more capable of withstanding unfavorable climatic conditions, as drouth and early frosts, than are crops not so well supplied with lime. The exact function of lime is not clearly understood, but it does seem to aid in the construction of the cell walls. According to some authorities, its absence is felt in less time than either potassium or phosphorus. It is claimed that a supply of lime is just as essential to the plant, in order that it may form cell walls from starch and sugar, as it is for the formation of bone in animals.

There can be little doubt that a proper balance in the supply of these important plant nutrients has a decided influence on the nature of the crop produced. Each one has its own particular work to do, and the absence or deficiency of any one of them will cause the death or the incomplete development of the plant. Added to the fact that these substances are absolutely essential, we find that they are absorbed during the early stages of growth, and that with cereals this gathering period is very short one. It is thus plain that, struggle as may, a plant cannot make a normal development and mature its seed unless it has a full supply of a well-balanced diet placed within its reach.

R. HARCOURT,
Professor of Chemistry.
Ontario Agricultural College.

The Farmer's Wood-lot.

Editor "The Farmer's Advocate":

As there is considerable agitation on at present regarding reforestation, I thought that I would pen a few suggestions in connection with the subject for the consideration of those that are interested in the subject.

Now, there are a few points in connection with this subject that might be taken up and considered by the Governments of the country, as well as the various municipalities. The Provincial as well as the Dominion Government are now spending considerable money, and justly so, to encourage tree-planting and a better care of the farmer's wood-lot. A nursery has already been established at the Ontario Agricultural College, and a School of Forestry is talked of, and the annual Dominion convention was held at Ottawa a short time ago to discuss the best means to adopt to further the work. All those are right and proper, but could not the Government do something in the way of granting the township municipalities the power of exempting the wood-lots that are not pastured from taxation? This, in my opinion, would encourage the farmer to be more interested in the project of reforestation. But as it is at present, the timber lands are being taxed at a higher rate than the cleared land. This, of course, has a tendency to cause the farmer to make haste to get rid of his bush. I have drawn the attention of the farmers to this at some of the Institute meetings, but some have objected to this on the ground that it should not be extended to parties holding timbered lots for speculation, but acknowledged that it would be a great benefit to the farmer who is holding his timber for fire-wood only, or general use on the farm. Now, there is another side to this question, and a great many lose sight of it, or have not considered it of so much importance as wood for fuel; that is, the influence the timber lands have on the growing crops and climate. This, in my opinion, is of vital importance, and should not be lost sight of, and I think the Governments could not do better than pass an act so that all unpastured land in timber, owned by farmers, may be or should be exempted from taxes. This would be quite an inducement for farmers to take better care of their wood-lots. I trust that the agricultural papers will take up the question and give the idea wide circulation.

Bruce Co., Ont. A. E. SHERRINGTON.

Wm. Lees, Percy, Sask: "'The Farmer's Advocate' is the paper of the day."

How Shall we Apply Farmyard Manure?

Editor "The Farmer's Advocate":

It still remains a very practical question for the agriculturist to decide, whether the farmyard manure should be applied to the fields in winter while in the green state, the fields thus deriving the full benefit of the manure, or whether it should be applied in the summer or fall months after it has remained in the yard, subject to an extensive loss by fermentation; a loss of great moment, which all manure undergoes in the heap, and the direct loss by leaking which has drained from the yard. Our manure is applied to the land we intend for hoed crops—a good liberal dressing—and is applied throughout the stabling season just as it is made. We have practiced this system of handling our manure for a number of years, and for many reasons we would not adopt a different system. By the application of farmyard manure we are in one way able to build up the store of fertility that our farms have been depleted of by the primitive methods of cultivation of the pioneer, and to supply the constant drain by the crops we are growing at present. In order that the farmer may apply manure intelligently, it is necessary that he understand the elements that constitute this by-product, and the chemical changes these elements undergo before the manure is of its greatest value to the soil, and at what times and under what conditions manure loses the greatest amount of its most valuable ingredients. By applying while green throughout the stabling season, I claim we offset many detrimental effects that would surely follow were it allowed to accumulate in a pile, and often we find this pile under the eave of a large barn—which is so much the worse.

On the soil upon which manure has been applied in winter, we find it very easy to prepare a deep, mellow seed-bed, containing abundance of moisture, and a large amount of available plant food in soluble form. Such conditions as these are very favorable to the growth of plants. Seeds germinate more quickly, and the plants, owing to their early growth, can endure drouth better. By applying manure while in the green state, a larger percentage of the liquid excrement is saved and applied to the land, and as the liquid excrement contains the most important ingredients, such as broken-down animal tissues, slight traces of phosphoric acid and more nitrogen and potash than the solid excrement, it is very important that it should all be saved as far as possible, and right here winter manuring very strongly recommends itself.

