

stituents : mineral or inorganic, derived from the disintegration of the original rock surface of the earth, and organic, resulting from the decay of past generations of plants, and grouped under the general term humus. Besides these, air and water are present, making the soil a suitable and comfortable medium for the growth of plants, and playing an important part in the preparation of their food. And, lastly, as we have learned in recent years, there are in every fertile soil myriads of micro-organisms, working, under conditions that afford them warmth and moisture and air, in the conversion of inert or locked-up plant nourishment of the soil into substances and compounds more or less immediately available for crops. The transformation of the useless nitrogen of humus, first into nitrites and finally into nitrates, is an important example of the valuable work done for agriculture by these microscopic plants.

We must not now stay to consider in detail the origin of soils nor the various natural agencies and forces that have been and are now at work in their formation. The whole subject is one of peculiar interest and magnitude, and merits a much more careful and systematic treatment than would be possible in this lecture. I can do little more than mention the fact that agriculturally, as well as geologically, the name of soils is legion. There are clay soils and sandy soils, so called from the predominance of clay and sand respectively, and soils rich in humus, and a host of intermediate soils known as loams. Save in the case of transported soils, such as the deltaic soils formed at the mouth of rivers, their mineralogical composition will accord with that of the underlying rock. But whatever the nature of soils, their chief agricultural function always remains the same, viz., to furnish certain mineral substances, among which potash, phosphoric acid and lime are the most prominent; to offer, in combined forms, nitrogen, a further essential for plant life; to hold moisture and air necessary for the growth of plants, and to form a firm, comfortable and warm support for their growth.

Before proceeding to speak of the amounts of plant food in soils, it is desirable that I should call your attention to the importance of humus as a soil constituent, since the method of employing clover as a fertilizer, which I am to bring before you