deteriorated, whether by the absorption of alien smells, by want of aeration, or by exposure to too low a temperature. The "light straw colour," which every maker ought to try for, varied very much in different creameries; in some cases, it even was as deep as "straw turned yellow by rain." This want of uniformity should be corrected, and might easily be cured by showing the makers a pattern of the proper colour. But it was still more painful to me to observe in some samples a want of

ENG. 4.—EFFECTS OF NITROGEN ON VETCHES.



I—Phosphate and potash no nitrogen. II—Phosphate and potash plus ½ gr. nitrogen. III—Phosphate and potash plus 1 gr. Nitrogen. IV—Phosphate and potash plus 1½ gr. Nitrogen.