NEW CARLISLE NOTES

On Tuesday morning at about 3 a.m. there passed away another of the old land marks in the person of Mr. W. J. Flowers at the age of sixty-five years. Deceased has been suffering for the past eight months and bore his illness very patiently.

Mr. Flowers was a very respected man and was always ready to help both with time and money for every good cause, especially in the cause of temperance, which was very near his heart. Many will feel they have lost a good kind friend and neighbor.

He leaves to mourn his loss, one son, W. A. Flowers and one daughter, Mrs. Arthur Horie, the latter whose home is in Saskatchewan came a few months ago to wait on her father. Much sympathy is expressed for the brother and sister.

His wife predeceased him about two years ago.

The funeral was conducted by the Rev. Mr. Buckland at the house and Anglican Church where a very appropriate address was given making special mention of deceased as to his character and citizenship.

Mr. Flowers has been a member of the I.O.G.T., for about forty years.

COMPARATIVE TESTS BETWEEN LIMESTONE AND GROUND STONE

In agriculture as well as in religion, it is well to remember the injunction to "be ready always to give an answer to every man that asketh you a reason of the hope that is in you;" and attention is called to the following reasons for the hope of Southern agriculture in ground limestone:

The Maryland Investigations

One of the most important investigations on record to determine the value of lime and the comparative value of caustic lime and natural lime (lime carbonate) is that conducted in a Southern State by the Maryland Agricultural Experiment Station. In these experiments 2500 pounds per acre of lime carbonate were applied in the form of marl and also in ground oyster shells, and equivalent amounts of caustic lime from two sources. During the eleven years of this experiment; as an average of all tests, the increase produced was as follows: Of corn, 31 bushels for caustic lime and 49 bushels for lime carbonate; of wheat, 1 bushel for caustic lime and 11 bushels for the carbonate; and of hay 86 ton for caustic lime and 1.53 tons for lime carbonate. In commenting upon these investigations Director Patterson, of the Maryland Experimental Station, says:

"It will be noted that the carbonate of lime gave decidedly better results than the caustic lime."

The Pennsylvania Investigations

The most extended investigation on record relating to the use of ground limestone and caustic lime in comparative tests has been conducted by the Pennsylvania Experiment Station. Four plots of land were treated with two tons per acre of burned lime every four years (the lime being hydrated, or slacked with water, before being spread on the fields), and four other plots received two tons of ground limestone every two years. A four-year rotation was practiced, consisting of corn, oats, wheat, and mixed clover and timothy, four different fields or series of plots being used so that each crop might be represented every year.

After twenty years' results had been secured, the Pennsylvania Experiment Station reports data showing that the land treated with ground limestone had produced per acre, during the twenty years, 99 bushels more corn, 116 bushels more oats, 13 bushels more wheat and 5½ tons more hay, than the land treated with caustic lime.

Moreover, after these investigations had been in progress for sixteen years soil analysis showed that the caustic lime had destroyed 4½ tons of humus and dissipated 375 pounds of nitrogen per acre as compared with the ground limestone. This means that every ton of caustic lime used had destroyed the equivalent of 4½ tons of farm manure, and dissipated soil nitrogen that would cost about $7.00 to replace in commercial form.

In discussing these investigations, Doctor Frear, of the Pennsylvania Agricultural Experiment Station, writes as follows:

"In each case the yields with the carbonate of lime (ground limestone) showed superiority under the conditions of this experiment over those following an equivalent application of caustic lime."

The Tennessee Investigation.

In these Pennsylvania experiments heavier applications were made than are necessary or advisable, and we may ask the question: If two tons of caustic lime once in four years destroy $14.00 worth of nitrogenous organic matter, how much would one tone destroy? This question is answered by the Tennessee Experiment Station. Experiments were conducted with the growing of wheat, followed the same season by cowpeas (used as green manure) on twelve different plots of land, and on four other plots the cowpeas were removed.

One ton per acre of burned lime was applied to one-half of every plot. As a general average of the sixteen plots the total increase from the caustic lime amounted to 17 bushels of wheat during the next five years; and as a general average of all plots the loss of nitrogen from liming amounted to 91½ pounds per acre; and of this loss the Tennessee Station states that "at least 65 pounds were wasted."

By computation it will be found that for each five years 117 pounds of soil nitrogen were worse than wasted by the use of two tons of caustic lime in Pennsylvania, for the crop yields were even lower than where ground limestone was used. Thus one ton of caustic lime per acre does more than half as much damage as two tons; and it may be added that this is in harmony with all agricultural experience and experiment; namely, that doubling the application does not as a rule double the effect, whether the material be lime, manure or fertilizer.

