

is absolutely indispensable; that under certain circumstances, soda may be eliminated without injury; that iron is essential to the formation of chlorophyll; that calcium performs a function somewhat similar to that of the potash; that it may to some extent replace it, and that it is possibly connected with the formation of tissues; that chlorine, and in some cases, sulphuric acid, is essential to the proper transfer of the substances digested in the leaves, to the parts where required by growth; that magnesium is an element of uncertain value in the internal physiological processes, but that it has a definite value in the soil, where it aids in the distribution, and thus in the more complete appropriation of potash; that silica cannot be eliminated without materially affecting the strength of the plant, and that phosphorus bears an important relation to the various processes of ripening in the fruit.

Another very important lesson to be derived from such special cultures, especially when combined with chemical analysis, is the fact that plants exercise a selective power with reference to the food supply; that is to say, if a plant were grown in a solution containing exactly the same proportions of all the elements entering into its composition, it would be found not to absorb them all in the same quantity, but some would be used much more largely than others. This becomes more obvious if we inspect the composition of the ash of different plants, or even of the same plant under different conditions or at different stages of growth.

It thus appears that some plants are special potash feeders, others use more lime, yet others an excess of soda, and this fact constitutes the foundation on which the well known system of rotation of crops is based. This briefly stated, is as follows:—When plants are grown continuously upon the same piece of land for a number of years, those elements upon which that particular class most largely feeds, will be withdrawn in excess of the ability of the soil and the natural chemical processes there taking place, to restore them. The soil is therefore said to suffer special exhaustion, because it is deficient in one or two elements