When manure is placed in a heap, let it be ever so small, there is constant fermentation going on, and this is always accompanied by a loss of nitrogen, in the form of ammonia. Bacteria are constantly at work in a manure heap, and while at first they aid the process of nitrification, later they attack the nitrates, which are all soluble, extracting the oxygen, and the ammonia, which contains a great deal of nitrogen, passes off. I shall not enter on a full discussion of the process of nitrification and denitrification as it goes on in the manure pile. Another advantage that should appeal to every farmer is the great saving of time, and, consequently, the saving of labor; and, also, that this work can be done better in winter, when we are not so rushed as in seed time—a greater area can be covered, and covered more evenly, than it could be with the same manure after it has remained in the farmyard all summer. By dropping the manure from the litter-carrier on the spreader in fall and spring, and on the sleigh in winter, while the snow is deep, one handling is saved, and the manure is always out of the way; and if this advantage were all, it would be worth something.

When applying it in winter, I would strongly advise spreading the manure on the snow instead of putting it in piles. When it is in piles there is sure to be a loss from fermentation, and then the good ingredients of the manure will leach through, and the field will be unevenly fertilized. From manure heaps, where fermentation is extremely rapid, large quantities of ammonia is being evolved, carrying with it much of the valuable nitrogen; afterwards this manure presents a scorched appearance, and is practically worthless. It is true that green manure contains a large proportion of unavailable plant-food, but if it has been properly cared for, and contains all the liquid excrement of the animals, it will contain sufficient available plant food for the present requirements of the crop, while the remainder will gradually ferment in the soil, and become available for the succeeding crops.

As a result of investigation up to date, the eminent authority, Prof. R. Warrington, deduces the following conclusion: "The original voidings of the animal have a far greater manurial value than the final product of the manure heap, which the farmer carries to his fields. In the whole process, from the stable to the field, the loss is going on. This loss is falling on the most valuable constituent of the manure, and resulting finally in a residue of comparatively inert matter." So we conclude, so far as economy of plant food is concerned, actual practice proves and science backs up the advisability of hauling manure as soon as practicable.

Dundas Co., Ont. CLARK HAMILTON.

How Best to Apply Manure.

Editor "The Farmer's Advocate":

I have been interested in the discussion on this subject of late, and I think it is a very important question—one not very easy to solve. Your correspondent, Mr. Lawson, in Feb. 22nd issue, criticised Mr. Thompson on what I consider the most important point in manuring. Most farmers can arrange to manure for corn, potatoes and roots satisfactorily, as the season for planting same is not so rushed, and if we can prevent fermentation of manure intended for those crops we have made no mistake; but Mr. Thompson was writing of manuring for spring cereals, and for these it is difficult to know how best to apply the manure. If we haul and put in heaps, if heaps are not large enough to ferment, they will probably hold the frost in spring and prevent early manuring, although, if manure was intended for field purposed to be sown last in our seeding operations, it might be successful, as we are generally most rushed then to finish. Manure, to be worked in with cultivator or disk, must be spread with spreader, unless straw has previously been cut, which is not practiced on every farm. My experience in manuring is to put on in spring with manure spreader as soon as conditions will allow. I have worked it when the ground was frozen, but it is very hard on machine. I keep my hog, cattle and horse manure separate, as I think where there are any number of hogs kept it is a waste to apply such rich manure for roots, which require a heavy coat. I apply hog manure for barley, to be seeded, at the rate of three to six loads per acre—50-bushel loads. I then work in with cultivator, and sow first thing in spring.

Simcoe Co., Ont. J. H. M.

Stave Silo Satisfactory.

Editor "The Farmer's Advocate":

I noticed a paragraph in one of the January numbers, recently, condemning the stave silo in many ways. I thought that some intending builder might be discouraged by this account, so, if you do not think I am taking up too much space in your valuable paper, I will give you my experience. The faults that the Norfolk farmer drew our attention to were: Silos blowing down, hoops getting loose in summer, ensilage spoiling round the outside, and staves decaying. Well, I may say I have had a stave silo (15 ft. by 26 ft.) for seven years, and never had anything but the very best results. I built a very light frame building around the tub right at first, and this did away with any danger of blowing down, and, while the staves shrink in summer when it is empty, they swell and become tight when filled with ensilage. As to the ensilage spoiling, I find that if it is properly mixed and well tramped while filling, it will keep perfectly. The staves of my silo are spruce and tamarack, and, at the end of seven years, they do not show the least sign of decay.

Lanark Co., Ont. SUBSCRIBER.

Farm Buildings and Home of M. A. Bonesteel, Hastings Co., Ont.