# For the CANADIAN LIVE STOCK AND FARM JOURNAL The Nitrogen Question and its Importance to the Farmer.

## By C. C. JAMES, M.A., Ontario Agricultural College, Gueiph. (Concluded from last issue.)

Who are the patient scientists who have been searching out an answer to this question? France gives us the names of de Saussure, Boussingault, Pasteur, Joulie, and Ville ; Germany those of Liebig, Schloesing, Muntz, Wolff, Hellriegel, and a host of others : England those of Lawes, Gilbert, Pugh, and Warington ; while America is represented by Atwater. Surely if such men are engaged in the scientific pursuit of agricultural questions no one can say that there are not within the province of the work principles of a high and important nature.

The conclusions of Hellriegel and Atwater are among the latest to come before us. For a long time the balance of opinion has been towards the conclusion that no plants are able through their leaves to take in or assimilate any of the free nitrogen of the air. These two men are somewhat opposed to this. It has for years been accepted by all that the cereals, such as wheat, oats and barley, could obtain their nitrogen only through their roots, and that they must feed upon nitrates. With this Atwater still agrees. EDITOR CANADAN LIVE STOCK AND FARM JOURNAL: But he rays that his experiments, as well as those of Hellriegel, clearly prove that the legumes, such as clover, peas, beans, lucerne, and tares, have the power of taking up much free nitrogen from the air direct. He says : "The ability of legumes togather nitrogen from the air helps to explain the usefulness of clover, alfalfa, peas, beans, vetches, and cowpeas as renovating crops, and enforces the importance of using these crops to restore fertility to exhausted soils,"

We are perhaps warranted in waiting for further confirmation of these conclusions, hoping that they may be proven to be correct; for if we can thus by legumes gather up nitrogen from the air, which upon the decay of the stubble give up food for the succeeding cereals, we shall have made a great stride forward in profitable agriculture. Dr. Wiley, in a paper read before the American Association for the Advancement of Science, reviewing the work done on this subject takes the following safe and reasonable ground ; he says, " In the light of investigations of the last few years, it may be well to admit that the opinion held by the vast majority of agronomists and agricultural chemists that the free nitrogen of the air never is assimilated by the growing plant should be held open for revision." To this statement we must ourselves subscribe. The farmer, however, is warranted in taking advantage of the doubt or of the possibility of help ; he certainly should, if at all possible, have some of the legumes in his rotation. Clover may or may not feed upon the nitrogen of the air, certainly it does feed deep in the soil and upon nitrogen compounds that the cereals are unable to reach or handle. It is the searcher or accumulator of food for the other crops, giving a good supply in its day, and leaving in the stubble still more richness. In many farms the clover crop, well and judiciously used, has been the turning point in the success of the farming by its indirect and perhaps unperceived action rather than by its direct returns. The former who is wise will by his deeprooted, broad-leaved legumes draw for his interest upon the subsoil and the air as well as upon the surface soil.

One more conclusion. If the nitrogen must first here to be learned ? The air is full of plant food, it is the part of the Professor,

laden with the elements and forces so instrumental in making soil, therefore the farmer should thoroughly underdrain his land to let in this food, and to let in these soil-producing forces and elements. If we could enforce one point only it would be this: let the air into the soil. It will feed the soil and convert the rocky constituents of the soil into soluble plant food, therefore let it in. We have said that the cereals feed upon the nitrogen of the soil in the form of nitrates. The nitrogen of the soil, or of the air, must be worked over in the soil into nitrates, and the entrance of the air helps to produce the necessary conditions for the production of these nitrates; in fact without the air nitrification will not take place, therefore let in the air with its oxygen and its nitrogen, with its carbonic acid gas and its ammonia.

We must close, and in closing, the important conclusions, so far as this nitrogen question is at present understood, to be carried away and put into practice, are that we should use the legumes to gather food from the subsoil and air for our surface soil feeders, and we should open up the soil by drainage and tillage to let in the air with its riches and ameliorating influence.

#### Duty on Corn.

Now that Parliament is in session, we hope THE JOURNAL will bring all the pressure it possibly can to bear on that body to remove this injustice to the farmers; it is no doubt true that the duty may help a few who raise corn to sell, but such number only about one in a thousand of the farming population of Canada. The removal of the duty on corn would in a small measure help to remove us out of the great depression which exists in agriculture, and lighten the load of the farmer, upon whose back all burdens seem to fall. W. H. McNish.

Lyn. Ont.

## Oats .- A Gate Fastener.

Editor CANADIAN LIVE STOCK AND FARM JOURNAL:

DEAR SIR,-I forward you herewith, a small sample of white

DEAR SIR, -1 loward you herewith, a small sample of white oats, grown from seed received from England. As there was no description sent with them, I shall be glad if you can tell me the name by which they are known. As a subscriber to your loursval, I take great interest in your articlet. I have tried the gate fastener mentioned in your number of the last month, page 360, and I think your readers will find that the fastener will work better if they use two stanles indeed of one.

I an having them fixed of one. I an having them fixed to all my gates, and personally must thank you for the sketch. Creekside Farm, Princeton, Ont. J. E. RICHARDSON.

