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The Farmer's Journal,

AND

TRANSACTIONS

OF

The Lower Canada Board of Agriculture.

Vol. IV. No. 1, Montreal, May, 1855. **POSTAGE FREE.** **Price 2s 6d per annum, in advance.**

The Farmer's Journal.

This month we present our readers with an extra quantity of reading matter, the greater portion of which has been selected with the special view of being useful at this season of the year.

——:o:——

The Board of Agriculture is about to distribute the Seeds selected by the Commissioners at Paris at the Great Exhibition, among those who will take the trouble of cultivating them carefully, and reporting the results. Each recipient of Seeds is expected at the end of the season to answer the following questions:—

1. What seed?
2. Quantity of seed sown?
3. Quantity of land?
4. Nature of the soil?
5. Land under-drained or only surface drained?
6. Nature of the crop last year?
7. The cultivation for this experiment?
8. Has manure been applied?
9. In what quantity, and of what description?
10. Date of sowing?
11. Appearance of crop during progress to maturity?
12. Date of harvesting?
13. Yield of crop in grain and straw?
14. With any other interesting observations.

——:o:——

A Correspondent wishes to know, where good Hereford stock can be purchased. Any one desirous of selling, will please communicate with us respecting terms.

Annual Show of Horses.

The Montreal Agricultural Society held its Annual Show of Horses on 29th April, in the Haymarket Square. There were no prizes awarded; but the premiums given at the Annual County Cattle Show, held in the fall, will be restricted to the Horses brought up at this Exhibition. The animals on the ground were not numerous, but some of these were of the very best kind. One in particular—a draught horse—attracted general attention. The bulls belonging to the Society were also on the ground and were much commended.

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Montreal County Agricultural Society.

Mr. Smith, the Secretary-Treasurer, acknowledges, with many thanks, the receipt of the handsome sum of $25 from J. Hutchison, Esq., St. Laurent, as his subscription for the current year.

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Farmer's Journal.

We have discontinued sending the Journal for the present month to those who have not remitted in advance according to our terms; but in order to supply such as may wish to continue, and may have inadvertently omitted to forward their subscriptions, we have printed off an extra number of copies, which will be transmitted on receipt of the subscriptions.

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To some of the leading Agricultural Papers published in the United States and Britain we address copies of the present number of the Journal, and will be glad to exchange with them.

Mutual Fire Insurance Co.—This company, whose Head Quarters are in Montreal but whose operations extend throughout the Province, is, we are glad to learn, in a very flourishing condition. By limiting their risks wholly to Farmer's houses, barns and other isolated properties, and avoiding towns and villages, they are enabled to insure at the remarkably low rate of 5s. per £100 for three years. It says much both for the management of the Company and the prudence of our rural population, that already £200,000 worth of property has been insured. Still there are a great many remaining, who ought to avail themselves of the security which this company affords them in case of being subjected to that too often recurring calamity—Fire.

——:o:——

Trefolium Incarnatum or Crimson Clover.

[The communication of "Agricola," on this subject, having arrived rather late, he will excuse us for preparing the following condensed abstract, that our English readers may have the benefit of his remarks in the present month. The letter will appear in full in our French issue.]

To the Editor of the Farmer's Journal.

Sir.—Allow me to call the attention of your readers to an article in your April number on the *Trefolium Incarnatum*. According to the author of the Prize Essay, quoted in your last number, this is a new clover. It has, however, been long cultivated in France, especially in the south-western provinces of that Empire, and it now receives more attention there than formerly. It was

introduced into England as early as 1804, and is probably still cultivated there. To us in Canada, however, it matters little if a member of the Highland Society of Scotland has made a novelty of a plant well known in France and England; if the crop is new to us, and likely to be advantageous, let us introduce it at once.

It appears to me that this plant, on account of its very rapid growth, will become very profitable in Canada, both for green fodder and for hay; although, according to the French agriculturists, it is a little inferior as fodder to the common red clover, (*T. Pratense*).

The Crimson Clover may be sown with grass seed in spring, and will be ready to cut in July, nor will it interfere with the growth of the permanent grass. It will also be useful to cover spots in which the grass may have been winter killed. It must be observed that it is an annual plant, and perishes in autumn, but if sown on the stubble in September or October, it is sufficiently hardy to endure the most severe winter and may be cut in the following June. Almost any soil which has carried grain crops will produce the Crimson Clover.

I may add that the Crimson Clover figured in the Exhibition at Paris, and is classed in the report of the jury with red clover, lucerne, and other plants too well known to require any special mention in connection with agricultnral improvement.

I am, &c.

AGRICOLA.

St. Joachim, April 15.

[Our correspondent is quite right in stating that the Crimson Clover has long been known in France and England; and perhaps the essayist quoted in our last number only called it new as being so to Scottish farmers. Notices of its culture in England and Scotland will be found in Sproule's Practical Agriculture, and Stephen's Farmer's Guide; and from the latter it would seem that it has been known in Scoland at least since 1837. Stephens also states that a mere harrowing of the surface of stubble land forms sufficient preparation for it without ploughing, and that it suffers in Scotland, when sown in autumn, from the winter and spring frosts. It succeeds well in the South of England, especially on the chalk soils, so that it would probably thrive on the drier limestone soils of this province. It may be very useful here in filling up head ridges and waste spots, in providing a rapid growth of green fodder for summer and autumn, and in serving as a substitute for green crops on fields which the farmer cannot find time to cultivate in roots. It is said to be well suited to this last use in consequence of its power of choking weeds, and yielding when ploughed up much organic matter to the soil. We trust that experiments will be made with it, and that our correspondents will give us information of the results.—ED. F. J.]

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Experiments on Manures.

At this season it is not to be supposed that even the most intelligent agriculturists can have much time for "book-farming," except perhaps to consult a good work, or turn over a volume of an agricultural journal for a hint as to any practical difficulty in the spring work. Yet we should like to occupy a half hour in the noon-day heat, or in the evening after work is over, with a few remarks on scientific farming in its relation to agricultural experiments, and especially to experiments on manures.

Many farmers have made up their minds to try in the present spring new methods which they have found in their reading during winter, or which have occurred to themselves. More are trusting to the success of methods approved by experience, and some are perplexed by the failure in late years of means previously successful. Now in reference to these several states of mind, the science of agriculture teaches the following important truths: 1. Experiments should not be made blindly without knowledge of the materials employed, or the circumstances in which they are to act. 2. A manure or a method quite successful on some other person's farm may be quite useless on yours. 3. A manure or method may be very advantageous for a time, and then become useless even on the same farm.

1. For an instance of the first of these truths, we may refer to the experiments of Messrs. Lawes and Gilbert, in England, criticised by Liebig in his late work, "Principles of Agricultural Chemistry." These gentlemen supposed in the first place, (in which supposition they were quite wrong,) that chemists maintained that potash, bone earth, and the other substances found in the *ashes* of wheat, are the only things that require to be added to the soil to increase the crop; or, in other words, that in any soil mineral manures containing the ingredients of the ashes of wheat, are alone sufficient to maintain and increase the production of this grain, without paying any attention to the materials of a different character, (nitrogenised organic substances,) which have been supposed to be supplied by the richer parts of animal manures. Now, if any one had really held this one-sided theory, it would have been very useful to have disproved it by experiment. But to have given the experiment a fair trial, it should have been made on land incapable without manure of producing wheat. This was not attended to. A spot was chosen which could produce, as the experiments showed, a number of crops without any manure, and on this land while the plots manured with mineral manures produced hardly anything more than the unmanured, those supplied with nitrogenised manures showed a marked improvement. The conclusion deduced was that mineral manures are useless, whereas the only thing really proved was that the land experimented on contained enough of the mineral ingredients of wheat to serve several crops. Thus this costly series of experiments, extending over ten years, really gave no new information, but only served to mislead the experimenters.

This great blunder, however, well illustrates the general truth in reference to *special* manures of all kinds, as distinguished from those barn yard manures containing the materials originally obtained from the soil itself, which we are always safe in preserving and applying at almost any cost of time and labour. Every cultivated plant requires from the soil a number of ingredients, which the chemist has ascertained with respect to all the more important plants. A soil capable of producing any plant without manure must have *all* the ingredients required, and a soil barren, naturally, or run-out by cropping, must want or have lost one or more of those ingredients; and in such cases the safe course is to ascertain by reference to good works on agriculture what manures afford in the cheapest form the several materials required by the particular crop, and to apply these on a limited scale to portions of the same soil, and carefully note the results. Such experiments are sure to be profitable, but care must be taken not to extend their results to other soils, or to suppose that the same manure will always be successful on the same soil.

2. This leads to our second principle, that special circumstances must always be considered in introducing methods or manures recommended by others. A farmer living on a soil very deficient in lime, applies a moderate dressing and the results are extraordinary, because previously the crops were stinted of that material. He announces the great effects, and another farmer cultivating

a soil in which nearly every pebble is limestone, applies lime, but without the slightest beneficial effect, and straight way he condems book-farming as leading to such unprofitable expenditure. An inland farmer uses salt with advantage, and another on the sea coast where every sea wind salts his fields, tries it and finds it worse than useless. This want of consideration of circumstances vitiates a great part of the information contained in the correspondence of agricultural journals. A little scientific knowledge, such as an intelligent young farmer could easily obtain in a winter's course of lectures, would enable him to discriminate in such matters; but where he cannot do this, it is safest to follow such recommendations at first only on a small scale.

3. A mineral or other manure very useful at first, may ultimately become useless, or if too often resorted to, may even exhaust the land. In some American soils gypsum is very deficient, and that mineral manure was consequently found to produce very surprising results, chiefly because it supplied to crops sulphuric acid, a substance which they need and could not previously obtain in sufficient quantity. But, after a few applications, gypsum ceased to do good, and began to be cried down as a mere "stimulant." The truth was that for the time the land had enough of it, and just because it had enough required more of other manures. Precisely the same results have followed the application of lime in many parts of the world. The land over dosed with this one manure, became destitute of others equally necessary, and this all the more rapidly that lime had been applied, not only on account of the decomposing effect of lime on the manures in the soil, but from a more general cause, very easily explained. Let us suppose that any cultivated crop requires from the soil equal quantities of three substances, which we may call A, B and C, and that the soil of a field is capable of supplying in one year 1 A, 2 B, 3 C, the plant requiring equal quantities can only avail itself of 1 A, 1 B, 1 C, while 1 B and 2 C remain as surplus or go to waste. Let the farmer now apply annually 1 A to the field as manure, the plant now takes 2 A, 2 B, 2 C, and the crop may be doubled. But it is evident that the increased crop exhausts B and C more rapidly than the previous small crop. Hence perhaps in a few years the proportions in the soil are reversed, and it can yield only 1 B, and 2 A, and 2 C to the crops. The crop will now fall to its originally small amount, and it is B that must be added to supply this new deficiency; any quantity of A doing no good when applied. This simple consideration explains many results otherwise puzzling, and we may add that the only manures which really contain the whole A B C of the food of plants, are those afforded by the liquid and solid products of the stable, and animal and vegetable substances of similar composition. Other manures are in their nature special and partial, and though their application achieves some of the greatest and most profitable triumphs of scientific agriculture, there misapplication through ignorance of the chemical composition of crops, soils, and manures, does very much to bring the whole scientific theory of agriculture into most undeserved contempt with practical men. It is hard that science should bear the blame of errors which arise simply from the want of it, yet this must be the case until farmers and agricultural writers familiarise themselves so far with the principles of chemistry as to be able to understand the meaning of the experiments which they make, and the results at which they arrive.

The bearing which we wish all this to have on the spring work, is to encourage experiments, especially with manures; but these experiments on a moderate scale and attended to in all their circumstances and results, so as to afford real information. We also wish to shew that the basis of all sound experiment of this kind must be the most careful economy of the manures produced from the crops which the soil has afforded, that nothing can in the present state of our knowledge make up for neglect of these, and that other manures, especially mineral manures, though capable of effecting surprising results, and even of rendering the most barren soils fertile; demand on the part of the farmer some scientific knowledge, and much practical good sense in order to realise their full benefits. Lastly, we beg leave to say, that we shall at all times be happy to answer to the best of our ability, questions relating to these subjects; our only fee for advice being payment of postage.

——:o:——

Root Crops.

It should be thoroughly understood, and the sooner the better, that in climates such as that of Canada, good and profitable farming can be maintained only by a rotation embracing in addition to the potatoe a large proportion of other root crops, such as the turnip, carrot, mangold wurtzel, &c. Attention to such crops removes the necessity of fallowing, and both theory and experience shew that, in most cases, fallowing in this climate is a most wasteful process. By the culture of these crops, the soil is sufficiently exposed to the renovating influence of the air, manures are thoroughly incorporated with it, and brought into that state which is best suited to the nutrition of grain crops, and especially of wheat, and the increase of weeds is effectually checked. These are, however, small considerations in comparison with the value of the root crops themselves. By means of these, hay is economised, working cattle are more easily kept in good condition, cattle can be fattened in winter, and milch kine can be kept in a productive state throughout the season. In addition to all this, it is well ascertained that the manure produced by the cattle well fed on roots, is both more abundant and more valuable than that of cattle half starved on dry food alone. This as well as the necessity of attention to collecting other manures than those of the stable, and the promotion of a proper rotation in connection with these crops, renders them not only of great value in themselves, but the key-stone of all good tillage agriculture.

Root crops require time and labour, but these are well repaid, and even if their culture should require the farmer to restrict his labours to a smaller surface, he will find more profit in cultivating a small farm with their aid than a larger farm without them. Some of them have also the reputation of being uncertain; but it can, we think, be shown that even those green crops considered the most precarious, can, by proper means be rendered certain.

We invite the earnest attention of all agriculturists to this subject, and in order to contribute our mite toward the extension of the culture of root crops in the present summer, we propose to give a series of articles on the best methods of culture approved by experience in this and similar climates, and we shall endeavour to insert these just as the season arrives for attending to the different operations to which our articles will relate.

