

Flesh, bread, fruit and the husks of grain furnish the body, with more phosphorus than it requires; and accordingly the superabundant quantity is thrown out in the urine and excrements. Large quantities of concretions formed of phosphate of magnesia and ammonia have been taken from the intestines of a horse. It must have been obtained from the hay and oats.

The phosphate of magnesia is an invariable constituent in the seed of corn (grain), and is requisite for its maturity.

We may here observe that we have a familiar illustration of the presence of phosphorus in vegetable matter in the luminous appearance frequently met with in some decayed woods, and visible at night.

Other substances are occasionally detected in plants, which may be regarded as necessary constituents in some of them. These substances are common salt, sulphate of potash, nitre, and chloride of potassium; clay and slates contain generally small quantities of the oxids of copper, and these are sometimes found in plants, although it is doubtful whether they are necessary for their growth and perfection.

A combination of calcium which is the base of lime, with the fluoric acid, forming fluoride of calcium, may take place of the phosphate of lime in the bones and teeth: the earthy parts of bones are composed principally of the phosphates and carbonates of lime in various proportions, mixed with small and variable proportions of the phosphates of magnesia and fluates of lime. The bones of a man contain three times as much carbonate of lime as those of an ox, which in return contain a larger proportion of the phosphate of lime and magnesia.

Speaking of the fluoride of calcium taking the place of the phosphate of lime in the bones and teeth, Leibig observes "at least, it is impossible otherwise to explain its constant presence in the bones of antediluvian ani-

mals, by which they are distinguished from those of a later period. The bones of human skulls found at Pompeii contain as much fluoric acid, as those of animals of a former world, whilst the bones and teeth of animals of the present day contain only traces of it."

De Suassure has remarked "that plants require unequal quantities of the component parts of soil in different stages of their development; an observation of much importance in considering the growth of plants;" thus wheat yielded 79-1000 of ashes a month before blossoming, 54-1000 while in blossom, and 33-1000 after the ripening of the seeds. It is therefore evident, that wheat from the time of its flowering restores a part of its organic constituents to the soil, although the phosphate of magnesia remains in the seeds.

Fallow time is that period of culture during which land is exposed to a progressive disintegration of its particles by the influence of atmosphere, which renders a certain quantity of alkalies capable of being received into the system of plants, and appropriated by them. Careful tilling of the land therefore must increase and hasten this disintegration or separation of particles. For the purpose of agriculture, it matters not whether the land is covered with weeds, or with a plant that does not extract the potash in it. Many plants are remarkable for the small quantity of alkalies or salts which they contain. Such plants therefore are favourable for fallow, as they do not exhaust the soil. The *vicia faba*, or Windsor bean, contains no free alkalies, and not one per cent. of the phosphates of lime and magnesia. The *phaseolus vulgaris*, or kidney bean, contains only traces of salts. The lucerne and lentil contain only fractionals of a part of the phosphate of lime with albumen. Buckwheat dried in the sun yields only the smallest recognizable quantity of soluble salts. These plants accordingly are termed fallow crops,