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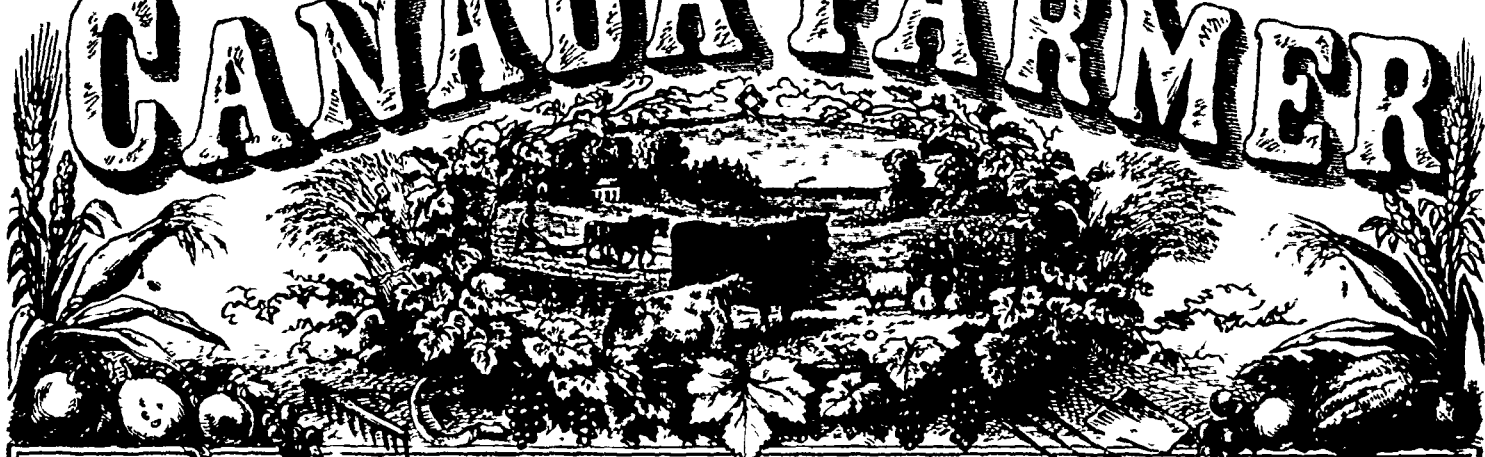
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THE

CANADA FARMER



Vol. III. No. 6.

TORONTO, CANADA, JUNE 15, 1877.

NEW SERIES.

The Field.

Turnips, and their Cultivation.

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II.
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SOWING.

Though turnips can be sown by hand, in rows made on the top of the drill, or on the flat, this method, except for small quantities, is very slow and unsatisfactory; where they are grown in any quantity, a drill of some kind should be used. Some drills sow one, and some two, rows at once. Seed drills of both kinds are to be got in most parts of the Province now.

The one in use on my own farm sows only one drill at a time. This is attached to a light roller drawn by one horse, the roller going over the drill that is being sown, and also the one last sown, thus making a smooth seed bed, and covering the seed at the same time. The drill has to be moved from one end of the roller to the other when turning at each end of the land. The time for sowing turnips varies in different parts of the Province; but generally the second or third week in June is the best time; and the quantity of seed required is from two to three pounds to the acre. This is a much larger quantity than is wanted for plants. Stephens, in his "Farmers' Guide," states that 1 oz. 6 drachms Troy, would give sufficient plants for an acre, supposing all grew, and the drills were twenty-seven inches wide, and the turnips ten inches apart on the drill; so that when sown at the rate above given, the waste of seed is twenty-seven to one. It must not be supposed, however, that 1 oz. 6 drachms of turnip seed will sow an acre, for many of the seeds want vitality, and many others are no doubt buried too deep to vegetate with the rest. Besides, plenty of seed not only secures a full braird, but tends to make the turnips grow faster at first, thus pushing them sooner past danger from the fly.

AFTER CULTIVATION.

If the land is moderately clear, turnips will need nothing doing to them from the time they are sown until they are fit to hoe and thin out. The time it takes for turnips to be ready to hoe cannot be stated, as it depends on the state of the weather. The young plants require to be from two to three inches high before thinning. If thinned too soon, they are apt to stunt; and if left too long, they are apt to grow long-necked and not bulb so well. Before thinning, the turnips should be gone through with a horse-hoe or drill cultivator, cutting up all the weeds between the rows, paring the soil from the young plants as near as possible without touching or covering them up, leaving a narrow strip of a few inches on the top of the drill, with the plants in the middle, so that but little ground remains to go over with the hand hoe. In hoeing, the young plants may be left from nine inches to a foot, or even more, apart; the richer and better the land the wider apart should they be left—leaving them laid over on one side. As soon as the plants begin to set up again, they should be gone through with the drill cultivator, killing the weeds between the rows. Sometimes, if the weather is showery, when thinning, the plants pushed out will grow between the drills, and they want killing as well as the weeds. After the first thinning, turnips want a hoeing a second time, cutting out all the weeds between the plants, and any turnips that may have been left double at the first hosing. It will conduce very much to their growth if they are frequently cultivated between the drills, keeping the ground fine and mellow to attract the dew, and get the full benefit from any showers that may fall. The ground cannot be kept too mellow. There is hardly any part of a farm that looks better than a well cleaned and thinned crop of turnips, and none that looks worse than one all grown over with weeds, which is not creditable, and cannot be profitable to the farmer, as it not only seriously damages the growing crops, but also fills the ground full of the seeds of

weeds. If the land is foul with fast growing annual weeds, such as fox-tail grass, charlock, &c., and the turnips do not come quickly, we have sometimes had to run the cultivator up one drill and down another, and then take a sharp hoe and pare the weeds off close to the rows of young turnips as soon as they could be fairly seen, thus preventing the fast growing weeds from smothering the young plants; but as the plant grows rapidly, this treatment will rarely be required.

HARVESTING.

As the turnip is a late growing plant—indeed they bulb best after the weather becomes cool, and a moderate frost does not injure them—they may be left in the ground as long as there is no danger of their being frozen in. They may with safety be left in the ground till about the first of November, often later; but in 1869 the ground froze up very early in that month, so that more turnips were frozen in the ground and lost than I ever knew before.

There are various methods of taking up turnips. The old plan (one I have generally pursued) is to take some heavy knife, made out of an old scythe or hook, pulling up the turnip, cutting off the root first and then the top, each man taking two rows, and throwing the turnips of four rows into one, so that they can be conveniently thrown into a cart or waggon; the waggon going in the middle, and taking eight drills with it, four on each side. The tops by this way can either be left on the land, to be eaten off by cattle or ploughed in, or they may be drawn off and fed to stock on some other field.

Many, especially on light land, cut off the tops of the turnips with a hoe, then collect the tops, and harrow up the turnips with a pair of blunt harrows, and then gather and draw them off. By this method the roots are all left on, but it is a speedy method. The tops are sometimes cut off, and then the bulb ploughed out with a sharp plough. Several other ways of taking them up are practised; and this last fall I saw advertised

a machine that promises to take up two drills at once, and eight or ten acres a day. Should it prove successful, such a machine would lighten the labour of taking up the turnip crop greatly.

STORING.

Having the turnips topped by whatever method, they are then ready for drawing in and storing up for winter. To those who grow large quantities, a root-house of some kind is indispensable. Those who are about to put up new buildings should bear in mind that it is well to have them so planned, and the place for holding roots so placed, that they can be fed to the cattle without having to carry them far, nor out of doors at all; to have them as convenient as possible to all the stock to which they are going to be fed.

Turnips can be kept very well in pits or heaps, covered over with a few inches of straw, and from six to ten inches of earth. They will come out quite fresh, but they are not so easily got out in winter as when in a root-house. By whatever method they are kept, care must be taken that they have sufficient ventilation after they are housed or pitted, as they sweat considerably. I have seen as many turnips lost by too close covering—thus heating and rotting them—as by frost from too light covering.

FEEDING.

Having got all the turnips safely stored for winter, the next thing is to feed them out to the best advantage. Almost all the stock on a farm will eat them readily, and will be the better for a few of them. They are, however, most suitable for cattle and sheep. A few fed every day during winter and spring to all the cattle on a farm will conduce to their health, and help to keep them thriving; and though they may not look much better for them during the winter, there will be a marked improvement seen as soon as the cattle are turned out in the spring. But the principal use that turnips are put to is feeding cattle and sheep for the butcher. When the weather is mild, or the feeding place sufficiently warm, either cattle or sheep will lay on flesh fast with turnips and grain; for a little grain or oil-cake may mostly be added with advantage; but many, both cattle and sheep, are made fat on turnips and hay, or even straw, alone.

COST.

The question is often asked: What does it cost to raise an acre of turnips? or what do turnips cost per bushel? It is one of those questions very difficult to answer. The cost varies greatly, according as the land is clean or otherwise. Some land may be in first-rate order with two ploughings and harrowings, whilst other land may require three or four ploughings and harrowings, besides repeated rollings, cultivating, &c. Moreover, land that is dirty and full of the seeds of weeds, will require more hoeing than land that is clean. I have seen estimates in the CANADA FARMER, giving the cost of an acre of turnips at from four dollars to forty-six

dollars an acre. I think that an acre of turnips may usually be put in, properly cared for, and duly stored, for about twenty-five dollars an acre, not counting anything for manure. The cost per bushel has been variously estimated from two to ten cents per bushel.