In the present article, we shall direct attention to the most profitable root crops, their best varieties, and the methods of manuring and sowing, and in doing so, we shall avail ourselves largely of the informa-

tion contained in a pamphlet by Judge Peters, of Prince Edward Island, a colony in which much attention has been bestowed on this branch of husbandry.

The Turnip—best varieties and sowing. No fewer than forty-six varieties of the turnip are enumerated, of which, however, only a few deserve the attention of the farmer. The *Swedish*, of which the purple-top is the best variety, is most important for a principal crop, as it is less injured than others by the fly and caterpillar, keeps better in winter, and yields a very large crop. Thirty to thirty-five tons per acre are considered a good crop in Britain. The *yellow bullock* or *Aberdeen yellow* and the *yellow tankard* rank next for winter keeping. The crop is smaller than that of Swedish, and the roots do not keep so long. These turnips, however, require less time to grow, and may therefore, be sown much later than the Swedes. The *white* and *red globe* are of large size and grow rapidly, and are as nutritive as Swedes in autumn and early winter, but become soft and of little value toward spring. It is the best policy to sow Swedes largely, and to have a proportion of the others for feeding in early winter. They also serve to fill up gaps caused by the depredations of the fly in the rows of Swedes.

Long or fresh stable manure does not suit turnips. They thrive better with short manure, compost, door cleanings, coal or wood ashes, bone dust, guano, or mixtures of these, and in addition to the manure ploughed in, a little wood ashes or guano sown along the tops of the drills with the seed is of great value in giving a vigorous start. The following directions from Judge Peters, give the best colonial practice that we know in preparing the ground and sowing :—

" Turnips are generally sown in that part of the rotation which closes one course and commences another ; and in this island it will in general be found convenient to sow them after oats sown on ley. On new-burnt lands their are few weeds, and excellent crops may be raised with little labour, by merely scattering the seed and hoeing it in ; but with this exception, they should always be sown in drills, under which system three acres can be cultivated with less labor than one acre broad cast. The land intended for them should be well and deeply ploughed in autumn, and cross ploughed in spring, then harrowed and rolled to break the lumps. If the land is foul with couch, have it well cleaned, or the turnip crop will be a failure, or cost more to keep clean than would have cleaned the land before they were sown. Next open the drills : thirty inches apart is the best distance for ordinary culture, as it gives room for the plough and horse hoe to work freely between the drills without injuring the plants. If a prize is wanted, perhaps twenty-seven inches will give a somewhat larger yield, but they will be more troublesome to clean ; and I am convinced that farmers, generally, will find thirty inches between the most convenient distance. When the drills are opened, then cart in your manure, which should be short, and make it in small piles, so that it can be regularly spread in the drills ; by making the piles so that they will spread into the three drills in which the horse walks and the cart wheels run, you will spread it more evenly, and with less labor, than from larger piles, in which I often see it deposited. As soon as the manure is spread in the drills, and before the sun can dry it, split the drills with the plough, which will cover the manure and make a ridgelet over it, then run a light roller length ways along the drills, so as to flatten them on the top, and drill in the seed at once ; it is very important that it should be done as soon as the drills are raised, for the ground is then fresh and damp : whereas, if you leave it, the tops of the drills get dry, and the seed is longer coming up, and the plants grow more slowly. I frequently see persons waiting for days, until the whole of the land is prepared, before they sow. This is a very bad practice, because, not only do the drills become dry, but the weeds begin to shoot before the seed is sown ; and when the plant comes up, it finds the weeds up before it, and is consequently smothered, and is much more difficult to hoe and clean. The least you can do for the turnip is to give it fair play, and a fair start with its numerous weedy competitors; and, therefore, make it a rule to sow in the evening, or, at furthest, the next morning, every drill that has been dunged and covered during the day.

" Some spread the manure broadcast, and plough it in with the second ploughing, and raise fair crops ; but by putting it in the drills, the whole strength of the manure is given to the roots of the turnip, and therefore, must promote its early growth more than when spread over a large space of ground. When the manure is ploughed in broadcast, I think it should be done in the fall ; a method which seems to produce excellent crops, and saves labor in the spring, when time is of most value to the farmer."

The *fly* will usually be prevented from destroying the crop by the following precautions : 1. Sow *not less than three or four pounds* of seed to the acre. This will give enough both for fly and farmer, and will enable you in thinning to select the strongest plants. 2. Sow not earlier than the 1st of June. 3. Sow as you prepare the ground, before the *seed furrow is dried up*, and if possible immediately before rain. 4. A little guano scattered over the drills is very useful, and if some seed of the white turnip be sown over the ground, it will attract the flies from the swedes. 5. If notwithstanding these precautions gaps are made in the rows, sow in them white turnips or have a seed bed of the yellow globe mangold wurtzel, and plant them out in the gaps. They will grow and thrive even in dry weather. 6. The last resort is a second sowing, but with the above precautions this will seldom be necessary.

The carrot, its varieties manures, &c. —The culture of this root is usually pursued on a small scale only, but its high nutritive power, its certainty and good keeping properties, as well as the large crops that it yields, make it deserving of more extended culture wherever there are deep and light soils, or they can be deepened by ploughing or subsoiling. The safest and most productive varieties are the long orange, red Alfringham and white Belgian. On the culture of the carrot, Judge Peters remarks :

" Carrots do not require the land to be so rich, but they want it very fine and deep. They seem to succeed best after potatoes ; probably because the ground is then light and friable. After the land is cross ploughed, harrowed and rolled in the spring, it should be thrown into ridgelets, making them as high as you can, so as to give the plant as great a depth of the soil to grow in as possible ; eighteen inches is width enough between the drills, but unless the land is very clean, thirty inches will be found the most convenient distance. Roll the drills, and drill the seed, while the earth is fresh and moist, in the same way as turnips. If you sow imported seed, you will require four or five pounds to the acre, and then not be sure of the crop ; but if home raised seed is used, one and a half pounds per acre will be sufficient, as almost every seed grows ; at least I have found it so. *Eight or ten days before sowing, I mix the seed with fine sand, carefully sifted so that no stones or lumps are left to choke the drill, and keep it moistened with water in a warm room, stirring it up every day.* When about to sow, I spread it in the sun for an hour or two, to dry, taking care not to dry it too much, which would injure the seed. I then place a guage, large enough to let a large buck-shot through, in my turnip drill (one of Birnie's), and drill the seed in the same manner as turnips. Seed thus treated is generally up in three or four days, and the plants have a fair start with the weeds. They should be sown in May, or early in June."

Carrots require the same manures with turnips, They have few enemies, and may

be considered a sure crop. They will yield from three to four hundred bushels per acre. The method of preparing the seed recommended above is of great importance, as many failures arise from the slow vegetation of the seed when unprepared.

The *mangold wurtzel* ranks very high as a root for feeding cattle, especially milch cows, to whose milk it communicates no disagreeable flavour. It keeps even better than the Swedish turnip, and is more valuable in spring than in autumn. Indeed, this and other beets should not be fed largely to cattle in early winter, as they contain, until they have been a few months in store, an acrid principle which is injurious. The principal varieties are the long red, long yellow, and globe orange or yellow globe. The long varieties thrive best on deep moist soils, the globe variety is more suitable for dry and shallow soils Manure as for Sweding turnips ; sow as early as possible ; prepare the seed like that of the carrot and sow by hand, but not thickly as the plants should be thinned to fourteen inches asunder. The sugar beet is very similar in its qualities to the mangold wurtzel and is more nutritive, but of smaller size.

The *parsnip* deserves culture as a farm crop, on account of its nutritive properties, and because it may be left in the ground and dug in spring when other roots are becoming scarce. Culture much the same with that of the turnip and carrot. It prefers a deep moist soil. Sow early, and prepare the seed in the same manner with carrot seed.

In conclusion, we again urge every farmer to collect every kind of suitable manure, and enlarge as far as possible his breadth of green crop, and not to content himself with potatoes and a few turnips, but to devote a large surface to turnips, carrots, and mangold wurtzels. We hope to notice in future articles, the subjects of thinning, cleaning, pulling, and storing ; and, in the mean time, shall be glad to answer any questions that may occur to our readers, or to receive any additional hints.

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Fruit Trees.

This is the season for attention to grafting and transplanting, and the best season for pruning is approaching. The following hints on these subjects may therefore be acceptable, especially to young farmers, who should, in the planting of orchards and ornamental trees, be laying the foundation of rich crops of fruit and of the future beauty of their home-steads.

In planting fruit trees it is of the first importance to have a suitable soil and exposure. The apple prefers loams, or sandy loams. The pear does well in similar soils. The plum does not object to a stiff clay, and will not grow luxuriantly in some of the lighter soils, in which the apple flourishes. The cherry, on the contrary, prefers a light dry soil. Much can be done, however, by proper drainage and manuring, to render all ordinary soils suitable to these and other fruit trees. A good exposure should be selected ; and where there is not natural shelter, belts or rows of trees should be planted on the sides exposed to the cold winds. Cherry trees suit well for this purpose ; so do spruces. The butter-nut tree has also been recommended ; and, indeed, any rapidly-growing tree, suitable to the soil, will serve the purpose. The ground should be well tilled, drained, and manured. It is folly to plant valuable trees in a poor, cold, undrained soil ; and it is folly to plant worthless or inferior trees at all, when good sorts can be procured.

Trees should be lifted with care, so as not to injure the roots ; as these are all required to nourish the tree. They should be planted with like care—spreading out the roots in a natural form, and trimming off some of the young shoots from the top. Holes for planting should be made both larger and deeper than is absolutely necessary ; and the surface-soil, with compost or rotted manure, should be turned into the bottom of the hole. If the soil be deep and dry, the tree may be set pretty deeply ; if cold and shallow, the tree should be nearer the surface. The earth should be carefully pressed around the tree ; and a little straw, or a few sods or some grass, laid on the surface, to preserve the moisture of the soil. Bones, parings of hides and horns, hair, and similar animal matters, are excellent and permanent manures for young trees. After planting, the ground should be kept clean, and regularly manured with old compost, ashes, ditch cleanings, or animal matters ; and on no account must it be allowed to become covered with a tough grass sward, especially in the case of apple trees. Trees are often seen growing in old grass sward, regularly mowed, and seldom or never manured. Such trees must eventually become unproductive and diseased. Trees extract large quantities of matter from the soil, and require plentiful manuring, especially when another crop is being taken from the same soil. Hence it is a good plan to plant orchards very open, and to cultivate and manure the ground in regular rotation ; taking care not to damage the roots unnecessarily, and not to leave the land long in grass. The apple is much benefited by frequent stirring of the soil ;—stone fruits require less of this, and are more apt to be injured by wounds inflicted on their roots.

When is is desirable to plant out trees before the ground is properly prepared, or when it cannot be tended as it requires, seedlings or slips may be planted out, instead of grafted trees ; and such of them as become strong and vigorous, may afterwards be grafted with good sorts. In like manner, farmers who have young trees of wild or inferior kinds, my have them headed down and grafted upon ;—if skilfully done, the grafts soon come into bearing. In planting, abundance of space should be left for air and light. When early produce is desired, the trees may be planted at half the proper distance apart, and each alternate tree may be forced into early bearing, by free pruning. These trees may afterwards be cut out, when they interfere with the others.

Pruning is a most important part of orchard management. Trees should be kept open, and trained symmetrically, so as not to permit the branches to interfere with each other, and to present the greatest possible surface to air and light. There are various modes of pruning, but all depend on this principle ; and wall, espalier, round, oval, or conical training may be preferred, just as one or other may appear, in the circumstances or situation, to be more or less adapted to promote access of air and light. The perfection of pruning, is to study the growth of the tree, and cut out as early as possible every twig that interferes with the intended plan, or with the symmetry of the whole. When it becomes necessary to cut out large branches, more or less permanent injury to the tree is almost unavoidable. The cutting off a large branch, is somewhat analogous to the amputation of a limb in an animal, and more or less deranges the circulation of the whole system. Large limbs should be pruned in summer ; small twigs may be freely cut in spring. Experience has shewn, that the dangers of spring pruning, in the case of considerable limbs, are much greater in stone fruits, than in apples and pears.

There has been much controversy as to the proper time of pruning. The best time for the health of the tree, the time when it can most speedily heal the wounds of the pruning knife, is just after the opening of the leaf. This is, however, usually a busy time, and earlier pruning will not injure vigorous trees if the orchardist watches their growth and annually removes the superfluous branches while still small.

Grafting is a delicate operation, but every young farmer should learn it, and in default of better teaching, the following instructions may enable him to practice it.

You require (1) *stocks*, which may be young seedlings or suckers which have been planted out in the previous year, or old trees of inferior sorts may be headed down and grafted on. (2) *Scions or grafts*, which

are healthy young shoots of one year's growth, from good kinds of fruit trees. They must be cut before the buds start, but may be cut any time previously, and kept with the ends stuck in moist earth, in a shady place or cool cellar. (3) A sharp knife, some bast matting, or strips of cotton or linen cloth, and grafting wax, which may be made of 2 parts tallow, 3 parts bees wax, 3 parts rosin; or, 1 pint linseed oil, 6 lbs. rosin, 1 lb bees wax.

The simplest kind of grafting is *cleft grafting*, which suits best when the stock is larger than the graft. Cut the stock off, split it down the centre an inch or two, open the split with a wooden wedge. Cut the lower end of the graft to a wedge form, and cut off the top, leaving only 3 or 4 buds. Insert the lower end of the graft in the slit of the stock, so that the bark of one side at least corresponds exactly with that of the stock. Withdraw the wedge, and apply some grafting wax over the place of junction, so as to exclude air and wet, and tie around strips of cloth or matting smeared with the composition. If you have not composition, tie matting around the stock and scion, and make up a plaster of tough clay and cow dung, and surround the top of the stock with a ball of this "grafting clay." On large stocks a graft may be put in each end of the slit.

