very much, and to some might seem very small. It was not possible to take out of the soil all they put in, and although those figures might seem very small, yet the constant drain of those substances would soon very materially affect the fertility of the soil. He then pointed out the loss sustained by the soil by the exportation of animals. In the chart before alluded to it, would be seen that the loss in nitrogen and phosphoric acid was high, and the loss of potash, lime, and magnesium was small. He showed that nitrogenous matter and phosphoric acid were being taken off the farm in the carcases of animals sold, in a greater quantity than the potash, indeed, there were in the grain 33lbs. of nitrogen per acre taken off the farm, while in the straw there were only 12lbs. It was the same with phosphoric acid—it was high in the grain and low in the straw. It would be seen from these figures that farms suffered from want of nitrogen and phosphates rather than potash. Straw was rich in potash, and farmyard manure, which consisted largely of straw, was also rich in potash, while it was comparatively poor in nitrogen and phosphoric acid; therefore the application of farmyard manure was not always attended with the most satisfactory results. The farmer very soon found that some kind of manure containing phosphoric acid and nitrogen must be used to assist the manure from the farmyard to make up for its deficiencies. There are two ways in which the deficiencies of the farmyard manures might be made up. One was the using of mineral manures, and the other by using linseed or cotton cake high in nitrogen or phosphoric acid. There was no way of adding satisfactorily and thoroughly, although slowly, to the fertility of the soil more than through the importation of feeding stuffs. It was frequently complained that the method was a slow one, and that it did not produce such brilliant results as mineral manures; but it suited light land better than mineral manures, and it would be able to tell its tale by and by, if not quite immediately. But it was important that they should have a ready return for the capital expended, and farmers liked to have a manure which they could count upon adding fertility to the crop to which it was applied. There were in the market, thanks to the energy of the manure manufacturers, an immense choice of various phosphoric and nitrogenous substances, and it became a difficult problem to the farmers which of those substances he ought to buy in order to produce the best results. The question was one very difficult to answer, because the application of manure depended very much upon the character of the soil, the character of the climate, and many other things, therefore it was of the utmost importance that the farmer should have some means of finding out for himself the best kind of manure to apply to his particular soil and climate, the best way to put it in, and the best time. These were considerations which required very great care and attention on the part of the farmer, and which could not be fully explained by merely reading a book or listening to a lecture, but by practical experiment. Now, he would firstly deal with nitrogenous manures, as the kind which was of the first importance, as that was the substance not only lost to the soil by animal and vegetable exports, but also by drainage. There were three forms of this manure, the albuminoids, ammonia salts, and the nitrates. In farmyard manure a large portion of the nitrogen existed in the form of abuminoids, and when those were allowed to ferment they gradually became converted into ammonia salts, which in turn became converted into nitrates. The albuminoid matter took a considerable time to ferment, and the nitrogenous or albuminoid portion of farmyard manure did not yield itself up entirely to the crops to which it was first applied, as its beneficial results were not experienced until several years afterwards. Ammonia salts was the most concentrated form of nitrogenous manure, and was not so easily washed out of the land. It had to be converted into nitrates before the plant used it, and before it was liable to be washed out. It was converted into nitrates owing to the action of a germ or small organism which was busily engaged in the fertile soil converting ammonia into nitric acid. This was very soon taken up by the lime, and in the form of nitrate of lime the plants were able to take nitrogenous food. But great care must be exercised lest the nitrates were not washed into the drains. Nitrate of soda very soon became nitrate of lime, and it was of the greatest importance that there should be a sufficient quantity of lime to assist in the conversion. If there was no lime there would necessarily be a retarding of the process of nitrification. Ammonia salts were firmly retained by the soil—indeed, some soils retained it so powerfully that it could not be washed out. In the case of a clay land, or a land with a large quantity of humus in it, there need not be any great fear of the loss of ammonia. But when the ammonia became converted into nitric acid it had a great tendency to find its way into the drains. In applying ammonia salts we had to consider how long the ammonia required to lie in the ground before the plants used it. Nitrate of soda should never be put into the land except the plants were actually there, otherwise there was a great danger of the substance running into the drains. These were general considerations, which might guide them as to which kind of nitrogenous manure to apply, and it would be seen by a little experiment how very marked was the difference in the power of the soil to retain the nitrogen in its various forms. Another question would present itself, namely, to what crop should a form of nitrogen be applied? It would be economical to apply to a crop with a long life a slowly acting nitrogenous manure such as dried blood, horn dust, and any other manures of that kind which are of the albuminoid class, and of a slowly decomposing nature. It required to be a long time in the soil before any result would be seen, or before it was converted into food suitable for the plants. Ammonia salts might be easily applied to strong land containing a large amount of humus before the time of sowing the seed, as it would be most disadvantageous to apply such a manure later on, because it was a peculiarity of nitrogenous manure that it was most wanted during the youth of the plant, and if it was late in being applied it would perpetuate the youth of the plant and retard the time of ripening. The manure required to be applied so that it should come into contact with the roots of the young plants, therefore it should be put in the soil early. Nitrates acted immediately, and should therefore be put into the soil when the roots of the plants were grown and ready to seize hold of them. It would never do to put any of those slow acting manures to a cereal crop. If it were required to add nitrogenous manure to barley, it would be no use putting it in the soil in the form of 'shoddy,' or even bones, of blood, or any other slow acting manures, as it would not have time to decompose before the plant had reached the age at which it would be benefited by such manures no longer. Speaking of the cultivation of grass, Dr. Aitken recommended nitrate of soda, as the roots of grass retained it, and made it impossible that it should escape into the drains. Then as to phosphatic manures. There was a great variety of phosphatic manures, and they were sold in many different forms under many different names. Perhaps the most familiar form was the oldest of them all, namely, bones. Bone was a phosphatic manure, which differed from many others of its kind on account of its having nitrogen in its composition. It was a phosphatic and nitrogenous manure, combining both those constituents, and it was an animal product, and corresponded with that which had been sold and carried off