INSECT ENEMIES.

The turnip crop is liable to several insect enemies; the most destructive is the turnip fly or flea, which attacks the young turnip as soon it puts out its first leaves. Should the weather be dry, or the turnips thin, they will very likely destroy, or at least greatly injure the crop. The best preventive that I know of is to have the ground in good condition, and sow plenty of seed. If the fly is very bad, a little plaster, lime, ashes, or even dust, may be sprinkled on the young plants; when the dew is on this will have a good effect. Turnips are sometimes damaged, even destroyed, by grasshoppers and caterpillars; lice, too, in the fall, are sometimes very destructive; but the fly destroys more turnips than any other of their insect enemies.

STATISTICS.

In Great Britain and Ireland, the number of acres sown with turnips in 1868 is given at 2,782,131. By the census returns of 1861 the number of acres in turnips in Upper Canada is given at 73,409; the number of bushels at 18,206,959 giving an average of 248 bushels per acre. The average for this county (Northumberland) was 346½ bushels per acre; the average for this township (Hamilton) was 377½ bushels per acre. The highest average of any township in this county was 410½ bushels per acre. We have no doubt the census now about to be taken will show a large increase in acres; whether it will show an increase in the yield per acre or not, remains to be seen. The past season was not a favourable one for turnips in this section.

The average crop of turnips in Scotland in 1854 was about 540 bushels per acre.

Turnips do not seem to be grown to a great extent in the United States; in many of their agricultural statistics, published from time to time, they are not noticed at all. In the neighbouring State of New York, according to their published returns, the growth of turnips fell from 15,322 acres in 1845, to 7,578 acres in 1855. I have not seen the number of acres given in any of their later returns.

In the agricultural returns of the United States for 1861, the average crop of turnips is given at 270 bushels per acre, and of rutabaga at 394 bushels per acre. The number of acres is not given in any return I have seen. None of these can be called large crops. In notices of turnip crops and competitions, in the past volumes of the CANADA FARMER, there are instances given of 800 and over 1,000 bushels per acre.

W. R., Cobourg.

Beet Root and Beet Root Sugar

NO. XVII.

In the previous articles I have discussed every plan which I have met with, and in so doing have waded through a large number of publications, and have endeavoured to extract from them and simplify the information they contained, and to bring down the whole into such language as any person of limited education and ordinary capacity could understand. The works at hand, and which have been most carefully read and analysed, are the following:—Ure's Manufactures and Mines; the works of Barachson; John Henderson Porter's; Crooks', the latest full account published; the Patent Office Reports of the United States for 1867 and 1868, which give most of the reports of the Commissioners of the United States sent to Europe to inspect and report on the beet root sugar manufacture; Dr. Voelcker's work on Beet root Distillation and Savalle's Stills for the Manufacture of Spirits; the various numbers of the magazines published in England, and called "The Sugar Cane," and which continually treats on the subject of beet root sugar; the Journal of the Society of Arts, in which the subject has been most exhaustively handled; and in addition, every newspaper attainable in which a paragraph appeared relating to the subject, and they have been not few; and all the information obtained resolves itself into the following facts, which for all practical purposes may be taken as a synopsis of the whole.

First. The growth of the root and the variety to be grown.—The best kind is the White Silesian, with a red, or rather reddish or pink skin, and the interior white. The seed of this should be obtained from Germany or France direct, and from some person who makes the supply of the beet seed a specialty. All the great seedsmen in England, such as Carter, Sutton, and others of equal notoriety and character, may be depended upon, if applied to direct, to furnish reliable seed; and doubtless the same seed can be obtained through any respectable seedsman in Canada, who will undertake to order it from England or Europe. The cost of the seed should not be a consideration—get the best. There is a wonderful difference in the quality of juice between the best and the more ordinary kinds. There are others of the same class: The White Silesian red top; the White Silesian green top; the Beta Imperialis, No. 1 and No. 2; Vilmorine's Improved White, and probably a dozen others; but all the best are believed to be one or other varieties of the White Silesian. This is also the most hardy and the most fit for Canadian growth.

In growing the roots, the land must be as good as possible, but not manured with recent manure. The land should have been thoroughly well manured the previous year.

The better land, the better the beets. Avoid all peaty and boggy soils and new land. Some parties lately tried to grow sugar beets on flat Moss in England. The beets grew well, but contained no sugar. Avoid all salt in the manure, and particularly fresh or leached ashes. The beet root has a special faculty for extracting these substances from the soil, and they are very difficult to get rid of in the juice. At the same time, a proper proportion of these substances in the soil is necessary, but they must not prevail.

Plant thick in the row, so as to have not more than one foot to fourteen inches between the roots; one foot is quite enough for most soils; but have the rows wide enough for a narrow horse hoe. When the beets begin to grow well, they must be gradually earthed up by the double-breasted plough, so as to keep the root covered. The part exposed to the light yields but a small portion of sugar. Keep the weeds well down with the hoe in the rows, and with the horse-hoe between them, until the leaves shade the spaces. The best beet in England have been grown with sewage water, on what without sewage water would be a desert of sand and gravel. This proves that the right kind of manure, and plenty of it, and moisture, are what the plant requires.

Never calculate to grow large roots; but get as many off the land as you can in numbers, provided they are not stunted. Different kinds of land require different manure. Nothing but experience can show exactly what is required.

In getting up the roots be careful not to cut off the lower part of the root, either with the plough or fork; for the lower down you go into ground, the more sugar there is. It has been ascertained by special analysis of a sufficient number of roots to prove the fact that the following is the relative per centage of sugar in different portions of the root, the root being divided into six parts, and beginning at the bottom or tap root :-

The first part contains (according to kind planted) from	
11.062 per cent. of sugar to	9.57 per cent.
The second, 10.734 per cent. of sugar to	8 24 "
The third, 10 500 per cent. of sugar to	8 24 "
The fourth, 8.647 per cent. of sugar to	8 50 "
The fifth, 7 212 per cent. of sugar to	6.02 "
The sixth, 5.230 per cent. of sugar to	6 02 "

Inferior kinds contain less These analyses are by Dr. Voelcker, the best authority in England It will therefore be seen how important it is neither to waste or spoil the bottom or tap-root end of the plant.

If you want your roots to keep well, break off the leaves, but never cut the crown of those roots that are to be stored. Store them so that they can neither heat nor grow;

better too cold than too hot. Growth in the pit or store destroys the sugar. Beet roots protected by earth, and well covered and dry, bear a good deal more frost than people generally suppose could be borne by them.

During the season of growth, keep your beets growing without check. As to the time of sowing, parties differ greatly. When Mr. James Fleming, of Toronto, was in France, enquiring into the matter, the person he consulted recommended late sowing. The Germans advocate early sowing. Possibly the best course lies between the two. Certain it is that if you want sweet and tender table beets, you should sow as late as the first week in June. No doubt a good deal depends on the time you can begin sugar making. In the trials of the American Commissioners, they found that the most sugar per cent. for the weight of the root was yielded in September; but the growth of the roots is considerable after that. The weight of the crop increases, and doubtless the quantity of sugar per acre; but in per cent. for the weight of the root, the sugar is less. Here again, no doubt, the best time for harvesting lies between the two extremes. All agree, however, that roots for keeping should be well ripened before they are dug. Where they are to be worked up at once, their being ripe does not signify. Unripe beets furnish more sugar for weight than ripe and full grown ones; but the latter keep best. The roots may be stored in the house or pitted in the field; but they must neither heat, grow, or dry up and wither. Any plan that keeps them in the freshest and soundest condition is the best

We now come to the manufacturing—and first the grinding.—The various plans for maceration and diffusion which of late have been so successful, prove beyond a doubt that the old and original system of fine grinding and pressing is not the best that can be adopted. But the very fact that either way will work, and work well, is most important, as it leaves so much to circumstances and to common sense; and in this latter article we in Canada, from the necessity of thinking for ourselves, have the advantage of other countries, where everything is bound down and carried on by rule. It may therefore safely be said that the method of grinding may be left to the judgment of the operator. If he grinds with any kind of common rasp rollers or crushers, he must squeeze out the juice in a screw or lever, or roller press; either will get out four-fifths of the juice, and the remainder may be leached out by water. The operator need not be bound down to any system. If he can feed his pressed cake at once, it is perhaps not worth while to waste time and labour over the last drop of juice. What you don't get your cattle do, and beet juice is not like the stippings of a cow—the last the best.

As fast as you get out the juice it should be run off to the defecating vessel or boiler, but if you cannot arrange that owing to any

reason, add a little milk of lime to the juice. It will then keep some time without mischief; without lime it turns black very quickly; but lime stops this and restores the colour. Keep your presses, press cloths, or bags, tubs, vessels, everything, as clean as possible, and wherever anything is likely to get either stale or sour, use lime water and limo wash.

When you get the juice into the defecating vessel, heat it up to 170 or 180 degrees of heat. Let it remain there some little time, and see if the juice breaks—that is, if lime has been added during any part of the process. If no lime has been added, add the milk of lime to the juice, little by little, stirring and mixing it well, and from time to time let it pause until you see if the juice separates from the flocculent matter in the pan, and becomes of a clear amber or white wine colour. If so, you have put in enough lime; if it does not, but looks greenish, or does not separate add more until it gets of the right colour. When this has been done, raise the heat pretty quickly to the boiling point. A thick scum rises, which must be removed with a proper skimmer. Then bring the whole to a boil, and see that you get off all the scum. The juice that you take off with the scum will filter through a flannel bag, leaving the scum, which forms a most valuable manure.