Whip grafting is well suited to small stocks. The stock is scarfed or sloped off at top, and the scion similarly sloped at bottom, and a tongue is raised on each by making a little split downward in the stock and upward in the scion; the two are then fitted together, the tongue in the scion fitting into the cut in the stock, and *vice-versa*, the barks are made to correspond at least on one side, and the whole is tied round with matting and smeared with composition, or with strips of cloth covered with composition.

Much of the success of grafting depends on the neatness of the cutting and joining, without leaving gaping spaces or tearing the bark, or separating it from the wood. The best time is when the buds are swelling in spring.

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Liquid Manure.

The importance of liquid manure cannot be over-rated. The farmer who permits the liquid manure of his stable to run to waste, loses about one half of his available material for the production of crops, and must ultimately reduce his farm to poverty, unless he expends large sums annually in the purchase of guano or other rich animal manure; one thousand gallons of the urine of the cow being equal to a hundred weight of guano. Nearly all good farmers are now aware of the great losses which have been sustained by negligence on this point, and large quantities of these valuable manures are now economised, more especially by providing for their absorption by swamp mud, soil, &c. There are, however, many advantages in applying them in the liquid form, especially in this dry climate; but considerable practical difficulties attend this mode of application, and we give the following remarks by a correspondent of the *New England Farmer*, in the hope that they may tend to remove some of these :—

"To farmers on a small scale who have not the means to provide themselves with that inestimable convenience of a warer-tight cellar under their barns, a simple and cheap substitnte is easily provided. That substitute is nothing more than a tank or cesspool, built under ground, of suitable capacity in proportion to the extent of the farm, placed in the most convenient situation for receiving the whole liquid refuse of the dwelling-house, the urine of every description from the barn, also water from the house pump to dilute the liquor and prevent smell when required. The tank may be constructed of stone, or brick, or even wood, as being the cheapest in the outset. Spruce plank is good enough for the purpose, and comes cheaper than any other material; and, if bedded in clay to prevent it from decay on the outside, the liquor will preserve it in the inside for generations to come. A tank 12 by 6 feet, and 4 feet deep, could be built of this wood, for about $20, and will hold over 1728 gallons; which is sufficient during the season to supply liquid in abundance to top-dress from 12 to 20 acres of grass-land, and increase the quantity of hay in a most astonishing manner. It should have a close cover for the top, part of which, however, should be movable at pleusure, with a view to cleaning out the bottom when required; and in the permanent part a hole should be left to admit a wooden pump, which is essential for discharging the liquid into the distribution cart. Also an aperture for the discharge of the back-house of the family which should be invariably placed right above the cesspool.

"A cart for the distribution of liquid can be made in different ways. Those used in many parts of Europe for that purpose, are on the same principle, and similar in construction, to those used in this country for watering the streets in cities, during dry weather in summer; but one of much easier and simplier construction may answer all useful purposes, to those of small means. A large barrel fixed on a pair of old wheels, with a spire for oxen or shafts for a horse attached to the axle, is all that is wanted; or the barrel may be placed in an ox or horse cast, as convenience may dictate, with a spout or box behind pierced with many holes in the bottom for the even distribution of the liquid on the grass. With such a cart one man can manure from 4 to 6 acres in a day, which is a great saving in the expense of labor compared with the common practice of top-dressing with composted manure, a topic worthy of some consideration in this frugal land.

"In order to derive all the advantages from this mode of manuring grass land, special attention must be paid to the proper fermentation of the liquid before application, as properly fermented, and unfermented liquid, may be compared to strong manure, and no manure at all. Every one at all conversant with the making of wine, beer and cider knows that these liquors require to undergo a certain degree of fermentation before they impart that invigorating, and stimulating effect on those that drink them, for which alone their value in proportion to their relative strength is estimated. In like manner does liquid manure operate in all its stages of fermentation; as it has to undergo several chemical changes during that process before it becomes fit food for plants. The next important consideration connected with this undertaking after the fermentation has subsided, is how to fix the ammonia and other volatile matter that the liquid may contain; and how to ascertain when they are fixed. Many substances may be used with good effect for fixing these volatile principles in liquid manure. Any ingredient of an acid nature, if added in sufficient quantity to decomposing urine, fixes and neutralizes the ammonia as it is evolved from the urea and the other nitrogenous bodies of urine; and in consequence very much enriches the utimate liquid manure. Water, as Professor Nash says, is an excellent absorbent of ammonia, and is in all cases a sufficient deodorizer, provided enough of it is used. This I have invariably found to be correct; and would, therefore, advise a certain quantity to be pumped in the tank every other day in proportion to the amount of other matter it may contain. This will completely subdue any offensive odor that may arise from the fermentation of the liquid, and add considerably to the bulk of the article. Should this course be objected to on account of such quantities of water making the preparation too weak, I would say add guano, night-soil, cow dung, or even green succulent vegetables and many kinds of weeds from the garden and field, to thicken the mass, and bring it up to the proper strength. Before application I invariably use a small quantity of diluted sulphuric acid as a deodorizer and neutralizer of ammonia; and the surest and safest criterion to judge by, when the liquid is fit for using, is its being destitute of any disagreeable odor when

stirred a about with a stick from the bottom of the tank. That shows conclusively that the whole volatile principles of the manure are fixed, and neutralized, and prepared for application to the grass or other crops. Any one may see that even water alone put upon grass while in a growing state accelerates its growth, often in a very wonderful degree; and how much more may not be reasonably expected, from such a combination of the known elements of fertility, as such liquids contain. With a plentiful supply of such liquid preparation, which are within the reach of every cultivator of the soil, from the small garden to the extensive farm, there is nothing to prevent an increase of the crops of hay and fruit four-fold, at least, if people interested in such matters would give it a trial.

"I have been a practical cultivator of the soil for over fifty years, in different parts of the world, and it is only within the last five years that I learned the secret of properly preparing and applying liquid manure to growing crops; and since then, I have seen two, three, and even four crops of strong grass cut from the same ground in one season by the copious application of liquid preparations; and for that valuable discovery I have to thank Professor Liebig's familiar letters on chemistry; although deadly opposed to book-farming previous to that date." T. C.

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Healthy Potatoes.

In the present precarious state of the Potato, it is an important question—what can be done in spring to ensure a healthy crop? Much we believe may be done, though we are convinced that the disease is deeper seated than to be reached by any remedy short of the removal of that degeneracy which has resulted from the long cultivation of the plant by division of the tubers. The following suggestions are from a publication entitled "Contributions toward the Improvement of Agriculture in Nova Scotia," by Professor Dawson, now of McGill College, Montreal.

Agents in developing the potato disease. —"The principal are wet and undrained soils, wet seasons, wet weather after warm dry weather, when the tops are fully grown; chilly nights succeeding hot days, rank manure in contact with the sets, want of attention to keeping the crop well tilled and free from weeds, run-out tubers long cultivated on the same farm. These and similar causes have evidently had an important influence in locally developing the disease, but *none of them can be its general cause*, since the disease often appears where all are absent, and these causes were quite as general as now, in former times, without producing any such consequence as the potato blight. Some valuable hints, however, as to the best palliatives or temporary remedies for the disease, can be derived from these causes, in connection with the experience of farmers. Of these *temporary remedies or palliatives*, the following are very important:—

"1. *Early planting*, and planting early sorts; because this gives greater probability of avoiding the effects of autumnal chills and rains. This remedy has been found very effectual in Nova Scotia.

"2. *Change of seed*, especially from poor and cold localities, to richer and milder situations. The Scottish low country farmers have obtained excellent results by importing seed potatoes from the bleak and poor highland districts.

"3. *Selecting* those *varieties* which have proved *least liable* to the disease; and these will generally be found to be such as have been recently introduced, or lately procured from the seed.

"4. *Planting in dry soils*, and underdraining more moist soils, if necessary to plant in them. The dry, sandy uplands of King's County, have almost entirely escaped the disease, when the crop has been put in early.

"5. Applying *well-rotted manure*, and plowing it in, instead of putting it with the sets in the drills. *Guano* and composts made with *liquid manure*, have proved themselves better than stable manure. This and the two last remedial agents act by giving the plants a greater degree of healthy, general vigor, than they could derive from run-out seed, in wet soil, or in contact with rank manure.

"6. Planting in *new soil* and the use of *mineral manures*. It is generally observed, that the potato has been most healthy when planted in new, virgin soil, before the unskilful agriculturist has extracted from it the stores of alkaline and other mineral manures remaining in it from the ashes of the forest. The composition of the ash of the potato at once explains the reason of this, as the following table, taken from Johnston, will show:—

"Ashes in 10,000 lbs. of the roots and stems of the potato.

	Roots.	*Tops.*
Potash,.....	40.28	81.9
Soda,.....	23.34	0.9
Lime,.....	2.31	129.7
Magnesia,.....	3.24	17.0
Alumina,.....	0.50	0.4
Oxide of iron,...	0.32	0.2
Silica,.....	0.84	49.4
Sulphuric acid,..	5.40	4.2
Phosphoric do...	4.01	19.7
Chlorine,.....	1.60	5.0
	82.23	308.4

"Here we have large proportions of soda, lime and potash; the latter forming nearly 50 per cent. of the ashes of the roots. Now these substances, potash especially, are plentifully supplied to the soil by the ashes of the woods, and are usually deficient in exhausted lands. Hence, if we apply to run-out, or long cultivated soil, lime, wood-ashes, gypsum, (sulphate of lime,) common salt, (choloride of sodium,) bone dust, (phosphate of lime,) we supply it with some or all of the more important substances in the above table, and thus assimilate it to the virgin soil in which experience proves the potato to thrive best. I have found, by experience, that healthy potatoes (though not a large crop) could be obtained by planting with no other manure than a pint of unleached wood-ashes in each hill, in seasons when potatoes planted with ordinary manure were blighted. This is not intended as a recommendation to be followed on the large scale, but merely to show the effect of wood ashes in promoting the health of the plant. When ordinary manures are used, wood ashes may be placed over the sets on the top of the drills, but should not be in contact with stable manure or other rich animal matter.

"For the same reason it is, of course, unwise to raise successive crops of potatoes on the same soil. Whenever, on old land, a proper rotation of crops is not attended to, there is much greater likeliood of failure."

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Transactions of the Board of Agriculture for Upper Canada.

The number for January, contains as usual much local statistical matter, indicating vigorous efforts in the improvement of Agriculture, more especially in the departments of Agricultural exhibitions and improved stock. The address of the retiring President of the Association, David Christie, Esq., M.P.P., contains some very judicious remarks on the importance of a scientific education to young farmers, and more especially on the advantages which they might derive from attending, during winter, the course established for their benefit in the Toronto University. We fully concur in his views on this subject, and are happy to hear that there is every prospect of the institution of a similar course in Montreal next winter. We prefer extracting, however, as important at the present season, a portion of the address referring to the subject of rotations, green crops, and wheat culture:—

"Our mode of farming differs essentially from that now pursued in Britain. We have no course of rotation of crops, which is generally practised. The system there is the four years' course—turnips, barley, or oats, clover and wheat. Summer fallowing is seldom resorted to, as it is considered that the land can be sufficiently freed from weeds and grass by the hoeing and working of the land required for the turnip crop. The farmers of Great Britain have no difficulty in

raising abundant crops by this process, and the application of various kinds of manure. There can be no doubt that, for them, their system is excellent and highly remunerative. Their method of tillage is:—after the wheat crop is harvested, the land is pared and ploughed. In spring it is ploughed twice and sometimes thrice, for turnips. In the next spring it is ploughed once, and sometimes twice for barley; so that the sheep droppings may be well mixed with the soil, and thus ensure an even crop. The third crop—clover—is sown with the barley or oats, and gives a year's rest to the teams, until the land is broken up with one ploughing, and sown with wheat the fourth crop.

The great difficulty in the way of the introduction of the course into Canada, is the turnip crop. It is not meant that root culture would not be productive of highly beneficial results, but that the amount o labor which is necessary for it is almost unattainable in the present state of the country. The principal part of the labor is not in the preparation of the soil for sowing, but in the after tillage and harvesting. In England, there is no difficulty in procuring any number of laborers, at any given time, and at a moderate rate. Here, the case is entirely different. At some seasons, it is very difficult to get men; and the busy time with the turnip crop is during one of those seasons—namely, wheat harvest. In this climate, turnips ought not to be sown before the end of June; if sown sooner, they become dwarfish, and rot readily. We usually begin wheat harvest about the 17th July; so that if the turnip crop be sown in the end of June, the proper time for thinning and hoeing it would be during harvest, when to attend to it, would be to neglect the wheat crop, and run the risk of losing it. Then the plan of feeding turnips to stock, on the land, as in England, would not do in Canada after the middle of November, as the severe frost would render it impossible for sheep to eat them. Neither could they be allowed to remain in the ground during the winter, as the severity of the weather during that season would completely destroy them for food. To make the turnip crop valuable, it would be necessary to house it, and this would require a large amount of labor. Turnips can only be raised to advantage on a small scale, for winter food for cattle and sheep, not to the extent of the fourth part of the available land of every farmer. As a substitute, Indian corn has been tried; still it has the disadvantage of being a cereal—carrying off from the soil some of the same substances which constitute the food of other plants of its class. In fact, in the absence of root culture, it is a very difficult matter to have a proper system of husbandry. However, even a change of cereal crops is better than no change at all. The system of planting corn after wheat, then barley or oats, then clover and afterwards wheat, is much practised in the United States and Canada. This course has been found to answer well. It would give, consecutively, one-fourth of the cultivated land on a farm for turnips, potatoes, corn and peas; one-fourth for barley or oats; one-fourth for clover, and one-fourth for wheat. Were this plan pursued, and all the farmyard and artificial manures applied during the first year of the course, except gypsum on clover, I have no doubt that farming would be more lucrative than at present. All the crops would be more abundant, and there would be more system and regularity about the work of the farm than now prevails.

