PRIZE ESSAYS.

No. 3—Reply to Newcastle Letter.

In your November issue, H. M. asks for advice and information on the following "things in farming":

1st. When, how, at what time, and in what quantity to apply lime for wheat?

2nd. As to the propriety of applying salt and ashes with the lime before sowing?

3rd. Should salt be sowed on barley land when you sow the barley, or when the barley is up?

4th. Will salt hurt young clover?

5th. Will it pay to sow clover with the barley in the spring to be plowed under in the fall?

6th. Will it pay to seed down every field each year?

7th. Will it pay to plow up in the fall the land I seed in the spring?

In order to answer these inquiries satisfactorily (as may be in the prescribed space of a column and a half of this journal), and to give your correspondent reliable advice, it would be at least desirable, if not necessary, to know more about the condition of his land, his wishes and intentions, than can be gathered from his letter. It appears that H. M. follows no system of crop rotation, at least with his grain fields—that he purposes sowing wheat with clover on certain fields, and on certain other fields barley and clover; in both cases plowing under the clover for the succeeding crop, applying lime, ashes and salt as manure.

Whether H. M. purposes using other manures he does not inform us, nor does he tell us anything more about the condition of his fields than that part of his land is clay, but the major part clay loam, or clay rendered friable and fitted for the profitable growth of crops by working it, and the consequent exposure to the action of the atmosphere by the admixture of organic manures, supplying nitrogenous matter, of which clay is naturally destitute, and by the chemical action of inorganic substances. H. M. does not tell us whether he has been in the habit of employing lime, ashes and salt, as described and proposed in his communication, but I take it for granted that he has not, otherwise he would be in a position to give information from the very best source—that of practical experience—instead of seeking information and advice from others. Taking these premises for granted, the writer would proceed to reply to H. M.'s inquiries—not in consecutive order, nor separately; as the materials which H. M. proposes to employ are to be used together, it will therefore be necessary to consider their actions upon each other, upon the soil, and of all these upon the future crop. Of course your correspondent knows that the best results cannot be obtained from clay soils without sufficient drainage, which, of course, must be artificial; also that no land pays better for the expense thus incurred than clay land. No matter what may be applied to undrained clay land, whether lime, ashes, salt, barnyard manure, or other organic or inorganic manures, a large percentage of waste results, unless the husbandman can afford to wait until the superabundant moisture has evaporated from the soil, and even then dry soils are so retentive of moisture that in rainy seasons water bears too large a proportion to manurial agents in solution, besides that the soil itself is not mechanically in a condition fit for the growth of plants.

Neither lime nor salt are, in a practical sense, manures. Lime, it is true, is required by all plants, but in such extremely small proportions, and it is so universally present in sufficient quantities, that its special application is unnecessary. Lime is, however, of the greatest importance and value as a comparatively cheap, easily applied, and most efficient agent in the disintegration and solution of the inorganic constituents of soils, and in the decomposition of humus or their organic ingredients, thus providing nourishment in an acceptable form for the use of plants. Clay soil is in an especial manner benefited by the use of lime, which sets free the alkaline silicates, etc., of which it is an inexhaustible storehouse, and not only sets them free, but presents them in a soluble state to the wheat and barley roots which will seize upon them with avidity.

With reference to the quantity of lime which it would be advisable for H. M. to use, I am most decidedly of the opinion that 10 bushels, the quantity which he proposes to put on an acre of land, is quite inadequate to the solution of the mineral constitutents of the soil and the decomposition of the clover which he proposes to turn under; 100 bushels per acre would be a light application to clay land. After the first application 10 bushels to the acre might be sufficient. The writer would prefer to apply lime on a summer fallow. The lime may be handed from the kiln, and put on the ploughed land in small heaps which should be covered with two or three inches of soil, and left until slackened by the atmosphere of carbonic acid, when it should be evenly spread and harrowed in.

It is very generally conceded, that salt applied to grain crops increases the yield of grain as well as stiffens the straw. I have before me a record of experiments made on the farm of the Royal Agricultural Society of England, according to which an application of 300 pounds of salt per acre resulted in a yield of 39 bushels, as against 29 bushels from an acre unsalted. Salt is also chemically adapted for use with lime. I should not, however, advise the use of salt under the circumstances which I presume to be those of H. M.

Ashes not only furnish to soils all that crops require for perfect growth, but they also greatly improve the mechanical texture of heavy soils, and absorb volatile ingredients that might otherwise escape and be lost.

The practice of seeding with clover to be ploughed under, is one that cannot be too strongly commended. Clover absorbs large quantities of free nitrogen from the air, incorporating it into its substance, which, when ploughed over, and aided by the action of lime, affords soluble nitrogen for the use of plants. Not only this, it greatly improves the texture of both light and heavy soils. The writer is of the opinion that good crops of wheat and barley should result from the adoption of the plan proposed by H. M. of annually seeding down with and ploughing under clover.

I have endeavored to answer the enquiries made by H. M. as fully as the information contained in his letter concerning the circumstances of the case, and the time and space at my disposal, will permit, and would say in conclusion, that I hope that the liberality of the editor of this journal will result in securing to H. M. and the readers of the ADVOCATE a great deal of valuable information.

E. S. C., Newport, N. S.

No. 4—Reply to Newcastle Letter.

