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AND

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THE ECONOMY OF FARM YARD
MANURES.

In a country like Canada the farmer must look chiefly to his own farm-yard for keeping up the fertility of his fields, and the increase of his crops. He is not in a condition to go largely into the market for purchasing foreign manures; and if he were so, it is doubtful whether such importations would prove profitable. There are two vital points which should ever command his attention: first, to pursue such a system of cropping as will not unnecessarily weaken the stamina of the soil, and secondly, carefully to collect all sorts of organic substances on the farm, with earthy and mineral matters, to form a mineral compost, and to pay constant attention to the preservation of the manure made in the stables and yards of the homestead. It is too much the fashion now-a-days to look abroad for the means of manuring the land, while materials close at home are neglected,—and which are sometimes a positive nuisance,—that may with a little care and trouble, and without much expense, be made into a compost, and thus largely minister to the growth of future crops.

On farms that have not been exhausted by a scouring system of cropping, purchas-

ed manures ought not to be necessary, except, perhaps, for the raising of root crops, a department of Canadian agriculture that profitably admits of both improvement and extension. When guano, crushed bones, superphosphate of lime, can be got of *good quality* at a moderate price, every improving farmer should more or less avail himself of them for this purpose. And here *quality* of culture, rather than *extent*, should be the primary consideration. By a liberal and judicious system of management, as many turnips, for instance, may be grown upon a single acre, as under a contrary course will be ordinarily produced from two or three. The cost per bushel, therefore, will be found much in favor of high culture. The chief value of root crops consists in their enabling the farmer to sustain a large number of animals in better condition than he otherwise could, and thus adding to his manure heap, on which he must mainly depend for increased returns of hay and grain.

The *dung heap*, therefore, must be considered the Canadian Farmer's sheet anchor, and nothing should be left undone to increase its quantity and improve its quality. The former can only be accomplished by keeping the arable portion of the farm in good heart, thereby producing

not only more grain, but a greater amount of hay and straw,—which with a liberal supply of roots, will enable the farmer to keep a larger number of animals, which are to be regarded as manufacturers of manure.

But it is of the latter condition, the *quality* of the manure, that we designed more particularly to speak. In this respect also, there is indeed much room for improvement. During our cold, dry weather in winter, farm-yard manure is not exposed to much waste or deterioration, and it may be put out into the field in separate cart loads, without much risk of loss. Even animal substances we find under these conditions of temperature and moisture run but very slowly into decomposition, and consequently the escape of ammonia into the atmosphere is prevented. The amount of rain too, in our winter months, is not generally so large as to cause much waste of the manure exposed in our yards and heaps, by washing away its saline and soluble portions. The great danger from this cause is in the spring, or the first breaking up of winter, when the rapid thawing of the frozen ground and the sudden conversion of snow into water, accompanied often by heavy rains, may be seen to convert the more valuable portions of farm-yard dung into stagnant pools or running streams, the water of which is so strongly impregnated with saline and organic matter, as to assume a dark-brown, and sometimes even an absolutely black color. Now what a lamentable waste is here going on, under our daily observation, and at our very doors! By this repeated drenching of the farm yard and dung heaps, the manure, before it is applied to the crops, is often denuded of one-half of its fertilizing power. Now we ask our farmers to prevent this. How is it to be done, some may ask? Much of this waste is owing no doubt to defective arrangements in the farm buildings, which are generally erected, with little regard to any high degree, of not only preserving the manure, but even of the com-

fort and health of the animals, and the proper economy of their food.

Without asking our farmers to do, what perhaps the majority have neither the means nor inclination of doing—to erase their old buildings, and put up new ones on a better system, (a most desirable and practicable object, however, in some cases,) much can be done towards mitigating the evil complained of, by the exercise of a little ingenuity and forethought. By collecting all refuse matter about the homestead and on the farm, in connection with the bedding of animals, and the water in the yards, all of which is more or less impregnated and intermixed with the solid and fluid excrements of the cattle; and putting these materials into a heap, so as to ensure a moderate degree of fermentation, covered by absorbing substances, such as half-rotted straw or leaves, liberally sprinkled with plaster or charcoal powder; *a much larger quantity of superior manure of home production*, can be obtained on the spot where it is required for application, than is now the case on ninety-nine farms out of every hundred. The principal thing is to prevent the heavy rains washing away into the swales and streams the liquid or best portion of the manure. By furnishing buildings with eve-troughs, and making a cheap tank or two, and especially by absorbing with porous substances the liquid matter as it exudes from the heap or yards, thereby preventing its absolute waste; these and other expedients that will naturally suggest themselves to every thoughtful mind, and adapted to special circumstances, would in a few years do wonders in effecting the increase of our crops and herds, and consequently the profits and improvement of Canadian farming.

SALES OF LIVE STOCK IN ENGLAND IN 1858-9.

The following items gleaned from several of the principal sales of Short-horn cattle and Sheep, will be interesting to many of our readers, who will see the

pure bred stock command high prices at home, and consequently that the risk and expense of importing them to this country must be very great. Several Canadian farmers have had sufficient enterprise to import from Britain a number of very fine animals, while others have obtained a similar object through stock from the States. In consequence of the monetary pressure that has been so severely felt of late, we fear that these enterprising operations have not been so satisfactory, in point of profit, as could be desired; but as the tide of affairs has now taken a decided turn for the better, matters will doubtless improve. The profits of Canadian farming, and therefore the principal means of public prosperity, must be chiefly sought in the increase and improvement of our flocks and herds. Our farmers will consequently consult their own interests and that of the country, by giving more earnest attention to this important department of their pursuit. Mr. Stone has some very fine animals that, considering their cost and breeding, can be obtained at a moderate price, and we see that the Hon Adam Fergusson announces bull-calves of his superior Short-horns for the comparatively low sum of \$60 each.

In 1858, 25 bulls from Mr. Booth's celebrated herd were let for 3000 guineas; and the bull Hopewell was let for two years for 200 guineas a year. A son of this bull, Baron Hopewell, was sold in Ireland for 300 guineas, to Col. Towneley. The Lamp of Lothian was sold in Dublin for 200 guineas. A cow named Eugenie, her calf, and young Master Butterfly, were sold to the Emperor of the French for 500 guineas; Baltic, a young bull from Bessie, one of the cheapest cows at Lord Ducie's sale, for 120 guineas; and St. Patrick, a bull bought for 60 or 70 guineas, by Mr. Drake at Sir C. Knightley's sale, for no less a sum than 600 guineas, in Australia.

From the sales by Mr. Strafford of the herds of Mr. Crisp, Mr. Cartwright, Mr. Allerton, and Mr. Bate, during the past year, we cull the following particulars as

illustrating the current value of good stock. At the first of these sales, Hawkesworth, a two-year old bull, was sold for 200 guineas. Zierow, a yearling, fetched 180 guineas; and Manfred, a five-year old bull, reached the price of 200 guineas. Picotee and Lama, heifers, fetched 100 and 150 guineas, respectively. At Mr. Cartwright's sale, five cows and heifers were sold, varying from 10 months to 6 years old, at prices averaging upwards of 100 guineas; and the second Duke of Cambridge, a four year old bull, reached 140 guineas. At Mr. Harvey Combe's sale, Cobham Park, 35 cows and heifers, 17 heifer-calves, all by Marmaduke, and 11 bulls and bull-calves, constituted the herd, which sold for 4838 guineas, averaging £80 12s 4d each, being thus about on a par with the herds of Mr. Ambler, Mr. Majoribanks, and Sir C. Knightley, which sold: 50 for £84 each; 59 for £90 each; and 78 for £80 each respectively. The 35 cows and heifers sold for 2719 guineas, averaging £81 11s 4d each. A remarkable feature was the price reached by the calves, all from Marmaduke—17 heifer calves reached 1253 guineas, averaging £77 7s 10d each.—Moss Rose, the calf of Cambridge Rose 6th, only eight months old, fetched 260 guineas! Eleven bulls realised 866 guineas, £82 13s 3d a piece. Marmaduke was bought by Col. Pennant for 350 guineas. At Mr. Wetherall's sale, 35 cows and heifers averaged £77 15s 9d each. The 13 bulls and calves fetched £60 3s 6d each. The whole 48 animals of all ages averaged £73 4s 6d each. Among the prices, some very long ones were given, as 91 guineas for a seven months' bull-calf; 150 guineas for a five weeks' heifer-calf, and 300 guineas for a yearling heifer.

With reference to sheep, we give the analysis of the two following sales:—*Leicesters*—Mr. Sandy's sale at Holme Pierrepont, resulted in the very high average of £31 13s for 40 lots disposed of. 20 two shear rams fetched 721 guineas; 10 two shear sheep realised 286 guineas, and

the remaining older sheep brought 199 guineas. The highest priced obtained 90 guineas, and was taken to Ireland. *South Down Sheep*—At the annual letting of Mr. Jonas Webb's rams at Babraham, four dozen shearling rams, 42 shear-sheep two dozen three year old sheep, and a few older rams were offered. The prices reached did not equal those of some previous years, although the average, £25 9s 10d for 54 sheep publicly let, was £4 10s higher than that of 1858. Mr. Waters, of Eastbourne, Sussex, was the hirer of the highest price tup at 70 guineas, and Mr. Rigdon, of Brighton, of the next highest for 60 guineas.

FLAX CULTURE.

Having been frequently asked of late for instructions in the art of flax cultivation, we have pleasure in referring to an admirable article upon the subject, which is commenced in the present No., from the Irish "Country Gentleman and Agricultural Review," a copy of which we have been favored with by Mr. Hutton, Secretary of the Bureau of Agriculture. Although written for the climate of Ireland, the article, with a few obviously necessary variations, will answer equally well for this country.

THE WIREWORM.

RAVAGES OF THE WIREWORM.

(Concluded from page 49.)

The wireworm feeds on the roots, or root-stems, or young stalks below ground, of almost every herbaceous plant. There are few which it does not eat. It more especially attacks all those crops which are commonly cultivated, as oats, wheat, barley, grass, clover, turnips, potatoes, mangold-wurzel, cabbages, carrots, onions, lettuces, hops, beans, &c.; and in the garden it is particularly destructive to carnations and pinks, irises, lobelias, dahlias, &c. It devours any succulent root, but prefers fibrous-rooted plants, such as wheat, oats, carnations, &c. The only plants which we

have heard of that it does not attack, are mustard and woad. It is also said to live in dung and vegetable earth; but there may be some mistake as to this, those who are not skilful confounding many different creatures which feed on, or are found at the roots of plants, with the true wireworm. It is probably to mistakes of this kind that we must ascribe contradictory statements which have been made on other points: for instance, we have above enumerated the potato among the plants which it feeds upon; but different observers are not at one as to this, some saying that the wireworm does not eat them, whilst others state that its ravages have been most destructive. To account for this, some have supposed it to be destructive in one district, and harmless in another. We are not disposed to admit that the habits or tastes of the wireworm differ in different counties; and as we know practically that the true wireworm does eat the potato (as slices of that tuber have been successfully used to collect them), it follows that where potatoes have escaped, that must have arisen from some other cause, such as the wireworms having other food that they preferred besides them,—or the grub having been a different insect. The slices have been found full of wireworm grub; while in the same garden the growing crop of potatoes did not suffer much. The turnip crop is attacked in the young state before the root has begun to swell, and the tap-root is eaten through about an inch below the ground. Of all crops, wheat, oats, and barley seem to suffer most and are most regularly attacked. The mischief which these creatures do appears from the following fact:—It has been found that on turning over with the spade a part of a field, which they infested, that there were six or eight worms in the space of every four feet; and it was there observed that one single worm had bitten from 8, 12, to 20 stalks, all in the same place. The place bitten is a vital one, being at the base of and into the heart of the stem. Fancy two grubs in every square foot going on at this rate. The wonder is, not at the havoc that is done, but that the whole field is not destroyed in a single night.

MEANS OF PREVENTION AND CURE.

No doubt the wireworm fulfils some important and useful part in the economy of nature, but we have not been able to find any aspect in which it can be said to be otherwise than injurious to the farmer; there is, therefore, no reason why it should be spared by him, or any other means of

prevention sought for than its utter extirpation. The question is thus limited to the best means of destroying it. We have seen that the insect passes through four stages, the egg, the grub, the pupa and the beetle. In each and all of these stages it is open to some means of destruction, and at all of them should be searched for with unremitting diligence.

It is obvious, that means of destruction which are practicable under one class of circumstances, may not be so under another—that what may be suitable for a small garden may not be applicable to a large farm; and in stating the various means of prevention which have been tried or found successful, the reader must judge for himself which are most suited to his own particular case.

The great encouragement to the wireworm grub and every other root-worm, is not cleaning the land properly. It has been found that the wireworm is always peculiarly abundant in land which has been recently broken up from old pasture. Undisturbed in the old pasture it is no doubt always a resident there, but we imagine is kept from increasing too much, by the consolidated state of the soil: when that is loosened, it more easily makes its way through it. It is for this reason that the grub, from its structure, always flourishes best in a loose sandy soil. When old pasture is broken up, this condition occurs; and the roots of the old grass are left upon the field to serve as food. No doubt the wireworm beetle also arrives from other quarters to take advantage of the suitable soil, and to lay its eggs in such a favourable locality. The plants which have been ploughed up, either partially grow again, or retain sufficient nourishment to keep the grubs in life until the new crop springs up, when the grub pounces upon the tender young shoots under ground. It is thus they attack newly broken up land in greater numbers, and with more destructive results, than they showed in the old pasture. But if the farmer, instead of leaving the turf and roots to rot on the land, had burned them, the result would have been very different. All insects whether in the state of egg, grub, or pupa, whether originally there from the old pasture, or deposited about the roots by strangers come to take advantage of the locality, would then be destroyed. This is the grand specific, and if *properly* attended to, no one need fear the wireworm.

This is no mere supposition or untried suggestion. Fields much infested have been pared and burnt, and were freed from

the wireworm, while others in the neighbourhood, where the surface was pared, but not burned, continued as bad as before.—At the same time we must remember that paring will only do in the summer time—in the winter season the grub is too deep for this, and deep ploughing must be had recourse to before burning, the grub being often a foot deep in the soil.