In the mode of tilling for wheat, the first and great point is to drain the land. In many places in Canada, the soil is so wet that wheat cannot be sown with even the probability of a fair return from it. A large portion of the country is of this character. The really first-rate wheat land in Canada, as in the State of New York, is limited in extent. I admit that a great deal of land is sown with wheat, but I do assert, and the result fully bears out my opinion, that in its present state, that is while wet and undrained, a great deal of land is sown with wheat which ought not to be sown with that kind of grain, for it only results in failure and disappointment. The first step then is thorough draining where it is needed, on all land intended for the growth of wheat. Wheat must have dry soil or it cannot grow well. The Genesee country and other districts famed for the growth of wheat are dry. The sub-soil of those places being gravelly, forms a permanent drain for superabundant moisture. It is gratifying to find that public attention is being directed to the subject of draining, and I gladly embrace this opportunity of urging its general adoption.

The next important point in the cultivation of wheat is deep tillage. The old furrow of six inches deep and nine wide won't do. The roots of the wheat dlant must have no such obstruction as hard pan at the depth of seven or eight inches. The land ought to be turned to the depth of twelve or fifteen inches. The plan of turning a sleek painted furrow, may be very well as a piece of fancy work, but will not answer practical purposes. Change your rules at your ploughing matches. For the narrow and shallow furrow substitute a wider and deeper one, carry the rule to your farms and you will find a vast difference in the produce per acre. Instead of breaking your summer fallows or clover sod with two horses, do it with three or four, or with what is an excellent plough-team, a span of horses and yoke of oxen.

A very essential matter is to clear the land thoroughly of grass and weeds. The great enemy to wheat is the spear or couch grass, and it is a very difficult one to get rid of; if not checked it bids fair to take possession of our best wheat lands. In England it gives a great deal of trouble, and the wish to get rid of it has led to various experiments. The old system of summer-fallowing, although partially successful, was found to he expensive and not so thorough in its effects as it was desired; it cost a great deal of labor and did not do the work effectually. The best English farmers set it down as a system requiring double the number of teams necessary for the present improved mode. They discovered that the mere ploughing of land did not kill the grass, and that even four and six ploughings did not eradicate it, that even after all that it still lived and infested the soil. They now act on the principle that to destroy speedily and effectually the vitality of a plant it is necessary to cut off the communication between the roots and leaves because no plant can long survive without coming into contact above ground with the atmosphere. They found that the *ordinary plough, unaided by any other implement*, cannot effect the object. In England they use what is termed the "paring-plough;" one kind of which (Bentall's) cuts the ground to the depth of two or three inches; another, and I think the preferable one, (Kilby's) not merely pares but turns over the ground. After this paring process, the ground is ploughed deeply; thus the grass is buried at a considerable depth were it remains undisturbed, to serve as manure. In the Genesee Country, as in other places in the U. S., a rather different plan is pursued, still the principle is the same. The ground is pared and ploughed at the same time, by an admirable implement called the Michigan subsoil, or double mould board plough. It consists of two ploughs, one placed before the other, and on the same beam. The forward one takes a furrow slice two or three inches deep, separating the tops of the grass from the roots, and laying its slice in the bottom of the previous furrow; the hinder one follows, raising a furrow slice eight or nine inches deeper, which it lays on the slice cut by the forward mould board. During the process of ploughing the soil is broken and mellowed, so that the work of harrowing can be afterwards easily and well done. The grass is so deeply buried, that harrowing or even light ploughing cannot afterwards bring it to the surface, to waste or grow again. Land ploughed with this plough, during the late wet season, after lying without being harrowed for six or seven weeks, scarcely showed a blade of grass, while that in an adjoining field, ploughed with an ordinary plough, and afterwards well harrowed, was quite green. The reason is obvious. Sod plouged in the ordinary way sends grass through the seams of the furrows as soon as turned over. This growth spreads through the furrow slices binding the whole together. When cross-ploughed the sod is not rotted, but is turned over in square pieces, which can scarcely be shaken apart, and then wheat is sown to struggle among sods and grass which grow again and choke the young plant. The practice of turning up again clover which has been ploughed down for manure, is certainly not in keeping with the idea that in

order to be of service manure must not be much exposed to the action of the atmosphere. What good farmer would allow manure to lie bleaching on the surface of the ground? Is it more sensible to cross-plough clover sod? And how is it possible to get rid of couch grass when we plough up half-rotten sod? The mode now pursued in the best wheat districts of New York, is to plough down clover in the middle or end of July, it is *turned over to the depth of three inches* with the "gang-plough," an implement with four small ploughs fastened to a beam resting on two wheels. This beam can be raised or lowered to the depth required, and the implement is regulated by a pole to which the horses are attached. *Unlike the cultivator, it turns effectually the whole surface* of the ground. It is drawn by three horses abreast. After the first working, should any grass appear, the land is again gone over with the "gang-plough." Before seeding it it is harrowed well. The wheat is sometimes drilled or sown broadcast and then covered over with the "gang-plough." I have seen a great deal of land managed in this way during the present season in the State of New York, which, as a bed for wheat was far superior to that which was ploughed three or four times."

We prefer, both on scientific and practical grounds, the Scottish four course rotation long since recommended by "A Farmer in the District of Montreal," to any of those referred to by Mr. Christie, though it must be admitted that they are good, and in some respects well suited to the country. The difficulties in the culture and storing of root crops referred to are no doubt real, but may be met by improved implements and management, as we shall endeavour to show in following up the article on these crops on another page. The remarks on wheat culture are well worthy of the attention of farmers, though they refer to what we must consider a defective system of rotation.

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On Hedges.--By George Lesslie, Toronto.

Hedges, or live fences being the subject for discussion at the first meeting of this club, I beg leave to give you an idea how hedges are managed in the old country; being brought up in a country where there was little else used for fences, but hedges, and being practically engaged in planting, trimming and managing some of the very finest hedges in Scotland.

Beech and Thorn mixed, were the only plants used for outside fences. Our mode of preparing the ground was as follows:—We dug a ditch 3 feet wide, and threw it all up one side, and levelled thoroughly from one end of the line to the other, we then set our line, and planted our Quicks in the face of the bank, half slope; then took the shears or hedge bill and cut them all to one length out of the ground: a breadth of 2 feet inside was dug once a year—this hoed and kept clean.

On large estates there is a scientific man kept, and goes by the name of hedger. He takes great pride in cutting and trimming his hedges, and tries with all his might to excel his neighbour. It requires a good deal of practice and taste to switch hedges neatly. In Canada, I have had but little to do with hedges; I am satisfied, however, that the time has arrived in the old settlements of this country, to look out for a plant that will make a permanent, substantial fence. The thorn has been tried in many parts of America and abandoned. I have given it a fair trial myself, and gave it up, at least for the present, on account of its diseases and attacks of insects, yet I would recommend further trial of the thorn, as I believe that the disease has not been as bad as it was three or four years ago.

Osage Orange, the best hedge plant I know, I have tried in my nursery several times, and find that it is altogether too tender, for this part of Canada at least.

Rhamnus Catharticus, Buckthorn. so much recommended by the late Mr. Downing, is a strong, quick, growing plant, and is perfectly hardy; makes a very good close hedge properly cut, and looks well; it has this advantage too,—insects will not touch it, and cattle will not brouse on it at any season of the year. Very easily grown on any kind of soil, on account of its fibrous roots. I have been selling plants of it for three or four years past, and in every instance it has given great satisfactfon; a specimen hedge may be seen at the nusery, 4 feet high. I have reason to believe, and say with Mr. Downing, that the Buckthorn will be the great hedge plant of America.

Privet, makes a beautiful ornamental hedge, grows rapidly in good soil, and almost an evergreen; good specimens of this may be seen in some of the gardens about Toronto.

Honey Locust, or Three Thorn Acacia, has long been recommended by the Americans for a farm hedge; but I have not seen a good specimen of it in all my travels. I have tried to make a hedge of it in the nursery, and find that it gets a good deal winter killed, and does not stand cutting; however I would advise a fair trial of it on dry, sandy land.

Japan Quince, makes a fine ornamental hedge for pleasure grounds; it is quite hardy, and when in flower, is magnificent in appearance.

Beech, is much used for hedges in the old country, but is too hard to transplant, and don't stand evenly. It is better mixed with thorn—makes good shelter on account of retaining its foliage all winter.

American Cedar, for an evergreen ornamental hedge, is very valuable, or for a screen to protect gardens and orchards, &c., there is no plant so suitable. It makes a superb hedge, and is of rapid growth—stands any amount of cutting; altogether the best evergreen hedge plant I know. There is a specimen to be seen in the nursery.

Hemlock.—Of all the ornamental plants for an evergreen hedge, the hemlock has no rival; the only thing against it is, that it is too tedious to start evenly, and hard to transplant even out of the nursery bed. I may here remark, and take the credit to myself, that I was the first in America to try the Hemlock as a hedge plant. I had succeeded so well after a few years trimming, that Mr. Barry of Rochester took notice of it, and wrote to Mr. Downing and other horticultural writers in the States, about the hemlock as a hedge plant, and the beautiful specimen of it to be seen at the Toronto Nursery; the result is, that now thousands of yards are planted every year by gentlemen in the States, and nurserymen are growing it from seed for that purpose.

Red Cedar.—Treated as a hedge plant, makes a beautiful evergreen hedge, equal I think to the hemlock; but I have not had much experience with it as yet. On Long Island, near New York, I have seen splendid Red Cedar hedges. I intend to experiment on it this spring. I have some thousands of fine plants for sale.

There are several plants that might be used for low ornamental hedges, such as Barberry Tree, Honey-suckle, Euanimus, or Strawberry tree, Dwarf Golden Willow, American Holly, &c.

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Rural Economy of the British Isles.

Cattle.

I shall now proceed to show how rich English agriculture is in cattle as well as sheep. England possesses the finest milch cow race in those beautiful, intelligent, gentle-looking animals, which go under the name of Alderney, and in the Scotch Ayrshire—that charm race of cows, whose graceful forms, speckled hides, quiet dispositions, large udders, and rich luxuriant supply of milk, realize the idea of pastoral life. She possesses also, the short-horned Durhams—animals which may be fattened as two years old, and attain, at that age, a weight which no other breed can arrive at so soon. Their heads, legs and bones, have been reduced to such small proportions, and the more fleshy parts of the body so largely developed, that nearly three-fourths of their weight is meat.

After the Durham short-horn, which, among cattle, is what the Dishley breed is among sheep, come the Hereford and Devon breeds, which, in their turn may be compared to the Southdowns and Cheviots. The Hereford breed follows closely upon the Durham, and is even more generally sought after, as offering almost an equal precocity, and the same aptitude for fattening, but with greater hardiness. The county of Hereford,

from which it comes, lies at the foot of the Welsh mountains, and possesses a soil of but indifferent fertility,

The English farmer looks upon cattle, with the instinctive calculation, which distinguishes his class, and argues that there are three descriptions of produce, which man may demand from cattle, besides the manures the hide and the offal—namely, their labor, their milk and their flesh. Of these, he deems their labor the least profitable, and therefore looks chiefly to their meat and their milk.

He demands of his milch cows the greatest supply of milk, and a good Ayrshire cow will give four thousand quarts of milk in the year; and it is reckoned that the three million cows in Great Britain produce three thousand millions quarts in a year—an average of a thousand quarts for each cow. The French cows, many of which are worked, do not average, as a whole, over five hundred quarts a head. To get the greatest quantity of milk from the cow, the English farmer has studied and labored, till he has spread over his fields the finest herds of milch cows in the world.

It appears, at first sight, that the work our cattle are made to go through with, would have but little influence upon the return they give in meat. It might be supposed that this work, since it turned the life of the animal to account, admitted of a cheaper production of meat. But not so argues the English farmer. He believes that habitual labor causes animals to become hardy, vigorous and slow, to eat much and fatten little, to increase in bony structure, make little available flesh and that slowly; that habitual inaction on the country, produces a soft, lazy race, which fatten early, assume rotundity of form and fleshiness, and on an equal amount of food, give a better prduct of butcher meat. The English farmer argues further that where labor is the first consideration, the animal is not killed till it has finished its office; but on the other hand, where meat only is sought, it is slaughtered at that period when it gives most, and that when the breed is precocious, this period comes early—and that thus, by raising cattle for slaughtes, he gets the best return for what they consume. The English farmer's reasoning on this matter, is, I have no doubt, right, when he possesses a precocious breed of cattle like Durham or improved Hereford. And this reasoning would be true, in any country possessing similar breeds of cattle, unless the profit of working oxen was greater than is in England. The result of British agriculture in raising cattle are that Great Britain feeds eight millions of horn cattle—slaughters two millions annually, which she realizes a hundred milions of dollars for meat alone.

The other species of domastic animals are horses and pigs. As regards horses, the preeminence of the English breeders has long been recognized. As for the race-horses and his rival, the hunter, everybody knows by what a combination of effort the English have succeeded in producing and keeping up these superior breeds. They are productions of human industry, real works of art, obtained at a great expense, and designed to gratify a national passion. A fine horse constitutes with everybody the ideal of fashionable life; it is the first dream of the young girl, as it is the latest pleasure of the aged man of business. But the English have breeds for draught, which are equally valuable. Such, for example, are the plow horses, the best of which, perhaps, come from Suffolk. I have already stated that tillage with horses has been generally substituted by the English for that of oxen; they thought, and with reason, that the quicker action of the horse made its work more productive, and that an idle life made the meat of the ox more productive. But they have done more; they have substituted horses for men wherever manual labor—the most expensive of all—could be replaced by a machine set in motion by horse-power. The brewers' horses and those used in coal wagons are celebrated for their strength and bulk. The best fetch high prices. It is the same with the carriage horses; the breed of Cleveland bay from Yorkshire is reckoned one of the most perfect that exists for average work.

English pigs on an avarage are not very large; but they are killed young, exemplifying the great principle of precocity contended for by Bakewell, and applied to all kinds of animals destined for food. They are all of breeds which fatten rapidly, and whose shapes have been improved for a lengthened period.

The English rear few fowls, the dampness of their climate being unsuitable for it, and spite of the efforts of wealthy amateurs, the occupation has hitherto obtained but little favour; whereas in France the annual production of eggs alone is estimated at twenty millions of dollars, and that of all kinds of fowls at an equal sum.

