

Secondly, we have nitrogen. The percentage of this element in the tissues of plants will vary from .1 to 3.0, the largest proportion being found in the seeds. With the exception of the legumes, farm crops, indeed all plants, obtain their necessary supply of nitrogen from that contained in the humus of the soil. This so-called organic nitrogen is not directly assimilable, but must first be converted by certain soil micro-organisms into compounds known as nitrates. The process by which this change of inert nitrogen into valuable food forms takes place, is known as nitrification and is one of the most remarkable and important in the whole field of agriculture.

The amounts of nitrogen as nitrates consumed by crops is variable; while some remove not more than 20 lbs. per acre, others utilize 100 lbs. or more. Of the legumes (clover, peas, beans, &c.) and the source of their nitrogen we shall speak more particularly later on.

The cropping of the land, therefore, we are to understand, depletes it more particularly of certain amounts of potash, phosphoric acid, and nitrogen—the so-called essential elements of fertility. To maintain productiveness, it is essential that the stores of these elements in available forms be preserved; to increase productiveness they must be added to.

The rate of soil exhaustion is indicated by the subjoined data of an orchard and field crop.

ESSENTIAL ELEMENTS OF FERTILITY REMOVED APPROXIMATELY
IN 20 YEARS FROM AN ACRE OF SOIL.

	Nitrogen. Lbs.	Potash. Lbs.	Phos. Acid. Lbs.
<i>Apples</i> , fruit, leaves and wood (trees in full bearing)	1,300	1,800	300
<i>Wheat</i> , grain and straw	700	700	400
<i>Mangels</i> , roots and tops	1,500	3,000	700

THE NATURE OF SOILS.

Having now taken this cursory review of the plant's requirements, we must turn our attention to soils, and learn somewhat of their nature and the manner in which they are affected by cultivation. All arable soils consist chiefly of two classes of con-