possesses means also of giving large quantities of ammonia to his crops. The liquid manure of the stables contains much of that substance. When urine ferments it is almost entirely converted into water, and a compound of carbonic acid and ammonia. This compound, called carbonate of ammonia, is soluble in water, and above all other manures adapted to give food to vegetables. The drainings from stables should therefore be carefully preserved, thrown upon some compost heap, containing a considerable quantity of *clay*, and then, as occasion offers, strewn upon the soil. The lecturer then alluded to the mineral substances which enter into the composition of vegetables, such as flint, phosphorus, lime, sulphur, &c. He stated that the one fact to be borne in mind with reference to all substances which naturally exist in a solid form, was, that before they can enter into the composition of vegetables, or be taken up by their roots, they must be in a state of solution in water. Water, he said, possessed the property of dissolving small quantities of many mineral substances. The condition, however, of the compound parts of the cultivated soil was generally not such as would permit of a sufficient quantity of the necessary substances to be dissolved in water as to produce the most favourable development of the vegetables grown upon the soil. It was possible, however, so to change the constitution of the necessary substances as to afford a sufficient supply for the use of the crops. Flint and phosphorus usually exist in the soil combined with other substances, which render them insoluble in water, if the oxygen of the air acts for some length of time on such soils, it liberates certain compounds of flint and phosphorus, lime and potash, and renders them capable of being dissolved in water. First, therefore, oxygen must be allowed to permeate the soil, which, together with heat and moisture, will prepare these mineral substances for solution in water. Secondly, *time* must be allowed for this slow process to operate. To ploughing and draining, another artifice must be added, to effect the desired object, namely, the fallowing of land; but in order that the land may not lie idle, recourse must be had to a judicious rotation of crops. The benefits resulting from a proper rotation of crops, arose from the circumstance of some kinds of plants requiring less of certain substances to build up their structure than other species.—Wheat, for example, must have a large amount of flint and silica, to give the stalk sufficient strength to bear the weight of the ear; and although an enormous quantity of flint existed in every soil, yet it was not in that state which rendered it capable of being dissolved in water. Under the influence of the atmosphere, heat and moisture, the compounds containing this flint were slowly disintegrated or broken up, allowing water to dissolve a portion of the required substances. When crops, therefore, requiring little silica or flint were grown upon the soil, time was given for the air and moisture to prepare fresh supplies of the necessary ingredient for wheat crops and corn-growing plants generally. One apparent anomaly presented itself, in growing oats either before or after wheat, but susceptible of easy explanation. An average crop of wheat drew from one acre of soil about one hundred and eighty pounds of mineral substances, while a crop of oats abstracted only sixty pounds of the same minerals from an equal extent of surface. So that *three* crops of oats took from the land, of soluble mineral substances, not more than *one* crop of wheat. Ploughing and draining, the lecturer observed, have mainly one object in view, which is to expose as much of the soil as possible to the influence of the atmosphere; that object is effected by greatly increasing the porosity of the soil, and thus permitting air to circulate through it, which it will always do at every change of temperature. A rotation of crops allows time for the effects of these influences to operate. The decomposition of the soil may be accelerated, and the amount of soluble minerals greatly increased, by throwing some substance upon the soil which is capable of assisting the decay and disintegration of vegetable and mineral substances in the soil. The element best adapted for effecting that object is lime. Lime not only rapidly decomposes vegetable matter, but it combines with some of the component parts of clays and sand, forming substances which are easily dissolved by water; if noxious compounds exist in the soil, it will convert many of them into suitable food for plants, or at least render them harmless. The soil in Virginia, which almost for centuries has produced luxuriant crops of wheat and tobacco, is now comparatively sterile. All the soluble mineral substances which it once contained in abundance have been abstracted from it, and no means adopted for accelerating the disintegration of the vast store it still contains, so as to render them soluble in water. Its fertility in many places is gradually being restored, by strewing lime upon it, and if that course be pursued for a few years, it will regain its original reputation. The lecturer then proceeded to advance a few observations on draining. You drain a swamp, and you convert it into excellent pasture land; does not this practical result afford a sufficient demonstration of the influence of air upon the soil. Where water is stagnant, no air can penetrate the soil in which the water lies; the decay of vegetable matter cannot be continued, and the disintegration of the solid constituents of the soil is at a stand-still—only such plants will grow upon it as are by their nature adapted for living in a soil saturated with water. Drain such a soil, and in a few years it will be converted into the most luxuriant pasture land. All soils of whatever character should be well drained, their temperature is thereby increased, and vegetables shoot forth much earlier on well drained than on undrained soils. The lecturer then expressed his opinion that draining, *in this climate*, was productive of the greatest benefits, but that subsoiling was an essential requisite in order that the beneficial influence of draining might be fully exhibited. Owing to the long continuance of dry weather in this climate, the soil frequently became altogether deprived of sensible moisture, to the depth of four, five, or even six inches; but if the soil is well drained and subsoiled, the root of a vegetable will penetrate far below the limit of dry soil, and obtain an unfailing supply of moisture, from a source removed from the evaporating influence of the hot sun in the summer months. Any farmer may satisfy himself of this fact, by digging perpendicularly to the depth of fourteen or fifteen inches, with a sharp spade, in the summer time. He will find the soil dry and parched for four or five inches; but at the depth of eight or ten, and below that, he will discover sufficient moisture for all the purposes of the plant, aided by the copious dews which fall at night.

With respect to the rotation of crops, he would remark that no fixed rules could be given, applicable to all soils; for the constitution of soils differed so much, that while on one farm wheat might be grown with success every third year, on others it would not be advisable to sow more frequently than once in every five or six years; experience or an analysis of the soil could alone determine the precise length of the interval. It is possible that an abundance of necessary substances may exist in the soil for the supply of a crop of wheat, and yet if wheat be sown, it is found to produce less than an average crop. How is this to be explained? The failure would doubtless be owing to the peculiar chemical constitution of the soil, and the nature of the crop grown one, two, or even three years before. The roots of clover, peas, and other green crops do not decay equally rapidly in all soils; their presence in the soil in a partially decayed state may be detrimental to the favour-