Such are the advantages obtained by British agriculture, from the best breeds and the best management of them in rearing domastic animals.

I must next show what crops support this animal production of England; for crops are both the causes and consequences of a great production of domestic animals.

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The Provincial Exhibition.

As this great design is one of paramount importance to this community and agriculturists generally, to the exclusion of other matter we give place to the following from the Montreal Transcript.—

"We understand great efforts are being made by the County Societies, both Lower and in the Upper Province, to exhibit specimens of Stock at the next Provincial Exhibitions such as will take the shine out of all that has been formerly shown in Canada. Our own County Society is importing two additional Ayrshire Bulls, and another couple of monster pigs. There is, however, considerable dissatisfaction evinced by many of the farmers with whom we have conversed, in reference to the ninth of the general regulations printed for the guidance of competitors in the Lower Province. It declares that "an animal which has already gained a first premium at a Provincial Exhibition, cannot again receive one in the same class; but it may be awarded a certificate, if it be deemed worthy of the first prize, but not otherwise" This rule is said to be very unjust, and destroys all fair and honest competition. The Provincial Exhibition in Upper Canada, for instance, takes place before ours at Three Rivers. Animals which carry off first premiums there cannot again compete here. Therefore, as, in a pecuniary point of view the first prizes here are more valuable, none of our first class stock will find their way to Kingston. One great object of these Exhibitions—large and extended competition—will thus be frustrated. Again, the rule is unfair towards the Upper Canadian farmers who make no such condition with ours; but let all the animals desirous of competing come in whether they have or have not already carried off prizes, and give them a fair field and no favor. And, once more, it is unjust towards our County Societies who, with a spirit of progression that does them great credit, at much expense and trouble, import animals here to improve the stock and add value to the breeds already in the country. The only way of repaying such Societies is by allowing them every facility to compete with each other; and letting the best carry off the prize. We, therefore, commend this matter to the attention of Major Campbell and his *confreres* of the Board of Agriculture; and trust it will have their attention at an early meeting."

The "Transcript" is in error. The Three Rivers' Show commences on the 16th September, the Kingston Show on the 23rd. The advantage, such as it is, lies with the Lower Province, and she is heartily welcome to it. Our Agriculturists are determined to render the Exhibition of 1856 "a great fact" in the industrial history of the Province, and they desire above all things to encourage and invite honorable competition. The "American Scientific Association" meet at Albany the third week in August; they have issued invitations to some twenty or thirty of the first Scientific men in Europe, to make the voyage both ways free of expense. The invitation includes Professor Lindley of the Horticultural Society; Sir William Hooker, of the Botanic Gardens; Sir Joseph Paxton, and many other high Agricultural authorities. The American Association will rise in time for the members to proceed to the Three Rivers Show on the 16th September, the Kingston Show on the 23rd, and the Watertown Show on the 30th. And as some of the best judges in the world will be among us, we are making great efforts, and do mean to show Europe and America what the Province can accomplish.—*Kingston News.*

Bone Crushing.

Point Levi, 6th April, 1856.

Isaac R. Eckart, Esq., Quebec.
Secretary, Q. C. A. S.

Dear Sir.—By an advertisement in some of the public papers I am glad to see that the Quebec County Agricultural Society offers a premium to any person who will establish a *bone crushing mill*. I have often thought that such a thing was wanted in this neighbourhood, for I am well aware of the good effects of crushed bones as a manure, having tried them here 30 years ago, under very unfavorable circumstances, having no other way of crushing them than with hammers on a large stone. Of course the work was but very imperfectly done, notwithstanding which the result was such as to show to my satisfaction that crushed bones are an excellent manure. Where I had applied them the spot was remarkable for many years by its superior greenness, &c. To derive the greatest advantage from bones, they should be ground to such a powder as to be sown along with or at the same time with turnip seed, &c. And they would be a substitute in some measure for that fashionable manure, Guano, which is not likely to be had here at reasonable prices.

As I have always been an advocate for Railways and Turnpike roads; being aware of the immense advantage they are to any country, and seeing that the great obstacle to their working well in this country is the collection of drifted snow in the deep cuts which it is necessary to make where the road passes through high grounds. Now to obviate this I would suggest planting, in a *proper manner*, such trees as were best adapted to the ground, a certain breadth, say an acre, less or more, according to circumstances, on each side such *deep cuts*, extending somewhat farther at each end. By which means, in the course of a few years, the Railway would be so protected from drifts of snow that the ordinary snow plough would probably be sufficient to keep the way clear even in *deep cuts*.

As you are more acquainted at head quarters than I am, I take the liberty to let you know my ideas on this subject, which can do no harm, and might be of very great importance to stockholders and the public generally.

Your humble servant.
Charles Robertson.

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Agriculture in Lower Canada.

TREES.

There is one more defect connected with the management of land in Canada, which I must not omit,—that is, the almost total destruction, when clearing land, of every tree that grows upon it, and the general neglect to plant any other trees, either for shelter or ornament, or for the use of the farm. I have frequently endeavored to attract attention to this subject, in order that some steps might be taken to prevent or check this evil, but the destruction still goes on, as if it was desirable that we should not leave a vestige of the fine forest trees that covered the lands of Canada, or plant any others in their place. The total destruction of trees where settlements are being made is attempted to be justified, in consequence of the difficulty of preserving trees when clearing land, and it is urged also that the trees that are left interfere with the cultivation of the soil. There may be some foundation for these objections; but I think it would be quite possible to overcome them, so far as preserving some of the trees, by selecting those that have the deepest roots in the soil, in situations where they are not so much crowded, removing all the underwood, and thinning the large trees out to a certain extent. There may be trouble in saving the trees when the fire goes over the land, but nevertheless some may be preserved from injury. More trees might be left than would be necessary, and then if some were injured by the fire, a sufficient number might remain safe. The best varieties to leave as scattered trees, for shelter, ornament, and for use, are the elm, birch, beech, maple, hickory, ash, butternut, and perhaps the oak. Soft woods tree, if preserved, must be left in clumps, or groves, as they will not stand alone, if of large size. The cedar, or pine species, left in clumps or groves, are very ornamental in the landscape, and may pay well for the land they occupy. If circumstances should not admit the preservation of some of the original trees of the forest, when clearing land for cultivation, trees should be planted at once, and I have no doubt they would pay for the land they occupy. Young trees of thriving appearance may be taken from the forest, and, if carefully planted, they will grow very rapidly. There is an advantage in planting—that the trees may be placed in the most eligible situations, where they will answer the best purpose, and be of the least injury. On an average, one hundred square yards would be amply sufficient space to estimate for each tree, until they would attain the age of thirty or forty years; hence, the use of only one acre of land would be lost for thirty-six trees, and if these trees were of a useful description, they would, perhaps, pay as well, when at a good size, for the land they occupied, as any other portion of the land, besides the shelter and ornament they afforded for so many years. They might, if cut down for any purpose occasionally, be replaced by planting other trees. I have seen trees planted alone in good soil attain a very considerable size in thirty years. In Britain, trees are planted for profit, and were considered to pay well for the land, if parties could only wait to allow them to attain a good size. But, apart from all consideration of actual profit, the rural population have an interest in maintaining the beauty of the landscape, and it is impossible to do so without a due proportion of trees. The long, straight lines of dead wooden fences, and the absence of a due proportion of trees is a great disfigurement to the landscape in Lower Canada. Trees of almost every variety were the natural growth or production of this country, from the lowest valley to the summit of the highest mountains, and I feel persuaded that it must have an injurious tendency to strip the land at once of all these trees, particularly where the summers are so hot, and the winters so cold. There is no doubt that the destruction of the trees in other countries has been found to be very injurious generally, and I fear it will have the same effect here, if we go on cutting down every tree, and not planting any. In many parts of L. Canada, where there is not a tree left standing, I have no hesitation in saying that the land suffers in consequence, and also the live stock pastured in Summer upon this naked and unsheltered land. I do not advocate too much shelter upon our arable land, because I believe it would be injurious to our crops of grain, but to a reasonable extent, trees and shelter judiciously provided, are absolutely necessary in Canada. In the Mother Country, live fences and trees prevail so much in some situations, that agriculturalists complain that they are injurious, but chiefly in consequence of their being a protection to game. In this country, shelter is more necessary, and we have not the trespass of game to apprehend. Doubtless, we cannot have the land which immediately surrounds a large tree very productive of either grain, grass or vegetables, but if all the remainder of the farm is well cultivated, except that part occupied by beautiful trees, left for shelter and ornament, we might very well afford to forego the crop that would be produced where these trees stand. I believe I am perfectly justified in stating, that a farm of two hundred acres, with a sufficient number of trees, judiciously placed, for shelter and ornament, would be more productive of grass, grain, and vegetables, for man and his live stock, than the same farm would be, if it had not a tree upon it. It may be very desirable to subdue the forests, and settle the country with industrious inhabitants, but the utter destruction of all the trees is not necessary to the accomplishment of this object. On the contrary, this object may be better attained by preserving some of the forest, or by planting other trees to the necessary extent, in place of those we cut down and destroy. This subject is of sufficient importance to entitle it to the serious attention of our Legislators. There is already sufficient proof of the injurious effects produced by depriving the land of every tree that grew upon it. It is better to inquire into the subject in time, while a remedy is in our power, than to wait until the matter is forced upon our attention by the manifest deterioration of the land in consequence of the destruction of the forest, and the want of trees and shelter. Any observing person, making a tour in the country in summer, will have noticed how animals appear to enjoy

the shelter of a large tree during the heat of the day, if they are so fortunate as to have a tree growing in their pasture. It is also worthy of observation, how greatly animals appear to suffer in the heat of summer, in exposed, unsheltered pastures, where there is not a tree or shrub growing, and in such situations, there is seldom much grass for the stock. The country was amply furnished with beautiful trees, in all possible varieties, when we took possession of it, and with our boasted civilization, our first connection with the forest is to destroy it,—in fact,—we declare war by the axe and the fire against every tree of it. In other countries, the most unmistakeable mark of education and civilization is to have a due proportion of trees in every variety, with hedges, shrubs, &c., and the absence of trees, and beautiful hedges, was the most certain indication of ignorance, poverty, and if not poverty, of bad taste, or want of a due appreciation of the useful and beautiful. Probably many parties may object to my proposition in regard to the great advantages of a due proportion of trees on every farm for shelter, ornament, and other useful purposes. I, however, would be delighted to have the matter fairly and thoroughly tested, in order that if trees are proved to be advantageous, as shelter for our land, our live stock and for other purposes, measures may be adopted to prevent the utter destruction of our native forests, without providing for their necessary shelter, &c., by the planting of trees regularly to a certain extent. A country without trees, reminds me of the descriptions I have read of the deserts of Arabia, or the frozen regions near the North Pole. It may be replied to my remarks, that the country is not so utterly denuded of trees as to justify my observations on the subject. In taking a general view of the country, trees and the original forest are seldom out of our vision; but at the same time you see numerous farms without a tree or shrub growing upon them. It is not of much advantage to these naked farms, or to the cattle pasturing upon them, that the forest may be within a mile of them, and that one or more trees may be growing upon a farm not far off. I am anxious to show that trees are necessary upon every farm, and if they are not growing there naturally, should be planted with as little delay as possible. It has often been my chance to see a beautiful tree growing in a cleared field, where, perhaps, it was the only one upon the farm, cut down, for no other object, but the use of the wood for fire. It is very proper to cut down trees when we require them for use, provided we can spare them, or that we plant others in their place; but to cut down an ornamental tree, that affords shelter to our cattle in the extreme heat of summer, is, to say the least of it, very inconsistent, with regard to our own interest, the comfort of our cattle, or any idea of what is necessary to constitute a beautiful landscape. Any attempt to interfere with the right of parties to do as they please in the management of their own property may be considered objectionable, and if a settler wishes to destroy all the forest trees upon his lot, without planting any others, he may suppose it would be very unjust to prevent him doing the first, or oblige him to do the latter, if he was not so disposed. I will not presume to offer any opinion on this subject. My object is to endeavor to show the injurious effects of destroying all the forest trees, without planting fruit or other trees, where they might be necessary for shelter, ornament, or other useful purposes. It is in our power to ascertain, by inquiry and investigation, what would be the probable result to the soil, and perhaps to the climate, by the total destruction of the forest in the country that is being settled and cultivated. I have read many reports of the injurious effects produced in other countries by the destruction of the forest, and the want of trees, and it appears only reasonable, that to strip the country we settle, at once of the whole of the natural production that covered it, may produce a very great change, though we may not be able to comprehend perfectly why it should have this effect. In countries having a humid climate, and not subject to the same degree of heat in summer as this is, the want of trees would not be so injuriously felt as in Canada. It is, therefore of general importance that this matter should be enquired into, and if trees are considered to have a beneficial influence, that means should be adopted to preserve them in due proportion, or that other trees should be planted. In the British Isles, landed proprietors are sure to plant trees and provide for their protection to a sufficient extent, and when woods are cut down, others are planted. If we continue to go on cutting down the forests here, as we have done up to this time, we shall not in a few years have a tree left in the settled parts of the country, either for ornament, shelter, or for necessary purposes. I believe the Legislature have passed an Act for the protection of game in this country; but perhaps where there is so much of Canada still covered with forest, it may not be thought necessary to adopt any measures for saving a portion from the axe and fire of the settler, as the work of settlement proceeds. The sooner every tree and shrub that grows upon a settler's lot of land is cut down, burned, and the ashes converted into potash and sold, the more successful he considers himself. There is not a farm that should not have some reserved wood upon it for necessary purposes that are constantly recurring, and if some of the original forest is not preserved, other trees should be planted regularly that would supply these demands, and answer for shelter and ornament, and be of general use to the country. Fine trees, in full leaf, are considered by most people to be beautiful objects, and notwithstanding this fact, it appears a most inconsistent proceeding, that we should destroy them all. Of course it is necessary for the settlement of the country that a large proportion of the forest should be cut down, in order that the land should be cultivated for the support of settlers; but as we have land in such abundance there is no necessity to destroy all the forest as we occupy it for settlement, we should spare a portion, if it was for no other purpose than to indicate the original state in which we received it for the occupation and support of our race.

