

Those 200 kilogrammes had been, therefore, dissolved in six millions kilogrs. of water, or, in other words, those soluble mineral substances enter into the roots of plants in a state of 1:30,000 of dilution in water; of course a very weak solution.

After these general foregoing remarks, I am now going to treat upon these nourishing mineral substances in particular, as to their origin, their importance for vegetable life, the extent to which they ought to be present, and by what substances of commerce they may be properly acquired. These substances may be represented under the following heads:

1. ALKALINE SALTS (SALTS OF POTASH AND SODA,) AND SOLUBLE SILICIC ACID.

Origin.—Both of those substances, which are on the head of this paragraph, owe their origin to volcanic rocks, which are composed of them as I have stated already in many places before.—By the disintegration of these rocks, they are partly liberated and partly retained, according to the advancement of this chemical process. Those rocks, among the volcanic or silicious, which are before all others, rich in alkalies, are, at the same time, also those which contain considerable quantities of clay, which, in combination with quartz, peroxyd of iron, &c., forms the last and remaining product of the disintegration, inasmuch as they cannot be transformed into other compounds. Wherever we find clay, whether in mountainous regions, or as a component of soils, it derives its origin from the disintegration of volcanic rocks; and as these volcanic rocks were such as contain at the same time considerable quantities of alkalies, which were liberated contemporaneously with the clay, by the process of disintegration, and inasmuch as the clay exercises an immense attraction upon the former, we never find clay which does not contain a greater or smaller quantity of alkaline salts, and therefore never a soil in which alkaline salts could be entirely absent. Among the volcanic rocks which are especially rich in clay and alkaline silicates, are to be named: Granite, gneiss, syenite, mica-slate, basalt, lavas, and many others. The manner in which the disintegration of them takes place, showing a series of periods which are to be run through with before it is completed, is explained in a little pamphlet, of which my former Assistant is the author, and which was published as his inaugural thesis on his promotion to the grade of Doctor of Philosophy. As a matter of general and especially of highly agricultural interest, I have no hesitation in quoting here a short extract of his work:

“The rock of which (the Kottenberg) in Germany is composed, furnishing the material for experiment, belongs to those numerous little basaltic cone mountains, which surround the large masses