We may be told that this grand specific has sometimes been tried, and proved no specific at all. In all such cases we believe that the failure has arisen from its not being *properly* applied at the proper times, and in the proper manner. The ploughing should not only be deep, but the burning should take place immediately after it. In the next place, it should be used either in autumn or spring, or still better in both.—If the roots and weeds on ploughed land are burned in the winter, or, as is usually done, in early spring, while the grub or pupa is still deep in the ground, where it has retired to pass the winter in a torpid state, it will not be injured by any such burning, unless indirectly from the roots and fibres which would have nourished it being destroyed, but this can scarcely be done so effectually as not to leave sufficient food to keep life in the grub till the young crop has begun to shoot. Whereas if the burning of the roots had been delayed till the grubs were eating them, they would both have been destroyed at the same time.—Besides, although the grubs may have been burned, the pupæ may not have been reached, as their cells are deeper in the ground; and the beetles may come out uninjured by anything that has been done. They lay their eggs, as we have seen, chiefly in May and June, therefore a burning at this season also may be essential. When this has to be done, it necessitates either a summer fallow, or at least a very late crop of turnips. It is better to submit to this than have the crop destroyed, not only for the present season but for several years to come. But it is very rarely that such a sacrifice will be necessary. If the farmer is careful in cleaning his land, and burns the roots of the ploughed land early in autumn, and a second time late in spring, he will seldom be troubled by the wireworm. Care should also be taken to leave no strips of grass or stubble in the field. It will only be when he breaks up old pasture that he will have to take any extra precautions; but even here he need not have recourse to any but early ploughing, and burning the roots and turf in autumn as early as possible, and repeating the burning in spring as late as possible. If, indeed,

the young crop is cut off by the wireworm, then it is better to let the crop go, and turn the rotation into a summer fallow, burning the roots and weeds again in June or July. It is of no use to re-sow the crop, as is often done. With the wireworm this is useless—he is in the soil ready to renew the havoc the moment fresh food is provided him. Summer fallow and summer burning are then the remedies. If the field could be kept perfectly clean, a crop of white mustard or woad might dispense with the necessity of summer fallow, as we have seen that the grub does not feed on those plants, and if there were no weeds or other roots they would die of starvation; but fields perfectly clean and free from weeds are seldom to be found in this country.

Various other means of prevention have been tried, and although not so effectual as the above, have still been attended with greater or less success. Very heavy rolling has been found of advantage, for the reason which we have explained when speaking of the hardened soil in old pastures, and is applied as soon as it is seen that the young plants are suffering from the attacks of the wireworm. Folding of cattle on infected places has also been found beneficial, from the cattle padding down the soil into a hard crust. Lime and soot have also been applied with success. We are informed by a friend who is an excellent chemist and skilful agriculturist, that he has used spirits of tar for many years with great success. Before having recourse to it, for instance, he could never raise a crop of carrots. When they attained the size of, say a little finger, they were in general all cut off; since he has used it, he has never failed to have an excellent crop. The manner in which he uses it is, after the ground gets a sort of digging in autumn, a quantity of sand is taken and moistened freely with spirits of tar, which is sown on the surface of the ground, and dug or ploughed in. The quantity used is about twenty gallons for an acre. The price of spirits of tar is about one shilling per gallon, and if a quantity were purchased, it could no doubt be got cheaper. Salt, chloride of lime, nitrate of soda, the refuse lime of gas-works, and other matters supposed to be disagreeable to the wireworm have been recommended, but we do not lay much stress upon them. Another curious recommendation is to sow pieces of rape-cake, of which it seems the grubs are very fond, and feed upon them so ravenously that they die of repletion. We confess we have not much faith in this singular prescription.

Hand-picking, though a tedious, has been found a very useful way of getting rid of insects, indeed there are many which have bid defiance to every other mode of diminishing their numbers. It has also been tried with the wireworm, and found to repay the expense. There are two ways of hand-picking them, one to follow the plough and pick them as they are turned up. Young children not fit for any harder labour, may be set to this work at small cost. The other plan is to set traps for them, such as slices of potatoes or turnips, burying them in the ground, and thus to collect a good many at one time. It was Sir Joseph Banks who first suggested the potato as a trap, on the occasion of the botanic garden at Hull being nearly eaten up by the wireworm in 1813. Although he was laughed at, at the time, by those who did not believe in the wireworm eating the potato, it has been found that Sir Joseph was right, and the potato trap is one of the best we know. Mr. McIntosh, in his *Book of the Garden*, says, that by means of it he succeeded in taking in a border of carnations, no less than 6360 at 3 takings. The number of slices set was 106, and the average number of wireworms per slice was 20. At one taking he captured 2120, and by persevering in that manner for about a fortnight, examining the traps every third day, he so completely cleared the boarder, that for four years after he never lost a plant. The way in which he applied the trap, was to place slices of potatoes on the point of a stick, and bury them about two or three inches under ground. Others prefer laying the slices of potatoes or turnips upon the surface of the ground, and in this way also considerable numbers are attracted. It is unnecessary to say that this plan is more suited for the gardener than the farmer.

It has been thought that irrigating the fields (when this can be done) would destroy the wireworm, but it has not been found to have much effect. The grubs can remain several days under water without being drowned, and in earth, covered with water, of course still longer, for it will be long before the irrigation can completely saturate the soil to the depth of a foot, to which distance, or deeper, the grub can easily retire. This, therefore, does not appear a plan likely to be attended with success.

The foregoing are the means which may be used against this scourge. But there are others provided by nature, which we should abstain from counteracting. Pheasants, partridges, lapwings, ducks, fowls, small

birds, &c., all are fond of wireworms, and the mole and especially the rook devour immense numbers. Let us, therefore, be cautious in interfering with the operations of these two useful allies. We believe it will be found that, instead of being looked upon as enemies, and destroyed as such, they should rather be cherished as friends.

LIEBIG ON THE DRAINAGE OF CITIES.

[The following letter of the celebrated chemist, addressed to Mr. Mechi, the well known, enterprising agriculturist, will be read with interest on this side of the Atlantic, by those who feel desirous of promoting the sanitary improvement of cities, and the increase of agricultural productions. We have in Canada a number of towns, sufficiently large, if their sewerage were properly collected and prepared, to manure annually many thousands of acres. The comparative insalubrity of American cities, and the gradual but certain deterioration of the cultivated soil by over-cropping and non-manuring must sooner or later command an earnest public attention to this important question.—Ed.]

MUNICH, Nov. 17th, 1859.

DEAR SIR,—Your letter of the 7th of November to the *Times*, furnishes me an occasion to express to you my sincere thanks for the views to which you there give utterance, and which I have labored many years to impress. I am sorry not to be able to say that my efforts have been attended with any perceptible results, and I regard it as a fortunate event that a man of so eminently practical a character as yourself has now for the first time, in the interest of agriculture and the national welfare, taken up the question of the "sewerage of towns" with warmth, and in language adapted to produce conviction.

It is my ardent wish that you may succeed in awakening the English people to your own convictions; for in that case the ways and means for setting aside the difficulties which stand in the way of procuring manure from the "sewerage of towns" will certainly be found, and a future generation will look upon those men who have devoted their energies to the attainment of

this end, as the greatest benefactors of their country.

The ground of my small success lies clearly in the fact, that the majority of farmers do not know the extent to which their own interests are concerned in this matter, and because the views and conceptions of most men in regard to the circuit of life and the laws of the preservation of our race, do not generally rise above those of C. Fourier, the inventor of the phalanstery. - He proposed, as you know, to supply the wants of the occupants of his phalanstery by means of eggs. He supposed it was only necessary to procure a couple of hundred thousand hens, each of which would lay thirty-six eggs a year, making as many million of eggs, which, sold in England, would produce an immense income. Fourier knew very well that hens lay eggs, but he seemed not to know that in order to lay an egg they must eat an amount of corn its equal in weight. And so most men do not know that the fields, in order permanently to yield their harvest, must either contain, or else receive from the hands of man, certain conditions which stand in the same relation to the products of the field as the hen's food does to the egg she lays. They think that diligent tillage and good weather are sufficient to produce a harvest; they therefore regard this question as one in which they are wholly unconcerned, and look forward carelessly and with indifference to the future.

As physicians, who in the apparent signs of a young man's blooming health, discern the fatal worm which threatens to undermine his organic frame, so in this case should those discerning men who are capable of comprehending the range of the question, raise earlier the voice of warning.

It is true that the diligent tillage of the fields, sunshine and timely rain, are the outward conditions, perceptible to all men, of good harvests, but these are perfectly without effect upon the productiveness of the field, unless certain things not so easy of perception by the senses are present in the soil, and these are the elements which serve for nourishment—for the production of roots, leaves and seeds—and which are present in the soil always in very small quantity in proportion to the mass of the soil itself.

These elements are taken from the soil in the products of the field, in the corn, or in the flesh of the animals nourished by these products, and daily experience shows that even the most fruitful field ceases after a certain series of harvests to produce these crops.

A child can comprehend that, under these circumstances, a very productive field, in order to remain *very* productive, or even simply productive, must have the elements which had been withdrawn in the harvests perfectly restored; that the aggregate of the conditions must remain, in order to produce the aggregate results, and that a well, however deep it may be, which receives no supply of water, must in the end become empty, if its water is constantly pumped out. Our fields are like this well of water. For centuries these elements which are indispensable to the reproduction of the field crops, have been taken from the soil in those crops, and that too, without being restored. It has only recently been ascertained how small a supply of these elements the soil really has. A beginning has been made to restore to the fields the loss which they sustain through the annual harvests, by introducing from external sources manures containing the same elements. Only a very few of the better informed farmers perceive the necessity of this restoration, and those of them who have the means have zealously endeavored to increase the amount of these elements in their fields; but by far the greater part of them know nothing of such restoration—they think that they may continue to take from the field as long as there is anything left, and that it will be time enough to provide for this necessity when it knocks at their doors. They do not of course know how large their stock on hand is, nor are they aware that when the necessity shows itself, there will then be no means to meet it. They know not that what they have wasted is irretrievable.

The loss of these elements is brought about by the "sewerage system of towns." Of all the elements of the fields, which, in their products in the shape of corn and meat, are carried into the cities and there consumed, nothing, or as good as nothing, returns to the fields. It is clear that if these elements were collected without loss, and every year restored to the fields, they would then retain the power to furnish every year to the cities the same quantity of corn and meat; and it is equally clear that if the fields do not receive back these elements, agriculture must gradually cease. In regard to the utility of the avails of the "sewerage of towns" as manures, no agriculturist, and scarcely an intelligent man, has any doubt; but as to their necessity, opinions are very various.

Many are of the opinion that corn, meat and manures, are wares, which like other wares, can be purchased in the market;

that with the demand the price may perhaps rise; but this will also stimulate the production, and that all turns upon having the means to purchase, and so long as England has coal and iron she can exchange the products of her industry for the corn, meat and manure which she has not. In this respect I think it would be wise not to be too confident of the future, for the time may perhaps, come, even in half a century, that not one of those countries upon whose excess England has hitherto drawn, will be able to supply her with corn, and that too, from the natural law, that what is true of the smallest piece of ground is true also of a great country—it ceases to produce corn if the conditions of the reproduction of the corn which has been carried off are not restored to it. Nor, furthermore, is it certain whether the corn-growing lands will always desire to exchange their corn for the products of English industry, since they may no longer need those products, or at least not in the ratio of England's need of corn. In the countries of Europe, and in the United States of North America, great efforts are made to become in this respect independent of England, as being in the end the only way of keeping up the corn prices in these countries, so as to repay the labor of the people.

In the United States the population increases at a still greater ratio than in other countries, while the corn production upon the land under cultivation has constantly fallen off.

History teaches that not one of all those countries which have produced corn for other lands have remained corn markets, and England has contributed her full share towards rendering unproductive the best lands of the United States, which have supplied her with corn, precisely as old Rome robbed Sardinia, Sicily and the rich lands of the African coast of their fertility.

Finally, it is impossible in civilized countries to raise the corn production beyond a certain limit, and this limit has become so narrow that our fields are no longer capable of a higher yield without an increase of their effective elements by the introduction of manures from abroad. By means of the application of guano and bones, the farmer of most limited capacity learns the real meaning of such increase; he learns that the pure system of stall or home-made manures is a true and genuine robbing system. In consequence of his restoring in the guano and bones but a small portion of the very same elements of seeds and of fodder which had been with

drawn from his fields by centuries of cultivation, their products are wonderfully increased. Experiments instituted with special reference to this end in six different parts of the Kingdom of Saxony, showed that each hundred weight of guano put upon a field produced 160 lbs of wheat, 400 lbs of potatoes, and 280 lbs of clover, more than was produced by the same-sized piece of ground without guano, and from this it may be calculated how enormously the corn and flesh production of Europe has been increased by the yearly importation of 100,000 tons, or 2,000,000 cwt. of guano.

The effect of guano and bones should have taught the real and only cause of the exhaustion of his fields; it should have brought him to perceive in what a condition of fertility he might have preserved his fields, if the elements of guano which he has transported in the shape of meat and products of his fields into the cities, were recovered and brought into a form which would admit of their being restored every year to his fields.

To an understanding of this, however, the farmer has not yet come; for, as his forefathers believed that the soil of their fields was inexhaustible, so the farmer of the present day believes that the introduction of manures from abroad will have no end. It is much simpler, he thinks, to buy guano and bones, than to collect their elements from the sewers of cities, and if a lack of the former should ever arise, it will then be time enough to think of a resort to the latter. But of all the farmer's erroneous opinions, this is the most dangerous and fatal.

If it is perceived that no country can perpetually supply another with corn, then must it be perceived that the importation of manures from another country must cease still earlier, since their exportation diminishes the production of corn and meat in that country in so rapid proportions that this decrease in a very short time manifestly forbids the exportation of manures. If it is considered that a pound of bones contains in its phosphoric acid the necessary condition for the production of 60 lbs. of wheat; that if the English fields have become capable by the importation of 1,000 tons of bones, of producing 200,000 more of wheat in a series of years than they would have produced without this supply, then we can judge of the immense loss of fertility which the German fields have sustained by the exportation of the many hundred thousand tons of bones which have gone from Germany to Eng-

land. It will be conceived that if this exportation had continued, Germany would have been brought to that point, that she could no longer have been able to supply the demand of her own population for corn. In many parts of Germany, from which formerly large quantities of bones were exported, it has already come to be the case, that these bones must, at a much higher price, be bought back again in the form of guano, in order to attain to the paying crops of former times.

The exportation of bones for so many years from Germany was possible only because the German farmers had less knowledge of the real nature of their business than the English, believing as they did that practice and science taught doctrines contradictory to each other, and were fundamentally different things, and that they must trust not in the laws of nature, but in recipes. Things have now changed for the better, although not to the extent to be desired, for the German farmers do not as yet generally understand the value of the element of bones for preserving the fertility of their fields, not to speak of the restoration of their former fertility; for if they all understood this, still no one could have any more bones; at all events no more than those which he brings to market in his grain and cattle.

The prices of bones have become so high in Germany as to forbid their exportation, and if the question should be put to English commerce, whence it furnishes the English farmer with this to him so indispensable manure, the answer would produce astonishment, for this commerce has so far robbed all the inhabited parts of the earth, that the manufacturer of super-phosphate can only set his hopes upon the phosphate lime of the mineral kingdom.