WM. EVANS.

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Gardening.

We copy the following from the "Canadian Gardener," a useful little work published in Aylmer in 1851, and written by Mr. A. Parker, Gardener, in that place.

Situation. — Those who have only land enough to cultivate for a garden, must be content with its situation; but to those who are in possession of a farm, I would advise, (as it is generally admitted,) that the garden be situated, on a gentle declivity to the south and east, —yet it is admitted that a northern situation will suit some vegetables best; such as the Cauliflower, Cabbage, English Bean, Spinach, Lettuce and other salads. Gooseberries will also ripen best when excluded from the midday sun. As earliness of production is an important object to the gardener, I would advise the former situation, viz.,—a south east situation, as many vegetables can be raised under the north side of the south fence.

As to form, it should be either square or oblong. If oblong, the longest side may be situated east and west,—I would recommend the latter form, as it would tend to raise a larger quantity of garden produce at an early period, under its northern fence. As to declivity of situation, a descent of one foot in twenty is recommended. Should the soil however, be light and sandy, I would recommend a perfect level situation, as in this case, heavy spring rains would have no tendency to wash away the seeds from their beds, destroy young plants, or carry off the best of the soil.

SOIL.—The best kind of soil for a vegetable garden, is a deep rich loam rather inclining to sand. A strong stubborn clay should be avoided. These selections are intended for garden vegetables generally, yet some of the same may do best in soil of a clayey nature, whilst others do best in a very sandy —these will be treated upon separately as we proceed.

PREPARATION.— Having recommended a situation for the kitchen garden, the next process is to prepare the ground—which is to be done in the following manner: Firstly, by ploughing and harrowing until the surface be perfectly smooth and clean. Secondly, by a good coat of well-rotted manure and a double ploughing; that is two furrows deep with a good sized plough—this should move the ground to the depth of fourteen or sixteen inches, which consequently will throw up a considerable quantity of the subsoil.

I would recommend that another dressing of compost or manure be added, and a single ploughing after. For the purpose of making the surface even, the latter ploughing should be back furrowed, by commencing where the former ploughing was finished, and turning the team on the opposite side. Should your garden be wide enough, I recommend cross-ploughing; or what is much better, good trenching two spades deep, that is, the length of two garden spade blades, which will at

least be two feet deep. This depth is not unreasonable should your soil admit of it, but if inadmissable, let the trench be as near to the measure as possible.

TRENCHING.—This is done in the following manner:—Begin at one end of the piece of ground, and shovel out two feet deep and two feet wide: Cast the soil, dug up, on ground you do not intend to trench; shovel out the bottom clean, and make the sides of your trench as near perpendicular as possible; thus you have a clean open trench, running all along one end of your garden ground. You will, as a matter of course, observe the necessity of using a wheel or other barrow, in conveying the soil dug out, into the last trench. Lest this might not be understood, after completing your first trench, you will then take another piece all along two feet wide, and put the earth that this new piece contains into the trench, taking off the top of the new two feet wide, and turning that top down into the bottom of the trench, and then taking the remainder of the earth of the new two feet wide and placing it on the top of the earth just turned into the bottom of the trench. Thus when you have again shovelled out the bottom, you have another clean trench two feet wide and two feet deep.—You will thus proceed till the whole of your garden ground be trenched, and then it will have been cleanly turned over to the depth of two feet. This should be done in the fall, and in consequence of the subsoil being on the top, it should have a dressing of manure in the spring, and well mixed by digging.

CLAY SUBSOIL.—Should your subsoil be stiff clay it should not be cast upon the surface at once, but should be loosened up with the subsoil plough or spade, as per example, see trenching. Observe that the bottom or clay part should be well broken up and cast out. This indeed, is not all that should be performed as the under ground drainings must be well attended to—these may be under the garden walks. Finally, the above mentioned soil is not to be preferred; should however clayey soil be well manured, nearly all kinds of vegetables will thrive in the same. I cannot pass this subject without reminding the Farmer of the great benefit to be derived from the use of she subsoil plough, especially on clay bottom land.

FENCING.—A good fence is essentially necessasy, although too often neglected. How often do we see garden crops destroyed for the want of proper or good fences. Should the farmer not have time to perform the work necessary for a good garden, it is to be hoped, that he will not neglect making a substantial fence so that he may enjoy the fruits of his industry, from a garden which he has perhaps but partially cultivated. As to the material of the fence, I will leave it to the judgment of the owner; but were I to command the means of making an ornamental fence, as a matter of course, I would make or plant a hedge. As few however command the means of making a brick or stone wall, I would recommend the north side to consist of boards, as on the south side of the same, grape-vines and other useful and ornamental shrubs could be reared.

HOT-BED.—The prevalent upinion amongst farmers respecting hot-beds is, that they are expensive articles requiring the skill of professed gardeners to manage them, and almost entirely beyond the range of farming economy. Both suppositions are decidedly erroneous, and we hope that every one who reads this will arrive at the same conclusion. We do not propose that every farmer should go into the regular routine of forcing vegetables at extraordinary seasons, but that every farmer, however humble his circumstances may be, should at least have a hot-bed to forward such plants as he may want to cultivate in his garden.

In preparing a frame and lights for a hot-bed, some previous instructions on the subject will be necessary, (unless it be well understood by the person who is to make the bed.) The sash should be made of good two-inch plank, without cross bars, in which there are to be four rows of panes of small glass. The sash is to be well painted; and in glazing, begin at the bottom and overlap each light about one-fourth of an inch, so that the rain water may run off. The length of the sash is to be in proportion to the extent of the bed; but by no means over six feet, and no more than four sashes to each frame, and the latter to be made of plank, which is to fit the sash. The back part of the frame to be nearly three feet high, and the front about half the same in height.

The site should be a dry place open to the sun and sheltered from the northerly and easterly winds Previous to making the bed, manure should be prepared, which may be unfermented stable dung. The preparation is simply this:—Throw into a heap, and when a smart fermentation occurs, turn it over.

In making a bed, the European system is to build above the ground three or four feet high; but in this country of sharp wind and dry atmosphere, I should deem it best to dig about eighteen inches below the surface, if the ground be not too wet; in this way two feet of dung, when settled, is sufficient. The former method is however preferable, should you want your plants to have an early start, as it gives a chance for lining (that is to place hot manure all round the frame to the top of the latter, which will keep up the heat, and can be renewed when necessary.)

In making the bed, shake the manure with a fork evenly over the whole bed, which should be the size of your frame.

If your dung be dry, apply water to the same; on this set your frame, and in it also put six inches of good rich soil, with a mixture of sand. Put on your lights, and when the heat rises, move off your glass and stir the soil. Should the heat be very strong, wait a few days before sowing, and admit plenty of air both before and after this period; in fact, the more air the better, provided there be heat enough to encourage vegetation—the sowing should be neatly done. After the plants appear, thin them out if needed, and give them plenty of water and air. I find the last of March or first of April, are periods early enough to sow for transplanting.

BEET.—There are varieties of this vegetable, the best of which for the table, are the early blood-turnip-rooted and long blood-red. The soil in which it delights, is a deep rich loomy kind. Should a few for early use be desired, I would advise sowing as early in the spring as the ground may admit. If for a general crop, let the sowing be delayed until May, as the roots will be much larger and better than those from early planting, which from being frequently stunted in growth by the various changes of weather, become tough, stringy, and of unhandsome shape. In case of the failure of crops, or of unfavorable weather in May, Beet seed planted the first week in June, will sometimes produce large handsome roots, which may be preserved for winter use.

I recommend that the seed be soaked in soft luke-warm water for at least twenty-four hours; to be sown in drills from one to two inches deep, and fifteen inches apart, if in beds. When they establish their vegetation, they may be thinned to about eight inches apart. In all cases the soil should be pressed down immediately after sowing, particularly that of a light quality.

CABBAGE.—Varieties of this plant have often been introduced to our attention, and many more than are necessary for our present purpose. At this period, however, I will not introduce to your notice a greater number than what may be profitable and useful to you, and these are the large and small early york and green savoy to be used in the summer, the quintal and drum-head for winter, and the red dutch for pickling. There are other varieties which are indeed very good; but as the propagation of the plant is my principal object, I shall make no mention of them, as they all require the same mode of treatment,—distance alone excepted, and this should be left to the seedsman.

TIME OF SOWING.—Much has been said and written by divers authors relative to the sowing of cabbage seed in the fall, for transplanting in the spring; but they spoke and wrote for other countries and not for Canada. For early use, I recommend sowing in a hot-bed, towards the last of March or the first of April. Should this advice be followed, you will find your plants strong and healthy when the period arrives for transplanting them; provided light and air enough may have been admitted during their confinement in the hot-bed. The best plants are produced by "pricking out" when quite small into a well prepared bed, in drills six inches apart and three inches in the drill,—there to remain fifteen or twenty days. What may answer equally well as this process, is to sow in drills, and "thinned out" as above. A knife may be inserted under the drills in a slanting position, and deep enough to cut off their tap roots, about two inches below the surface; this will cause new roots to germinate, and will have the same effect as "pricking out." In case the above directions be not attended to, the plants may be "*thinned out*" when young, so that they may be straight and strong for transplanting.

The state of the weather when these operations are performed, is not a matter of indifference, and has been a subject of controversy; some recommending dry weather, others, wet. As in many cases of disputation the truth lies between them, that is, moist weather that is neither dry nor wet, and precisely that which is best for setting out cabbages or any other vegetables. We ought not, however, wait long for even this state of the atmosphere, since with a little labor we have the means of making up for its absence.

TRANSPLANTING.—The small early-york, and others of the same size, which are not enumerated here, are to be put in rows of course. As to distances, they must be proportioned to the size which the cabbages usually come to. For the small early-york plant, a foot apart in all directions is enough; and the large york,—from eighteen to twenty inches will be sufficient space. For savoys and red-dutch, two feet apart in all directions will suffice, and for the large drum-head three feet may be sufficient. One particular, I wish you to observe, and this is, that in

transplanting, the earth must be caused to come in contact with the point or lower part of the root—*this is an important object*. The ground should be plowed or dug up previous to planting.

Every variety of cabbage grows best in a strong rich, substantial soil, rather inclining to clay than sand, but will at the same time, grow in any kind of soil, if it be well worked and abundantly manured with well rotted dung, and the after culture well attended to. I would recommend to hoe them while the dew is on, at least once a week.

Should your early cabbage have an inclination to burst ere you are prepared to use them, you may lift them sufficiently to start or disenengage the roots, (partly,) and this will retard their growth.

It is well known that the turnip fly will destroy young cabbage plants &c., soon after they crack the ground, and often it is laid to the imperfection of the seed.

To guard, therefore, against this fly, sow your cabbage on top of your root-house, or in a box or mound which may be elevated several feet above the level of the ground, as in their flight, they attain but to a trifling elevation.

CELERY.—There are several sorts of this plant, but the propagation and cultivation are the same. The whole of that part of the year during which the frost is out of the ground, is not at all too long for getting fine celery; it should be started in a hot-bed, and *pricked out* into a bed made very fine, and this should be done with care; it should afterwards be watered gently—once will answer, and then they may be shaded for a few days. In this bed they may stand till the last of June, or about that period, and then may be transplanted in the trenches; make the latter about four feet apart, one foot wide and one foot deep; throwing out the earth equally on both sides of the trench; the ground in which you make the trenches may be in a solid state. Along the trenches put some good compost manure, consisting partly of wood ashes, not fresh dung; dig in the manure and make all very fine. Take your plants and trim them of the long roots; shorten the tops, pick off all the side shoots or off-sets, and plant them six inches apart. You may hoe them with a small hoe, and as they advance in growth earth them up, but not too much at one period, lest you smother them. In going through this process, hold up the leaves, that the earth may not get between the outer and inner ones.

LEEK—This is a vegetable which for certain purposes is preferred to onions. The time for sowing is as early in the spring as the weather and the ground will permit. Sow in drills of fine earth eight inches asunder, and thin the plants to three inches apart in the row. Keep the ground clean till about the first day of July; then take the plants up, cut the roots off to an inch long and cut off the tops of the leaves, but not too low down; make deep drills with a hoe at two feet apart, plant the leeks in these drills with a setting-stick, fastening them well in the ground and leaving the drill open. As the plants grow, put to their sides the earth that came out of the drill; after that draw more up to them on each side from the interval, and if your ground be really good, each leek will have attained a sufficient size for use.

LETTUCE.—All knds of lettuce will have arrived at greater perfection by being transplanted in good ground. The tennisball and other small kinds will grow within six inches of each other, but the royal cape, grand admiral, and the large cabbage kinds should be set one foot apart each way. In transplanting, you will be careful to allow some of the original earth to adhere to the roots of your plant when you detach the same from the seed bed.

ONION.—Of the several kinds of onions, the red and yellow are the most profitable as a general crop; and of all the varieties, (potato onion excepted,) these will keep best through the winter. The New England White is a mild, pleasant onion, but not good for keeping. All the varieties propagated by seed require the same culture.

The onion will grow best in a moist and loamy soil, although they will grow in soil, partialy sandy, if well rolled after sowing. Previous to sowing onion seed for a general crop, the ground should be well prepared by digging in some of the oldest and strongest manure that can be got. The earlier this be done in the spring the better, and the planting should not be delayed longer than the middle of April, if the season will permit. The seeds may be sown moderately thick in drills, from half an inch to one inch deep, and twelve inches apart.

When the plants are up strong they should be hoed. Those beds that are to stand for repening, should be thinned out while young, to the distance of two or three inches from each other. If a few should be required for use after this, those can be taken which more incline to tops than roots, and if the beds be frequently looked over, and the small and stalky taken away where they stand thickest, the remaining bulbs will grow to a large size.

