luable manure contained in the soil below upon the land. Sub-soil ploughing was, however, only suitible to certain soils, and hence it was that when it was sometimes tried it was found injurious. Mr. Pusey had stated that great benefits were derived from it on red soils. In th se were locked up stores of oxygen; and when Mr. Smith produced his subsoil plough, he applied to them the key. Success depended on the admission of air, and therefore draining should always precede sub-soil ploughing. Air could not be properly admitted ifthe soil were wet, nor could a wet soil exercise that obstructive power which was necessary to retain food for growing vegetation. Cato was told right if his inquiry related to a light dry soil, but ifto a clayey heavy soil, the answer should have been first drain and then plough. Draining was greatly neglected in England. It had been said by Mr. Chadwick that Cheshire was so wet that it was not fit for sheep; and if that were so it could not be fit for men. The sooner, therefore, a change took place the better; not for that county, but for the general community. As one proof of the importance of draining in this respect, he would mention an anecdote which had been told him by Professor Liebig. There was a prison in Prussia from which they had been accustomed to send anatomical subjects to the medical schools at the neighbouring universities. This prison was situated in marshy land, but it was subsequently drained, and now the unfortunate universities were obliged to send for subjects to other countries. Thus drainage not only conferred health, but even life to a whole community. The learned gentleman concluded by stating that his lecture this evening had been more exclusively scientific than he could have wished, but that in his next he would direct their attention to the principal causes of it.

Dr. Playfair commenced by saying that in his last lecture he had endeavoured to show how the sequence of events, from the first dawn of the creation, was calculated to elucidate the theory of the practice of agriculture. They had seen how carefully nature prepared her soils for cultivation long before man devoted himself to her service. They had followed her when the sea acted as great ploughs and subsoil ploughs, and ameliorated the noxious ingredients in the rocks, and fitted those which were fertile for the purposes of vegetation. They had admired also how curiously she locked up in the soil those measures of fertility, and the manner in which she presented the key to the industry of man. They had also followed her into the high and black regions of calcareous and cretaceous rocks, and those of the old red sandstone, in which she compensated for the elevation by an admirable system of drainage, either by numerous cliffs, or a porous nature of materials, so that the water might run quickly away, and not by evaporation render the soil cold, by which admirable examples she taught them how to improve the climate of their district, to hasten and increase the amount of vegetation, and thus obtain the greatest return for the labours which they expended on its cultivation. To-night they had also to travel over a wide field, in which they would see the same beauteous adaptation of the means to the end. The theory of ploughing and draining had already been brought before them, and the nature of fallow had also been partly explained in the consideration of those operations. Having exhausted soils by frequent cropping, all the silicate of potash was removed, which was essential to the growth of similar crops. To liberate again the necessary quantity, the ground was therefore to be exposed to the action of the air, and when enough was again liberated to be available for a crop, the ground was again in a condition to support vegetation without manure. But although the soil might be exhausted of one ingredient, it still might contain other constituents adapted for other kinds of plants, by growing which their purpose might be as well fulfilled as by a naked fallow. As this was a subject of great importance, he should endeavour to explain to them the theories on the subject. Professor Low told them that to receive all the benefits of an efficient fallow it might be necessary to plough the land from four to eight times. Now, this must be a great expense, and in many parts the system was entirely dispensed with. The theory of the new practice would be easily understood by reference to the composition of the mineral ingredients in plants. The mineral ingredients of plants wers as follows:—Bases—Potash, soda, lime, magnesia, peroxide of iron, oxide of magnesia, alumina. Acids or Radicals—Silica acid, phosphoric acid, sulphuric acid, carbonic acid, chlorine, iodine, bromine. Plants generally contained most of these ingredients, but in very different proportions. The silica plants were wheat straw, barley, rye straw; the lime plants were tobacco (Havannah and Dutch), pea straw, potato haulms, sainfoins, and meadow clover; the potash plants were maize straw, turnips, beet-roots, potatoes (taberose), Helianthus taberosus, sunflower. Any table, however, showing the proportions of the ingredients of each plant could only be a mere approximation, for classification had been shown to be inadmissible, as being contrary to a beautiful law pointed out by Professor Liebig, that certain bases might replace each other, according to the law of equivalents. Instead, however, of scientific reasonings on this subject, he could, perhaps, occupy their time more usefully in testing the theory in relation to their own practice. Of course the rotation of crops must vary according to the composition of the soil, and this variation would be better understood by reference to the formation of the rocks, as laid down in the former lectue. They saw that granite was composed of silicate of potash, soda, and alumina, and occasionally with lime, magnesia, or phosphates, and therefore it was found that the farmer also grew upon it the silica plants, or wheat, oats, or barley. Clay slate and graywacke, were merely degraded granite, but with still less lime, and accordingly they found two potash plants in general cultivation on this soil—oats and turnips. Red sandstone was much richer than either. being better manured with limestone and with phosphates, the relics of extinct animals, and with silicate of potash also in abundance, and there also they found potash plants principally preferred. They then passed the boundary, and came to the deposits of limestone, the great mass of which was under pasture. The true coal formation best suited the potash and silicious plants, and the magnesian limestone was peculiarly favorable for plants containing much magnesia, as potatoes, wheat, barley, &c. Further on was the ploughed-up strata now deposited in the new red sandstone, and forming an admirable soil adapted for the cultivation of both potash, soda, and silica plants. The beautiful result of this retrospect was to show that the farmer's experience had taught him the best plans which the investigations of science pointed out as those which should be adopted in the respective localities; and as they proceeded further, they would observe still more closely the exact agreement between science and practice. He would first take the four years' rotation, or the Norfolk course, which was very universal. It usually began with turnip, well manured, followed by a corn crop, then by artificial grasses, and concluded by another crop of corn. The manure was generally rich in silicate of potash and phosphate, which gradually became