In relation to guano, I have been assured that in 20 or 25 years, if its use should increase in even the same proportion as hitherto, there will not remain in South America enough to freight a ship. We will, however, suppose its supply and that of bones to continue for fifty years, or even longer—then what will be the condition of England when the supply of guano and bones is exhausted?

This one of the easiest of all questions to answer. If the common "sewerage system" is retained, then the imported manures, guano, and bones, make their way into the sewers of the cities, which, like a bottomless pit, have for centuries swallowed up the guano elements of the English fields, and after a series of years the land will find itself precisely in the

condition it was in before the importation of guano and bones commenced; and after England shall have 'gobbed' the cultivated lands of Europe even to complete exhaustion, and taken from them the power to furnish her longer with corn and manure, then she will not be richer than before in the means of producing corn and wheat, but will, from that time forth, become even poorer in these means.

By the importation of guano and bones the population has, however, in consequence of the increased production of corn and meat, increased in a greater ratio than would have been possible without this importation of manures, and this population will make upon the rulers of the State their natural demand for food.

If men do not deem it desirable that the balance between population and the supply of food be restored by means of exterminating wars and revolutions, (in which the want of food has always played a certain part,) or by means of wasting plagues, pestilence, and famine, or by emigrations *en masse*, then should they reflect that the time has arrived for getting a clear view in regard to the causes of the existence of the increase of population. A very little reflection will lead to the conviction that the relations of populations are governed by a great and comprehensive natural law, according to which the return, duration, increase or diminution of a natural phenomenon depends upon the return, duration, increase, or diminution of its conditions. This law governs the return of the harvest upon our fields, the maintenance and increase of the population, and it is easy to see that a violation of this natural law must exert upon all these relations a pernicious influence, which can be set aside in no other way than by the removal of its causes. If, then, it is known that certain existing relations work deleteriously upon the fields, if it can be foreseen that their continuance must bring about the ruin of agriculture, if there is but a single one of all the means which have hitherto resisted this deleterious influence and made it less sensibly felt, which can be safely relied upon to secure a perpetual fertility to our fields, and it is certain that this means, by a simple change and improvement of the existing deleterious state of things, can be obtained, then it becomes us to think whether a nation should not summon up all her intellectual and material resources in order to preserve these fundamental conditions of her welfare.

It has been maintained that the recovering of the manure elements out of the sewers in the large cities is impracticable. I am

not ignorant of the difficulties which stand in its way—they are indeed very great; but if the engineers would come to an understanding with the men of science in relation to the two purposes—the removal of the contents of the sewers, and the recovery of their valuable elements for agriculture—I do not doubt that a good result would follow. Intelligence, in union with Capital, represents a power in England which has rendered possible and practicable things of much greater apparent difficulty. I look forward with deep concern to the solution of the "sewerage question." For if this question is decided in Great Britain without regard to the wants of agriculture, we can scarcely hope for anything better upon the continent.

Permit me to add still a few words in relation to the leading article of the *Times* of the same date, in which the one side of this question is taken up with great clearness, while the author of the article seems to have views not quite correct in regard to its bearing as it presents itself to my mind. The mistake into which he has fallen arises from his confounding the condition of a State with that of its population.

In the natural sciences we know nothing of a State, of its might or its feebleness. We know only of lands, their geological formation, their climate and soil, and whether the soil contains the natural conditions for the subsistence of man and beast. In places where these conditions are abundantly present, and geological circumstances do not hinder their intercourse, men cannot be exterminated. The most wasting war cannot rob a land of the conditions which nature has given, nor can peace give them to a land which wants them.

If Mr. LAYARD is disposed to answer the question put to him in the article of the *Times*, he will doubtless say that the decay of the admirable system of irrigation rendered the permanent maintenance of a great population in Assyria and Mesopotamia impossible. Countries may be fruitful, and become capable of sustaining a large population, when certain resisting influences, which in their unimpeded working make the cultivation of the soil impossible, are overcome by human intelligence; or when a land has all the conditions of productiveness except one, and then receives the one which it lacked. If Holland were without her dikes, which must be kept up at great expense, she would produce neither corn nor meat; the land would be uninhabitable. In a similar manner the inhabitant of the African oasis protects his grain fields by dikes against the storms of the desert,

which cover his ground with a barren sand. I know that prophets of future evil have at all times been derided by their own generation, but if history and natural law can furnish any ground whatever for a just conclusion, then there is none which stands upon a firmer basis than this: That if the British people do not take the pains to secure the natural conditions of the permanent fertility of their land, if they allow these conditions as hitherto to be squandered, their fields will at no distant day cease to yield their returns of corn and meat. Every man may picture to himself the state of things which will then gradually arise; but it does not belong to the province of natural science to decide the question whether the might and strength and independence of the nation can be maintained when this state of things shall have arisen.

Believe me, dear Sir,
Very truly and respectfully yours,
JUSTUS VON LIEBIG.

To J. J. MECHI, Esq., London.

THE EARLY ENGLISH AGRICULTURAL WRITERS.

(Continued from page 32.)

The lawgivers of the iron days of Cressy and Poitiers, had evidently an interest in other viands beyond mere beef and mutton, for in the act of 1363 (37 of Edward III., the statute of Westminster, made by the king, lords, and commons), we find that "for the great dearth that is in many places of the realme of poultrie, it is ordained that the price of a young capon shall not pass three pence, and of an old capon fourpence, of a pullet one penny, of a goose four pence, and in places where the prices of such vittailles bee less, they shall holde without being enhanced by this ordinance. And that in the townes and markets of upland, they shall be soulded at a less prise according as may be agreed upon between the seller and the buyer." This wise law was not repealed until the year 1624.

More than two centuries after this absurd poultry statute, we find the parliament imitating this necessarily abortive attempt to run counter to market prices, by an act to regulate the price of butchers' meat.—In the year 1532, by the 24 Henry VIII., c. 3, an act which was not repealed till the year 1541, it was declared in "an act concerning flesh to be sold by weight,"

that all beef, mutton, veal, and pork, should be sold by "haberdepois" weight, and moreover that no person should thereafter take "for any pound weight of flesh of the carcasses of beefe or porke, above the price of an halfpenny, and of mutton or veale above the price of one halfpenny and half farthing," and after endeavoring to enforce these prices by a penalty of 3s 4d, it gravely continued: "Provided alwaies that the heads, necks, inwards, purtenances, legs, nor feet, shall be counted no part of the carcasses aforesaid, but such to be sold for a lower price.

The parliament were not content with fixing the price of calves' meat; they even declared what a butcher should not kill; for instance, in 1529, we find in the old statute books (the 21st Henry VIII.,) "An Act against the Killing of Calves" for three years, because, as the framers of the Act gravely inform us, "of late yeeres now passed the breeders of such calves, of their covetous minds, have used to sel their calves young sucking to butchers, weining, rearing, and bringing up few or none, whereby the increase of old cattell is marvellously minished and decreased." A penalty of 6s 8d is then imposed upon any one who should kill a calf during the next three years.

As might be reasonably expected, the farmers evidently evaded this act very extensively. But the Legislature was not to be turned aside from their grave resolves; so in 1532, by the Act of the 24th Henry VIII., c. vii., after explaining in its preamble that the act of 1529 was intended to provide "that calves once wained should not be put to slaughter before they were of convenient yeeres and meete for beefe," but that since the last act divers bad persons had continued "to kill young beasts called wainlings, steers, bullocks, and heifares, of one or two years old, or little more," it goes to enact that no person shall, under a penalty of 6s 8d, cause any cattle to be killed under two years old.

Then, again, the same parliament had evidently discovered another mare's nest; they deemed the increase in the price of mutton to have arisen from the flocks of England having become too large; so, as usual with them, they were prompt in attempting the remedy of an Act of Parliament.

In 1533, therefore, the 25th Henry VIII. c. 13, is an Act entitled, "Concerning the number of sheep one should keep. After describing at some length the several enormities that do ensue by the greedy desire of having many sheep—some persons then

having 24,000 and 20,000 sheep—"by which a good sheep for victual that was accustomed to be sold for 2s. 4d; or 3s. at most is now sold for 6s., or 4., or 3s. 4d. at the least," it goes on to enact that no one shall have more than 2,000 sheep in future under a penalty of 3s. 4d. for every sheep above that number. And by sec. 14 of the same act, it is provided that no one shall hold more than two farms; under a penalty of 3s. 4d. per. week they shall hold any land contrary to the act.

And the legislature of those days were not content to regulate the number of sheep a farmer should keep, and the price he should obtain for his mutton, but they regulated the trade in his wool. It was not to be exported, or, when it was allowed to be sent out of the kingdom, it was carefully provided that it should be sent only to the staple at Calais. I have not found in the English statute-book any direction as to how he should *shear* his sheep; but the Scotch government early issued directions similar to that of the Irish parliament of 1634.

The public acts of those days inform us that even as late as the seventeenth century the flockmasters of Ireland and Scotland had a summary way of gathering the wool from the sheep, which their rulers were enlightened enough to restrain. Thus, by the act of the Irish parliament (11 and 12 Charles II., c. 15), entitled "An act against plowing by the tail and pulling the wool off living sheep, it is declared that "in many places of this kingdome there hath been a long time used a barbarous custome of ploughing, harrowin, drawing and working by horses by the t.,yle, whereby (besides the cruelty used to the beasts) the breed of horses is much impaired in this kingdome. And also divers have, and yet do use the like barbarous custome of pulling of the wool yearly from living sheep, instead of clipping or shearing them. These miserable practices were then declared to be illegal, and to be punishable with fine and imprisonment.

It is evident, however, that there had been a previous Irish ordinance on this subject, since such a reformation is referred to in a letter written to his Scotch council by King James, in 1617. Chambers' (Annals of Scotland, vol. i., p. 471) gives an extract from a curious entry in the Scotch Privy Council Record. The document states that "In some remote and uncivil places of this kingdom an old and barbarous custom was still kept up of *plucking the wool from sheep instead of clipping it.*" The king hearing of the practice, wrote a letter to

his Council, denouncing it as one not to be suffered; telling them that it had already been reformed in Ireland, under a penalty of a groat on every sheep so used, and was "far less to be endured in you." The Council immediately (March 17, 1617) made an order to the same effect; and after stating that many sheep died in consequence of this cruel treatment, concluded with a threat of severe fines on such as should hereafter continue the practice. "It is remarkable," adds Mr. Chambers, "that in the Faroe Islands there is to this day no other way of taking the wool from sheep than that which was then only kept up in remote parts of Scotland."

It was as early as the year 1337 that we find the exportation of English wool prohibited. The same measure of injustice to the farmer was conferred in 1521. And in 1696 the *wisdom* of Parliament was evinced by the prohibition of the export of wool from England, or even from Ireland into England. It was not till the year 1824 that the Acts of Parliament restraining the exportation of wool were repealed.

The Scotch parliament were by no means to be outdone by that of England; for so late as the year 1581, in the seventh parliament of Jas. VII. of Scotland, it was enacted "That no manner of wool be transported, or put in schippes or boates to be transported, furth of this realm in time cumming." A law had been previously made, in 1467, that no cattle or sheepe should be sold out of the realm of Scotland; and again in 1535, by the fourth parliament of James V. of Scotland, it was directed, with all becoming gravity, "That na manner of men in time cumming sell nolt, sheepe, or other cattle, auld nor young, to ony English-men be himselfe or ony other mediate person, nor have nor send the samin in England to be sauld."

It sounds strange in our ears to read in these Scotch acts the title of "James, by the grace of God, King of Scotland, England, France, and Ireland."

We have seen how, previously to 1634, the Irish were wont to fasten their horses to the plough by their tails; and there is some reason to conclude, from a print in a Saxon manuscript now in the Harleian collection, that our Saxon ancestors did the same. I find no act in the English or Scotch statute-books relating to so barbarous a custom; not but that the Caledonian senate legislated upon the horse; they regulated his shoeing, and restrained his owner from over-feeding him. For in 1477, by the tenth parliament of James III., it was enacted, "because ignorant smiths

through ignorance or drunkenness spillis and enrickis mennis horse," that a smith shoeing a horse in the quick should pay the cost of the horse till he be whole, and furnish the owner with another; and if the horse will not mend, that the smith hold the horse. And 1581, by the seventh parliament of James VI. of Scotland, "that none under a barron or landed man worth a thousand merks of yearly free rent keep horse at the hard meat after the 15th of May, or take them in before the 15th of October, on pain of forfeiting the horse." And the reason assigned is "that amangis the mowie uther occasions of deurth of victuallers, there is ane speciallie very unprofitable to the commonweill, quhilk is the holding of horses at hard meat all the summer season, used commonlie be personnes of mean estate, cowppers of intention to make merchandise of the said horsis, being for the maist part small nagges, and na horses of service."

The parliament who, in 1533, regulated the number of sheep a farmer should keep, had more enlightened views in regard to the encouragement of the linen manufacturers. They erred strangely, however, when they tried to enforce the cultivation of flax on all soils. It was in 1532 that, by the 24th of Henry VIII. (repealed in 1592 by the 35th Eliz., c. 7), it was enacted, after a well-drawn preamble, setting forth the advantages of encouraging the home manufacture of linen, that every person having arable or pasture land "apt for tillage" should every year for every sixty acres in their possession sow "one rode or one quarter of an acre with line-seed, otherwise called flax-seed or hemp-seed."

Here, again, the Scotch parliament had long preceded that of England in regulating the husbandman's crops. In 1426, by the fifth parliament of James I. of Scotland, it was enacted that "ilk man tailand with a plauch of aucht oxen sall saw at the least ilk zeir a firlof of quheate, half a firlof of pease, and forty beans, under the paine of ten shillings to the baronne of the lande that he dwellis in."

ON WINTERING STOCK.

*Read before the Hope Farmers' Club,
by Mr. John Wade, Jr.*

MR. PRESIDENT AND GENTLEMEN.—The severity of the Canadian climate at this season of the year, renders the wintering of stock a very important part of the occupa-

tion of the farmer. And especially does it demand particular attention now that the wheat crop is so beset with enemies, as in many cases to materially reduce the yield, which makes it very desirable that the profits of live stock should be increased to the utmost extent. In view of this state of things, it will be well for every farmer to give the subject the amount of attention which it deserves, and make all necessary preparations for the coming winter. Stock should receive such treatment during winter, that they may be turned out in the spring in as good condition as when first taken into the yard in the fall; for I believe there is one point on which good farmers will all agree, viz: that cattle of whatever description should be kept constantly improving until they arrive at full maturity; and to accomplish this end, they must be well sheltered and receive food enough of the proper kind during winter to keep up the animal heat and support the waste of the system.