You then proceed to carbonation, will be described in the next article.

NO. XVIII.

We now come to the evaporation, and here our troubles really commence. In grinding and pressing, if we do not grind quite as fine as we ought, and press as close as might be, our cows get the balance that remains in the root; but if we do not evaporate properly, we lose the whole results of our labour. When the juice has been defecated with lime, then carbonated with the bellows and the fumes of burning charcoal, then strained or filtered, and all the chalk and lime taken out of it, it is then in the proper state to reduce to syrup, but it must be perfectly clear and transparent, and will be the colour of Madeira or sherry wine. The boiling this with a portion of bone-black, is supposed, and indeed is positively stated in the works before quoted, to destroy and weaken the brown or yellow colour; but the writer, in his experiments, has not found it produced any very sensible effect. Doubtless, however, he did not go about it in the right way, as bone-black (which is bone charcoal) is a well known destroyer of colour in syrups, and is most extensively used by sugar refiners.

The chief trouble you will find in evaporating, however, is not the colour you will naturally have in the juice, but the colour you will make in it by burning it, sensibly or insensibly, and the colour which all vege-

table liquids seem naturally to acquire from long boiling, particularly when boiled with lime.

There are several ways of evaporating; indeed, as many as there seem to be of doing everything else relating to beet root sugar, and each plan by its *professor* is pronounced to be the *only one*; but the fact that more than one plan will answer is the best proof that the manufacture is not beyond Canadian intelligence and ingenuity.

I shall now proceed to describe in general terms these plans, merely remarking that the plan which affords the quickest means of getting rid of the superfluous water is the best, for longer boiling than is necessary is extremely injurious.

The first plan is that of the ordinary boilers or kettles, either deep or shallow, set in such a way that the fire does not act too strongly on them, so as to burn the juice. These vessels may be of any shape or size, according to the taste or means of the owner; but when he uses them he must be especially careful against burning, or browning the juice and syrup, as beet root juice burns and browns much more readily than maple sap.

The second, and perhaps the best for ordinary use, is a broad, flat pan, so stiffened and strengthened as to admit of its being rocked backwards and forwards (or rather up and down), with a considerable amount of liquid in it. This should be balanced on a centre cross bar, with bearings, and should be constructed in such a way as to admit of the ends being raised and depressed from two to four inches, according to the length of the pan. The fire is lighted directly under the pan, and the brick-work sides are so arranged as to leave the working of the pan up and down free from undue friction, but still enough to keep out the cold draft of air down by the sides, and the smoke from coming up. The draught of the chimney will, however, in a great measure, prevent this. The juice is put into this pan, and made to boil. As soon as it does, or is hot enough, the pan is raised and depressed slowly, so as to allow the contents to flow backwards and forwards over the surface of the iron. It must, however, be done so carefully as not to make the liquid rush over the ends of the pan. The evaporating power of this pan is very great, many times that of ordinary kettles, and as the contents are kept moving over the surface of the metal bottom, no burning occurs. In this vessel the juice may be evaporated down to the thickness of medium molasses; and after that, it should be evaporated still further in a double pan, the outside one being filled with water, or steam, and the syrup being in the inside one.

The third system of evaporation is the concretor, which has been described before, but which is lately made with some modifications.

The concretor system is entirely based on

the fact that a hot blast of air, driven over the surface of the liquor to be evaporated, evaporates the water at a rate infinitely faster than heat applied *under* the liquid, and that when the under heat and the hot blast are combined, evaporation proceeds with marvellous rapidity. It is for this reason that the concretor is generally made in two parts, the tray and the cylinder, (the third part or drum will never be required in Canada, until exportation of the concreted juice takes place). The tray is used for bringing the juice to the boiling point as soon as possible, and partly to evaporate it, and this it does in its passage backwards and forwards down the channels formed for it; it is then run into the cylinder, which is made to revolve slowly, in such a manner as constantly to expose fresh surfaces of the syrup to the action of the air; and *through* this cylinder a hot blast of air is continually forced by a fan, which is driven by machinery. The air is heated in a chamber either formed round the iron chimney of the apparatus, or steam engine, or by convoluted stove-pipes in a chamber, or in any other way; and it is a singular fact that however hot you make the air, it never burns the syrup. The watery particles of juice splashing through the cylinder, and the steam evolved from them, carry off all the extra heat, and the cylinder is now constantly used instead of the vacuum pan. In the first concretors the cylinder was plain and smooth inside, and the evaporation depended on the thin pellicle of juice that was carried up by the surface in the revolutions of the instrument. Now, the plan is carried further, and projections are made in the inside of the cylinder, which carry up the juice and syrup, and then drop it in a continuous shower through the moving hot current of air which is passing through it; thus each drop of the fluid is exposed on all its sides, and evaporation progresses most rapidly.

These cylinders are worked in two ways. In one a continual flow takes place, and there is a constant discharge of the concreted juice. In the other, the work is done by charges; a certain quantity being let into the cylinder, and which is then revolved until the evaporation is sufficient, when the contents are discharged at the lower end by depressing the cylinder. The cylinders are also worked with outside heat, as well as with the hot blast going through them, and with the hot blast alone. In this way the beet juice is brought to a thick brown syrup, which will keep for any length of time, and is in the proper state to be submitted to the skill of the refiner.

The price this syrup will bring will be entirely governed by its purity. If it is from well grown beets, is free from lime, or chalk, and has had the salts taken out of it by the "Osmose" process, it will bring the best price; every per centage of impurity will have the effect of lowering the value most materially.

VECTIS.

Our Roads.

BY ALAN MACDOUGALL, C. E.

As clay roads must always be looked upon as merely "temporary concerns," the first step as it were towards the more permanent institution, the gravel or macadamized road, it was not necessary to say so much when treating of them regarding the cutting of side ditches, drains in the road bed, &c., as it will be necessary to say now that permanent roads are being treated. As has been already stated, the width of the road should be 25 feet, and the metalled surface 20 or 22; this distance of 25 feet is ample on embankments, but for all cuttings where they are not too deep, or of too great an extent, the breadth should be increased so as to allow a small side ditch on each side at the foot of the slope, to catch any water coming down the slope, and coming off the road bed. These ditches need not be wider than 1 ft 6 in., or 2 feet, and about 12 or 15 inches deep. In all wet places in cuttings, and in long banks or cuttings, top drains should be cut to let off any spring water that may be found, or any surface water that is likely to be troublesome. These drains should be made about 9 or 12 inches square, either of wood or stone, or even tile pipes, if they can be got, can be advantageously used; they should be put down about 3 feet, so as to be out of the way of the frost, and should connect with the surface with proper eyes or traps.

The back slopes of the cuttings and the side slopes of the embankments, should be protected either by a few drains placed in them or by having a light coating of soil thrown over them, so as to form a ground for a sward. Ill weeds grow apace, says the proverb, and every farmer knows how difficult it is to keep his fields clear from weeds, so that there would be no difficulty in inducing a crop of grass and rough weeds to coat the sides of a road slope, were only a little soil put on the slopes to attract vegetation.

There are several matters of equally great importance in road making to those already noticed connected with the maintenance of roads, which will be taken up in future articles.

The editor of the *Gardener's Monthly* says that the Honey Locust is an admirable hedge plant for cold climates, and is far better than any other plant where the soil is poor and thin. There is one great advantage which it possesses over other plants. The Osage Orange, for instance, has thorns on its young growth, and that is the end of them; but thorns come out of the old wood of the locust and continue to come out year after year, branching and growing simply as thorns, and nothing will dare go through a hedge of this plant, even although there should be a tolerably large gap invitingly open.

Carrots on New Land.

Many people would like to grow one or two acres of carrots, if it were not for the difficulty of singling them out and constantly weeding the rows; *between the rows* no difficulty exists, for horse hoeing can be as easily applied as to any other crop. I have long since stopped clearing up new land; but many people have not, and to them I now address myself. Some years since I had determined to grow some carrots, and as weeding and thinning the rows was specially objectionable to me on account of so much stooping, I determined to try new land for them. I argued that turnips always produced well under these circumstances, and if I could get sufficient clay soil, mixed with the leaf mould, to prevent the carrot seed perishing by the hot sun *after germination*, this plan would answer well. An ingenious friend constructed a cultivator—we called it the forest cultivator—which worked to perfection amongst stumps and roots, even on quite new land, mixing up the soil to about 6 inches deep with the leaf mould, and preparing a beautiful seed bed. Moreover, I thought with the help of this implement I could get in the carrots much earlier than turnips could, with safety from the fly, be sown; and also I was well aware that carrots would do well if sown in almost peat muck, whereas turnips would often fail under such treatment. I had such a piece of black ash swale, well drained by surface drains, but still naturally wet and low. In the fall, when this land was well prepared and dry, I passed the cultivator over it once each way, the last crossing the first, and it then resembled a black bed of ashes. The seed was sown about the week in May, and soon came up, and showed an even plant, about 6 inches apart each way, although some were much closer. My neighbours who saw them so close said they would never come to anything; but I had some experience in thick sown carrots on such land, and allowed them to remain as they were. At harvest the crop was very good, and quite easily gathered in. Having sown the White Belgian variety of seed, the roots in many cases projected four inches out of the earth, and seemed rather to evince a disinclination to go deeper into it than about 8 inches. The roots individually were not large, but the crop as a whole was heavy, and quite satisfied me of the advisability of growing carrots on new land, especially where this cultivator is used. Without it I am afraid the young seed, when first germinating, might perish.

