

importance to plant food, and when a soil is deficient they must be supplied to secure a full crop.

Of the mineral elements or compounds, which enter into the composition of the plant, only two need to be mentioned—potash and phosphoric acid, as they are the only ones in which a soil is likely to be deficient. The others are supplied by nature in such abundance that we need to take little thought about them. Thus we see that while by far the greatest part of the constituents of plant food required to perfect its growth is supplied by the hand of an all wise and kind Providence in the greatest abundance, and require no forethought on our part for their supply. In human agriculture, however, both animal and vegetable products are consumed off the land that produces them, and if no return is made to the land at least a part of the essential constituents of plant food must be removed in the form of potash, phosphates or nitrates. Hence the necessity of manuring, if permanent fertility is to be retained. The fertility of a soil is thus nearly connected with the amount of nitrogen, potash and phosphoric acid that exists in it in a soluble condition.

Farm-yard manure consists of the solid and liquid excrements of the farm stock, plus the straw employed as litter. Its composition depends very much upon the animals contributing to it, the character of their food, and also a good deal in the care taken of it, and the method of its preparation.

In the case of an adult animal neither gaining or losing weight, the excrement will contain the same amount of nitrogen and ash constituents as were contained in the food consumed. If, however, the animal is increasing in weight, or is producing young, or furnishing milk or wool, the nitrogen and ash will be less than that contained in the food. The manure from this class will consequently be much poorer than from the former, supposing the same food were given to each.

The character of the food will affect the quality of the manure even more than the character of the animal. A diet of straw and chaff will yield only a poor manure, as these foods contain little nitrogen or phosphates. A diet of wheat bran, oil cake or beans, will, on the other hand, yield a valuable manure, as these foods are very rich in nitrogen and ash constituents. A common mode of increasing the supply of manure is by the consumption of purchased