With regard to the manner of sheltering stock, great diversity of opinion exists. Some farmers assert that the stabling is much to be preferred to any other way, while others affirm with great confidence that the barn yard is preferable to the stable. The chief argument advanced by the former is economy of fodder, as by keeping the animal in a moderately warm stable much less food is required to keep up the animal heat; consequently they are not so liable to lose flesh. While the latter entertain the opinion that stabling is so much more expensive and laborious as to entirely counterbalance any advantages derived from it.

Perhaps it would be well before proceeding further to explain more fully why feed is saved by protecting the animal from the cold. Physiologists inform us that the heat of the body, when in a state of rest, is the same on every part of the earth's surface, and at all seasons of the year, blood heat in domestic animals is about 100° Fahrenheit in the hottest days in July and August; and it must be kept up to the same point in the coldest days in winter, even if the frost is so intense as to freeze the mercury. Now, according to one of nature's laws, when a hot substance comes in contact with a cold one, the heat will immediately begin to leave one and be absorbed by the other, until they are of equal temperature. Thus when an animal is surrounded by a very cold atmosphere, the animal heat will be given off at a very rapid rate, and without a fresh supply, the temperature of the animal will soon be reduced to that of the atmosphere,

and death would be the result. We see, then, the importance of keeping up the animal heat by food containing the proper elements for combustion. Now, let us enquire how this can be done? After food has been taken into the stomach it undergoes a number of changes, which it is not necessary to mention here, and a portion of it is converted into blood; this in the course of circulation enters the lungs, when the carbon and hydrogen of the blood, which are both derived from the food, come in contact with the oxygen of the air which is brought into the lungs by breathing. A union takes place, and heat is given out just in the same way that heat is given out by burning wood in a stove, combustion is the same in both cases, only that in the latter case it is much more rapid than in the former.

Now it must be apparent to all, that as animal heat if thrown off much more rapidly in cold than warm weather, and as animal heat is produced by food, it must require much more food when stock is left exposed to the piercing winds and severe frosts of this climate, than when provided with good, warm and comfortable, stables, or shelters. The effects would be precisely the same as removing them to a warmer climate, and with much less cost. Indeed we cannot mount them on railways to transport them to a warm country, or give them wings to emigrate, but we can furnish them comfortable houses and a genial atmosphere, and thus prevent the rapid expenditure of their bodily heat, and save our fodder.

I may seem to have dwelt upon this part of the subject longer than was necessary; but I consider it of vast importance that the necessity of providing good shelter for domestic animals should be thoroughly impressed upon the minds of farmers, in order that the practice of consuming so much valuable fodder, merely for the purpose of keeping up animal heat may be to some extent discontinued.

In order to raise a stock of large healthy cattle they must receive extra care and attention until they arrive at the age of one year. The frame at this period is but partially developed, and the size and value of the animals when full grown will depend much upon the treatment they received during their first winters. The food given should contain, in abundance, all the different elements required for the growth of bones, muscles, cartilage, &c., and might consist of turnips, or carrots, either of which should be cut into small pieces, and such good hay as they will consume, and oats, rye, or peas made wet and mixed

with cut straw. If they are kept in a comfortable stable or shed, and a sufficient quantity of the above mentioned varieties of food and a good supply of water be given them daily during their first winter, the growth of the animals will be such as to amply remunerate their owner for his extra expense and attention. For it should always be borne in mind that young cattle will increase more in weight from a given quantity of food than old ones, and lay on fat more rapidly after they arrive at maturity by being well fed while young.

When winter feeding of beef is practiced, strict attention is absolutely necessary. Cattle in such cases being generally full grown, unless they are kept fattening a great loss of feed must be incurred, and as comfort and quietude will conduce much to rapid feeding, it is very important that they be tied up in a warm stable or fed in a dry, well littered shed. A regular system of feeding ought to be adopted; and a kind of feed given most calculated for the formation of tissue, and the secretion of fat. As cattle usually have a keen appetite in the morning, it is advisable that the coarse portions of the fodder be given first, and the most nutritious part left until the appetite is somewhat abated. But in all cases, regular feeding hours should be appointed, and strictly adhered to. Cattle so managed, after receiving a feed will generally lie down, and remain quiet until the approach of the next feeding hour; by pursuing this course the stomach will be kept in a healthy state, and digestion will be regular and perfect. The chief articles used for fattening cattle in the United States are Indian meal and hay, but in many parts of Canada turnips are more plentiful than corn, and when judiciously given make an excellent article of diet for cattle.—Great care should be taken however, to have them kept perfectly free from frost, and given in moderate quantities, especially in cold weather. Peas or rye meal, and oil cake when it can be produced, will be found to increase the weight of cattle very rapidly. But in order that the quantity given at a time be sufficient in bulk to satisfy the appetite, and as meal enough to have this effect would have a tendency to clog the stomach, it is found beneficial to mix it with cut straw. It will then be more easily acted upon by the digestive organs, and a saving of feed will be effected, for it is very evident that only a certain quantity can be taken up at once, and if more than is necessary be given, waste of food must be the result.

Although stabling, when sufficient attention is paid to ventilation and cleanliness, is undoubtedly the most economical mode of wintering stock, still the majority of Canadian farmers, from deficiency of barn room, and either inability or want of inclination to erect more, winter their cattle in yards. In such cases it is necessary to erect sheds and divide the yards so as to meet the wants of the different lots of horses, cattle, and sheep. The whole farm stock should never be allowed to go in one lot. Sheep should invariably have a yard and shed to themselves, and cattle would have a much better chance to thrive well if kept in two or more lots, according to the size of the herd; unless this plan is adopted the old cattle will be very likely to abuse the young ones, as well as deprive them of the best portion of the feed. All young horses should, if possible, be separated from the cattle, and the refuse from the fat cattle, if any are kept, fed to them daily; for it is very noticeable that any portion of feed refused by cattle, will frequently be eaten by horses with avidity, and vice versa. The yards should be so arranged that the feed will be easily accessible, and racks provided for the cattle to eat out of. When straw has to be carried any distance, a single horse sleigh with a suitable rack is very serviceable in distributing the fodder, it may either be left in the yard for the purpose of a feed rack, or merely used to convey the hay or straw to the place required.

A sufficient supply of water might in many cases be obtained by putting eave troughs to all the barns and sheds and collecting the rain water in suitable tanks. They can be made in any part of the yard, at a moderate cost, when the ground is dry in summer. They should be made sufficiently capacious, lined and arched over with birch, and in place of a pump, one of Winegar's water elevators, which will not freeze, inserted in each. Where there are no springs or wells near the barn, this would be a great saving of labor, and a great comfort to the stock. Although moderate exercise will conduce much to the health of stock, still for animals that are not confined in the stable, taking their supply of water in the barn-yard will be found much better than walking some distance twice a day over a rough or icy road. A great saving of manure would also be effected, which in many cases would amount to almost enough to defray the cost of building the cisterns. For unless cattle are given to and from the water, they frequently tarry around the place for some time; and the quantity of manure wasted

by a large herd of cattle while they are absent from the yard, would in the course of winter be considerable.

I will omit saying anything respecting the management of horses, sheep, and pigs, as I do not consider it necessary. Good shelter and plenty of feed, being all that is required to bring them out in good condition in the spring. I will therefore leave the subject in the hands of those better qualified to deal with it.

JOHN WADE, JR.

Hope, December 26, 1859.

ON THE CULTIVATION OF FLAX.

BY JOHN WALSH.

From the Irish Agricultural Review.

Flax belongs to the fifth class of the Linnean system *Pentandria Pentagynia*, and to the natural order *Grinales*, and genus *Linum*.

There is but one species for us to consider—viz., *Linum Usitatissimum*. It is indigenous to several countries in the east, and is supposed to have taken its origin from the alluvial soils of Egypt, formed by the inundation of the Nile. From the most remote period its fibre has been manufactured into various fabrics of different textures.

The plant will grow on a great variety of soils, sandy loams, light medium, and heavy clays, alluvial deposits, marly, peaty, or chalk soils; all these will produce it well under favorable circumstances. But a due admixture of sand and clay is the best adapted, having a red or yellow clay subsoil.

By paying due attention to the following hints, good flax may be grown on any of the above-mentioned soils; but like all other crops some are better suited to its growth than others. The best may be stated to be a sound dry, deep loam, with a clay subsoil.

Land intended for flax should be deep, and easily pulverized. The land, therefore, should be thorough drained, if not naturally dry, so as to admit the fibres of the flax-root to descend in search of nourishment.

The flax penetrates the soil from one and a-half to two and a-half feet in a right line downwards, i. e., if the rootlets meet no obstacles. The flax occupies different places in various rotations; much of course depends on the nature of the soil. It is not generally considered advisable to grow flax in the same portion of ground at shorter intervals than eight or nine years. I shall give an instance of a rotation in which it can be grown successfully, provided everything else is favorable. It being an eight course shift an interval of eight years will elapse from the time flax is grown in any particular field of the rotation till it is repeated again.

First, potatoes; second, wheat; third, flax; fourth, turnips; fifth, barley, &c., with seeds; sixth, grass, 1st year; seventh, grass, 2nd year; eighth, oats.

Flax is here grown immediately after wheat, it being found by experience to be of a fine fibre after it. If this course is followed out it becomes necessary to add some special manure, or give a watering of liquid manure if such be available.

The following compound has been proposed by Professor Hodges as a manure which may be distributed broadcast on the soil prior to the final harrowing before sowing the seed :—

"For a Statute Acre of Land."		
"Muriate of Potash 30 lbs, cost about	3s.	0d.
"Chloride of Sodium (common salt,) 28lb	0s.	3d.
"Burned Gypsum, powdered 24lb	0s.	6d.
"Bone Dust, 54lb	3s.	6d.
"Sulphate of Magnesia (Epsom salts) 56lb.....	4s.	0d.
	11s.	3d."

It has been found by chemical analysis that the flax crop abstracts from the soil certain ingredients which must be restored by the application of special manures containing these abstracted ingredients in a preponderance.

I flax be grown after a potato crop, as is very often the case, or, in fact any other green crop, it is found to be of a coarse fibre. This is the only rotation in which we depart from the general law never to grow two grain or exhausting crops in succession. We can grow flax after oats in any of the other rotations, but it might come in the same field too often. It may be here remarked that we have been growing flax at too short intervals of late on the same ground, and therefore the yield falls far short of what it would if due attention were paid to the few important points going to be detailed briefly in the essay.—Being sown in April it is invariably ready for pulling by the middle or end of July.—At this time a crop of some other sort may be taken after the flax is removed. I may remark here that it is the general opinion of many practical farmers that flax does best after potatoes, but this is an error.—Except on light inferior soils a far superior crop will be produced after grain.

If grown after a grain crop, as it should invariably be, after the removal of the latter the soil should receive a ploughing, followed by a harrowing to clear off weeds of all kinds. The furrow should be thoroughly cleaned with the plough in order to give a free passage to the rain water, &c., during the winter. After wheat one ploughing

will suffice on light friable loams, but two is more efficient, and on stubborn soils three may be found necessary. The second ploughing should be given in December, and thus the soil shall be exposed to the ameliorating influence of the winter's frost. As no crop requires a more thorough and minute pulverization of the soil than flax, it is indispensably necessary to have it exposed to the winter frost, by which it is crumbled down finely. In spring this fine winter surface must be harrowed and well rolled to consolidate it. Let it be remembered that we are taking it for granted that the soil is thoroughly drained before-hand, which is one of the points of the greatest importance in the growth of flax. Admitting that the soil is well drained it should be subsoiled also, so that we can sow the seed on the flat, which will give more even and average crops. In spring it is better to grub lightly than plough in order to avoid as much as possible the turning down of the fine surface mould, which is so necessary for the tender flax-seeds.

This cultivation may do for the majority of flax-soils, but very heavy clay will require an additional ploughing some weeks before grubbing. Light soils in the meantime will do with one ploughing in September and a grubbing before sowing, giving at the same time a good harrowing, and collecting weeds of all kinds.

In selecting flax seed great care is necessary on the part of the purchaser. The seed should be pretty plump, heavy and shining, as also bought from a respectable seedsman, which latter precaution should be carefully observed in the purchase of all kinds of seeds.

The best variety of seeds adapted for most of our soils is the Riga, which, when imported to us, is generally the growth of the previous year. The American seed has not been approved of on account of its producing a coarse branchy stem. With us in Ireland, Riga seed is now most universally used, but Dutch is considered by some superior for heavy soils. This Dutch is also imported from Riga, but is the production of the second year back. Riga gives a heavier crop but Dutch produces a finer fibre, from the greater care with which it is prepared. It is much cheaper than the Riga, which frequently contains a large percentage of the seeds of injurious weeds. Much of course depends upon circumstances; but for my part (and I have had experience of both) I prefer the *Riga*, and if seed-weeds are suspected being in it we should run it through the fanners, putting in a very small sieve.

Home-saved seed has produced excellent crops to my own knowledge; it should therefore, be strongly urged upon the grow-

ers of this plant to save from their foreign sown seeds each year as much as would produce a sufficient quantity for the following year's crop. The produce of seed may be stated at about 20 bushels per Irish acre. The thinner portion of the field ought to be selected for saving the seed off. Riga seed varies in price from 3s. to 16s. per bushel, and Dutch from 7s. to 13s. 6d., this of course fluctuates with the demand and supply. The quantity of seed sown per Irish acre may be stated at 3½ bushels, and so in proportion to the statute. It is better sown rather thick than too thin, for in thick sowing the stems grow long and straight, and bear only a few bolls at the top. It is also superior in fineness to thin sown flax, which gives up a coarse and strong stem, producing much seed and inferior fibre. Well, to proceed with the cultivation. The ground having been well pulverized, roll and sow; if it has not been already marked out in ridges or broad lands, say ten or twelve feet wide, it should now be done, in order that the sower may distribute the seed more evenly. Flax should in this climate be sown if possible in the early part of April, and in fact sooner if the weather be mild. Many persons delay sowing until May, but they need not expect a crop equal to that sown in April.

For fine fibre early sowing is necessary. Vegetation is more rapid in the latter part of the season, nothing like steady growth for quality. After sowing it should be covered with the grass-seed harrow slopewise across the field. The sowing is finished with the roller, which leaves the seed covered about an inch, the proper depth. The ridges should not be too high in the centre, as in such a case the crop will not ripen evenly. I should mention also that there is another advantage resulting from early sowing, viz., that in case of the crop falling from bad seed or any other cause the farmer can plough it up and substitute for it some other crop.

In many places they manure the flax crop. If desirable, we may apply some farm-yard manure with the autumn ploughing, or use the manure advocated by Dr. Hodges, noticed in the early part of this article.

We seldom or ever use any manure here in Ireland, thinking the ground rich enough where it is generally sown, and we fear rankness of growth, and if heavy rains come on it would lodge, and consequently materially injure the fibre by discoloration.