As to thick or thin sowing of carrots, I never tried any kind so thick as I have the "Early Horn" variety. These I have sown so thick for many years that the rows of carrots were nearly solid, and each root touching the other so closely that you could scarcely put your finger between them. When first drilled in, the rows are almost a foot apart,

but at harvest they have so spread out sideways that each row of solid carrots is often 4 to 6 inches wide, leaving only about 6 inches of space *between the roots*. The roots thus grown are short and small, about as large as a kidney fluke or "lady's finger" potato; but I have weighed from good land and in favourable spots 1,800 bushels (of 50 lbs. each) to the acre. We never use any tools to dig these short carrots; grasping a handful of the greens in the hands is sufficient to draw them from the earth. An ordinary rake will often do well. If the greens are fed off with sheep *first*, the carrots are ready to house or pit as soon as pulled or raked out of the ground.

Many years since, in the township of King, I saw a farmer pulling up a field of white Belgian carrots, grown in fat, black, mucky soil; very deep it was, I recollect, and plenty of carrots were 18 inches long, and as large as a man's wrist, and many much larger. They grew, like mine, about 6 to 7 inches out of the earth, and were so clean and free from small fibrous roots that the owner often pulled up ten at a time, one bunch in each hand as he went along. The heaps (green and all) where the crop was heaviest, looked like hay-cocks almost. I should think there must have been upwards of 1,000 bushels an acre; but I think, nevertheless, a larger crop of early horn can be raised than any other variety.

C.

Influence of Potato Seed.

A correspondent inquires—"What is your opinion on the influence of cut and uncut potatoes for seed, and on small and large ones? There are many contradictory statements in the papers?"

The contradictory statements are owing to the varying circumstances under which the experiments are made, without a sufficient repetition of them. Conclusions are drawn from too few tests. A single experiment will not do for the basis of a theory.

If the soil is sufficiently moist when potatoes are planted, cutting is an advantage. It reduces the number of stalks, gives fewer new potatoes, and, as a necessary consequence, allows those few to grow larger and develop themselves better than when they are numerous in the hill, resulting from many stalks from all the eyes of a whole potato. But even here there is a considerable difference with different varieties—some potatoes growing thicker and more numerous in the hill than others.

If the soil and season happen to be quite dry, the cut pieces dry up rapidly, lessen the supply of food to the young and growing sprouts, and the plants are enfeebled. In such cases the crop will often succeed better by planting whole potatoes, the skin of which being nearly impervious to moisture, keeps them plump for a long time. If potatoes are planted early in the spring, when the soil is nearly always quite moist, and remains so for some weeks, there can be no objection to

cutting potatoes into pieces before planting, and the crop will be likely to be better and the tubers more uniformly large.

There is much diversity of opinion relative to the value of small potatoes. They are not usually so successful as large ones. But the wrong reason is assigned. It is said that "like begets like," and that, therefore, small potatoes tend to produce small ones. This would be true if true seed from flowers, instead of portions of the root or stem, were employed. We might as well say that grafts cut from a large tree would produce larger fruit than others, or that planting large trees from the nursery rows would give orchard trees of greater size. The truth is, the tubers of potatoes are essentially underground stems, and the eyes are the buds. We could no more expect to get larger trees by using large buds than larger potatoes by planting large tubers. Nevertheless, we find by experiment that large potatoes give the heaviest crops. What is the reason? Simply this, that the large tubers give a greater supply of nutriment to the young sprouts, just in the same way that in a moist soil they will do better than in dry hot ground. In repeated trials with potatoes not over an inch long, cut into as many pieces as those four inches long, no perceptible difference was observed in the size of the tubers produced from both; but on careful weighing, the large seed was found to yield about one-eighth more on an average. This difference was undoubtedly owing to the earlier and more vigorous start from the large seed, and to the continued supplies of nourishment, and not from any inherent change, as of "like producing like." The planting of the potatoes in these experiments was done in fine mellow, moist soil, and early in the season; had it been late, or in a dry or parched soil, it is probable that the small potatoes would have yielded nothing.

It is well known that some varieties deteriorate in successive years in particular soils, so that the magnitude of the crop is gradually diminished. It would be interesting to determine by a long series of trials whether the constitutional weakness is affected by selecting the largest seed only, on the one hand, and small seed from poor crops on the other. Several years would be required to determine such questions, under different circumstances, side by side.—*Cultivator*.

Thorough Culture.

A correspondent of the Germantown *Telegraph* writes:—

"Thorough culture and high manuring are essential to profitable farming, and this is the right mode of farming. If ten acres of land can be made to produce twenty tons of hay, is it not better than to cultivate twenty acres for the same amount? It is less labour to get twenty tons of hay from ten than twenty acres.

"Supposing you are growing 25 bushels of shelled corn per acre. You can, by applying more manure, with thorough cultivation, get 50 bushels of corn. This might be increased to 75 or 100 bushels per acre. What is there to prevent? You can easily test this. Select a small piece of land in your corn-field; plough it a few inches deeper than heretofore, manure the ground

thoroughly, at the rate of twenty cords per acre; plant good seed, then keep out every weed, and the result will astound you. Gardeners understand this principle, and they plough nearly two feet deep and apply thirty cords per acre, besides using large quantities of commercial manures. For many garden crops the surface of the ground two inches deep should be one fourth manure. In this way, by keeping the ground moist, lettuce can be grown that is tender, large and nice, and so of other crops.

"The fact is we cultivate too much land. Says one, 'I have so much land, and must cultivate it all. What would you have me do with it; give it away? Better give it away than to half cultivate it. Let it grow up to wood or use it for pasturage. Sell it. Perhaps that would be the best plan; take the money and improve the rest of the farm. A farmer has 100 acres in his farm, and he keeps as much stock and cuts as much hay and raises as much produce as the farmer who has 200 acres. Which therefore is the best farm—the smallest or the largest? I think you will see at a glance that the smallest farm is the best. I don't say but what the larger farm can be made as productive as the smaller, acre for acre; but this is not often the case. One man from an acre of strawberries will get from \$500 to \$1,200; while another man will work over a large farm and get only this amount. Use brains; these, if rightly applied, will give large crops from a small amount of land."

Silver Beet for Ploughing Under.

Some months since the writer stated in the CANADA FARMER that a certain course of experiments were in progress practically to test the value of the Silver Beet as a manurial crop for ploughing under. So far as he has yet gone he has every reason to be more than satisfied with the result. The roots were grown, and the leaves allowed to retain their full growth, and to decay by being ploughed under; but the great difficulty and barrier hitherto to its general use consisted in the expense of the seed. I have this year quite a number of roots that have wintered safely over by being covered up as they grew, and are now springing beautifully, and so far likely to bear any quantity of seed; and a friend has tried the same experiment on a small scale. If this one great difficulty should be swept away, and the seed found to be as easily produced as any other, (of which I have at present not the most remote doubt), this plant is destined probably to furnish all the elements of renewal of fertility to our impoverished lands. The quantity of green stuff on an acre is immense, and this, with the rapid growth, forms a most valuable means of procuring green manure at a minimum cost. I would most certainly strongly urge on any farmer who can attend to it, testing the utility of this plant for himself. Let me proceed, for the guidance of any who wish to prove it, to give a brief description of the plant, its growth, and cultivation, according to my own experience. The great advantage over other roots for the same pur-

pose consists in not wanting any hoeing or thinning out. After the first crop of weeds is checked by cultivation, the rapid growth of the greens will smother all weeds.

On or about the first week in June I sowed some Silver Beet seed; the land was not poor, nor was it rich; it was a sandy loam, light soil; the seed was scattered thinly in rows, about 12 inches apart. The plants did not appear for upwards of two weeks, the weather being very dry. When they did come up they grew rapidly, and after once hoeing between the drills the plants soon smothered all but the largest weeds, whose habit of growth caused them to outstrip the beets, and ultimately to reach twenty inches and upwards above them. These large weeds were then pulled out, but not before it became quite evident that the beets could hold their own against them. The mass of green forage that these beets threw up was very great, far in excess of the mangels, as the plants stood touching each other, and sometimes two side by side in the row. The crowding together did not seem to impede their growth to any extent, as certainly would have been the case had they been mangels. In about eight weeks the plants had attained a large growth of top, and in three months there was a perfect mass of succulent vegetation. At the expiration of two months the crop could have been ploughed under with every advantage as a manure.

The roots are more like roots of trees than mangels, there being no bulbous root proper, as with mangels or turnips, but a mass of fibrous roots emanating from a bulb, like a poor small beet root, but not edible for cattle in any way. Two years since I grew some of this plant, probably about twenty roots, and left them in the ground all winter. In the spring there was a perfect mass of rotten leaves, and each mass of roots occupying a space of about 5 by 5, and 10 inches deep, was at that time in a perfect state of decay and vegetable manure. I sowed the second crop directly where the first rotted down, and this may in part account for the rapid growth of the second, although not altogether so, as the first crop grown was nearly as fine, and it laboured under many disadvantages that the second did not. When winter frosts set in last fall I covered up the roots (greens and all as they were growing) with rubbish, and over that about six inches of earth. When uncovered in the spring, almost all were in good order and growing, some few partially rotten, and were throwing out sprouts from the sides. My object was to show that the seed could be saved at a minimum cost of labour, and therefore I wished to avoid harvesting the roots in any other way than as described.

