

Phosphoric acid is found in all fertile soils, usually combined with lime. It seldom exceeds 1 per cent. even in the richest soils, and the average in good soils is probably about .2 per cent.

Lime not only affords direct food for plant life, but it also liberates potash and nitrogen held in the soil in insoluble forms. A soil containing less than 1 per cent. of lime is considered to be deficient in that particular.

Nitrogen is supplied by the decaying vegetable matter of the soil. Only as fermentation takes place is it rendered assimilable. Nitrification is brought about by a microscopic ferment, which is assisted by moisture, warmth and carbonate of lime. Very rich soils may contain as much as 1 per cent. of nitrogen, though the average of good soils is .1 or .2 per cent.

In a table on the next page the composition of a number of virgin soils is given. Soil No. 1, from the Red River valley, is particularly rich in organic matter, and consequently in nitrogen. In potash also it is much above the average, and in lime and phosphoric acid it is of fair value. Calculating for the first foot only, it contains 33,000 pounds of available nitrogen, 34,000 pounds of potash, and 9,500 pounds of phosphoric acid to the acre. An average crop of wheat is said to remove 15 pounds of phosphoric acid and 23 of potash to the acre. No. 2 is a sedentary soil derived from felspathic rocks, and consequently rich in potash, but it is poor in other respects. No. 3, which is low in lime and potash, would respond readily to fertilizers, but would be easily leached.