When the young flax plants are two or three inches high they should be carefully weeded, which should be performed twice, and before the plants get too long. The operation of weeding should be performed with scrupulous exactness, so as not to in any way injure the young plants. Women

or boys, after folding up their loose garments tightly about their knees, wearing shoes without nails, (in fact better have no shoes on at all), the weeders should go on all fours in a creeping posture, facing the wind, always, by which the plants are soon raised upright again. But if due attention be paid to the cleaning of the seeds and the soil few weeds will appear.

Flax flowers about the end of June, at which time the plant with its delicate blue flowers present a most magnificent appearance. When the blossom falls off the bolls begin to form, and when fully grown, which will occur about the middle of July, they are nearly round. The bolls partly enable us to ascertain the state of its maturity. When it is found to be of a fine firm dark green it is considered fit for pulling. In fact this is a point which requires much judgment and experience, for if pulled too soon there is a loss in the manufacture of it, such as scutching, hacking, &c., and if pulled too late it is generally too coarse. It may be stated in a few words that flax is ripe when the seed is changed from a green to a pale brown color, and the stalk yellow two-thirds of its height from the ground. Long experience has shown that early pulling is the most profitable (not too early of course,) for although the seeds have not become fully matured, yet if dried slowly they will absorb from their integument a sufficiency of sap to render them of a certain degree of ripeness. When pulling, if it be of uneven length it should be pulled separately, i. e., the long with the long and the short with the short. This can be effected by holding the flax under the bolls immediately; this allows the shorter portion to escape, and this can be taken up a second pulling. These two separate lengths should be kept by themselves in all the subsequent operations, as a great waste is entailed when both are treated together.

To be concluded in next number.

Agricultural Intelligence.

THE PROFITS OF RED RIVER FARMING.

A few days ago we received a call from one of our largest and most successful farmers—Mr. Gowler, whose cheese and tobacco enjoy the reputation of their having been critically tested and reported upon to the Canadian Government—and from him we learned how easy it is in any favored country for the steady and industrious settler, no matter how poor in pocket, to climb the ladder of independence.

Mr. Gowler's commencement was about as unpromising as the lot of the poor immigrant well could be. And the success which has attended his efforts is, therefore, the more conspicuous. His knowledge of the country dates from 1837, when he was brought here to perform the part of a laborer in that most expensive of all the Hudson's Bay Company's agricultural experiments—the experimental farm—one of “the unfortunate sisters,” whose precious memory will live embalmed in the ponderous ledgers at Hudson's Bay House. The scheme, as everybody knows, failed—to the great loss of the Company and the great gain of Mr. Gowler. For, released from obligations to the Company, Mr. Gowler commenced farming on his own account; and being no longer bound down by the unmeaning restrictions of a body of proprietors living 4,000 miles from the scene of operations, he at once began a successful career which gives promise of his beating his old masters on what they have been wont to regard as their own ground.

In June, 1852, Mr. Gowler entered upon 200 acres of prairie, on the north bank of the Assiniboine, about eleven miles above the fort, paying the sum of sixteen pounds. In the course of the summer he erected thereon a small dwelling-house with the necessary out-buildings, and ploughed a portion of the land. During the following spring he sowed 13 bushels of wheat, 10 of barley, and fifteen of potatoes. Harvest time brought good returns, particularly from the potatoes, to the growth of which the soil—a rich black vegetable mould—is well adapted. Of this no better proof could be given than that afforded by Mr. Gowler's farming experience in the fourth year, when the almost incredible number of 2,000 bushels of potatoes appeared as the product of 56 bushels of seed. Next year his farm, as well as those of his neighbors, was visited by a plague of grasshoppers, which spread themselves over the ground, and consumed and destroyed the fruit of the husbandman's toil, on every hand. The crops which are garnered that season were therefore but poor and scanty, as were also those of the following, for within a week of the harvest time, the farmer's riches—the golden grain—took to themselves wings and flew away in the shape of swarms of young grasshoppers, which had risen from the eggs deposited in the ground during the visitation of 1857. At seed-time of the present year all traces of the pestilence had disappeared and, Mr. Gowler having before his eyes the sure prospect of a good market, brought under

cultivation a greater breadth of land than any year previously. He sowed 63 bushels of wheat, 36 of barley, 24 of oats and 161 of potatoes, and from those he realized 700 bushels of wheat, 350 of barley, 480 of oats, and 2,100 of potatoes. The cost of the seed was £50; in preparing and tilling the soil about £25 more was expended; and the cost of gathering in and thrashing the crops is set down at £100—making a total expenditure of £175.—Place against that the sums representing the sale of the wheat at 6s., the barley at 3s. 9d., the oats at 2s. 6d., the potatoes at 1s. 3d. per bushel, (average prices, which the produce will easily command), and an argument more strong and convincing than could be wrought out by any other process of reasoning, stands stubbornly forth in favor of the claims of the settlement as being one of the best agricultural countries on the face of the globe. It should be added that Mr. Gowler's profits have already enabled him to enlarge the bounds of his estate to 600 acres; to stock it with a noble herd of cattle and horses; and to make the necessary preparations for erecting thereon, next summer, as snug and comfortable a mansion as imagination of gentleman-farmer could conceive or his heart desire.—*Fort Garry Norwester.*

ACTION OF FROST UPON SOILS.—The soluble part of the soil is the inorganic food of the plant. Rain water cannot come in contact with the soil, or even with a gravel heap, without dissolving some of it. Expose almost any stone, or handful of gravel, washed clean, to the action of a quart or so of rain water for several days, and upon evaporating the water, poured off carefully from the stones, it will be seen from the whitish residue left that a portion had been dissolved. Now let these same stones be exposed, covered or partly covered with water, in a saucer, to the action of frost, setting them out of doors for two or three snapping cold nights, taking care that they thaw by day. Pour off the water, rinsing with fresh, and evaporate as above, and it will be seen that a very much larger quantity has come into solution. The reason is, that all stones, being somewhat porous, by the action of the frost their outer portion is broken up, scaled and fissured, and a vastly greater surface is exposed to the action of the water, even though this fissuring is not visible to the eye.

Application.—When land is exposed to alternate freezing and thawing, the same effects must take place; and when it is

thrown into ridges in the fall, these effects are produced more conveniently than in any other way.

Snow will lie untawed between the ridges, ensuring a cold temperature, and the tops of the ridges will, unless the fall of snow is very heavy, be exposed to the sun, and will thaw by day. Thus a considerable portion of the soil during a great part of the winter, will be alternately frozen and thawed daily. This effect on many soils, especially those of a heavy clayey or gravelly nature, will be equal to a dressing of manure.—*Homestead.*

HERD BOOKS.—We learn from the Mark Lane Express, that the 3d volume of the Devon Herd Book, by John Tanner Davy, and the 4th volume of the Hereford Book, by Thomas Buckham, and the 13th vol. of Coates' Short Horn Herd Book, by H. Strafford are issued.

HIRAM OLMSTEAD, Walton, Delaware Co., N. Y., raised last year 809 bu. of Ruta Baga on 82 rods of ground, and 227 bushels of Carrots on 42 rods of ground. The largest Ruta Baga weighed, after it was removed, 17½ lbs.

Mr. Olmstead, from 12 cows and 3 heifers, made over 3,200 lbs. of butter, giving an average, after making allowance for heifers, of between 220 and 230 pounds per cow, for 1859.—*Journal N. Y. State Society.*

ALDERMAN MECHI, of Tiptree Hall, says, "My crops for several years have averaged per acre,—wheat 40 bushels, barley, 56, oats 88; and mangold wurzels from 25 to 40 tons, the latter being a more certain crop in the dry climate of Essex, than Swedes."

GUELPH CATTLE FAIR.—The February Cattle Fair was held on Wednesday last, and was eminently successful. There were some of the finest cattle on the ground we have ever seen in Canada, and they were all readily sold at good prices. No less than *eight cars completely filled with fat cattle* were despatched by the Great Western Railway yesterday morning. A considerable number were also forwarded by the Grand Trunk. As a sample of the prices obtained we may mention the following: Mr. William Hood sold two steers for \$150; Mr. Swanston of Eramosa, sold two steers for \$120; John Peters, Eramosa, sold two heifers for \$130. Our monthly cattle market is now a great and abiding institution—a mutual benefit to all parties.—*Waterloo Chronicle.*

ABUNDANCE OF WEEDS.—An English botanist discovered, by careful examination, 7,600 weed seeds in a pint of clover seed, 12,600 in a pint of grass seed, 39,440 in a pint of broad clover, and 25,500 in a pint of Dutch clover seed. In a single plant of black mustard he counted over 8000 seeds, and in a specimen of charlock 4,000; the seed of a single plant of common dock produced 4700 little docks.—The white daisy has over 400 seeds in each flower, and sometimes 50 flowers from one root.

NEW CATTLE.—Mr. Andrew Kyle, of North Dumfries, intends importing eight heifers and two bulls of the Galloway breed, in the early part of April next.—This breed of cattle is considered well adapted to the Canadian climate.—*Waterloo Chronicle.*

TOWNSHIP OF YORK AGRICULTURAL SOCIETY.—We were invited the other day by the President of this Society, Philip Armstrong Esq., to a dinner at Bet's, in this city, at which were the Directors of the Society, and a few invited guests. The evening was spent in the most agreeable manner, in the interchange of sentiments and information, chiefly pertaining to agricultural subjects, and the state and prospects of the Society, which has had new life infused into its proceedings during the past year; and from the spirit evinced by the several office-bearers, including the indefatigable President, there is good reason to expect a continuance of prosperity. The York Township Society is a proof of what energy and unanimity will do in restoring to active life and usefulness a society that was almost dead, and we wish the Directors continued success. Several present expressed a willingness to communicate to the *Agriculturist* any thing of interest that might come within the range of their experience or observation, and we trust that the office-bearers and members of other societies in different sections of the Province will follow the example. With out such co-operation, this journal cannot fully represent the state and prospects of the agriculture of the country. We shall be glad also to hear from horticulturists, manufacturers and mechanics, upon any subjects relating to the industrial arts of the Province.

In the Pike's Peak regions, such delicacies as chickens bring \$4 a pair, eggs \$2 per dozen, and sweet potatoes 45 cents a pound.

Horticultural.

PROGRESS OF HORTICULTURE IN AND ABOUT TORONTO, DURING THE LAST QUARTER OF A CENTURY.

The suitability of the soil and climate of Canada to Agricultural pursuits is now well known and acknowledged, both within and without the Province; and it is this great interest that constitutes the foundation of our prosperity and wealth. The clearing and cultivation of land is the first step in the progress of all new countries capable of sustaining any considerable amount of population in comfort and independence; and as agriculture advances and wealth increases, its twin sister, horticulture, is called into being, ministering to man's taste, refinement and luxuries. This advanced stage of social progress and civilization, of which the beautiful art of gardening may be considered one of the principal exponents, now admits of ample illustration in the rapidly advancing state of horticultural pursuits in the vicinity of most of our principal towns and villages. We have been favored by a practical gardener of twenty-five years standing in this city, with some memoranda of the progress of his art in this vicinity during that period of time, which embraces nearly one half of the entire history of the settlement of Toronto.

In 1836, there were only two small green-houses in this city, and in them nothing further was attempted than the culture of very common plants. In 1860, we can point to many thousands of square feet of glass structures, most of them formed in accordance with the most approved modern principles, and supplied with all the most recent appliances, for the growth of grapes, and orchard fruit of the finer varieties; green-house and exotic plants, including many of the more recent imported varieties. A brief glance at some of our principal gardens will not be uninteresting to our more distant horticultural readers.

Judge Harrison's residence on Dundas Street, the site of which a few years since was a cedar swamp, is now a most delightful spot. The grounds are laid out with much taste by the Judge himself, who is his own architect, and who has spared no expense in getting together an extensive collection of all the choice hardy and half hardy plants and shrubs that will flourish in our climate. By the drainage and efficient preparation of the ground, the shrub-

bery has already the appearance of maturity, and the Judge may literally be said to have made "the wilderness to blossom as the rose." His surface of glass is quite extensive; embracing three green-houses and one hot-house, filled with the choicest and rarest plants, including a fine collection of *orchids*, in a flourishing condition. The houses are heated by hot water, on a system modified and improved by the Judge's experience, and which may now be said to be very efficient. There is likewise an extensive cold vinery, and an orchard house, stocked with choice sorts, and highly productive.

Next we may mention the very pleasant residence of the Hon. J. C. Morrison, on Yonge Street, which has been matured with much taste and expense within a very few years. There is a very extensive range of glass, comprising green and hot-houses, cold vinery and forcing pits, of the most recent and improved construction, after plans furnished by the late Mr. Mundie, of Hamilton. They are built in the most substantial manner, glazed with rough plate glass, and heated by Hitching's hot water apparatus. The hot water is conducted through near two thousand feet of pipes, four inches in diameter, which radiate sufficient heat in the coldest weather. Mr. Morrison's plants are not only extensive as a collection, but many of them are rare and exceedingly interesting, their appearance indicating skill and care in the gardener, and can hardly be surpassed in Western Canada.

The residence of C. S. Gzowski, Esq., Bathurst street, is a delightful villa, the grounds being laid out with great taste. Attached to the house is a very beautiful conservatory, heated by hot water, and filled with a tastefully assorted collection of rare and healthy looking plants. In addition to these are a large green house and cold vinery; the latter produced a good crop of splendid grapes last year. An extensive range of glass has just been completed to be used as a cold orchard house for the growth of the finer sorts of grapes, peaches, pears, cherries, currants, &c.

D. L. McPherson, Esq., has recently completed a large and commodious residence on Yonge street, with appropriate shrubbery and pleasure grounds. His extensive range of hot and green houses, now in the course of erection, will, when completed, surpass any thing of the kind now in the Province.

Henry Eccles, Esq., Jarvis street, has a very good green house and vinery, heated by 800 feet of four-inch water pipe, and

glazed with rough plate glass, which may now be pronounced from sufficient experience to be well adapted to this climate.—Mr. Eccles has exhibited a number of very fine grown plants at the Toronto Horticultural Society's shows.

The Hon. H. H. Killaly, of Wellington Place, has just completed a fine range of buildings, green and hot houses, a cold vinery, and an orchard house, all constructed on the most approved modern principles.

W. H. Boulton, Esq., has an extensive range of houses for the growth of grapes, peaches, &c. The Hon. W. Cayley, has also a large cold vinery. Jas. Metcalf, Esq., on Yonge street, has just commenced the erection of a very fine conservatory. Prof. Hirschfelder, of Yorkville, has an excellent greenhouse well stocked with choice, healthy plants, and is a very successful competitor at the Horticultural and Provincial Shows. We have quite a number of amateurs who practise on a smaller and less extensive scale, who have contributed in no small degree to the advancement of gardening in all its branches, in this vicinity. J. C. Small, Esq., the indefatigable Secretary of the Toronto Horticultural Society, and J. D. Humphreys, Esq., may be instanced as belonging to this useful and important class.