I shall continue some occasional allusions to the details of the growth of these plants, and at harvest will distribute the seed gratis to any one wishing to sow it. I would meantime advise any one to procure an ounce or so and experiment for themselves.

C.

As an instance of the rapid reproduction of timber on Maine land, Mr. Hobson, of Saco, who has been extensively engaged in lumbering operations for years, states, as the Bangor *Whig* reports, that many years ago he cut from 60 acres of land in York county 400,000 feet of lumber—cutting down to twelve inches on the stump. Eighteen years afterwards he cut on the same land 565,000 feet more—cutting down to the same size as before—which had grown up in the interim.

Winter-killed Wheat.

We learn from an esteemed correspondent that, contrary to ordinary experience, winter wheat, where it has been killed out, stood on high places; low ground has, during the past season, proved the safest. The same correspondent dissents from the opinion expressed by a writer in this journal that shallow ploughing was one prolific cause of winter killing, and that the opposite practice of deep ploughing was a preventive of the accident. He says:—"Though as much in favour of deep ploughing as any one, I do not think that it will in the least prevent wheat from being winter-killed. I have sub-soiled land for wheat, and have seen no difference, as far as killing goes, between that and common ploughing. It is mostly in spring that wheat is killed. I think that if a sharp frost comes after the ground has thawed out an inch or two, the frost heaves the soft ground, and as the roots of the wheat are held firm by the old frost below, the roots break off between the new and the old frost, and the plant is killed. The shorter way the frost is out, if just sufficient to allow the plant to heave and break the roots, the greater I think the danger, as then the roots that spread near the surface are hurt as well as the tap roots."

Sagging of Posts.

Every farmer in the country has witnessed the inconvenience of a sagging gate. New ones are well constructed and well secured to firmly-set posts, by stout hinges, and the owner promises himself much satisfaction from these convenient and permanent entrances to his yards and fields. All goes well the first summer; but he finds after the next spring that the latch strikes too low, and will not catch the socket. The soft earth has given a little, and the constant pressure of the heavy gate has caused the post to yield, a hair's breadth at a time, till it has varied a little from the true perpendicular. Being now left unfastened, it beats against the post, and the latch is broken. The subsequent hard usage it receives makes the post settle always still more. Subsequently the gate rests on the ground, over which it is laboriously dragged day after day, and year after year, until the hinges are broken. Of several modes to remedy this evil we prefer the following:—Take two pieces of durable timber, short posts, or an oak or chestnut rail sawed in two, and place the ends against the posts on opposite sides, one a foot lower than the other beneath the surface, beating the earth firmly about them. If only three or four feet long, they can never be moved a hair's breadth by sliding endwise in the soil, when firmly placed. Some would prefer to place them across the post, but this is quite a mistake, as the earth will thus yield by hard and continued pressure; while no practicable force could move them in the slightest degree endwise. It often happens that such pieces of durable timber are found on every farm, and a moderate degree of labour will cut a short deep trench on the outer side, and a shallow one on the inner, and firmly place them in position.—*Michigan Farmer.*

Influence of Trees on Health.

The effect of trees on climate has often been brought before the notice of our readers. They exert also a material influence on health in various ways; and this view of the subject has been recently well treated in a pamphlet by Dr. John Ranch, of Chicago, on the effects of Public Parks upon the moral, physical and sanitary condition of the inhabitants of large cities. It abounds in facts, not only those which have come under the observation of the author, during many years' practice, but gleaned from home and foreign sources of high authority, which prove the advantage and benefit of maintaining public parks in all large centres of population. The influence of vegetation, particularly trees, upon health, is treated at considerable length, and numerous examples are given which show that the cutting away of forests and belts of trees has been immediately followed by the prevalence of fevers and other diseases, and also showing the protection which trees afford against the effects of malaria, &c. Among these illustrations are the following:—Dr. Hosack, in his "Practice of Medicine," states that a family in New Jersey was attacked with fever in consequence of cutting down a wood that separated them from a morass in the neighbourhood; before the operation they had been healthy. Whole families have resided near the Pontine marshes near Rome, and by the intervention of shrubs and trees, have escaped for years the noxious effects of the mephitic vapour which the putrid waters of the swamps engender. In the summer of 1852, the trees on the high bluff in the northern part of Burlington, Iowa, were cut down. It was not until the months of August, September and October, of the following year, that any apparent effect of this destruction of trees took place, when nearly all who lived in that portion of the city suffered with fevers, and several of them died. Much of the sickness of the Army of the Potomac in the summer, autumn and winter of 1861, while encamped near Washington, was the result of the destruction of the trees for purposes of defence, as a military necessity, and for the use of troops. The same result was also strikingly illustrated at Port Hudson and in Louisiana.

The leaves of plants and of trees, as well as the green substances that cover the soil, are all inexhaustible sources of oxygen, which is so important to sustain life and health; and M. Carriere, in a work on the climate of Italy; says:—"To cover the fields, the edges of marshes, and the whole extent of soil with an abundant vegetation, is equal to placing on the surface of unhealthy regions a vapor-ative apparatus of the greatest power." Trees, therefore, must have a large share in the amelioration of the country in consequence of the quantity of leaves they furnish. Trees may be regarded as so many pipes for conveying heat from the earth to the air in winter, and from the air to the

earth in the summer; and this effect in modifying the range of temperature is very significant. Facts show that during the winter a far greater amount of fuel is consumed by a locomotive running through a prairie region, than through one that is densely wooded. Trees and plants exercise a marked influence on the humidity of the air, causing its moisture to be more equally distributed; and Dr. Ranch is also of opinion that the terrific tornadoes which were so common throughout the northwest several years ago, were owing to the treeless prairies of that region. He says:—"It is a well established fact that the climate of the older States has undergone a marked change in consequence of the destruction of the forests, viz: in the greater extremes of heat and cold, and in the perennial flow of the springs. It has also been observed in Sweden that the spring, in many districts where the forests have been cleared off, now comes on a fortnight later than in the last century. This is manifest in its influence on man, in the altered character of the diseases, and also by the fact that many manufacturing establishments, which, a quarter of a century ago, had a water-power ample at all seasons to drive their machinery, are now compelled to resort, during the summer months, to the auxiliary aid of the steam engine."

We commend this important subject to the careful study of every man whose fortune it is to own, cut down or plant trees; to every community considering the question, "Shall we have a park?" and to every farmer who has a home to beautify and render healthy.

Utilizing Wet Lands.

My experience in improving wet black ash swaly lands has been quite extensive, and when clearing up our farm I early came to the conclusion that it was bad policy to allow wet places and swamp holes to disfigure the land. Unfortunately, there were several of these places to be contended with, as the position or "lay" of the land caused five or six extensive swales to discharge their surplus water over our farm. The water did not come all at once, or at any particular time. The heavy spring thaws and freshets of course quite inundated us whilst they lasted; but the great evil was the continual soakage all the summer long from the higher level above and across our farm. All these investigations were made, and the remedy prepared before commencing clearing. Afterwards the difficulties would have been much increased and the cost certainly greater. This may seem strange to some, but it is nevertheless true; and the remedy applied before clearing was to dig a drain following the swales all through the farm, wherever such spots and swales were felt to be a nuisance.

I provided a spade, strong, and ground to almost a chisel's edge. An active Irishman

took the contract, to dig the drains at 25 cents a rod. The spade being ground sharp, and used by a man who understood the use of such, was easily driven through the soft spongy roots of black ash, and the man who contracted for the work averaged about \$1 50 a day, wages. In this first trial and contract the drains were dug too deep, and not wide enough. Subsequently I amended this, and found that a drain 3 feet wide at top, 12 inches at bottom, and 18 inches deep, was a much better size than the one we dug, which was 2½ feet wide, 2½ feet deep, and 12 inches wide at the bottom. Eighteen inches is quite sufficiently deep for any drain through swaly new land. If deeper, the frost founders the sides in, and cattle also destroy it, broaching the sides with their feet, so that it in reality soon becomes what it ought to have been in the first place, a depression in the ground, about 18 inches deep and 3 feet wide. If the digging of drains is delayed until after the land is cleared, the difficulties of clearing the land are much increased. The burning also of such swamp timber, when fallen into mire, is almost impossible, and the logging is also greatly impeded by having to be done in mud and water. When the drain is completed before chopping and clearing, it is manifestly as easily and cheaply done as afterwards, and all subsequent work is performed dry and comfortably, instead of in a perfect mess.

So successful did I find this draining system to be, when conducted as above described, that if I was going to buy and clear up a new farm again, I would from choice select a black ash swaly tract of land, provided it could be drained. This quality of land is much more enduring in its fertility, and quite as good for grain, when drained, and far better for grass. C.