The plants should be hoed at least three times in the early part of their growth; but if the season prove damp and weeds vegetate luxuriantly, they must be removed by the hand, because after the onions have begun to bulb, it would injure them to stir them with a hoe. When the greenness is gone from the top of the onions it is time to take them up, as from this time the fibrous roots decay. After they are pulled they should be laid out to dry, and when dry removed to a place of shelter. The small onions may be planted in the spring, Even an onion which is partly rotten will produce good bulbs, if the steed stems be taken off as soon as they appear.

PARSLEY.—Parsley is a hardy biennial plant, and grows wild in moist climates, but has been greatly improved by cultivation. The leaves of the common parsley are used as a pot-herb, and those of the extra curled kinds make a fine garnish.

These may be sown in the fall or spring in a cool situation, a quarter of an inch deep, with the earth pressed hard upon it; this process is indispensably necessary in dry weather. In addition to its utility as a culinary plant, it is highly ornamental in its first year s growth, as an edging for walks.

PARSNIP.—As the seed of this vegetable is so long sown ere it vegetates, it is recommended to sow as early in the spring as possible; drill culture is preferred; the seeds to be sown in the drills, fifteen inches apart, and thinned out to four inches. Soil and preparation the same as the beet. That part of your crop of parsnips that you may not want until spring, may be left in the ground, and those dug in the fall, may be packed in dry sand or sandy earth.

SEA-KALE.—This being found on the shores of Great Britain, forcing its vegetation through gravel and sand, has led a great many to believe that such a soil as the latter would be the best for its culture; but it is now found by experiment, that the soil suitable for the Asparagus, will suit this vegetable also. It is a hardy perennial of long duration, and may be raised from the seed or pieces of the root.

Its earliness makes it more valuable, and when blanched, it is highly esteemed as a culinary vegetable.

[Sea-kale is a much more useful plant than it is usually supposed to be. A little salt applied as manure greatly promotes its growth.]—*Ed.*

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URATE.

This fertilizer has not been very extensively used, as yet, in our country, and few are aware of its nature, or the process by which it is formed. Every one must have noticed on entering a stable, or other place where horses are confined, a very peculiar and pungent odour, often affecting the eyes, and sometimes the throat, and creating nausea. This offensive principle is ammonia, one of the most powerful, and—contemplated in an agricultural point of view—most valuable of all the gaseous products of vegetable decomposition. Now if we sprinkle common gypsum, or pulverized plaster of Paris, we shall economize this volatile substance, and bring it to a condition readily available as a substance for plants. In its fertilizing character and properties, it is similar to *urate*, but not strictly the same.

It is asserted by manufacturers that from three to four hundred weight of urate form an ample dressing for an acre of wheat; but how much better would it be for the farmer to economize the liquid voidings of his domestic animals, in the manner here described, and apply it to his crops of hay, grain and roots, as his necessities or wants may require. All urine is rich in the food of plants; the urea and salts are all highly valuable, and no one who rightly reflects upon the subject, will willingly suffer it to be lost.

Another article of much value in economizing the liquid voidings of animals is sulphuric acid. It should be first diluted, say one gallon of the acid to one and a half gallon of water, and sprinkled over the manure heaps, or floors where animals are confined, every morning. Urine, in its fresh state, does not evolve ammonia; it is only when in the putrifying or fermenting process that this gas is given out or eliminated. Pulverized charcoal, and a solution of copperas, are also valuable, used for this purpose.

By attending to this matter the farmer may easily save a large amount of his richest fertilizers in a single season. His lands will be all the richer for it, repay him liberally and for all trouble and expense involved.

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REMARKS ON BREEDING HORSES.

Mares that have been well treated while young, (that is, not allowed to get stunted in growth,) may be used at three years old; but as a general rule, four is early enough to commence breeding them. From this age, good mares may be bred every year, if due care be paid to feeding, and not over-working them, till they are twenty years old. Beyond this age, they cannot be relied upon with much degree of certainty to breed, although in many instances they do, but it is by no means a general rule.

In answer to the inquiry, whether ringbone, spavin, or any other disease is hereditary, I answer, that I am fully convinced some diseases are. Many years ago there was brought to this country a fine stallion, said to be a high blooded horse. He was stone blind, and the person who brought him here solemnly declared that it was caused by a severe blow between his eyes. This declaration, together with the fine form and graceful action of the horse, induced many of our farmers to breed their mares to him. But in a few years they saw how sadly they had been bitten; for a great number of his colts were either weak eyed, or went entirely blind, without any "*blow between the eyes*," as no doubt their sire did before them. Some of his colts were kept for stallions, and the same is as true of *their* posterity. I consider this proof positive that blindness is hereditary in the horse.

Another disease has come under my observation, which satisfies me that it, also, is hereditary. It is what is called club-foot, and I have seen instances of it springing from the sire, and others from the dam. I well know some deny this being hereditary, and argue that it is caused by the colt travelling on hard ground about the time of the first hoof is growing off, and breaking, or wearing the foot sore, which causes it to stand on its toe, till its foot grows strait or turns under; but certain I am that there is a greater disposition in colts bred from club-footed parents to get *sore feet*, than there is in any others. So strongly I am convinced of the truth of this, that I would not breed a mare to a blind or club-footed horse if I considered him perfect in every other particular.

With regard to ringbone, or spavin, I am not posted, but my opinion is that they are in some degree to be feared. If I owned a mare with either of these blemishes, I would not stop breeding her, unless I found by experience that she entailed the disease to her colts; but I should not run the risk of breeding a clean limbed mare to a stallion with these blemishes.

If Equus is about to enter into horse breeding, I would advise him to obtain good young mares, say from four to six years old, even if they cost him more, and then they are fit for both raising colts and work, and he will be saved the expense of keeping other horses to perform his farm labor. The colts may be easily learned to lead by their dams with a halter, and thus save much annoyance to their master, and they will not be half the trouble to break when they are thus tamed.—PLOUGHMAN in *Country Gentleman*.

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FARM LABOR WITH THE ELEPHANT.

The "cultivator," which was sufficiently large to anchor any twenty of the small native bullocks, looked a mere nothing to the splendid elephant who worked it, and it cut through the wiry roots of the rank turf as a knife peels an apple. It was amusing to see the same elephant doing the work of three separate teams when the seed was in the ground. She first drew a pair of heavy harrows; attached to these and following behind were a pair of light harrows; and behind these came a roller. Thus the land had its first and second harrowing and rolling at the same time. This elephant was particularly sagacious; and her farming work being completed, she was employed in making a dam across a stream. She was a very large animal, and it was beautiful to witness its wonderful sagacity in carrying and arranging the heavy timber required. The rough trunks of trees from the lately felled forest were lying within fifty yards of the spot, and the trunks required for the dam were about fifteen feet long, and fourteen to eighteen inches in diameter. These she carried in her mouth, shifting her hold along the log before she raised it, until she had obtained the exact balance; then, steadying it with her trunk, she carried every log to the spot, and laid them across the stream in parallel rows. These she herself arranged, under the direction of her driver, with the reason apparently of a human being. The most extraordinary part of her performance was the arranging of two immense logs of red keenar, (one of the heaviest woods.) These were about eighteen feet long and and two feet in diameter, and they were intended to lie on either bank of the stream parallel to the brook and close to the edge. These she placed with the greatest care to their exact positions, unassisted by any one. She rolled them gently over with her head, then with her foot, and keeping her trunk on the opposite side of the log, she checked its way whenever its own momentum would have carried it into the stream. Although I thought the work admirably done, she did not seem quite satisfied, and she presently got into the stream and gave one end of tho log an extra push with her head, which completed her task, the two trees lying exactly parallel to each other, close to the edge of either bank.—S. W. Baker's Eight Years, Wanderings in Ceylon.

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FEROCITY OF A HOG.—The week before last week, Messrs. John Oakley and John Emigh, who reside in the northern part of the town, started to drive a hog to a neighbor's, and had proceeded but a few rods when the hog turned to go back. They tried to drive him, but instead of going, he charged directly upon Mr. Emigh, who struck him a heavy blow across the snout as he came. This seemed to have but little effect, (the hog is over a year old and pretty large,) and he reared up on his hind feet, struck Mr. Emigh and knocked him down, seized him by the leg above the knee. inflicting a fearful wound. The suddenness of the attack, the blow and the wound caused Mr. E. to faint and the hog would have undoubtedly killed him, had not Mr. Oakley, who was close by, came to the rescue.

Mr. O. had no club, nor time to get one; so he grappled with the hog and tried to throw him or pull him off. Finding himself attacked in this way the hog left Mr. E. and turned upon the assailant, knocked him down, and seizing him by the leg near the knee joint tore him so dreadfully that it is feared he will not be able to walk in a long time and perhaps be maimed for life.

During the fracas Mr. Oakley called the dogs—a large Newfoundland—one who seized the hog and dragged him away from the men, thus no doubt saving the life of one or both.

We learn that Mr. Emigh is able to get about with the assistance of crutches.—*Poughkeepsie Telegraph*, March 4.

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United States Agricultural Society.—The Executive Committee of the United States Agricultural Society had a meeting in Philadelphia last week. The *Philadelphia Ledger* says of it:—

How to get Green-Pea Soup in Winter.—"We shall have visitors early in February, and must have green-pea soup once or twice at least. Tell the gardener to provide a supply of young peas." Such was the order given one Christmas day to the cook in a great household, and duly communicated by the culinary to the horticultural department. "Fresh green peas in a month, in the middle of winter! the thing's impossible," cried the astonished gardener. "My lord can't have given such an order; we havn't a house or a light to grow them in—and if we had....." "We must have them for all that," was the curt rejoiner; and the gardener was left to discover the *quo modo*. In his dispair the worthy man bethought him that young peas and young pea leaves tasted much alike, and that, perhaps, the one might be as good for soup as the other. So he took some shallow pans, planted them pretty thickly with dwarf Spanish peas, put them in his early vinery on a shelf where he sometimes grew strawberries and where a good heat was kept up. They soon began to grow; they had air as much as it was possible to give it them, and by the beginning of February were six inches high, well furnished with healthy, tender green leaves and stems. The supply thus obtained was cut like mustard and cress, and handed over to the cook, who declared that it made better *puree* than if he had had green peas themselves. And from that time forward peas were forced at——as regularly as French beans; and all lovers of good living wondered how Lord—— continued to have such capital *puree* of green peas whenever they visited him in the winter.—*Lindley's Gardeners' Chronicle*.

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FRUITS IN SEALED CANS.

A good deal was said last fall about putting up fruits, green vegetables, &c., in hermetically sealed cans—a patented article—and having them come out in the winter as fresh and nice as new. We purchased a dozen of such cans, and made the experiment to our satisfaction. Before, however, we express our opinion, we give what the *Ohio Cultivator* says about it:—

Putting up fruits in sealed cans, was extensively practised last fall. Many people are now enjoying the luxury of fresh peaches, tomatoes, and the like, much to their health and comfort. With the latest improvements in cans and canning, this is easily attainable in many sorts of fruits and vegetables. Owing to the unusual wetness of last season, the fruit was very watery and unfit for late keeping, but our peaches and tomatoes open as nice as can be expected. Some people tried to seal up green corn, but as far as we know, failed in every instance to keep it good. We must try some more scientific plan to keep this dainty dish. Others have had a more sad experience in canning Rhubarb or Pie Plant, which contains so much oxalic acid, that on being used from the cans has nearly been the death of whole families. Keeping in this way seems to give more virulence to its poisonous qualities, which are comparatively harmless when the plant is used fresh from the garden. Let the matter be looked to.

This caution is timely. Plants or fruits that contain oxalic acid will become poisonous—and we dont know but some other vegetables, may by standing too long in metallic vessels. We filled our cans with green peas, beans and corn, prepared with exact care, according to

the directions. On opening a can of peas the other day, for the first time, there were something in both smell and taste so odious, that we cast them far from us very speedily. The beans and corn proved less offensive, but neither was a dish that any who surrounded our table would choose to eat. The whole, in our experience, was a decided failure, and others may have the pleasure of this admonition at our expense. Fruits preserved in the old fashioned way, in sealed glass bottles come out much better. Our black raspberries, particularly, are a great acquisition to our winter table.—*Rural Intelligencer.*

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Transplanting Fruit Trees.

Seeing an article in the "Country Gentleman" of the 27 March, upon the subject of the "Transplantation of Trees," it occurred to me that a few suggestions upon the subject of transplanting fruit trees might not be out of place at this time of the year.

I have had some experience in transplanting trees, and latterly with good success. I set an orchard of 165 trees in 1851, and every one lived. I set three small orchards in the spring of 1854, and notwithstanding the almost unprecedented drouth of that year, I lost but one tree. Two of the orchards were upon very dry gravel soil. There I lost none. I dug a pit for each tree about 16 or 18 inches deep, in basin form, about three feet in diameter, and put in a large wheelbarrow load of good loam soil. Upon this I set the tree, holding it in my hand while my man with a shovel sprinkled the soil which came from the top of the pit on to the roots, having first been made fine. The tree is moved up and down so that the fine soil is worked under the roots until they are fully covered, and should the roots be so shaped and so clustered as to form a roof to prevent the soil getting fully up under the centre, the hand is used to accomplish it. When the roots are covered, a quart or two of water is turned upon the centre of the roots, which form a mud directly under the body of the tree. Then dry soil is again thrown on, upon which the person holding the tree steps, planting his feet 4 or 5 inches from the tree upon each side, and so passes thereon round it. The water or mud will by this pressure be forced up to the top of the ground, which gives evidence that all the space under the roots is filled.

The soil is then thrown around the tree to about the height it was in the nursery, but raising a circle around it high enough to hold a pailful of water. If the season is one with ordinary rains, they will leave out and grow. If they should not, and the season is dry, place around them some broken straw and long manure, giving each one a pailful or a half a pailful of water. Should any fail to leave out with this treatment, tie around the trunk quite up to the limbs or further, a thin layer of straw, putting on the upper layer first, and then with a ladle turn water upon the upper end of the straw until the tree is thoroughly wet, and repeat it daily. This will seldom fail to bring out the leaf; and save the tree.

