

Summary : 100 large heads.

1900 :	Oats	\$110	
	Wheat	110	
			\$220 x 8 = \$1760
1901 :	do		1760
1902 :	do		1760
			\$5280

Three year lb. grain per acre competition :

Oats.....	\$295
Wheat.....	295
	\$590 x 8 = \$4720
	\$10,000

V. All those who desire to enter the competition should send their names and addresses to Professor Robertson, Ottawa, before the 1st May, 1900. These communications should contain only the words "Entry for seed grain competition," and the full name and address. They will be carried by mail free of postage.

I particularly request that no questions be asked on these entry applications. Full particulars will be mailed in good time to every one whose entry is received; and I am sure the newspapers will accord their much-prized courtesy and help in giving publicity to any further announcements. The competitors will doubtless number many thousands, and it will not be practicable to write letters to them individually. The plan provides for 640 prizes, of which 16 are \$100 each; 16 are \$75; 16 are \$50 each; and 64 are \$25 each.

I invite the teachers to join in helping forward this educational movement. I would not on any personal, private or selfish matter add one straw to their already heavy burdens of labor. I think they do the most valuable and the most poorly-paid service of all the workers in our country. However, in this case although they may neither seek nor expect material reward, they will, with the certainty of seed time and harvest, win the fulfilment of the apt promise "Cast thy bread upon the waters: for thou shalt find it after many days."

JAS. W. ROBERTSON.

Ottawa, Jan. 1st, 1900.

Clover and Phosphate

To the Editor of FARMING:

In your report of the annual meeting of the Ontario Fruit Growers' Association, in FARMING for Dec. 12th, some reference is made to the address of Mr. Powell, of Ghent, New York, but so brief is your summary that but a slight idea of his views on the important subject of manuring can be gained from it. Some points brought out, however, command attention. His reference to the requirement of humus in the soil is important, but the correctness of the popular idea that this humus is needed principally to "hold moisture" may be challenged. While a soil will assuredly hold moisture better for being well supplied with humus, such moisture holding action is but a secondary function of humus. May we not consider humus as the basis of plant food in the soil, and the soil the stomach of the plant. The humus resulting from the decomposition of organic matter in the soil (stomach) of itself supplies material from which the plants with their weak acids can obtain soluble food. Also the humic acids produced by the humus dissolve and free other ingredients in the soil which forming humates provide more food for the plants. It is the combining of these dissolved ingredients in the soil which then gives the plant the necessary proper food. All this is wonderfully similar to the process of animal digestion, only that in the latter case the one living being is detached from the earth and moving about carries in its stomach a mass of material to dissolve from,

while the other, being the plant, being fixed, passes its rootlets through a stationary mass. And here we open another important point. As the animal takes into its stomach a great deal more food than it can dissolve and uses only the most available portion of it, so the plant should be similarly supplied with an abundance so that it can gather from it its requirements in a given time. But as in the case of the animal, so in that of the plant, an unbalanced ration in the stomach causes first an undue development of certain organs or peculiarities, and the want or poverty of one important ingredient retards development.

I am as strong an advocate of clover manuring as any of my neighbors, but I deprecate the teaching which seems to be running riot on it. Clover adds importantly to the soil in nitrogen obtained freely by it from the atmospheric storehouse, and I look upon it as the proper source of nitrogen for farming, but clover is a rank feeder of phosphoric acid, and needs a copious supply of it to enable it to get that nitrogen and so develop protein compounds.

Clover-growing for the feeding of the following crops or cattle impoverishes the soil in phosphoric acid, and by-and-by the soil fails to produce clover or anything else satisfactorily, because the phosphoric acid available becomes reduced. This reduction of phosphoric acid leaves the clover unable even to assimilate nitrogen.

In such a condition as this an experiment would surprise us by showing that clover would respond to an application of nitrate. This of course we know is not a natural condition of clover, but misleading experiments of this kind crop up here and there unexplained in reports, and bewilder the experimenter and his readers.

As Mr. Powell has been growing fruit and trees on the soil he describes, he must steadily decrease the phosphoric acid. I would expect the first indication of it would be found in the development of the reproducing power of the fruits, in the keeping qualities of the produce, and in the hardness of the wood, but I might be mistaken in this, for the clover itself may show the first evidence of deterioration. As may be inferred, I advocate phosphating for clover, but on soils well supplied with humus the phosphate of lime used should not be water soluble, but in a condition to yield readily to the humic acids. Just on the moisture point we should bear in mind that a soil rich in easily soluble material will suffer less in a drouth than a poor soil, for the plants will not require so much water if that water is rich in nourishment; and they will do better, for a teaspoonful of fluid beef in a cup of water has as much strengthening power as the same amount in a gallon, with the further benefit of less strain on the system.

I would add to Mr. Powell's advice of clovering for nitrogen the timely warning to balance the nitrogen with phosphate. It may be worth noting that peas and vetches are quite as successful agents for obtaining nitrogen from the atmosphere, but, being cultivated plants, require more soluble phosphate to develop the nitrogen-gathering power. Even the graminaceæ will not make full use of the nitrogen presented to them in the soil if they are not well supplied with phosphate.

Fernside, Jan. 10th, 1900.

T. C. WALLACE.

Cement in Farm Structures and Buildings

Synopsis of an Address Delivered by
Mr. Isaac Usher, Queenston, Ont.,
at the Farmers' Institute Meetings
in Manitoba

To the Editor of FARMING:

I was requested in a letter of October 16th from Mr. Hugh McKellar, Secretary of Farmers' Institutes for Manitoba, to write a copy of my address for publication in his annual report of Institute work. My absence from home