HOW TO IMPROVE SANDY SOIL.—About twenty-five years since I came into possession of about nine acres of thin, sandy land. There had been, within say three or four years previous, two crops of corn taken from it that did not exceed ten bushels per acre. I had it ploughed deeply, and sowed heavily to oats. As soon as they began to ripen we ploughed them in, and applied about 70 bushels of lime-kiln ashes to the acre; we then seeded it with rye, and also sowed clover and timothy. We cut a splendid crop of rye, and for several years mowed a good swath of grass, since which we have kept up a rotation of corn, then wheat or rye, followed by grass which has been either mowed or pastured; two of the years potatoes have taken the place of corn. The corn has averaged from 50 to 60 bushels per acre of shelled corn, and the other crops have been above the average of the balance of a good farm. We have put little if any manure upon it, except a moderate amount with potatoes. I may add that a large portion of this lot is so sandy that it does well for building purposes.—Cor. Country Gentleman.

Advantages of Draining.

In a recent course of lectures delivered in Pekin, Illinois, by the regent of the University, Dr. Gregory, we find the following, as given by the *Prairie Farmer*:—

In the evening, Prof. Shattuck lectured on draining. He said the advantages of draining consist not only in removing water from the surface of grounds, but to a considerable depth below, so that the air and other elements may be more freely admitted through the soil, by which means it became better pulverized and prepared to feed and sustain growing plants. When thorough draining was effected to the depth of three or four feet, an increase of heat, often as much as fifteen degrees, would be secured. On such grounds the combined action of sunlight and greater porosity of soil will cause them to yield three inches in dew, thereby, to a considerable extent, protecting plants during protracted drought, as well as from an excess of water after heavy rains.

The increased warmth, just mentioned, would often prove sufficient after corn is planted, to insure germination, for corn would germinate in a well drained soil at fifty-five, while in a similar soil, undrained, the temperature might remain below forty-five, when the corn would soon rot. By raising the temperature, then, ten degrees, which would be the sure result in wet soils after draining, whole fields of early planted crops might be saved, which otherwise would be lost.

It was further argued that when crops appeared uneven in different parts of the field or dry up and shrivel in a moderate drought, it indicated lack of drainage. The theory was also advanced that underdrainage increases the healthfulness of our homes and greatly lessens the attacks of ague and malarious diseases; that it has been ascertained by carefully collected statistics that consumption decreases two-thirds by a thorough and systematic drainage of country formerly wet.

The cost of draining an acre with two-inch tile put down four feet deep in ditches forty feet apart, will be about fifty dollars. Would use three, four, or even larger tile, according to the quantity of water to be conveyed away. Two-inch tile laid four feet deep and forty feet apart, in a ditch one hundred and thirty-two rods long, would be ample to carry off all excess from subsoils not springy. Round tiles are best, because of the greater ease in laying and making better joints.

SEASONING OF WOOD.—A writer in an English journal informs us that small pieces of non-resinous wood can be seasoned perfectly by boiling four or five hours—the process taking the sap out of the wood, which shrinks nearly one-tenth in the operation. The same writer states that trees felled in full leaf, in June or July, and allowed to lie until every leaf has fallen, will then be nearly dry, as the leaves will not drop of themselves until they have drawn up and exhausted all the sap of the tree. The time required is from a month to six weeks, according to the dryness or wetness of the weather. The floor of a mill laid with poplar so treated, and cut up and put in place in less than a month after the leaves fell, has never shown the slightest shrinkage.

The Question of Weeds.

Every good farmer knows that to insure satisfactory crops his land must be cultivated in the best manner, and if it is so cultivated few weeds will be found upon it. Sometimes, even upon well managed farms, a field here and there, owing to adverse weather, a shortness of hands, or a rush of work generally, may be neglected for a few days and the weeds may get a start, but this happens rarely, and an observing man can always judge of the character of a farmer by glancing his eye over his premises. If the weeds are not to be regularly and systematically destroyed, the idea of conducting agricultural operations profitably may as well be abandoned, for the one is incompatible with the other.

And even this is more pointedly so with the garden. Weeds and a garden crop are as antagonistic as life and death. They cannot stand upon the same platform. One must be master, and it is for the owner to say which. If a garden is systematically worked—and without system no garden is worth having—the labour of keeping down the weeds is reduced one-half. But let them once get ahead, and they may be fought all summer, and prove victorious in the end.

Again, let no weeds go to seed; and do not throw into the public highway such as do, to be washed down upon the land of your neighbour.

Pasture Land.

A correspondent in the *Country Gentleman* has a sensible article on the proper treatment of pasture lands, and the following extract may be read with advantage by some of our Canadian farmers:—

Our experience in this matter has been less limited than that of many, and we have found the less pasture land the better; and that forty head of stock can be kept on twenty acres quite as well as on eighty, simply by growing plenty of green fodder, instead of relying upon common pasturage. But then if pasturage is desired, why not prepare the land for it as for other crops? If we want fodder for winter, we do not expect to get the same of such character as will suit us, unless we take pains to break up the soil and outroot the noxious weeds, and seed it down with good plant seed. Now, why not follow this eminently reasonable plan to get a good pasturage? I know some writers, and of high authority on some agricultural topics, are quite in favour of letting the land lie in its original state, and simply top-dress annually to get the natural grasses to grow luxuriantly, and among these the late and lamented R. L. Allen; yet it is hardly as good logic as we like to see, and therefore sooner recommend the plan of breaking up the land by a years fallowing, and sow the same with a heavy seeding of a large variety of grasses. But then we suppose some will say this is too expensive; for it costs something to fallow, as well as for a heavy seeding. This reasoning is not good, for it can be applied to mowing meadow with like

effect. We hold it to be an evident truth, that to make a good meadow is the same thing as to make a good pasturage—you want the same conditions, and almost the same grasses.

A pasture field may be a little rougher than is fit for mowing, but it ought to be about as rich in fertility of soil, and about as clean of noxious weeds. If in England they can pasture three or four times the number of stock on a given area of land that we do; so in England do they give much more care to their pasture lands. If they let them lie unbroken for many years, so do they also many of their mowing lands.

We claim that a good sward is of no small worth to turn under, and that after land is tilled successively for some years, it is good policy to turn it into meadow or pasturage in order that it may be regenerated in some measure; and to do this we need to change our pastures to tillable land. Our proposition is to break up our wild pastures, and to seed them down carefully, and to give them a good start each spring, and to profit thereby.

Potash and Potatoes.

We all know, who have read the results of analysis, that the ashes of a burned potato are about half potash, consequently, when all the soluble potash in the soil is exhausted by cropping, it must be supplemented by vegetable manure rich in potash, or by the application of the muriate or nitrate of potash from the dry-salters, as it is impossible for the roots of the potato plant to extract soluble potash from the insoluble granitic silicates of the stones in the soil, sufficient for the growth of the tubers.

In England, where the farmers are tenants, with a heavy rent to pay, they cannot afford to be ignorant of the right application of both special and stall manures as required by their different crops. Hence, the farmer who has little vegetable manure will apply that little to his potato crop, for its potash, or he will supply muriate of potash in its place, and perhaps Peruvian guano, to supply phosphate of lime and ammonia for a full crop. An experimental farmer, no longer ago than last month, writes to the *Mark Lane Express* thus:—"Though abundance of experiments upon phosphatic and nitrogenous manures are extant in our agricultural books, those upon potash are few, and not readily found. Having tried it very thoroughly on potatoes, I send you some particular results, which will, I hope, prove useful to some of your readers who are about to grow potatoes."

Here follow the details of thirteen experiments in which the muriate of potash is generally used with other manures, occupying too much space for the limits of this article; suffice it to say that 4 cwt. of muriate of potash, with 4 cwt. superphosphate, applied to an acre of land, produced 7 tons 6 cwt. and

89 lbs. of potatoes. On another acre, 15 tons of farm-yard manure produced but 111 lbs. more, while another acre, manured with 4 cwt. superphosphate and 4 cwt. salt, produced the first year 6 tons 16 cwt., and the next year but 4 tons 7 cwt., with the same manure and no potash. The writer says: "I have tried the effect of potash manure upon grains and grasses, and cannot advise their application to the grains as a profitable investment. Upon a clover crop the effect of potash is very marked, and when applied in moderate quantity, say under 20s. cost per acre, will generally prove profitable, if quality is wanted; but where a great weight of rye grass is wanted, the addition of potash to the manure is not profitable, though the quality is improved. It has also shown profitable results when applied to the turnips."

He also says:—"As the practical results of very numerous experiments, I recommend for potatoes, per acre, superphosphate of lime, 6½ cwt.; muriate of potash, 3 cwt.; sulphate of ammonia, 2½ cwt. This will be found for potatoes much better and safer, as regards disease, than farm-yard manure; and if the latter is valued at 8s. per ton on the field, the above mixture will be found also cheaper, even taking into consideration the after-effect of farm yard manure."—*Boston Weekly Spectator.*

Fints to Root Growers.

Work your root land as early as possible.

If you intend to use manure in the spring on root land, draw out as early as possible, spread and plough in so that the weed seeds will start.

You will thus be able to fallow your land before June and July.

The great secrets of successful root growing are—thorough pulverization of the soil, and perpetual warfare upon all noxious plants.

Have the land clean before planting time, and it will be a very slight matter to raise a good crop of roots.