Should any of the trees falter through the summer, as they may, if a dry one, give them a pail of water in the basin prepared for it, and they will go through. This is some trouble, but if a tree is worth buying and setting, it is worth saving.

I have saved trees which had been very much dried before they had reached me, by digging a trench in a wet place, and heading them down so that the body will be at an angle of, say, 30 degrees with the ground. If water shows itself in the trench it is no objection. When the roots are so covered, the buds will open if there is any vegetable life in the tree. They should then be set.

I very much prefer the spring to the fall for setting trees; but as the early part of the fall is the best time for getting a chance of trees in the nursery, it is well to take them out at that time, and heel them down in dry ground, in a protected spot, until spring, and then set them. I treated pears and plums in that way the last year taken from Thorburn & Co.'s Nursery, Albany, and every one lived, and more than half of them ripened fruit the first year.

S. CHEEVER.

Waterford, March 27th, 1856.

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Draining--Results of Experience.

A meeting of the principal English agriculturists, who have distinguished themselves in improved farming, was held in London during the past winter, which was confined in its discussions wholly to the subject of underdraining, and, as might have been expected, a great deal of valuable information was elicited. The experience of British farmers with draining has been great; and the conclusions they have arrived at on some disputed points cannot fail to prove interesting. But we find the same defect in their statements, that characterizes nearly all the details of experiments made in this country; namely, a want of accurate estimates or measured results. Their conclusions are given generally, without any data by which we know the amount or degree of benefit or injury occasioned. "*I think so*," or "*I know so*," is not a very scientific rationale, nor very clear mathematical calculation.

Depth of Draining.

An important point, on which nearly every one present agreed, was that deep drainage, —not less than four feet,—was invariably the best. Among other statements on this part of the subject, we observe that of T. Scott, who had had for fifteen years constant connexion with extensive works for drainage. In 1838, he superintended 140 miles, which were dug 27 to 30 inches deep. The bottom was laid with sole tile, or with 12 inches of stone broken so as to pass through a 2½ inch ring. "The effect of the drainage was wonderful, and repaying at the time;" but, as proved to be the case with many other shallow drains, these seemed to lose in part their efficiency after several years; but having learned the superior advantages of deep drainage, measures were taken ten years afterwards to take these all up and replace them with four feet drains. The objection that surface water would not find its way down to such a deep channel, had not been found to exist in practice, which indeed appears very obvious when it is remembered that water will descend through soil four feet much easier than horizontally 12 or 15 feet, which it must do to effect thorough drainage of the land.

Deep drains were found to commence running sooner than shallow ones, and to continue running longer—showing their greater efficiency; doubtless owing to the fact that the subsoil must be first filled by the falling rain, up to the bottom of the shallow ditto, before the flow of water can begin; and it must again cease when the surplus water in the subsoil is reduced down to this level.

Only one member of the meeting advocated as shallow a drainage as three feet—which he did on the ground of saving expense, the last foot of a four-feet ditch often costing as much to excavate as the three previous feet.

It was claimed by some members, that soluble manure would be carried down and flow off in shallow drains, while the water will run clear from those of greater depth. This reasoning does not appear to possess much weight, for if the channels are two rods apart, all the surplus water of the soil would be only *one sixteenth* nearer to the three-feet drain than to the four feet—a difference of small amount, and affecting very little the results in practice.

It would have greatly assisted our enterprising farmers in America in determining the proper depth, if we had been furnished in this report with precise statements of the actual difference in results,—given in figures from careful measurements,—showing the increased cost per acre of the various increased depths, together with the greater amount of growth in crops. As the statements now stand, there is nothing more than a mere expression of *opinion*, founded on extensive observation. A five-feet ditch may be best; but what we want to know is whether its increased cost will *pay*.

Importance of Levelling-Instruments.

Where there is a steep descent, little difficulty is commonly felt; yet a *uniform* descent would admit of smaller tile, and prevent those lodging places for sediment, which has been sometimes found to cause the entire obstruction of the channel. When the land is nearly level, an instrument for determining the descent, in the first place; and for its uniform slope in the second, is absolutely indispensible. Col. Challoner mentions instances where, without this careful attention to the fall, three-fourths of its entire amount had been taken up before the drain had been cut half its length, thus leaving the remainder almost a dead level and nearly useless. He recommended an accurately-made common bricklayer's level, whose length divided into the entire length of the drain, would give the descent for each length, and perfect uniformity be thus maintained in every part.

Cost of Draining.

It appears from the various remarks made by the speakers, that *brush-draining* had been regularly and efficiently performed for 30 to 40 shillings per acre, or eight or ten dollars of our money. These continued to answer the purpose for twelve or fourteen years. The drains appear to have been made much shallower than the four or five feet tile drains, which have cost about five to seven pounds or twenty-five to thirty-five dollars per acre, and which is about the same as the cost of draining in this country only two and a half or three feet deeper. The difference in cost, in the two countries, is attributable to the difference in the price of labor and cost of tile. We entertain hopes, however, that by the use of Pratt's ditching machine, we may be able to drain land three feet deep, and lay it with tile, for $20 per acre, of which the tile will be one-half. The price of tile now, is much higher than in England, but it will unquestionably become cheaper when there are greater facilities for its manufacture, but more especially a larger market for it than at present.

Durability of Drains.

The opinion was expressed that deep, well made drains, would last at least fifty years. If they would last fifty, we cannot see why they would not last a hundred and fifty. The only thing in the way of their continued durability appears to be sediment accumulating in the tile and choking it, or the settling of the earth about their exterior and filtering into their crevices, and thus shutting up the access to them from without. In clay soils, there appears to be little liability to internal choking. In those of a sandy and gravelly nature, the danger is greater, and is to be prevented, (in addition to the uniformity of descent already mentioned,) by using collars at the junction of the pipes, by surrounding the pipes with gravel or broken stone, to be covered with flat stone, hard-wood slabs, or brush, or using brush alone in contact with the tile. In quick-sand, all these remedies may need to be combined. The same remedies will of course prevent external clogging. This difficulty was found to be much greater in shallow than in deep drains. Fifteen years ago, two feet was regarded as deep, many drains being less, but they soon lost their efficiency.

Advantageous Results.

G. Donaldson mentioned a piece of land in Clydesdale, drained in 1821–2. The land was previously so wet and boggy that it was unfit for cultivation. It was drained from three to five feet deep, and the third year afterwards it produced a crop of wheat of six quarters (48 bushels,) to the acre, and 64 lbs. weight per Winchester bushel and had ever since been in profitable cultivation. Another instance,—300 acres in Lancashire,—never before cultivated, producing only coarse grass and heath; after thorough underdraining, was ploughed and produced a crop of oats which sold at public auction for 9 pounds (45 dollars), per acre, and the land was let for the next year for £11 ($55) per acre. In another instance, mentioned in a letter from W. Hulton, of Lincolnshire, land which "four horses had found a difficulty in ploughing, is now producing excellent crops of wheat, worth almost the fee-simple of the land in an unimproved state." In another case, mentioned by J. B. Denton, the Speaker of the House of Commons (his name not given,) had several farms to drain, occupied by tenants much prejudiced against deep draining. A single farm was therefore drained four feet deep. "When this was done, the tenants one and all, begged that their *wet* lands might be drained—they selecting the *wettest* portions. On the completion of this second job, the same tenants, with greater earnestness, begged now to have the same lands drained that they had withheld as *dry*,—because they found by comparison with the drained land, that the excepted dry land was *insufferably wet*."

The following calculation shows the great importance of deep draining, and after it, of deep tillage, — viz. that every *inch* of additional depth of drainage, drains and renders porous for the cultivation and the penetration of the roots of crops, *one hundred tons* of soil per acre. The following interesting and striking facts show

The depth that Roots will Penetrate.

J. B. Denton (who is high authority) says, "I have evidence now before me that the roots of the wheat plant, the mangold wurtzel, the cabbage, and the white turnip, frequently descend into the soil to a depth of three feet. I have myself traced the roots of wheat nine feet deep. I have discovered the roots of perennial grasses in drains four feet deep; and I may refer to Mr. Mercer, of Newton, in Lancashire, who has traced the root of rye-grass running for many feet along a small pipe-drain, after descending four feet through the soil. Mr. Hetley, of Orton, assures me that he discovered the roots of mangolds in a recently made drain five feet deep; and the late Sir John Conroy had many newly made drains four feet deep stopped by the roots of the same plant."

The Distance of the Drains Asunder.

Most of the speakers thought that this distance should not be less than 30 feet, and on the whole recommended 25 to 30 feet. Some of them seem to think there was a definite distance to be observed, for the remark was made that "a single yard too near may be a pound per acre thrown away, while a yard too wide may occasion dissatisfaction for ever." We cannot see how so distinct a line may be drawn. The soil nearest the drain is of course made dry first, and then that more remote, in gradual succession; and the greater the distance the longer the land would require to become properly drained. There is a certain medium, pointed out to observation and expediency, which a view to economy may make greater distance, where labor is costly and land and crops cheap, than otherwise; although the saving of labor in tillage by underdraining, should not be forgotten in the estimate. The quantity of rain that falls, and which rains in differents places, may have an important influence on the number of drains to carry it off speedily.

The Keythrope System.

This is a system of drainage, extensively practiced by Lord Berners (who had previously expended several thousand pounds in shallow drainage, in the common or *gridiron* arrangement of the drains.) In the Keythrope system, the arrangement of the drains is entirely irregular, and dependent solely on the natural seams and strata in the soil—and is of course only applicable to such soil as have these seams and strata—and which are more common than many suppose. In some places, a single drain, properly located, will affect complete drainage of a large piece of land; in others, numerous parallel or branching drains may be requisite. To ascertain this very important point, *trial holes* are dug at regular intervals all over the piece of land to be operated on; the rapidity with which they fill, and the quantity they contain, will afford a guide for the commencement of operations. A ditch is cut in such places as appear best; and then its effects are observed on the trial holes. Those which are soon laid dry by this means, show that no more drains are needed there, even if at some distance. While those that continue filled with water indicate that further drains are required, the position of which must be governed by observation and circumstances.

The chief recommendation of this system is its *cheapness*. The drains being cut only where they are actually wanted for use, a great saving of labor is effected, the cost by this mode sometimes being not more than one half that of the regular or gridiron system. Several gentlemen who had visited Lord Berners' lands after a long and heavy rain, affirmed that the drainage wns effected by this system in the most complete and thorough manner.

We have no doubt that in many portions of the country, the adoption of the plan of digging trial holes *at regular distances* over the whole field to be drained, would afford much valuable knowledge on the requirements of the land, and on the position of drains; and that much land supposed to be quite dry and to need no labor of the kind, the water would be found to stand a long time in the holes, showing the amount of stagnant water in the subsoil.

Position of Drains.

The general voice of the members of this meeting was in favor of running drains down hill by the shortest or steepest course. If the drain descends *obliquely*, and if water will leach into it from above, it may also leach out again on the lower side; but once in the directly descending drain, it cannot flow out again, but takes the shortest cut down the hill, in the bottom of the ditch. In the Keythorpe system, however, exceptions are made to this rule, wherever the nature of the stratified earth seems to demand it.

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MONTREAL MARKET PRICES.

Rates at which produce is purchased from the Farmers.

20th April, 1856.

Hay from 9 to $10 per 100 bundles.
Straw from 2 to $3½. do.
Fresh Butter, per lb. from 1s 3d to 1s 6d.
Salt Butter, do from 10d to 11d.
Country Cheese, from 6d to 8d.
Wheat, 6s 6d to 7s.
Barley, 4s 9d to 5s.
Rye, none.
Oats, from 1s 6d to 1s 8d.
Yellow Indian Corn, from 5s to 5s 6d.
Indian Corn, 3s 9d to 4s.
Buckwheat, from 2s 9d to 3s.
Peas, from 3s 9d to 4s.
Beef, per 100 lbs, from $6 to 8.
Pork, $9 to $10 per 100 lbs.
Mutton, per lb., from 5d to 8d.
Veal, 7d to 7½d.
Eggs, 8d to 9d.

1856.

THE COUNTY OF MONTREAL Agricultural Society,

OFFERS the following Premiums for the following Crops:

ENGLISH CLASS.

	Shillings.				
Potatoes, 6 Prems. 50	45	40	35	30	25
Carrots, 5 do.	40	35	30	25	20
Mangol Wurtzel, 5 do.	40	35	30	25	20
Turnips, 3 do.			30	25	20
Indian Corn, 6 do. 40	35	30	25	20	15
Horse Beans, 3 do.			30	25	20
Summer Fallow, 2 do.				30	20

For General Competition.

The Best Surface Drained Farm, 2 premiums, . . .				30	20

RULES AND REGULATIONS.

A Field of Four Arpents, at least, will be required to entitle a Farmer in this Class to compete for Potatoes and Summer Fallow.

One arpent for Indian Corn.

One arpent for Beans.

Half an arpent for Turnips, Carrots, Mangol Wurtzel, the whole to be Field Culture.

No person allowed to compete unless a Member of the Society.

No Premium to be given unless Farm is free from noxious weeds.

The parties to whom First Premiums are awarded, shall report to the Society, the system adopted in the production of the crops.

That such Premiums shall be paid only upon Interrogatories being answered, and Circulars returned filled up, addressed to the Secretary-Treasurer.

This Rule will be enforced strictly.

Notice of Competition to be give to the Secretary-Treasurer on or before the 20th July next.

By Order,

JAMES SMITH, Sec.-Treas.

Montreal, 1st May, 1856.

Notice to Farmers.

THE MUTUAL FIRE INSURANCE COMPANY of the COUNTY OF MONTREAL, insures the properties of farmers in Lower Canada, at 5s for £100 currency, for 3 years, &c.

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P. L. LE TOURNEUX,
Secretary and Treasurer.

Montreal, 1st July, 1854.

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