of cattle. We have three acres of orchard, have usually about fifty acres in grain, and keep on an average from 60 to 100 sheep. We have over 70 at the present time. About the only thing done extra on account of the sheep is to sow half an acre of vetches or some mixture for green feed in fitting up show sheep. We only grow about two acres of roots (mangolds). We sow some rape seed among our oats, this makes a lot of cheap feed for sheep. I can safely say that sheep make several times over more clear profit than all the other farm operations put together. Sheep, however, have their ups and downs ; but have not failed once in thirty years to pay a fair dividend on the capital invested, sometimes one hundred per cent. A flock of good sheep of the right sort well managed will get the farmer out of debt, keep him out of debt, lay him up something for old age, and leave the farm fertile, clean and productive for those who come after."

Smith Evans, Gourock, Ont .:

"You letter of the 21st inst. to hand in reference to sheep raising. A young farmer in Western Ontario asks how many sheep could be kept on one hundred acres. I think he might profitably keep about twenty-five ewes. A great many common breeders in our section run their sheep on the road side till after the crops are off in the fall. I would recommend sowing some rape after the fall wheat is off or sow some in June for the lambs after they are weaned. In regard to the cost of keeping a sheep a year I would say about two dollars for the keep of a common sheep."

John Campbell, Fairview Farm, Woodville, Ont .:

"Replying to the enquiry of recent date sent you, regarding the number of sheep that can be profitably kept on a good 100-acre farm, much depends on how the farm is otherwise stocked. Where sheep-raising would be made the principal business, and other kinds of stock kept only in sufficient numbers for family needs and to work the farm, a breeding flock of fifty or sixty ewes may be kept on the average 100-acre farm in our best districts. A neighbor who pins his faith strongly on Shropshires, keeps a breeding flock of about thirty ewes and winters over threefourths of his lambs, which usually average one-and a-half lambs per ewe and over. He also keeps two or three milch cows, a team from which he raises foals, and also keeps pigs ; all on a fifty-acre farm. During five years I never knew of his being obliged to purchase any feed.

Probably your subscriber's wish is to ascertain what number of sheep can be kept successfully on a 100-acre farm of good soil, where other lines of stock-raising are given the first place. In that case I would say that a breeding flock of fifteen ewes would be quite enough, and can be kept with much satisfaction, and most likely a larger clean gain can be secured than in keeping a larger number. It is a fact not easily accounted for that a small flock stands a far better chance of giving its owner a larger percentage of increase at maturity, as well as greater individual weight of the progeny, than a flock where numbers more than actual gain is studied more in its management. I will give some figures showing what may be accomplished along the line which your enquirer is considering, basing my statement on the doings of acquaintances during the present and recent years. The majority of farmers sell their lambs in September or October, when the price will not average \$3 00. Instead of selling at such a low price the aim should be to get the most possible profit out of the business, by finishing them so as to insure the securing of the largest profit, which certainly is after the fall months are past and gone. One consideration should be, what kind of a lamb brings the highest price in the best market, and next comes the thought, in what season is that available Having settled these questions satisfactorily, the effort should be to furnish all the necessary conditions required to top the market. One very essential operation is the castrating of ram lambs, and next, all should be tailed. Having done all that is in keeping with good management my expectations of results would be that 15 ewes would

give 22 lambs, which in March would average 130 rounds and sell at 5 cents live weight, making \$6.50 per lamb, or \$143 for the lot. Where the great advantage lies in sheephusbandry is that so little costly grain is required to get them ready for the market. Lambs, when given a run on rape in the fall and in winter fed unthreshed peas once, clover hay once, and cut turnips twice daily, will grow and fatten with less cost and labor than any other kind of stock, and leave the feeder a large margin of profit ninetynine times cut of a hundred."

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Manures and Manuring

The Relations Between Soils, Crops and Manures

By T. C. Wallace, before the Ontario Farmers' Institutes

The great interest which attaches to this subject of manures and manuring makes it important that it should be approached with care and as much exactness as possible, and even much me e in detail than has been the practice in dealing with what are usually looked upon as scientific subjects. Manuring is not a branch of agriculture, but the very foundation of profitable farming. It underlies all branches of our work, and may truly be called the mainspring of crop-production and stock-raising. It has its branches and they are : The working of the soil to release some of its locked-up fertilizing elements, drainage and ærating, restoring some of the alimentary substances we remove by cropping and grazing, the proper care and handling of manures, with the best method of application, the use of commercial aids, supplying humus and nitrogen by the aid of the legumes, clover, peas, vetches and beans, and the action of water.

I shall not undertake to lay down plans of procedure, for I know full well that it is quite impossible to do so intelligently. I shall aim, then, only to indicate as shortly as possible such of the basic principles underlying the work as our space will permit. And I will ask that the subject receive the earnest thought of every Canadian farmer, so that, if possible, by taking warning from the mistakes of the older nations, and even our forefathers in our own country, we may place our fair Dominion at the head of the list among the agricultural countries of the world, by maintaining, and even increasing, her soil productiveness.

ORIGINAL SOILS

Were but rock ground up, disintegrated by the action of the elements, air, fire, frost and water; also more or less by microbic action. This ground up rock, carried by the floods and lesser flows, formed banks or deposits which the waters, receding, left as a resting-place for animal life to follow. The coarser parts sinking earlier in the streams, and the finer parts being carried further on, accounted for the various grades of soil. The kind of rock from which they came governed the class of soil, as, for instance, the feldspathic rock-forming clay., These original soils were clearly mineral only and would certainly be wanting in one of the important elements necessary to the growth of such types of plants as we mostly grow for our use. I refer to nitrogen, which seems to be entirely an element of the atmosphoere, which is nearly 80 per cent. nitrogen, and can only be taken up by plants after becoming fixed in some form in the earth. This is worth noting, for it suggests a reason in nature for such a "nitrogen fixing" class of plants as the clovers and their brothers, the peas, vetches and beans, which can flourish on the mineral elements alone in the soil and get their nitrogen from comparatively low forms of microbic life

Before pursuing this line of thought further it becomes necessary to impress upon our minds the elements entering into plant and animal life, or at least the principal ones as understood. Plants and animals utilize some thirteen of the