Joseph Harris says a field he top-drained last winter, kept green during the whole summer, while other grass land was completely burned up. It produces more grass, at the time most needed, than double the number of acres of any of his other pastures

CORN IN DROUGHT.—A correspondent of an Australian newspaper makes the following suggestions in regard to raising corn in times of drought. At times the weather is so parching at the period the corn is coming into flower, that the pollen of the tassel is not in condition to fulfil its office, and many stalks are left barren. I am certain that barren corn results from scarcity of pollen, and it can be easily observed if the weather is dry when the corn comes into flower. To prevent mishaps of that kind, I would make every third row about a foot wider than usual, or about five feet wide, and when the corn is about a foot high, and has been hoed a second or third time, I would plant seed in this wide row; plant it close, and if the pollen falls in the first planted corn, the second may come to the rescue, and make a crop, when otherwise there might be none.

Stock Department.

Cost of Feeding Stock, &c

"Enquirer" sends us several questions, which we shall endeavour to answer by our experience.

With regard to those questions which refer to the feeding of stock, it must be borne in mind that much depends upon regularity of feeding, warmth, cleanliness, and good ventilation. Indeed if these points be not most carefully attended to, amounts of food will vary very greatly in their effects upon all live stock. Moreover, the various qualities of stock differ greatly in their tendency to put on fat.

1st. Does it pay to drain thoroughly land worth only \$20 or \$25 per acre?

This question is too comprehensive to answer generally. We must know certain conditions with respect to such land before we can give any definite opinion. Like the Scotch peasant, we must answer this question by a few queries of our own. Is the land stumpy or well cleared? level or hilly? What is the nature of the soil and sub-soil? What drainage materials are at hand? Upon the general statement that the land is worth so much an acre, we could not commit ourselves to an answer.

2. How many bushels of turnips does it take under fair circumstances to put on 100 lbs. of beef or mutton? Does it need as much in proportion as the animal advances in weight?

We must again take exception to the general term "under fair circumstances." If the animal be young, and has been put into the stall in good condition, it is generally assumed that about 1,600 lbs. of clover hay will put on 100 lbs. of beef and fat. Animals, however, thrive better on a mixture of food, and therefore we generally reduce the hay and replace it by Swede turnips and some grain.

In feeding hay not less than 10 lbs a day should be given; this quantity at least is absolutely necessary to correct the laxative effect of roots upon the bowels.

Now for fattening purposes—
 6 lbs. Swedes is equivalent to 1 lb of sound hay
 .20 lbs. Chopped peas or barley is equivalent to 1 " "
 1.50 lbs. Straw is equivalent to 1 " "
 Therefore if we feed—
 90 lbs. or 1½ bus. Swedes, per day, we equal ... 15 lbs of hay.
 7 lbs. Chopped peas or barley will equal 35 " "
 30 lbs. Hay will equal 30 " "
 —————
 80

To feed 1,600 lbs of hay its equivalent will then take 1,600 ÷ 80, or 20 days.

To put on 100 lbs. of beef will therefore require—

630 lbs. hay, (by Toronto markets for 1870), worth \$5 per ton at barn.. \$1 50
 31 bushels turnips at 6 cents at barn 1 86
 147 lbs. chopped grain at \$1 per cwt.. 1 47

Total \$4 83

After the first 100 cwt. of beef has been put on, we may assume that the next two hundred will cost say \$1 and \$3 50 respectively.

Now suppose we buy a steer in the fall which on the scale weighs 800 lbs., the animal might be bought for about \$25. Then put him up to fatten on food as above, and put an increase of 300 lbs. of beef on him, which would be equivalent to about 433 lbs. live weight. The animal now dips the scales to 1,233 lbs., but he is now ready for the slaughter; two-thirds of him is beef, or, in other words, he shows \$22 lbs. of beef.

This at \$6 is worth \$49 32
 Or an increase of 24 32
 Now we have shown that it costs to put on 300 lbs. of beef..... 12 33

We have then a clear profit..... \$11 91

The hide will have increased in value about 54
 The tallow will have increased in value about 2 51

So far total profit we may reckon ... \$15 04

Now for the value of the manure—Analytical chemists show us that 1 ton of clover hay fed makes manure to the value of 12s. sterling or..... \$3 00

1 Ton of Swedes fed makes manure to the value of 4s. sterling or..... 1 00

1 Ton of chopped peas fed makes manure to the value of £1 16s.... 9 00

Our steer has consumed—

1,590 lbs. of clover hay, which makes manure to the value of..... \$2 80

5,580 lbs. or 93 bushels Swedes, which makes manure to the value of..... 2 70

441 lbs. chopped peas, which makes manure to the value of 1 98

—————
 \$7 48

We would thus sum up—

Cash profit \$15 00

Manure profit..... 7 48

Total profit from fat beast..... \$22 48

And we think that we have charged the food at such a figure, and given the animal such a full complement to make him fat, that practical experience, where cleanliness, regularity of feeding, and warmth are in vogue, will show a much larger profit than that which we have committed to paper.

Let the reader bear in mind that we have not assumed the methods either of cutting the hay, pulping the roots, boiling or steaming. The economy of food arising from these several processes we propose to make the subject of a future article.

4. Does it pay to cook turnips for any animals?

Whatever may be the generally acknowledged result of the many tests upon cooking all sorts of food for stock, which are daily appearing in agricultural journals, it has been shown for many years that cooking turnips, especially by steaming, makes them far more digestible to the fattening animal; and

a smaller quantity, owing to more complete mastication and less strain upon the digestive organs, will have the same effect as a large proportion of raw roots. The question whether such pay, depends somewhat upon the value of the fuel; but from the result of several experiments we are inclined to think that a saving of about one-sixth in bulk of roots is effected by the process of cooking.

5. Will it pay to feed store pigs high during the winter, and do they pay as much for clover eaten during summer as cows or sheep?

To the first part of this query we say, without hesitation, as a rule, no. We qualify by the words as a rule, because if pork should rule extra high in spring, it might, as an exceptional case, show a profitable margin. The most profitable way to raise pigs for market is, we think, to bring in our sows early in spring, feed the mothers generously until weaning time, let the young pigs have full run of the stubbles in the fall, and as soon as they have pretty well cleared all the shellings of the harvest, put them up and harden them off with grain before the very cold weather sets in.

For these reasons we think that it costs less in proportion to make pork 150 or 200 lbs. than larger. Well bred sows, if kept warm in winter, require little food; indeed, with the Berkshires, the complaint is very often that the sow in pig will run too much to fat.

Without being able to lay our hand just now upon any reliable experiments actually made upon the subject, we are inclined to think that a hundred of pork would be made from less clover than the same amount of beef, and perhaps of mutton; but this is a point which must not be regarded in the light of producing a given amount of meat from a given amount of clover. These three classes—sheep, cattle, and swine, are most profitably raised when all are kept; for the cow gives us a large amount of skimmed milk, buttermilk, and whey, which help greatly to fat the pigs; and the sheep will thrive well upon land in which both the cow and pig would fail.

6. How many bushels of barley, peas, corn, potatoes, carrots, or mangolds, does it take to make 100 lbs. of pork?

This question is again too vague. It will take far more food in very cold weather than in the fall. If the animal is put up to fatten off the stubbles, it will take far less than if he be lean when taken up. A well-bred hog will fat on two-thirds of the grain that it will take to fatten a pike-faced, long-legged animal. Let us suppose, then, that our hog is about seven months old, well bred, has had run of stubbles, and is put up in good order, we may safely allow about 9 bushels of any of above grains to make 100 lbs. additional pork. We do not think that roots alone would ever fatten a hog properly, but consider that we may with advantage substitute for part of the grain carrots or mangolds, at the rate of about 12 bushels to every bushel of grain, and potatoes at the rate of about 5 bushels to every bushel of grain.

We have at hand an excellent communication on the subject of cooked vs. raw food, in one of our Western exchanges; but this article is already extended to sufficient length, and we must reserve the clipping for another issue.

The foot and mouth disease is reported as having made its appearance in the northern part of Rhode Island.

The restrictions on the movement of cattle from the New England States have been removed, except on premises where the foot and mouth disease is known to have existed.

The Orangeville *Summentions* that Mr. J R Craig, of Edmonton, on Tuesday, sold a pure bred shorthorn Durham bull calf—Master Frank—to Mr. A. Wanless, of Toronto. The price paid for the animal was \$150. Nothing pays better than raising good stock, and we are happy to see Mr. Craig's enterprise in this respect rewarded.

The regular monthly fair at Manchester, held on Tuesday, the 9th inst., was very largely attended by farmers, cattle buyers, and visitors. There were between eighty and ninety head of cattle at the fair for sale, and over sixty were disposed of, bringing good prices. The *Uxbridge Journal* says fat cattle brought \$4 to \$5 per cwt. live weight, and milch cows were sold at \$32 to \$42 each. Mr. Grandle, of Borella, sold fifteen head of cattle; Mr. Bangor, of Prince Albert, disposed of nine head, and quite a number of farmers sold small numbers. The principal buyers were Mr. Brady, of Kingston, Mr. A. Knox, of Oshawa; Messrs Geo. Anderson, Henry Gould, and Wm Blair, of Whitby; Messrs, Taylor and Miller, of Belleville; Mr. Costes, of East Writby, and Mr. Stone, of Brook. Considering the busy season of the year, and the fact that nearly all the fat cattle have been sold at this time, the fair was very successful, both in respect to attendance and to quality of the stock exhibited.