Through the kindness of Mr. Rennie, of Toronto, we are enabled to identify the sample of oats sent us as the Early Cluster, or as sometimes called, the Early English White. It is gratifying to us to know that Mr. Richardson has found the gate fastener to work so well. The suggestion he makes of using two staples will commend itself. We are always exceedingly pleased to have our friends comment or suggest improvements upon any plan or device we offer .-- [ED.

# The Ontario Agricultural College.

Editor CANADIAN LIVE STOCK AND FARM JOURNAL

DRAR SIR,-I, along with the other members of the Wellington County Council, had the pleasure of visiting the Agricultural Farm and College in December.

The new buildings there are a credit to the province, they are very convenient, and are the most substantial structures of wood and nails I have seen.

The barn is a most handsome building, but I think it would have looked better if the walls had been four feet higher; it would have increased the capacity at a very small cost. The workmanship reflects great credit on the builder, Mr. Schwendi-

The live stock, though not equal to what I have seen there before, are looking thrifty. The steers, which were bought this pass through and into the soil, is there not a lesson fall for feeding, are well selected, and show good judgment on

But, Mr. Editor, what took my attention the most was the construction of a road through the farm. The grade seemed to me to be what is required, not only at the Experimental Farm, but on concessions and side roads. The knowledge that will be obtained by the young men who are engaged on it will be a great benefit to the country at large. Our roads at present are a botch in many respects, not intentionally, but because our road masters in many cases do not know how to grade a road.

I hope the Professor will instruct the students in road-making along with the farm operations.



#### A Troublesome Insect.

EDITOR CANADIAN LIVE STOCK AND FARM JOURNAL:

DEAR SIR,—We have been troubled very severely this year in this part of the country (Kent County), with a nasty insect on the turnip crop. I have seen them before in small patches, but never to affect a whole crop as they did this year. Some fields were nearly destroyed with them, the insect was of greenish color, and in some places completely cover the leaves which would will down as soon as attacked. If you or any of your readers can give us a remedy you will confer a favor, other-wise we will be compelled to give up growing them. Highwate. A. J. STONE.

Highgate.

A. I. STONE.

103

Feeling that this question should be entrusted to a more competent pen, we wrote Prof. Fletcher in regard to this insect, and in answer received the following generous reply : Editor CANADIAN LIVE STOCK AND FARM JOURNAL:

My DEAR SIR,-In reply to your letter, I beg to inform you that the insects which Mr. Stone forwards for identification, are the Cabbage Aphis, which occasionally attacks the turnings well as the cabbage. These insects belong to the large and injurious family of plant lice, which attack almost every known plant. They are all small insects, very few species being known which are 14 of an inch in length, and most of them less than half this They are soft bodied insects, frequently of a green color, size which cluster around the young shoots of plants, and suck out the juice by means of a slender tube, into which their mouth parts are modified. When perfect, they possess wings, with which they migrate from plant to plant. They are characterized by being exceedingly prolific. As a rule, it may be said that plant lice pass the winter in the form of eggs, familiar examples of which may be soon upon apple twigs in winter, where they will be found as minute shining black objects, like small grains of gun powder. From these, in the spring, are liatched wingless females, which give birth to fully formed but small plantlice. These are full grown, and again bear other young ones by a process which is analogous '> budding in the vegetable kingdom. No males are born until late in the fall, when pairing takes place, and as a result, the winter eggs above mentioned, are laid. The cabbage plant louse is sometimes very injurious to cabbages and turnips. I have noticed this more particularly in dry seasons. They are, however, seldom developed in these large numbers, and it is not often that remedial measures are enquired for. These plant lice are about 1-10 of an inch in length, of a greenish yellow color, more or less covered with a pale bluish white powder The eyes and some Jots along the sides are black. There will be found both winged and wingless individuals upon the plants at the same time which differ slightly in appearance.

Several remodies have been proposed, such as drenching with soaj-suds, tobacco water, lime water, and brine; but these are difficult of application when the insects are attacking a fieldcrop. The most useful remedy known against plant lice is undoubtedly a keroscne emulsion; but for the proper preparation and application of this remedy, a force pump is necessary. This, however is a most useful instrument for every farmer to possess, and the good results by ridding his plants and fruit trees will soon more than pay for st. To make a kerosene emulsion, dissolve 1/4 lb. of soap int a quart of soft water, by heating it to the boiling point. Take from the fire when boiling hot and turn in 2 quarts of kerosene (coal oil), and churn briskly for about ten minutes, when the whole will be in a frothy creamy mass. When cold, this emulsion will be in a gelatinous mass, that can be diluted in water without the kerosene separating. For the cabbage aphis, one part of this emulsion may be diluted with 12 to 15 parts of water, and this must be sprayed by means. of a spray nozzle over the parts of the plant where the plant-lice are clustered. Every one it to oches will be killed. This is the most economical remedy which can be applied, costing about one cent per gallon as above recommended.

Cb going the crop from the ground which was infested the pre ous year is, of course, a wise precaution to prevent the attacks of insects which injure any given crop. I am sir, yours obediently,

Central Experimental Farm, Ottawa. JANES FLETCHER.