Toronto is well supplied with public Horticultural establishments, some of which are quite extensive. Mr. Fleming, of the Yonge Street Flower Garden and Seed Store, has several green houses filled with a large assortment of plants; many of them of a rare and valuable kind, and also a capacious cold vinery recently erected. Mr. F. Richardson, of Carlton street, grows a varied and extensive assortment of hard and soft wooded plants. Mr. John Gray, of the Lake view Nursery, is noted for the production, among many other things, of a fine collection of choice roses; and Mr. George Leslie, proprietor of the extensive Toronto Nursery, raises large quantities of bedding and other plants.—Our market gardeners, as well as amateurs, here of late years shown a spirit of emulation, that has materially advanced the art of culture; so that our market is usually supplied in profusion with vegetables and open air fruits of the best description. In some kinds of fruit, however, we have of late years severely suffered in common with too many other sections in this Province and on this continent, from disease, and the depredations of insects, to counteract the ravages of which will require all the

care and skill that the gardener and entomologist can exercise and possess.

No notice, however brief and general, of the state and progress of horticulture in the vicinity of Toronto, ought to conclude without referring to a gentleman who has done so much both by precept and example, to promote a taste for this useful and beautiful pursuit among his fellow citizens. The Hon. G. W. Allan, the proprietor and occupier of the fine old mansion and grounds of Moss Park, President of the Toronto Horticultural Society, and the generous supporter of every movement that tends to improve and elevate his native city and country, has recently given to the above society five acres of land situated almost in the heart of the city for the purpose of an illustrative garden, and for holding the Society's exhibitions. Five acres adjoining have been purchased by the corporation, and the whole, comprising ten acres, will form, when completed, an attractive place for public resort to all who have a love of green leaves, shrubs and flowers, amidst the hum and bustle of city life. These grounds have been laid out, and important improvements already made, by and under Mr. Edwin Taylor, an English landscape gardener of distinguished taste and large experience, now residing in this city. What with the University Park, the Exhibition Park, and these beautiful Horticultural Gardens, Toronto will possess, close at hand, lovely and comparatively retired spots where its citizens can resort for health and recreation, and breathe the pure air of heaven amidst the charms and beauties of the floral Kingdom. Must not these agencies tend, and in no small degree, to promote the physical and social well-being of the great masses of the people?

In other cities and localities of the Province Horticulture has no doubt made a similar progress, thereby clearly indicating the advances which our people are making in social refinement and physical comfort; and we shall be happy to record in our pages such information bearing upon the subject, as we may be favored with.

TREES.—The Japanese have a custom, uniformly observed amongst them, by which every man leaves on his grounds as many trees as he finds. Hence, in Jeddo, the forest city, some groves covered several acres, and were in the most perfect state of nature; in other places were to be seen neat houses, finely shaded with gardens, and ornamental shrubbery, trimmed into fanciful forms of every description.

CRANBERRY CULTURE.—At an informal meeting of the State of Maine Board of Agriculture on 20th January last, the following remarks were elicited on the cultivation of the Cranberry. We copy from the *Maine Farmer* :—

Mr. Dill said he had cultivated a cranberry bog for five or six years with considerable success. His bog covered five or six acres. It was at first occupied with a resolute growth of laurel and hardhack, which he eradicated by chopping up the turf and carting it off. He used to bank up his barn cellar, and subsequently mixed it with the manure. This nearly paid for getting it from the bog. After removing the turf he carried on sand, to the amount of fifty full loads to the acre. After distributing the sand, he set his cranberries in rows about 18 inches apart. In about two years from setting out the growth runs together, which is desirable, for the fruit does not yield until the matting takes place. It is necessary to flow the bog after the plants are set, and keep the water on until the season of frost is over, to the end that the roots remain undisturbed.

Mr. D cultivated six varieties—the Bell, Cherry, Bugle, each of two kinds, large and small. He preferred the Bell, and next to that the Cherry. He obtained them all from West Bridgewater, Mass.—They may also be obtained in Wells and Leeds in this State. Mr. D. had found that the purest sand was the best for cranberries, as weeds trouble them in their infancy. When they get well matted, however, they will protect themselves from grasses and weeds. Sand, water, and air, they want, in abundance. The varieties he had named are better for preservation than our natives, which soon perish. Mr. D. made mention of a few native varieties. In the vicinity of Rangely Lake a vine cranberry was found in bogs growing 10 or 12 inches high, in bunches, like beans.—The fruit was fair sized, and in the form of a cherry, quite prolific, and very good. In the same vicinity were two species of high bush cranberries. One was well known, it had one large stone in the centre resembling the parsnip seed, except that it was thicker. It was tart and made a good jelly. The other kind was but little known and a much better fruit. The seed is about one-third as large as the other. The bushes were small, and the fruit grew like the currant, in bunches among the leaves.—There was one little patch of this in Dallas plantation, and it is found also on the

Kennebago stream north of Rangely—a tributary of the Androscoggin. This latter kind ripens in August and September, while the former does not ripen till November.

Mr. True had watched the growth of the cranberry for some years. It was with regret that his neighbours were obliged to send to West Oxford for them, when there were so many unimproved places hard by, where they might be profitably raised.—Two experiments had interested him particularly. A neighbor of his had a cold swale on which nothing grew except the coarsest grasses. This he turned over with his plow and stuck in his cranberry bushes, and left them to contend alone with the grass. In two years they had crowded out all competitors, and gave a luxuriant crop of most excellent fruit. An experiment was conducted by a man in Kennebec, who, in a similar piece of ground, planted his cranberries without plowing, lifting the sod with his hoe sticking in a vine and saying to grass and cranberry, "now go it?" The cranberries soon obtained the mastery, and were now amply rewarding the owner. In his judgment the cranberry was one of the most profitable fruits, and our cranberry bogs are mines of wealth.

Mr. Tlissell of the Senate was called upon, and made a few remarks descriptive of the mode of gathering cranberries in Massachusetts. It is done with a sort of rake which gathers them from the bushes without injury to the vines.

Mr. Wells of the Senate was called upon, and said there were ten or fifteen acres of bog in Wells which yielded from three to seven hundred dollars worth of cranberries annually.

TO SAVE FROZEN HOUSE PLANTS.—When plants are found to have been frozen during the night, they should not be moved to a warm place, but on the contrary, they should be dipped in cold water and set in some cool place where they will not freeze, and also in the dark. They will then have a chance to recover if not completely dead.—*Michigan Farmer.*

NEW ROCHELLE BLACKBERRY, ITS NAME.—The correct name, New Rochelle, has been adopted in all American books on pomology, and by nearly or quite all the principal American nurserymen. We now scarcely ever see the name "Lawton" used, except in the advertisement of the person who bears this name.—*Country Gentleman.*

PROFITS OF APPLE RAISING AND CIDER MAKING.—Very few are aware of the extent to which the manufacture of cider is carried within a few miles of New Haven. In conversation with a gentleman from Cheshire a day or two since, we were surprised to learn that in that town alone 5,000 barrels have been made the past season from apples raised in that and adjoining towns, nearly all of which is now in process of clarification, and will be ready for market early in the spring. Four establishments alone have made 1,500 to 2,000 barrels each, which is already disposed of, and will be sent to market as soon as ready for use. This when clarified, is as pure as wine, and is sold readily in New York to bottle, for \$4 per barrel for the liquid, and when bottled is in great demand at the South at \$5 per dozen. The business is rapidly increasing, and the cultivation of the apple is as likely to prove as profitable as that of the grape at the West, where thousands of dozens of wine are put up yearly. The cultivation of the grape at Cincinnati has increased within a year or two extensively, and although attended with a much greater expense, is now the most profitable crop of that locality. The fruit growers of Connecticut can cultivate apples with but little expense, and can realize at least 20 cents per bushel for all they can raise. The past season those who have mills at Cheshire have paid from 18 to 20 cents per bushel for all they could find, taking them from the orchards in which they have been collected, the raiser being subjected to no expense except that of picking up and miling in heaps.—*New Haven Journal*.

THE LESSON OF THE GARDEN.—A garden is a beautiful book, written by the finger of God; every leaf is a letter. You have only to learn them—and he is a poor dunce that cannot, if he will, do that—to learn them, and join them, and then go on reading and reading, and you will find yourself carried away from the earth to the skies by the beautiful story you are going through. You do not know what beautiful thoughts—for they are nothing short—grow out of the ground, and seem to talk to a man. And then there are some flowers, they always seem to me like over-dutiful children; tend them ever so little, and they come up and flourish, and show, as I may say, their bright and happy faces to you.—*Jerrald*.

THE APPLE CROP OF NIAGARA AND ORLEANS COUNTIES, N. Y.—The papers of the above counties are making careful

estimates of the product, in dollars, of the apple crop of 1859. That of Niagara foots up at \$300,000, and Orleans at \$250,000. This is the amount received for fruit sold for exportation. No estimate is made of that used for home consumption.—*Rural New Yorker*.

PROFITABLE BLACKBERRY FIELD.—The Editor of the Norfolk, Ct., Gazette, last fall visited the New Rochelle fields, belonging to Messrs. George Seymour & Co., and says that three acres under cultivation have produced over four hundred bushels of blackberries, with a cultivation that cost \$8 per acre, and the blackberries, when sold in New York, realized, above expenses, \$3,200, or more than \$1000 per acre. Besides this, thirty barrels of blackberry wine, now worth \$50 per barrel, have been made from the berries grown on the same lot, and there are plants enough for the sale of next spring to make the net yield from this small lot at least \$5000.—*Boston Cultivator*.

DESTRUCTION OF FORESTS.—Do our American farmers sensibly realize that the great majority of them are laying the foundation, and that permanently, to have their farms without a good wood or timber lot, in fifty years? I am led to such a conclusion when I compare the present condition of the heavy timber lands with that of forty-five and fifty years ago. Let them have the same treatment fifty years to come, and the words of the Prophet will be fulfilled: "The trees of the forest shall be so few in number that a child can write them." Now, Messrs. Editors, would it not be beneficial to a large proportion of your readers, to give this subject a thorough investigation in the *RURAL*,—show how it is being done, and also what is the remedy? To effect this object, I send you a few of my reflections and conclusions on the subject.

First—How are timber lands likely to be made bare of timber? By continually pasturing them. In such woodlands the underbrush has long disappeared, and much has become seeded to grass. This gives a good chance for the wind, when the leaves drop from the forest timber, to blow them into the hollows, or pile them up into heaps by old logs, or carry them along by the wind among the timber, and lodge them in gullies, or over the brink of the ridges in windrows. Examine such woodlands, and where the leaves are carried off, the most of the timber is dying out fast. Why? Because there it has become the most seeded to grass, its roots occupy the soil and col-

leaves most of the nutriment from the small amount of leaf mould, and the roots of the timber are driven to the subsoil for support. The tops of the trees, of all sizes, are fast becoming dry, because the roots are robbed of that food they need to keep up a thrifty growth of timber.

Second—What treatment should timber lands receive to give the most thrifty growth to the timber? This is the question that should be understood. I answer, stop pasturing them and let a thicket of underbrush start up. This is actually necessary, for several reasons, to give a thrifty growth to the larger timber. It keeps a supply of young timber coming along to fill the place of the old that is decaying by age. A thicket of underbrush keeps the grass from growing, and holds the forest leaves where they drop, keeping them spread in an even coat over the ground, preventing evaporation in the summer, and holding moisture more evenly in the soil. Examine the leaf mould, and it is found filled with a thicket of small, fibrous roots, clear up to the dry leaves. Here is found the very nutriment needed to give a thrifty growth to the timber.—*Correspondence Rural New Yorker.*

The Dairy.

PRODUCTS OF GOOD COWS.

At the last exhibition of the Hampshire Franklin and Hampden (Mass) Agricultural Society, nine milch cows were entered for prizes. We condense from the Transactions of the Society a portion of the statement furnished by the owners of the cows, relative to their products.

1. A. J. Lincoln, Northampton. Cow supposed to be grade Durham. Calved about the middle of March—during month of May, 1859, was fed on cut hay and six quarts corn meal and rye bran, equal parts per day. She gave of milk during this month, 1178½ lbs, equal to 38 lbs per day. June 1st, she was turned out to pasture, and no extra feed given—and for the month of June gave 1220½ lbs, equal to 40½ lbs per day. For seven successive days in June, viz., from 10th to 17th, she gave 287 lbs, or 41 lbs per day. For the month of July, she gave 1130 lbs, equal to 36½ lbs, per day. For three months ending July 31st, she gave 3528½ lbs, equal to 38½ lbs per day. Milk was sold and no butter made.

2. W. B. Hale, Northampton. Grade Durham cow, eight years old. Mr. Hale

bought her November 25, 1857, two weeks after calving. From this time till June 21, 1859, (when she again calved) a period of 572 days, she gave 13,056 pounds 3 ounces of uncommonly rich milk, an average daily for the whole time (including 24 days in which she was dry) of 22 lbs. 13 oz., over nine beer quarts or eleven wine quarts. No butter was made—milk sold.

3. E. Fitts, Northampton. Cow seven-eighths Durham, 7 years old. Calved January 20, 1859. From 1st to the 10th June, she averaged 21½ quarts milk per day, weighing 53 lbs. Feed—the best of hay and 1 peck of roots per day.

From the 10th to the 20th of September she averaged 35 lbs per day—feed, poor pasture and 4 quarts of shorts per day.—From the 10th to the 20th of September, was made from her milk 17½ lbs. of nice butter.

4. Alfred Clapp, Huntingdon. Cow, half-breed Alderney, 4 years old. She gave, on common pasture, from September 21 to 28, an average of 23 lbs. of milk per day, which produced an average of 1 lb. of butter to 15 lbs. of milk, under good circumstances, thus making 1½ lbs. butter per day.

5. T. E. Elliott, Southampton. Half-blood Hereford heifer, 3 years old. She came in the first time June 6, 1858, when two years and six days old, her milk averaging from 28 to 32½ lbs. per day for ten months, and making 1 lb. of butter per day on an average.—*Country Gentleman.*

Arts and Manufactures.

MINERAL DISCOVERY.—A correspondent of the Brockville Recorder, intimates that a very rich mine had lately been discovered in the front of Yonge, C. W. The vein first opened consisted of very pure Nickel, and it is supposed that copper and even gold may yet be found in said mine. The mine is located on the farm belonging to Mr. Benjamin Bayle, and was discovered last summer by a very ingenious mineralogist, named W. Burham. The work has been pursued to some extent last summer, but will be properly opened the ensuing spring.

