

holds in solution. Consequently, a surface soil is generally poorer in lime, and frequently in potash, than the subsoil. The complete impoverishment of the soil is prevented by the presence of certain constituents which combine chemically with the liberated plant food substances, and by the conservative action of vegetation. The plant is continually collecting from the soil and subsoil dissolved or easily soluble matter, storing these in its tissues, and at its death leaving them in the surface soil. But even with the best of management there is some plant food leached from the soil.

However, according to a well known law, Nature allows nothing to be lost, and these leached-out materials are, through various agencies, at least partially, made to accumulate in great beds of limestone, phosphatic rock and potash salts. It is these accumulations of past ages that are to-day furnishing the main constituents of fertilizers. Who knows but what the plant food which is being annually leached from our fields will come into use in future ages.

LOSSES OF PLANT FOOD IN CROPS.

But the leaching away of plant food is not the only way in which these materials are lost from the soil. The vegetable and animal produce of the land are frequently consumed off the land which reared them. A partial return of the plant food thus taken from the soil is made by the application of farmyard manures, but the sale of vegetables, fruit, grain, animals, and animal products, the congregating of men in towns and cities, and the difficulty in employing sewage with profit; and the loss of fertilizing constituents from farmyard manure before it is applied to the land, all tend to make the return of the manurial constituents to the soil incomplete.

Some soils are naturally so rich in the elements of plant food that when the crops are properly rotated and "catch" crops used to economize this natural wealth of fertilizing constituents, it may be a long time before the soil needs special manures; but, if the land is naturally poor, or injudiciously cultivated, or if special crops of like nature have to be grown year after year on the same ground, it may soon need some extra manure.

On naturally poor soils it may be necessary to make a complete return of all the elements of plant food removed by crops; but in most soils there is an abundance of some one or more of these elements, and a partial manuring will consequently suffice. With intensive farming, where thorough cultivation is practised, a good system of rotation followed, where little grain is sold and some food is purchased in its place, and every care taken of the manure, the land may even gain in fertility. These, however, are not the conditions which exist with the gardener and fruit grower, and they must of necessity purchase manure of some kind.

MANURES.

Manures may be defined as anything that when added to the soil increases the amount of available plant food in a reasonable length of time. Generally speaking, they may be divided into two classes: general and simple manures.

The general manures include farmyard manure, the various products of the stables, and substances of vegetable origin. These materials not only furnish