

pursue this interesting and important subject now, but I thought it well, this morning, to draw your attention to this recent discovery in agricultural chemistry, and so, indirectly, to emphasize its importance to our farmers.

By Mr. Carpenter :

Q. At what stage of growth is there the most nitrogen in these plants?—A. The maximum amount of nitrogen is immediately after flowering—as the seed is forming.

By Mr. McMillan :

Q. The scientific men at one time thought that the assimilation of nitrogen was all by the leaves. Are they still of that opinion?—A. No. If you take up a clover plant and carefully wash the earth from its roots, you will notice there are little tubercles upon the roots. In these tubercles will be found bacteria, which in some way, not at all clearly understood at present, but by some physiological process, assimilate for the clover plant the free nitrogen of the air. This is proved by the fact that when the clover plant is deprived of the tubercles it is no longer able to make use of or assimilate the free nitrogen in the atmosphere. It has been found that when the clover plant is grown in soil rich in nitrogen, these tubercles do not develop, showing that their growth is dependent upon a certain "hunger" of the plant for nitrogen. This points to the fact that there is no economy in growing clover for manure upon soils which are already rich in nitrogen, because in that case, they draw nitrogen from the soil and not from the air. But if you supply mineral food in the form of potash and phosphoric acid to a soil deficient in nitrogen, the legumes, by the bacteria in the tubercles, by a process known as *symbiosis*, assimilate and finally convert into albuminoids, within their tissues, the free nitrogen of the air.

By Mr. Roome :

Q. Then the leaves have nothing to do with the assimilation of the free nitrogen?—A. No.

By Mr. Bain :

Q. Does this apply also to the bean plant?—A. Yes.

Q. The roots develop in the same way?—A. Yes, but they have their particular form of bacteria. The tubercles of the lupine contain a different form of bacterium to that of clover, but the function is the same in both cases.

SOILING CROP.

The practice of growing a patch of mixed oats, pease and wheat to be fed to dairy cattle when the pasture runs short, is now becoming common, and wherever it has been tried has been highly spoken of. Sometimes the mixture is of oats and pease only. This green food is succulent, nutritious and palatable, and proves of much value in keeping up the milk flow during the hot dry season. It is a cheap fodder, there being a large yield per acre.

By Mr. McMillan :

Q. Will the development of the tubercles take place most rapidly in a well drained soil, or in a soil well saturated with water?—A. I have no data on that point, but should not suppose the clover would thrive in a soil altogether impermeable to air. I might add, that we can inoculate soil and can induce this assimilation of nitrogen, by transferring to a plot of ground a certain quantity of soil that has had clover or pease grown in it. That will bring the bacteria with it and inoculate the soil. Root tubercles will then be formed on pease or clover subsequently sown.

By Mr. Roome :

Q. What do you include in the term "bacteria"?—A. I include the plants which we ordinarily understand as those which produce fermentative changes, and amongst