MANUFACTURES.—The Toronto Leader lately stated that an English manufacturing company has taken a large building in Dundas, erected about two years ago by Messrs. Holt & Co., at a cost of some ten thousand pounds, with a view of turning it into a cotton manufactory. The machine

ry is to be sent from England, and the manufactory to be got into operation early next Spring. Three hundred hands, it is said, will be employed in this establishment.

Over three hundred of Sorghum, or Chinese sugar-cane molasses, was made in Carroll county, Indiana, last Fall. It sold readily at 60 cents per gallon.

The iron exported from the Lake Superior mines during the past season, is estimated at \$402,000 in value.

A stream of salt water has been found at the Montezuma, N. Y., salt works which yields 62 per cent. The yield at Syracuse is 53 per cent.

The amount of flour manufactured in Chicago in 1859, was 185,029 bbls against 140,602 bbls in 1858, and 90,000 in 1857.

The use of the decimal system as regards measures of length, is to be obligatory in Portugal from the 1st of January next.

Scientific.

SEA BIRDS.—The question is often asked where do sea birds obtain fresh water to slake their thirst, but we have never seen it satisfactorily answered till a few days ago. An old captain says that he has frequently seen these birds at sea, far from any land that could furnish them water, hovering around and under a storm cloud, chattering like ducks on a hot day at a pond, and drinking in the drops of rain as they fall. They will smell a rain squall a hundred miles or even further off, and scud for it with inconceivable fleetness. How long sea birds can exist without water is only a matter of conjecture, but probably their powers of enduring thirst are increased by habit, and possibly they go without it for many days if not several weeks.—*Honolulu Advertiser.*

THE STUDY OF STORMS.—A few weeks ago the British Association for the advancement of Science, passed a resolution saying the Board of Trade to consider the possibility of watching the rise, force, and direction of storms, and the means for dealing, in case of sudden danger, a series of warning telegrams along the coast. A few days ago, at a meeting of the council of the association at Buckingham Palace, the Prince Consort in the chair, this resolution was again brought forward, and, after some debate, was referred as a special recommendation to the care of the Board of Trade.

THE GULF STREAM AS A FERTILIZING AGENT.—If we follow the Gulf Stream across the ocean, we perceive how fully it fulfils the purpose for which it was designed. Sir Walter Scott tells that the pools in the Orkneys are never frozen, the effects of the grand hot water warming apparatus of a far distant shore being sensibly felt even in these islands, which are situated in latitude nearly ten degrees further north than the ice-bound coast of Labrador. We all know that in Great Britain there is an extraordinary difference between the eastern and western coasts, so great indeed as to induce completely different systems of agriculture. The Emerald Isle owes her splendid grazing land to the soft west breeze, born of the Gulf Stream, which strikes full upon her shores; the western shores of England are robbed in bright green pastures nourished with the warmth and moisture issuing from the same tropical source. The dairy produce of Great Britain has its root and issue in this steadfast hot water river in the ocean the limits of which modern science has so accurately mapped; nay, the florid, plump looks of our people, and the large size of our domestic animals, are but effects of that moist and genial atmosphere which finds its birthplace in the beneficent Gulf Stream.—[*London "Once a Week."*]

A growing subject of alarm in France is the frequent deaths within the last year, of individuals bitten by a certain kind of fly. The death is certain and rapid if the bite is not immediately incised and cauterized, either with the actual cautery or with some active caustic substance. Death takes place most frequently in from four to twenty-four hours, and with much the same symptoms as from the bite of venomous snakes. It is supposed that the insects, in order to produce such instantaneous and powerful effects on the human body, must have recently fed on some decayed animal matter.

Veterinary.

WHO BREEDS THE BEST ROADSTERS?—It may be recollected that at the Agricultural Show at St. Louis, Mo., last fall, \$1000 was offered as a premium for the best roadster stallion. It was announced that this liberal premium was given to Stockbridge Chief, a son of Black Hawk, bred in Massachusetts, and now owned in Cincinnati, Ohio. But we have heard of some interesting additional facts, in regard to their decision, viz., that the judges in the first place selected from the great number offer-

ed, six which were deemed the best, and then made a critical examination of them to find the best one. Of these six, five were sons of Black Hawk and the sixth a grandson—the latter being Green Mountain Black Hawk, whose sire was Sherman Black Hawk, or the North Horse.—*Boston Cultivator*.

SOUNDNESS AND UNSOUNDNESS OF HORSES—Although much has been written upon this subject, it, unfortunately for the profession, still remains an unsettled question, as to what is soundness and what is unsoundness; or why it is that such conflicting opinions are given by the members of the veterinary profession as to soundness or otherwise in their examination of horses.

Perhaps a candid inquiry into the *cause* of the latter will in some measure answer the former question; at all events, so far as its *legal* definition is concerned. As in medicine it is, I believe, of the first importance to ascertain and remove the *cause*, and afterwards to apply the remedy, so, perhaps, here this theory is admissible.

I am inclined to think that much of the difficulty now enveloping this question has in a great degree been increased and extended by veterinary surgeons themselves, and not so much by any serious or palpable neglect in the law of warranty. Further, that this state of things has been the result, and is attributable to examinations being made, and opinions given too prematurely, that is, without due consideration; to which may be added, too great an anxiety manifested for the interest of their employers. A prejudiced mind is one of the stumbling-blocks ever in the way of the professional man, and unless it is met by timely antagonistic determination it becomes the high road to fatal error.

Who has not seen the mistakes in judgment that many have fallen into, and which afterwards have been freely confessed, by the habit, apparently trifling, but nevertheless serious, and much to be deprecated, of "nodding the head," when the animal is running and under examination? I hesitate not to say that this simple act has prejudiced many a mind. Then, is not the very wish, if too eagerly pursued, to do the best for our employer in these cases, too apt to prejudice the mind? and thereby to render the *hand* and the *eye* a little too ready to indulge in this same prejudice? And, again, it does unfortunately sometimes happen, however we could desire it were otherwise, but we must not disguise the fact, that with other causes *jealousy* will lend the helping hand to prejudice.

If some such deplorable causes as these, with many others of the like kind, easily aduced, did not too frequently exist, we should not be so often pained by hearing and reading those daily reports of the large amount of hard swearing in our courts of justice which characterise horse causes. And I cannot help thinking that if veterinary surgeons would take the law as now defined for the foundation whereupon to raise their structure, instead of many of their own fancies as to what is law, it would then be a simple question for them to answer, as to whether or not many of the numerous diseases named did exist at the time of their examinations or not. Indeed, this I presume to be the strict duty of the veterinary surgeon; and for a catalogue of these I with pleasure refer him to that concise and excellent work, "Olliphant on the Soundness and Unsoundness of Horses."

Let the veterinary surgeon, when consulted, go to this with an unbiassed mind and a firm resolve to look at the case calmly and dispassionately, and with a determination under no circumstances whatever to swerve from that course which his professional knowledge, honestly and without favor, so loudly calls upon him to pursue; never caring by whom employed or by whom opposed, or whether or not the opinion he may give "*suits*" his employers or meet his anxious desires. Let him follow the course in all cases, and he will, I think, find his duty respecting an examination to soundness free from all difficulties, and plainly defined.

I cannot conceive veterinary pathology and anatomy to be really in such a state of darkness as not to render easy to all advocates the detection of any disease by knowledge by the law as constitutional soundness; but I *can* conceive, and have often witnessed, what flagrant errors stretches of the imagination, and a want of strict adherence to common sense and scientific knowledge, urged on by prejudice, and invariably do lead to; together with latitude given to persons who are inclined to accept the opportunity of setting forth their peculiar notions as to the *probability* of an animal *some time or other* taking a certain disease whereby he *may* be unsound. This has ever surrounded the question with thick clouds of mystery, is called "predisposition," a word unhappily, by its misapplication, "*no good remedies*," has become a poison, like the *explain all* "inflammation," become a mere peg whereupon to hang a cap of ignorance. Again, you will be disappointed to find professional men not only disagreeing

the existence or otherwise of disease, but also as to what diseases by their appearance render an animal unsound. But, in this particular the veterinary surgeon is not the only one who creates a difficulty. Are not the most eminent judges of our land at variance? and do they not make a way of escape by each propounding and establishing his peculiar views? Surely this should not be. Again, who has not witnessed the different opinions given as to soundness even when two veterinary surgeons agree that some certain disease does exist, and which is acknowledged by the law to be unsoundness? The one feels it his duty (as no doubt it is) legally to reject such an animal; the other, as strenuously opposes it, because he says the horse does not show any lameness. Now, the law does not sanction any such ambiguity as this. I, therefore, cannot think that the law must be entirely blamed for the present unhappy state of things.

That the law of warranty does require some alteration, there is no doubt, and at a future period I will respectfully submit in what particulars, and offer a few suggestions as a remedy.—G. BODDINGTON, R.C.V.S., in *Veterinarian*.

The Poultry Yard.

TO FATTEN CHICKENS.—It is hopeless to attempt to fatten them while they are at liberty. They must be put into a proper coop, and this, like many other poultry appliances, need not be expensive. To fatten twelve fowls, a coop may be three feet long, eighteen inches high, and eighteen inches deep made entirely of bars. No part of it solid; neither top, sides nor bottom. Discretion must be used according to the sizes of the chicken put up. They do not want room; indeed the closer they are the better, provided they can all stand up at the same time. Care must be taken to keep such as have been accustomed to be together, or they will fight. If one is quarrelsome, it is better to remove it at once, than the other bad examples, it soon finds its way. A diseased chicken should not be put up. The food should be ground and may either be put in a trough, or a flat board running along the front of the coop. It may be mixed with water if the latter is better. It should be soaked, forming a pulp as loose as can be provided it does not run off the board. It must be well fed three or four times a day—the first time as soon after day-break as may be possible or convenient, and at intervals of four hours. Each

meal should be as much and no more than they can eat up clean. When they have done feeding, the board should be wiped and some gravel may be spread: it causes them to feed and thrive. After a fortnight of this treatment you will have good fat fowls. If, however, there are but six to be fattened, they must not have as much room as though there were twelve. Nothing is easier than to allot them the proper space, as it is only necessary to have two or three pieces of wood to pass between the bars, and form a partition. This may also serve when fowls are up at different degrees of fatness. This requires attention, or fowls will not keep fat and healthy. As soon as the fowl is sufficiently fattened it must be killed, otherwise it will still get fat, but it will lose flesh. If fowls are intended for the market, of course they are, or may be all fattened at once; but if for home consumption, it is better to put them up at such intervals as will suit the time when they are required for table. When the time arrives for killing, whether they are meant for market or otherwise, they should be fasted without food or water for twelve or fifteen hours. This enables them to be kept for some time after being killed, even in hot weather.—*Cottage Gardener*.

Domestic.

COFFEE.—To have this beverage in perfection, two things are indispensable. The coffee must be roasted well, and then made in a boiler of right construction. The roaster should be a close sphere, or cylinder. The aroma, upon which the good taste of the coffee depends, is only developed in the berry by the roasting process, which also is necessary to diminish its toughness and fit it for grinding. While roasting, coffee loses from fifteen to twenty per cent. of its weight, and gains from thirty to fifty per cent. in bulk. More depends upon the proper roasting than upon the quality of the coffee itself. One or two scorched or burned berries will materially injure the flavor of several cupsful. Even a slight over-heating diminishes the good taste. The best mode of roasting, where it is done at home, is to dry the coffee first in an open vessel until its color is slightly changed. This allows the moisture to escape. Then cover it closely and scorch it, keeping up a constant agitation so that no portion of a kernel may be unequally heated. Too low and too slow a heat dries it up without producing the full aromatic flavor; while too great heat dissipates the

oily matter and leaves only bitter charred kernels. It should be heated so as to acquire a uniform deep cinnamon color and an oily appearance, but never a deep dark brown color. It should then be taken from the fire and kept closely covered until cold, and further until used. While unroasted coffee improves by age, the roasted berries will very generally lose their aroma if not covered very closely. The ground stuff kept on sale in barrels or boxes, or in papers, is not worthy the name of coffee.

Coffee should not be ground until just before using. If ground over night it should be covered; or, what is quite as well, put into the boiler and covered with water. The water not only retains the valuable oil and other aromatic elements, but also prepares it by soaking for immediate boiling in the morning.

In regard to coffee making, no good housekeeper can hope to succeed well if the old method of boiling in a common coffee pot is adopted. The "*Old Dominion*" coffee pot, now so extensively used throughout this country, is, beyond all question, the best contrivance yet introduced to the public. In using this according to the plain directions given, bad coffee is simply impossible. Many house-keepers, who use this coffee pot, grind their coffee and put it in the boiler over night, setting the boiler on the range, or near the fire, but not where it can boil. The beverage thus produced, is rich, mellow, and of a most delicious flavor. We commend this plan to our lady readers. One of the strong recommendations of the *Old Dominion* coffee pot is its economy. It saves from one-fourth to one-third of the berry. We have used one in our family for several months past, and being very fond of a cup of real good coffee, would not dispense with it for ten times its cost.—*Farmer & Gardener.*

TO PREVENT RATS UNDERMINING CELLAR WALLS.—The stability of cellar walls is sometimes seriously affected by rats digging underneath them and thus weakening the foundation. In order to prevent such injury, after the cellar walls are completed and pointed, you must dig a small trench inside of them, about one foot wide and half a foot deep. Now fill this trench nearly full of small stones and water-lime mortar; then cover the stones and mortar with the earth taken from the trench. If thus you guard the bottom of the walls, you will find all the efforts of rats at undermining to be utterly vain; they will have to go sneaking out at the very door or hole by which they entered. Some people say that rats from the outsides

dig down under the wall, and thus under the cellar; but this is a mistake. The fact is, they enter the cellar by the door or some hole, and then, if this entrance is closed against them, they dig a passage out under the wall. Such passage they cannot make if the inside trench is as described, as they always begin to dig close to the bottom of the wall; and hence, when they encounter the stones and mortar, they are disheartened and abandon the undertaking. If planks close to the wall should lie on the cellar bottom, they will commence digging at the inside edge, although it be a foot or more from the wall. If a quantity of potatoes should be piled up in the middle of the cellar, the rats will begin to dig under the pile, or even under the bottom of the chimney, perhaps instinctively expecting thus to work their way out. But to guard against these digging operations cover your cellar-bottom with a thick coating of water-lime and sand, and the saucy predators won't trouble you any more.—*Rural American.*

TO DESTROY RATS.—The *Griffin* (*GA.*) *Empire State* says that a lady in that city, whose house became infested with the troublesome visitors, gives the simple remedy of dissolving copperas in water (make it strong), and sprinkle the most prominent places; it will make them leave at a "forty" rate and no mistake. She tried successfully, and has not been troubled with rats or mice since. It is simple, and does not cost much to try it.