Half-informed people often advise farmers to use either ground limestone or burned lime depending only upon the relative cost for equivalent quantities; but dare we ignore the enormous destruction of humus or organic matter and the dissipation of soil nitrogen as shown by the long-continued Pennsylvania experiments and fully confirmed by the more recent Tennessee experiments? On the contrary, these modern carefully conducted chemical investigations as to the effect of caustic lime upon the soil itself forcibly remind us of the long-established opinion of European farmers concerning caustic lime, based upon centuries of agricultural experience, and well expressed in the German proverb, "Kalk macht die Vater reich, aber die Sohne arm," a literal translation of which reads, "Lime makes the fathers rich, but the sons poor;" and also expressed in the English proverb, "Lime and lime without manure will make both farm and farmer poor."

The Ohio Investigations.

Attention may be called to the fact that where caustic lime was applied with farm manure in the Pennsylvania experiments it produced much better results (as compared with manure alone) than when used without manure, but no test was made with ground limestone and manure; and, hence, no comparison is possible. Fortunately, however, we have results from such an investigation conducted by the Ohio Experiment Station, where 1000 pounds per acre of burned lime and an equivalent amount of ground limestone (1780 pounds) are applied with 8 tons of farm manure every three years in a rotation of corn, oats, and clover. Manure alone was not used, but if we assume that gypsum at least paid its cost when used in addition to 8 tons of manure, then the average net profits from three acres (one acre of each crop) were at least $5.57 for ground limestone, and $4.27 for caustic lime, as an average of eight years' work, with no deduction for the destruction of organic matter or waste of nitrogen by the caustic lime, and using the prices adopted by the Ohio Station.

The English Investigations

Porter and Grant in a recent Farmers' Bulletin issued by the Agricultural Department of the County Council of Lancashire, England, report experiments on both manured and unmanured meadow lands, showing that ground limestone is more profitable than burned lime for application to grass lands which are in need of lime.

In the above discussion are summarized the established facts from all of the long-continued investigations the world affords on the comparative effects of caustic lime and the natural carbonate of lime; and the farmer and landowner should be able to draw trustworthy conclusions from these facts.

Alfalfa Experiments

The Rhode Island Experiment Station has reported thirty-seven field experiments with the use of ground limestone for alfalfa, and on thirty of these fields the soils were deficient in lime. The results from these thirty fields were as follows: Where commercial fertilizers alone were used (62 tests) the average yield was 1.20 tons for the season; where 2½ tons per acre of ground limestone were applied in addition to the fertilizers, the average yield (79 tests) was 3.27 tons; and where equivalent applications of caustic lime were made (38 tests) the average yield was 3.14 tons. No investigation is reported relating to the effect of the caustic lime upon the soil humus.

Illinois Experiments

As an average of all results secured during the first four years of the experiments the Illinois Experiment Station reports increases in crop yields of 77 tons of hay (clover or cowpeas), 8.2 bushels of wheat, 12.4 bushels of corn, 8.4 bushels of oats, from the initial application of six tons per acre of ground limestone on the acid upland soil of Southern Illinois (Saline County), each crop being represented every year; and further applications of 2 tons per acre every four years will not begin till eight years after the initial heavy application was made. Improvement in quality of crops also occurs, especially in the hay crop.

In permanent systems of soil improvement, the first marked benefit of ground limestone is usually upon the legume crops, especially upon the biennial and perennial legumes (clovers and alfalfa), and these in turn make possible large additions to the soil of nitrogen and humus-making material by plowing under crop residues or farm manure. As an average of the third and fourth years in these Illinois experiments, limestone increased the legume crops by 1.1[illegible] tons per acre.

Authoritative Opinions on Lime

(By Hall of Rothamsted.)

The eminent English authority, Professor A. D. Hall, for many years Director of the Rothamsted Experiment Station, makes the following statement in his work on "Fertilizers and Manures:"

"The question of whether lime is required as a regular part of the routine of farming on a given soil can be decided only by an analysis of a soil; any soil containing less than [illegible] of calcium carbonate [illegible] by liming, and when the [illegible] falls to 2 per cent [illegible] necessity [illegible]"

By Thorne of Ohio

Professor Charles E. Thorne, author of a most valuable treatise on "Farm Manures," for twenty-five years Director of the State Agricultural Experiment Station of Ohio, and clearly one of the highest authorities on soil fertility, writes as follows:

"When the land begins to need lime, it is a waste of time, energy and money to continue to cultivate it until this need is supplied; for the economic use of every other fertilizing material, including manure, depends upon the lime supply."

By Wheeler, of the American Agricultural Chemical Company

Doctor H. J. Wheeler, a prominent investigator and authority on the subject of lime, for many years the Director of the Rhode Island Agricultural Experiment Station, now the agricultural chemical expert of the American Agricultural Chemical Company, writes as follows in his 1913 publication on "Manure and Fertilizers," under the captain, "Liming; the Most Basic Treatment:"

"Whether, therefore, a soil is strictly acid or is sufficiently lacking in bases to require their addition, even if for other reasons than for the neutralizing of acidity, liming is suggested as a suitable remedy. In fact, no other basic treatment, excepting possibly in some cases with magnesia, is either so economical, so lasting, or is it followed by such general good results, as liming."