In the November number of the ADVOCATE, which, by the way, did not reach me till the 19th inst., you offer a prize of $5 each month for the most useful and practical articles pertaining to the agricultural interest and prosperity of farmers. I will endeavor to give a satisfactory reply to your correspondent, H. M., which appears in the current number of the ADVOCATE, and first on lime, the great essential of our cereals, without a due supply of which no success in grain farming can be attained. Lime, to some extent, may be found in all soils, and where it does not naturally exist in sufficient quantity the defining must be supplied by the farmer. Lime in itself does not supply the neccessary ingredients for plant food, but by entering into chemical combination with other substances, it brings them into a soluble form so that they can be taken up as plant food. As a necessary preliminary either the land must be naturally dry or rendered so by surface or underdraining. Marshy land, when thoroughly drained, contains too much acidity to produce anything but aquatic plants or sedge. Hence, lime being an alkali, counteracts that acidity, and brings soil into a suitable condition to produce either grain or grass crops. From the nature of lime it follows that to apply it to the soil year after year, without the addition of farm yard manure, impoverishes the soil instead of improving it; this may be called the abuse of lime. The quantity to be applied per acre must depend on the nature of the soil. In light soils about 100 bushels to the acre is sufficient, whilst a clay loam, if not originally a limestone soil, would be the better of an application of 200 bushels per acre, whilst for heavy clays 300 bushels might be applied with advantage, although from the tendency of lime to sink into the soil it is generally considered better to apply that quantity in successive years rather than at once. Lime has the opposite properties of binding sandy soils, whilst it loosens and renders friable heavy soils. One lavish mode of applying it used to be, casting the freshly burnt lime, which is lighter of carriage and smaller in bulk than slacked lime, into the field and piling it in heaps of 25 or 50 bushels in a heap, levelling the top of the heap and covering it with a few inches of earth, and in about 14 days time the lime would be slacked, when a man was sent with a wheelbarrow to wheel the lime out and lay it in small heaps at as equal distance from each other as possible, but at the same time so near that the lime when scattered with a longhandled shovel would cover the allotted space of ground as evenly as possible, and harrow it over before sowing the seed. This is the way we used to apply the lime in the county of Cornwall in my time A less expensive way would be to load a cart with the unslacked lime and let a boy drive on slowly, while a man walking behind would take out the lime with his shovel and scatter it over the ground. As time has a tendency to decompose woody fibre, it follows that wherever this exists in the soil the fresher the lime is applied and harrowed in the better, as its caustic qualities are soon weakened by its power of attracting moisture from the atmosphere, on which account the good effects of lime are always more apparent in a dry summer than in a wet one. It was always considered best not to compact freshly slacked lime with stable manure, but to apply the stable manure first, plough that in, and apply the lime afterwards to be harrowed in only, as it has a natural tendency to sink into the soil deeper every year. The foregoing proportions of lime to the acre are used in England, both summer and winter; a less quantity may do, especially for clay land, which, if ploughed in the fall, will be sufficiently pulverized by the action of Jack Frost during the winter, although even here some soils have naturally so little lime in them that the foregoing preparations would not be too much. As ashes and lime are both alkalies, I do not see what benefit would result from mixing them together. I have never tried mixing salt and lime, although I have been advised to thin one bushel of salt with ten bushels of lime, keeping the mixture under cover, then sprinkling it with water and turning the heap every day for a fortnight, or dissolving the bushel of salt in water, and slacking the lime with that, when it may be applied to the land at the rate of 20 bushels to the acre, to be spread broadcast and harrowed in with the grain, or mixed with compost manure if required for top dressing meadows. Nor have I yet tried salt as a manure, although an acquaintance of mine told me he had sowed it broadcast at the rate of 20 bushels to the acre on part of a field of barley with a very beneficial result, the difference between the salted and unsalted portion of the field being very perceptible throughout the summer. I should not approve of seeding down a field of grass, as that would prevent a proper rotation of crops being carried out besides being very expensive. If the field were much worn out, I should prefer as being less expensive sowing buckwheat early in the spring, and when it was about a foot high ploughing it in, and resowing with buckwheat to be ploughed in early enough to admit of a crop of fall wheat being sown by the 15th of September. However, I should recommend experiments of this kind to be tried on a small scale at first. Soils and situations differ so much that a mode of proceeding which might answer for one place might not do for another. As for the application of salt to clover I have not tried it, but as a moderate quantity of salt is beneficial to vegetation generally, I should think it would be worth trying, especially as we are so remote from the sea coast that the air is not so loaded with saline particles as it is in the old country.

SARAWAK.

An Experiment with Fall Rye.

SIR,—I took one of the most exhausted fields on my farm, containing $4\frac{3}{4}$ acres, and completely overrun with the well-known pest, Canada thistle, ploughed it deep in the latter part of September, and sowed two bushels per acre of fall rye. In the spring I turned on all my stock, four cows, four horses, and three sheep and their lambs, about the 20th of April, and kept them on till about the 24th of May, when they had it cropped so close that I took them off for a week to give the rye a start. The last week in June I ploughed the field about nine inches in depth, harrowed well, and in about two weeks ganged it over, and harrowed again about the first of August. I put on about twelve loads of well rotted manure per acre on the highest parts, and ganged it down September 1st. ridged it up about six inches deep, and sowed with a broad cast seeder two bushels per acre of clawson wheat and harrowed once. This year I cut nearly forty bushels per acre, wheat weighing 61 lbs. to the bushel, and all the thistle could have been bound into one small sheaf. Soil, part clay loam and part sandy loam, but a clay subsoil.

J. D., Uxbridge.