starch. They served as human food, and, to a certain extent, as food for cattle. Root crops were almost entirely consumed on the farm as food for the cattle in the stalls or the sheep on the land. Only rarely could farmers sell roots, and that was when near a large town where there were dairy farms. The leguminosæ were largely used on the farm, while grasses were consumed by cattle on the farm, and also occasionally sent into towns in the form of hay for feeding horses. But the cereal crops were those principally sold away from the farm. The others were used for the production of live stock on the farm. Passing on to the essential constituents of plants, the lecturer remarked that crops had to be considered in two different ways—as they were reaped, and in the dry state; and, by means of tables thrown on the screen by limelight, he showed the weight and average composition of ordinary crops. Root crops removed from the soil something like 4,000 pounds weight per acre per annum of dry matter; and with the aid of slides the lecturer showed how this dry matter was made up. Nitrogen was removed from the soil to a much greater extent by root crops and leguminosæ than by cereal crops. He also explained the way in which the other constituents were removed by plants from the soil. They could see how former scientists came to the very rational conclusion that what had to be done in manuring was to put those constituents back into the soil. But other inquirers had shown that they could not settle things quite in that way, and that other points had to be borne in mind. Liebig put forward the mineral theory, which was found to be incorrect; and, as Lawes and Gilbert pointed out, the growth of plants did not depend so much on those mineral constituents, as on nitrogen, which exercised an important influence. It was also shown that growth depended on the power which crops had of assimilating constituents present in the soil. If they were all alike, and acted with equal power, the mineral theory might be perfectly good. But great differences had been found. If they took a cereal crop they discovered that it had not the power of taking nitrogen from the air, but a clover crop had that power, and so, though the produce might show a larger amount of nitrogen in clover than in barley, that did not come from the soil, so the extra nitrogen supplied in manure was not needed. Root crops had very much the same amount of phosphoric acid as cereal crops. A cereal crop grown upon a soil with a fair amount of phosphoric acid in it would utilise it, whereas the root crop would not grow. Therefore the phosphoric acid must be supplied in the form of manures. They had also to consider the conditions in which those constituents were in the soil. They had to be in an available condition for the plants, and so the analysis of the crop was no guide in manuring. Thus the mineral theory was incorrect, because it put all crops upon a level, whereas practical experiments showed that they had different powers of absorbing constituents from the soil. In the case of cereals the most essential constituent was nitrogen; in root crops phosphates; and in the leguminosæ potash. But he (Dr Voelcker) did not mean to say that they would get the best results by using these by themselves. The best result was obtained by using combinations. It was the minimum quality that ruled the whole question. If the essential constituent were absent it could not be made up by any excess of the other constituents. Experimental trials could be made by growing plants in pure sand. *The ordinary farmer, however, had his own soil to deal with, and each must make experiments for himself,* though the experiments made by scientific men were to a certain extent useful. A number of slides were at this point thrown on the screen showing the effect on the growth of certain plants of the presence or absence of any constituent in the soil. It made a good deal of difference how the seed was sown, and further slides explained the results of different methods. The best results were obtained when the seed was sown at regular depth and not too thickly. The question of wheat supply had been discussed very much of late, and Sir William Crookes had opened up to them the dreadful prospect that the country would not be able to provide wheat enough for its increasing population. In other countries land was getting poorer. His solution was that we must get nitrate of soda. But the quantity imported from Peru was diminishing, and so the only way would be to make use of the nitrogen in the air. For that purpose the aid of the chemist would have to be called in. As against that, Lawes and Gilbert have shown that the real reason was that in foreign countries the land was not being cultivated properly, although the soil was much richer than that at home. In their own land they had been able to produce much richer crops, and they argued that if that was the case in their land, how long would it take to exhaust other lands which were much richer?