

way than that of its affording them *direct* nourishment by the assimilation of its constituent parts.

Sulphuric acid is, as a *direct nutriment*, less essential to clover and others of its class on which it best acts, than to other classes of our cultivated plants, as they contain the smallest amount of compounds united to sulphuric acid, and also less of sulphur; as to the influence of its other constituent, lime, it is present as a *nutriment* in sufficient abundance in nearly every soil, and moreover, plaster acts well, and sometimes best, on those soils which have been heavily limed or which originally contain the largest amount of calcareous matter, its beneficial action must therefore be explained by the relations which it bears to ammonia. It is certainly known that plaster of Paris *when dissolved* exercises an attractive influence on carbonate of ammonia, and by a transposition of its elements fixes it, by forming sulphate of ammonia. This action is however reversed in the dry state, for a mixture of sulphate of ammonia and carbonate of lime will evolve carbonate of ammonia.

Now clover and the other crops which I have mentioned are famous for the large extent of their leafy surface, and derive most of their *nitrogen by assimilating it through their leaves*, leaving the soil richer in this substance than before these crops were produced. Clover and all the plants of this class therefore obtain most of their organic nutriment through their leaves. Plaster, therefore, being sown on these leaves, and the weather being moist or dew being in sufficient quantity to dissolve it, will at once *fix* the ammonia of the atmosphere, and the leaves will take it up and carry it throughout the whole organization of the plant.

This view of the action of the plaster is strengthened by the known facts in relation to its utility. If plowed in the soil, it never produces the same effect as when sown broad-cast. It does not act so well on plants which have but a small leafy surface as on those which have that surface very extended. It has no action in dry, windy weather. It does not act when mixed in the soil on moist land, which shows that its want of action in dry, windy weather is not due alone to its not being dissolved.

Furthermore, and I deem this conclusive as to the views which I have given above; soils may contain a sufficiency of plaster to meet all the wants of the crop, and yet the particular class of plants which I have above enumerated will be much benefited in particular seasons by having plaster sown broad-cast over them.

When sown broad-cast it adheres to the surface of the leaves, and being dissolved by dew it fixes the volatile carbonate of ammonia of the atmosphere, which is taken up by the leaves, and this explains fully all the phenomena of its beneficial action.—