Fertilizing the Market Garden

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BEFORE the market gardener can intelligently and economically use commercial fertilizers it is essential that he have, first, a clear conception of the needs of the soil under cultivation; second, a definite idea of the nature of the growth wanted, whether for large development of leaf and stem, or for seed and fruit, and how this may be forced; and third, a knowledge of the function of the various constituents of a fertilizer, and the value of different forms of these constituents as found in the various brands of fertilizers on the market.

It is not an easy matter to express exactly what is meant by soil fertility as so many conditions are involved, all of which have more or less influence. A fertile soil must contain, at least, a fair quantity of those constituents that are removed from the soil in maximum quantities by the crops grown. Experiments have demonstrated that plants require at least 10 chemical elements for normal growth and development. Each of these substances has its own particular work to perform and no one can take the place of another. Fortunately, most soils are abundantly supplied with all these essential constituents, nearly all of which are held in such forms that they are not readily leached from the soil.

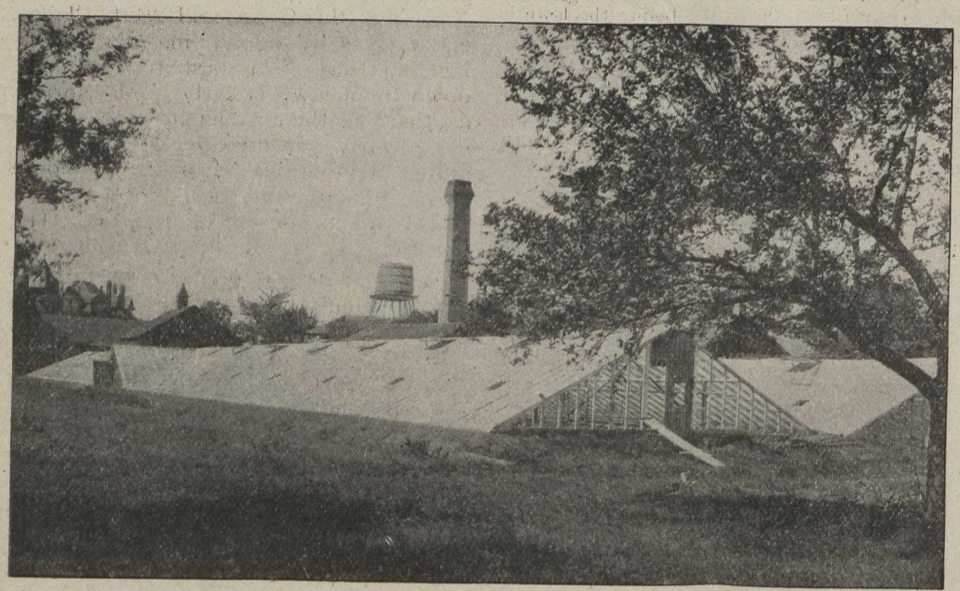
Plants, however, take up comparatively large quantities of nitrogen, phosphoric acid, potash, and lime, and, as they are removed with the crop, it must follow that in time the soil becomes more or less depleted of these constituents. The organic matter of the soil is the source of nitrogen to the majority of plants, and in its decay the nitrogen is converted into a soluble form which is quickly lost in the drainage water unless taken up by plants. Lime, also, as a result of the many chemical changes taking place in the soil, is continually being carried away in the soil water. Evidence of this is seen in the fact that water collected from the soil or rock contains lime, or is "hard." These, then, are the four constituents which must receive the greatest amount of attention in the cultivation of the soil.

But the presence of the chemical elements of fertility in themselves is not sufficient to insure fertility. To serve as food for plants they must be in a form available to the roots. Water is absolutely essential both for the solution of the food elements in the soil and for their distribution in the plant after they are acquired. As we understand soils, they are made up of particles of various sizes. When it is well drained, the water is held on the surface of these particles, and the interspaces are open, thus making it possible for the air to penetrate into the soils and supply the oxygen essential to the life of the various types of micro-organisms busily engaged with the decomposition of the organic matter. The amount of water held on the surface of the particles depends on their size and shape; the smaller and more irregular the shape, the greater the amount of water they will hold. Consequently, a drained clay soil will hold more water than a sand, and a soil rich in humus more than one poor in that constituent.

Humus not only increases the water-holding power of the soil, but it also appreciably effects its general physical condition, and, further, in its decay causes potash and phosphoric acid to be rendered available to plants. Humus apparently has a wider influence on the fertility of a soil than any other one factor. The various essential elements of plant food may be supplied in inorganic forms, but unless humus is present to regulate the general physical conditions and to supply the essentials for the breaking up of the insoluble salts formed in the soils, good remunerative crops cannot be produced. This fact must not be lost sight of, for unless humus is present we cannot hope to get good results from the fertilizers applied.

Nitrogen forces leaf and stem growth and tends to retard maturity; phosphoric acid aids in the formation and transportation of the proteids and seems to hasten maturity, and potash appears to be essential to the formation and transportation of carbohydrates. With many of the crops of the market gardener, especially those sold in the immature state, quality is dependent upon, or measured by, both appearance and palatibility; and palatibility is determined by succulence and sweetness of the vegetable, or its freedom from bitterness, stringiness, and other undesirable characteristics that frequently exist, and that can be largely eliminated by providing an abundance of food for a continuous and rapid development of the plant. Any delay in the growth of radish or of lettuce is largely responsible for the sharp taste and pungent flavor of the former, and the bitterness and toughened fibre of the latter. For crops of this nature, a generous supply of potash and phosphoric acid is essential, but nitrogen is the constituent that should predominate.

Owing to the wet fall and open winter and the consequent leaching away of nitrates, it is possible that nitrate of soda will give unusually good results this year, especially on crops sown in the early spring. While nitrogen may be used freely on some crops when maturity is required, as with the tomato, corn, potato, sugar beet, etc., a soluble form of nitrogen, as nitrate of soda, may be used early in the season to insure a good start, but it should be withheld during the latter stages of growth in order that the ash constitu-



Where Vegetables are Forced

These greenhouses are owned by Mr. John Westwood, of Todmorden. The chief crops grown in them are lettuce and radish. At present they are filled with lettuce, radish, parsley, cress and mint, but the last three crops in small quantities. Mr. Westwood claims that lettuce and radish are the most profitable. The tank in the rear is used for high pressure in the spring and fall. In winter, however, the water supply is taken from a tank in the boiler house. A windmill is used for lifting the water to the tanks, and the pipes are underground and away from danger of freezing.