

sides, the proportion of ammonia in the soil is increased by the presence of vegetable mould, which absorbs ammonia.

The views above given indicate the causes of impoverishment of soils, and in another place we will endeavor to point out the most economical means for repairing the injury.

Within the past few years, several European chemists have occupied themselves with series of experiments in reference to the action of soils upon the several soluble matters in substances used for manures or fertilizers. The most important are those of Prof. Way in England, and M. Brustlein in France. Their investigations have evidently been conducted with the greatest care, and the well known reputation of the gentlemen to whom the world is indebted for them, is a sure guarantee that they are fully reliable. It would occupy too much space to give the details of their experiments in full, and besides, I am sure that my agricultural friends would prefer the results to be given in a shape more practicably useful to them. They are as follows:

1. It was proven that soils withdraw certain substances from solutions and retain them, whilst others are carried off by the water *percolating* through.

2. This absorbing action of the soil is especially exerted upon the *bases* of soluble salts, the acids usually passing off. There is, however, *an exception in the case of phosphoric acid*, which is a wise provision for retaining this important substance in the soil. Even if silicate of potash, or soda in solution, be agitated with a soil, it is the silica (which is an acid) that passes off, and not the alkali. This is an altogether unexpected result, because of the greater solubility of the alcalies than of silica, but its utility in the economy of nature is obvious.

3. Whilst we need not fear the loss of potash, soda and phosphoric acid, by being washed out of the soil, we find that nature has made no provision for retaining therein the sulphuric and nitric acids and chlorine. This, however, is of little consequence, because of the very small proportions of these substances required for plants. It is true that parts of many plants, especially the seeds, contain considerable proportions of nitrogen, but that is supplied by ammonia, which, as we have seen, is retained by soils.

4. The above were the general results, but it was also found that the character of the soil had much influence upon its power of absorption. The effect was trifling in pure silicious sand, but a sandy soil, almost wholly devoid of alumina, but abounding in vegetable matter, was found to possess considerable power in fixing ammonia from its solution in water. That this was due to the vegetable matter in the soil was proven by experimenting with vegetable mould from the hollow of a decayed oak tree, which was found to