grown, and thus they may, to a greater extent, be extracted from the soil by immoderate and indiscriminate cropping. One marked peculiarity has been discovered, to which it is important I should call your attention, viz: that the inorganic parts of one plant are very different from those of another. The relative and absolute quantities, even of mineral food, taken from the soil by the various crops, have been ascertained by a careful analysis of the ash. We find that the chief ingredient in the ash of the grains wheat, barley, and oats, is phosphoric acid; of straw, silica or flint; of turnips, corn and potatoes, potash and soda; of peas, beans and clover, magnesia and lime; from which we can only draw one deduction-that without the presence of such mineral substances in the soil, our grain, roots and clover could not grow.

The discovery of these facts will be found to have a marked bearing on many practical points now to be considered. We observe that a great variety is necessary for the sustenance of man and the domesticated animals. Nature has provided all the elements to produce this variety. Free power has been given to man to draw upon these, while he is endowed with understanding to husband them, so that they shall be preserved to minister to his abundance. We are thus enabled to understand why it belongs to good husbandry to raise such a succession of crops, in rotation, as will bring out the full capabilities of the soil. But there is one point requiring further illustration, which is the restorative power of the atmosphere, in furnishing fresh supplies of inorganic food by the disintegration and decomposition of mineral substances. Nature is always silently at work, reproducing all the elements which have been extracted by the husbandman. But it is a gradual process, and the most beneficial operation will be that which draws upon all the powers of the soil in regular succession, so as to prevent the repetition of the same species of plant within a given period.

Thus, while wheat is growing, which draws principally upon silica and the phosphates, soda and other elements are accumulating, and so on in rotation. But a subject equally important is the due preservation and application of manure, without which it is impossible that any ordinary farm can continue for a succession of years to yield a proper return. If we calculate the amount of mineral substances carried off every year by the exportation of grain, pork, beef, wool, and other produce, the good farmer will see the necessity of husbanding with every care the manure on the farm; he will, to the utmost of his power, be always restoring what he can to the treasury. He will further study to give the manure to such crops as will be most benefitted by it, and can receive it without hazard and in-

before fall wheat, may produce too much straw, and increase the liability to rust and mildew, whereas it may be given with certain benefit to corn, turnips, and other crops, and after one year's exhaustion the remaining elements would minister more safely to the cereal grains. A healthy cultivated plant (as Mr. Hind observes) requires a property balanced supply of organic and inorganic food. If too large a quantity of the former is present, the straw will be too rank, while there will be a poor formation of seed. A material point with the farmer is the quantity and quality of his grain. These are matters involving many nice considerations and much scientific skill. It is erroneous to suppose that the first crop will exhaust all the good of the manure. If a root crop, it may extract the soda and potash so far as not to produce immediately another of the same class in such luxuriance; but there might still remain abundant materials for a grain crop, and afterwards for peas or clover. On the subject of fallow, I desire to make one or two remarks. It is necessary that the ground should be kept clean as well as rich, which is most easily effected, where labour is scarce, by the naked fallow; but many practical agriculturists are of opinion that this might be less frequently required by the introduction of improved systems of rotation. With our present prospects of railroads, and improved markets for every kind of produce, there will be more encouragement to the farmer to keep up the fertility of the land to the highest remunerative point. It will pay better than it has done to raise a larger quantity of stock. There will consequently be a greater supply of manure, and with the aid of horse hoes and cultivators we may hope to see a large part of the naked fallow superseded by green crops, the cleaning cultivation for which is so beneficial. The great value of clover upon the lighter lands is now well understood, and it must be advantageous to raise more sheep than we have hitherto done, and always keep the full complement of stock n the pastures. But I feel that I am trespassiog too long on the time of this meeting, and wou'd only remark, in conclusion, that although the principles and laws which regulate the growth and secure the full development of our grains are fixed and immutable, it is still impossible to lay down rules which shall be generally applicable. The rotation of crops must be regulated by considerations of climate and by the character and composition of the soil, for there are very few farms of such uniform texture that the whole of the fields could be all cropped in the same manner with advantage. It happens also sometimes that the market value of one kind of produce is more remuncrative than that of another. These and all other circumstances must jury. Recent manures, applied to certain soils have their weight with the farmer, whilst he is