A CHEAP FUMIGATOR.—The following will be found to be a cheap and pleasant fumigator for sick rooms, and diffusing healthful, agreeable and highly penetrating disinfectant odor in close apartments, wherever the air is deteriorated. Pour common vinegar on powdered chalk until effervescence ceases, leave the whole to settle and pour off the liquid. Dry the sediment and place it in a shallow earthen or glass dish, and pour on to it sulphuric acid and white fumes commence arising. This quickly spreads, is very agreeably pungent and acts as a powerful purifier of vitiated air. Concentrated and reduced again to liquid state, it constitutes aromatic vinegar of commerce.—*Scientific Artizan.*

MRS. MARTINEAU ON COOKERY.—What is to be done?—for cooking does not come by nature, nor even ordering a table by observation. The art must be learned like other arts, by proper instruction. We must have, schools of domestic management now that every home is not a school. Mothers can at least teach

daughters to know one sort of meat from another, and one joint from another, and, in a rougher or more thorough way, what to order in the every day way and for guests. Thus much, then, every girl should know, from childhood upwards. A little practice of observation in the markets would soon teach a willing learner to distinguish prime articles from inferior kinds, and to know what fish, flesh and fowl are in season every month in the year. We have seen ladies buying pork under a sweltering summer sun inquiring for geese in June and July, and taking up with skinny rabbits in May, and letting the season of mackerel, herrings, salmon, and all manner of fish, pass unused.—*Once a Week.*

Editorial Notices, &c.

THE AGRICULTURIST POST FREE.—Some of our subscribers having recently informed us that the Postmasters from whom they received the *Agriculturist* had been charging them postage on its delivery, under the impression that it was their duty to do so under the new postage law, the Secretary of the Board of Agriculture, with the view of preventing any similar mistakes in future, communicated with the department of the Hon. the Postmaster General at Quebec, requesting an authoritative notice upon the subject. To that communication the sub-
 ed reply was received, which, our readers will perceive, sets the matter satisfactorily at rest:

POST OFFICE DEPARTMENT,
 QUEBEC, 30th Jan., 1860.

I have the honor to acknowledge your letter of the 26th inst., representing that some of your subscribers have complained that postage has been claimed from them for their copies of the "Canadian Agriculturist."

In reply, I am directed by the Postmaster General to say, that the "Canadian Agriculturist" being a periodical specially addressed to Agriculture, is clearly entitled to free transmission by post in this Province, when addressed directly from the Office of Publication; and that Postmasters are therefore no right to charge postage thereon. I will be good enough to inform the

Department of the names of the Post Offices whereat such charges have been made, the Postmaster General, who regrets that such errors should have occurred, will specially address the respective Postmasters in correction of their misconception of instructions in this particular.

I am, Sir,

Your most obedient
 Humble servant,

EDWIN KING,
 Secretary.

HUGH C. THOMSON, Esq.,

Sec. Board of Agriculture, U. C.,
 Toronto.

OUR SUBSCRIPTION LIST.—We are happy to be able to state that the subscriptions for the *Agriculturist* are coming in very satisfactorily this year. We have still, however, plenty of back numbers on hand, and shall be glad to have the whole edition taken up as soon as possible.

A Meeting of the Board of Agriculture will be held at Toronto on the 23rd instant.

We have no *Transactions* this number. The conclusion of the Rev. Mr. Mulkins' Address will be given in our next.

Market Intelligence.

TORONTO MARKETS.

TUESDAY, Feb. 14, 1860.

The grain market was altogether well supplied to-day. Competition was brisk, and late extreme quotations were fully realized, buyers exhibiting considerable spirit and animation.

FALL WHEAT—About 1,500 bushels was the extent of the deliveries. Prime samples brought as high as \$1 27c.; the range of prices being from that figure to \$1 15c per bushel.

SPRING WHEAT—About 500 bushels were sold at from 95c a \$1 04c per bushel.

PEAS—500 bushels at from 55c a 58c.

OATS—1,000 bushels from 34c a 37½c.

PORK—75 hogs were sold at from \$5 75c a \$6 37½c per 100 lbs.

HAY—Good supply at from \$12 a \$20 per ton.

STRAW—\$7 a \$10 per ton.

FLOUR—No change in price. We quote Superfine No. 2, \$4 10 a \$4 20; Superfine, No. 1, \$4 40 to \$4 50; fancy, Spring Wheat \$4 75 to \$4 80; fancy, Fall Wheat, \$4 90 to \$5 00; extra, \$5 25 to \$5 45; double extra, \$5 50 to \$5 75.

NEW YORK MARKETS.

NEW YORK, Feb. 14.

FLOUR—Receipts 14,000 bbls; State and Western dull and rather easier; Sales of Western 43,000 barrels unsound at \$4 a \$4 80; superfine State \$5 a \$5 15; extra State \$5 25 a \$5 40; round hoop Ohio \$5 80 a \$5 95; common to good superfine Western \$5 a \$5 15; extra Western \$5 25 a \$5 45; Southern dull; sales 800 bbls at \$5 50 a \$5 75 for mixed to good, and \$5 80 a \$7 for fancy and extra. Canadian flour unchanged and dull; sales 200 bbls at \$5 40 a \$6 75 for extra.

GRAIN—Wheat dull; sales 2,200 bushels White Canada \$1 40. Corn unchanged; sales 15,000 bushels new yellow at 78c. Oats quiet; Southern and Jersey at 38c a 41c; Northern and Western 44c a 46c.

PROVISIONS—Pork firm; sales 250 bbls mess at \$17 50 for old and \$18 37 for new prime, \$12 25 for old prime, and \$14 25 for new do. Lard quiet and firm; sales small at 11c a 11½c.

MONEY continues unchanged, easy and plenty.

BRITISH MARKETS.

(Per Canadian Steamship "Bohemian.")

LIVERPOOL, Jan 11.

FLOUR—American in demand at full rates; Western Canal 23s a 24s; Philadelphia and Baltimore 23s a 25s; white not so strong of tone as this day week; white and mixed 9s 9d a 11s 6d; red 8s 6d a 10d per 100 lbs. Corn not very active, but one or two parcels had advanced 6d per 480 lbs; white 36s a 38s; yellow 32s; mixed 31s a 31s 6d.

BEEF—Where sales have been effected large rates have been paid. In pork little has been done. Lard—Not so large a business as last week.

ASHES—pots 28s a 29s; pearls 30s.

Advertisements.

PIGS FOR SALE.

FOR SALE, A LOT OF THOROUGH Bred Small Breed Berkshire Pigs.

R. L. DENISON.

TORONTO, Feb. 14, 1860.

GALLOWAY BULL.

FOR SALE, A THOROUGH BRED FOUR Year Old Galloway Bull.

E. W. THOMSON.

CARLTON WEST,
February 14th, 1860.

QUEEN'S SEEDSMEN.

PETER LAWSON & SON.

EDINBURGH, 1 George IV. Bridge.
LONDON, 27 Great George Street, West
min. str. S W.

ON ACCOUNT OF THE NUMEROUS applications which have been made to PETER LAWSON & SON, to send their Lists of Seeds and Nursery Produce to the United States and Canada, they beg to inform the Trade in America that they are prepared to furnish them with

PRICE LISTS

and to assure them that any orders they may be favored with will receive their best attention.

All orders must be accompanied by Cash Satisfactory References in England, or may be forwarded through

CRAIG & NICOL,

No 6 Bowling Green, New York

JANUARY, 1860.

SEEDS! SEEDS! SEEDS!

AS the season is near at hand for part requiring GARDEN & FIELD SEEDS to look out for the best to be had, I beg to call the attention of all, and at present, particularly of WHOLESALE PURCHASERS, to my fresh stock which is about completing; as for quality and tensiveness it cannot be surpassed by establishment in the country.

Wholesale priced catalogues (for trade only) are now ready, and may be on application.

Catalogues for this season, contain many new and rare acquisitions, together with numerous useful remarks and for the raising of Vegetables from Seed will also be ready in a fortnight.

Orders from a distance attended to with usual care and despatch.

J. A. SIMMERS

Seedman

Corner of Front St. and West Market
TORONTO, Jan. 30, 1860.

YONGE STREET SEED STORE AND FLOWER GARDEN,

Established 1836.

Fresh Garden, Field and Flower Seeds, for Spring sowing.

THE Subscriber begs to inform his friends and the public, that his stock of Fresh Seeds is now complete, and very extensive, embracing almost every sort of Seed that is adapted to the country.

The stock of Agricultural Seeds is large and well selected, and the vitality of each sort being fully tested, the genuineness of the seeds may be fully relied upon.

Comprising a large stock of:—Spring Wheat, Spring Tares, Tartar and Poland Oats of the most approved kinds; Field Peas, including Golden Vine, and other approved sorts, White and Black Eyed Marrow Fats; Barley, two and four-rowed; Imported Purple and Green Top Swedish Turnip, Imported White Globe do., Imported Yellow Aberdeen do., Imported Six-weeks or Stubble do., Imported Red Round, Red Globe and several other sorts of Turnips; Long Red and Yellow Globe Mangel Wurzel; Sugar Beet and Field Parsnip, Large White Belgian Carrot and Spring Rape; Long Orange, Red, Surrey, and Altringham Carrot; Timothy, Orchard, and English Tre Grasses; Red and White Dutch Clover; French Lucerne, Cow, and Hungarian Grasses, Alsike or Perennial Clover; Yellow and White Millet; Early Potatoes of the most approved sorts; Corn, 8 rowed Early Canada, King Philip, Yellow Dutch, and several other sorts.

*Agricultural Books and Garden Tools,
Draining Tools, One Horse Ploughs, and
Cultivators of all kinds.*

The Subscriber has also a full and general assortment of all kinds of Garden Seeds suitable for the country, a catalogue of which, with directions for sowing seeds, may be had gratis.

Merchants and Agricultural Societies ordering seeds in bulk will be supplied at wholesale prices.

Complete assortment of Garden Seeds ready put up in small papers, with directions for sowing, and sold by the box, containing 150 papers, at very moderate prices.

Twenty packages of Flower Seeds, choice, will be sent free by post to any part of the province, to the address of any person remitting \$1, free of postage, or 25 pages, postage unpaid.

JAMES FLEMING,

Seedsman to the Ag'l As. of U. C.

Monto, February, 1860.

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YONGE STREET SEED STORE.

CHOICE VEGETABLE & FLOWER SEEDS FREE BY MAIL.

THIRTY SIX VARIETIES FOR TWO DOLLARS.

THE Subscriber, wishing to give parties who reside at a distance an opportunity to test the quality of his Seeds, will, on receipt of \$2, free of postage, send free to any Post Office in Canada, 24 Full Sized Papers of VEGETABLE SEEDS, many of them containing half an ounce of seed, and 12 Papers of Choice FLOWER SEEDS, with Descriptive Catalogue and Box included—the seeds to be of my own selection. None but the most useful and desirable varieties will be sent.

JAMES FLEMING.

Seedsman to the

Agricultural Association of U. C.

Toronto, Jan., 1860.

IMPROVED SHORTHORNS.

THE HON. ADAM FERGUSON, WOODHILL, WATERDOWN, P. O., will have Seven Thorough-bred Durham Cows to calve in Spring. These cows are in calf to "ETHELBERT," bred by Samuel Thorne, Esq., and have a large portion of "DUCHESS" and "BATES" blood. They may be seen at any time at Woodhill, within a half hour's walk of Waterdown Station, G. W. R. R.

Orders for bull calves must be sent by the 1st of March. Full pedigrees will be furnished. Price of each calf \$60.

Four of the Cows will be sold at moderate prices.

WOODHILL, Jan. 2nd, 1860.

HUNGARIAN GRASS.

This valuable grass was introduced into this neighborhood three years since by our County Agricultural Society, and has given very great satisfaction to all who have tried it. Its ordinary yield is FOUR TONS TO THE ACRE, and in some cases SIX TONS have been cut. Cattle and all kinds of Stock are very fond of it, preferring it to Timothy. Its fattening qualities too are believed to be superior to those of any other known grass.

The Subscriber has obtained a quantity, and will send to any person making a post-paid application, sufficient to sow one-third of an acre for One Dollar, or One Bushel for Six Dollars.

All seed will be sent free of charge.

ARCHIBALD YOUNG,

Treasurer,

Lambton County Agr. Society

Sarnia, February 10, 1860.

THE AGRICULTURIST.

ARRANGEMENTS FOR 1860.

THE "AGRICULTURIST, AND JOURNAL AND TRANSACTIONS OF THE BOARD OF AGRICULTURE OF UPPER CANADA" for 1860, will be published on an entirely new system.

It will appear twice a month, and will consequently be much more useful as a medium of intelligence on all subjects affecting Agricultural Societies, and farmers generally, than heretofore.

Each semi-monthly number will consist of 32 pages, and will be printed on fine white paper.

Notwithstanding the increase of size, and of times of publication, the price to single subscribers will be only half a dollar for one copy per annum.

Further, even at this low rate, a bonus will be given of one free copy for every 10 copies ordered and paid for in advance. That is to say, for \$5 remitted, 11 copies will be mailed; for \$10, 22 copies; for \$15, 33 copies will be mailed, and so on.

The *Agriculturist* is Post Free.

It will consequently be the cheapest paper of its kind, and contain the largest amount of reading matter of any published on this continent.

In addition to the very low terms of subscription, as a further remuneration to those who exert themselves to obtain subscribers, the undermentioned money premiums will be paid to those who send in the largest lists accompanied with the amount, before or on the 1st day of April next. Subscriptions will be received at any time, and the amount of each list reckoned up on the 1st April. The money must be received, not merely mailed, on that day. The following are the prizes offered:—

To the officer of any Agricultural Society, member of a club, or other person who shall send in the largest list of subscribers, accompanied with the cash, on or before the 1st April next, a money prize will be paid of.....	\$20
To the person who shall send in the next largest list.....	19
To the person who shall send in the next largest list.....	18
To the person who shall send in the next largest list.....	17
To the person who shall send in the next largest list.....	16
To the person who shall send in the next largest list.....	15
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To the person who shall send in the next largest list.....	3
To the person who shall send in the next largest list.....	2
To the person who shall send in the next largest list.....	1

"AGRICULTURIST OFFICE,"
Toronto, November, 1859.

FOR SALE.

A THOROUGH-BRED AYRSHIRE BULL
3 years old.

RICH. L. DENISON.

Toronto, July 20, 1859.

To Agricultural Societies, &c.

THOROUGH-BRED NORTH DEVON
BULLS to sell or let for the season.

"Colonel," 569, A. H. B. The Colonel took the first premium as a yearling at Branford.

"General," 571, A. H. B. The General took the first premium as a two-year old at Toronto.

Apply to

DANIEL TYLER

Wilmet. Co. Waterloo,
Jan. 3, 1860.

The Agriculturist,

OR JOURNAL AND TRANSACTIONS OF THE BOARD
OF AGRICULTURE OF UPPER CANADA,

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