Care of Horse and Ox Teams

Above all seasons of the year, this is now the most important time to take care of your horse and ox teams. The spring season tests the influence of certain qualities of food and care on the constitution and endurance of draught animals. Do not suppose that hay and oats, pitched into rack and manger at all hours and in irregular quantities, can be all that is necessary. Care and nursing, cleaning and "looking after," and a knowledge of how a team should be fed and driven, are worth half as much more as food alone. It has often been quoted as an apt saying, that "the master's eye makes the horse fat." This is an old adage, and certainly quite true; but where the master is as thoughtless and careless as the man, the horse or ox suffers alike from the want of knowledge or neglect.

My horses, when I look after and drive them myself, are always fat and in good health, and do as much as any others; and so it is with many a careful teamster or master. The reason is, they never "over-do" them. To exemplify this we will just suppose it necessary to drive a team, heavily loaded, two miles only, and that the roads are bad. One driver does the distance in three-quarters of an hour, and the team is not distressed; another does it in ten minutes or quarter of an hour less, never breathing his horses, tearing along the whole way, and the team reaches the end blown

and sweating profusely, and very probably quivering at the shoulder and flank—in short, "over-done," and only a few minutes saved—all of which time, and more, is consumed in recuperation, and much more mischief done than could be undone with a week's care. Horses and oxen, like ourselves, sometimes feel unwell, but they are unfortunately unable to tell us so. How often do we feel unable to work quite as hard and as freely one day as we have been in the habit of doing. It is true we suffer no great pain, and we can eat pretty well; but we do not feel right, and work is a severe labour, and if we are forced on, serious illness is often the consequence; So it is with horse or ox team. These are at times affected in the same way, and an observant owner or driver, who looks after the team himself, will quickly detect it, and ease the labour accordingly. From seemingly trifling symptoms (unlikely to be noticed by any but the person always entrusted with the animals), any such ailment will be at once detected. Twenty-four hours' care will probably see a material amendment, and next day all will be right as usual, provided the necessary care be used. If otherwise treated, a week will often not suffice to restore the balance of health and appetite.

FEEDING.

In this department much error has crept in. The habit of ignorant hired men is often to make the time requisite for giving the food suit their own convenience rather than the necessities or health of their horses. When brought to the stable, it is a common custom to first take the team to the water trough, and allow them to distend their stomachs with an immense quantity of well water. This is bad as can be. The horses want water, it is true, but it is best to give only a few mouthfuls to refresh them, then give a little hay, and in a quarter of an hour grain of any kind can be given in almost any reasonable quantities, without any chance of injury. After eating, water may be given with impunity to any extent. Where horse teams are employed jointly with a number of men, such as railroad work, or the like, they must be fed and ready again to go to work when the dinner hour is over; and for this meal, under these circumstances, chopped hay and ground oats, slightly moistened, form an admirable mixture. I prefer feeding it in this way to teams at all times and seasons, and am quite convinced that much saving is effected and injury to horses avoided. With this mixture horses may be fed with perfect safety, if ever so heated, provided there is not too much grain among the hay.

A very intelligent friend of mine, who used this kind of feed, always took nose-bags to the field with him, and gave his horses ten minutes' feed and rest, at a medium interval between breakfast and dinner, and the same at about half-past four in the afternoon. No team did more work than his, or on less feed.

Cavalry horses are always sparingly fed both as to hay and oats, and any horse that cannot live on the regular allowance is at once sold as a "cast horse." This, however, very rarely happens. Generally the feed, although scarcely more than half as much as is ordinarily fed, will amply suffice to keep the animal in high health and condi-

tion. Men and teams often, and indeed generally, eat far more than is absolutely requisite for them; they cannot assimilate such an immense quantity as is sometimes given. A large portion of the excess passes undigested through the animal; or, if digested, unassimilated. Chemical analysis has proved this to be the case over and over again. There is a certain demand made by the system for food to supply the wear and tear caused by labour. When this is supplied, no more can be done. If the animal fail in condition, rest or restoration to health is absolutely necessary.

C.

Sheep Washing.

The methods usually adopted for washing sheep depend upon the means at hand to the individual farmer. A thorough washing is, however, of great importance, for upon a proper performance of this operation depends greatly the value of our wool as a marketable commodity. It is often done in a very hasty and inefficient manner. I have seen a flock of sheep driven three or four miles along a dusty road, penned in on the banks of the Grand River (where the current is very strong), taken out one by one, shoved into the water, and after being turned over by a man standing in the river, and slightly rubbed, allowed to swim ashore and go off again along the dirty high road.

A roomy pond of clear stagnant water is far preferable to a running stream. The water is usually softer, and the yolk or oil which is supposed to be formed through the wool by insensible perspiration, being of a very soapy nature, causes the wash to act more effectually. In running streams this soap is carried away with each sheep, and the water remains *hard* from first to last.

The sheep owing to the weight of fleece upon its back, is in its normal state hot at all times, and particularly so in the end of May. A sudden plunging into cold water is therefore a very severe shock. The water in a stagnant pond, or in one formed by draining a creek, has a chance of being well warmed before use, and this is another point in its favour.

Perhaps the most effectual plan is to combine these several ways. Let the sheep be seized by the fore-legs, and passed to a man standing in the stagnant and warm water. He should turn the animal in every direction; should squeeze out the wool well with his hand, and pass it on to one who is placed below, either in running water or under a shoot.

After two or three have been washed, we have good soapy water, which will far more effectually soften the wool and loosen all impurities, than will clear hard water; and these impurities will be entirely removed by a final immersion in the running stream. Moreover, the stagnant water being warm, will prepare the animal's body gradually for the colder, and will do away with that shock to the system caused by a sudden immersion of the sheep, which has sweated under the combined influence of a May sun and its own struggles with its captor.

All borrs and tenacious impurities should be carefully and thoroughly removed, and the offensive matter collected round the anus may, when thus softened, be drawn from the wool, thus saving many pounds of wool in a flock from the process of tagging at shearing time.

A clean pasture, and if possible a clean road to pasture, should be provided until after shearing. The former is most necessary; for when the dews are heavy, if there be a patch of bare ground in the field, there will the sheep be found lying at night.

So important, indeed, has the subject of thorough cleansing of the fleece before shearing been considered by large breeders, that some years ago the Farming Society of Ireland recommended the use of a large tub of water warmed to blood heat, in which to place the sheep till the wool be well softened, and then to river wash, on the ground that "the keeping the animal in cold water a sufficiently long time to wash thoroughly, endangers its health; that fleeces of a close pile cannot be cleansed by the usual mode of washing, and that the extra labour required to wash sheep in tubs of warm water would be amply repaid, were the washings in these tubs carried out and applied as manure, the quantity of rich animal soap which they contain making it one of the most fertilizing applications which can possibly be used."

It is better to allow a full week to elapse before shearing. The wool will then, if it has been fine, be thoroughly dried, and some time is necessary for the oil or yolk to ascend from the body into the wool, by which the weight of the fleece is increased, and by which a great deal of softness and elasticity is imparted to the marketable wool.

C. E. W.

Principles of Breeding.

The following extracts are taken from a lecture recently delivered by T. F. Jamieson Lecturer on Agriculture, in the University of Aberdeen, Scotland:—

PURITY OF BLOOD—IN-AND-IN BREEDING.

In order to fix the type, we must keep to one sort. It is only by continuing to breed from good animals that any dependence can be placed on the excellence of the progeny; and if a certain form and style are wanted, a race must be reared from individuals not only themselves distinguished for these qualities, but which have sprung from ancestors in whom the same qualities have been inherent for generations. The characters thus become intensified in the blood, and will re-appear with certainty in their descendants.

With the view of stamping the type more firmly in the race, many of the most successful breeders of domestic animals have had recourse to the system of matching together individuals very nearly related in blood. Such has been the course pursued by Bakewell, Colling, Bates and others. This is what is called *in-and-in* breeding. It is, however, a system that requires to be pursued with great judgment and caution, and only succeeds in the hands of a master, for although it no doubt has the effect of more speedily attaining certain objects, yet it is

equally certain that numerous bad consequences have in many cases resulted from it. Many breeders, seeing the success that attended the practice in the hands of Bakewell and Colling, have attempted to follow it, to the ruin of their herds.

With animals of great excellence, and of very robust constitution, it may apparently be hazarded to some extent not only without injury, but with great prospect of advantage; the characters of the wished-for type become more strongly pronounced, and their progeny retains them with greater completeness; and notwithstanding all that has been advanced in opposition to the system, it is an undeniable fact, that our most eminent breeders of Short-horn cattle have pursued it in founding the races for which they have become famous, and many of the finest animals they have produced have been bred in this way.

In-and-in breeding, in the case of our domestic cattle, when managed with judgment and skill, seems to bring out the tendency to fatten more decidedly; it gives greater fineness of bone, and seems to intensify the family character by concentrating the blood of that particular type which the breeder wished to develop. But if the system is persevered in too long, or is attempted with unsuitable animals, experience shows that vigour of constitution is rapidly lost, and the race becomes delicate and subject to disease. There is even some reason to suspect that vigour of constitution is occasionally lost by a race of animals when long reared in the same spot, under similar conditions of food and treatment, even although they are not closely related in blood, and that good will result from transporting them to another quarter where the climate, soil, and food are somewhat different.

EFFECT OF FRESH BLOOD.

When a race has become too close-bred, an infusion of fresh blood has the effect of increasing the size, vigour and fertility of the animals. Fineness of quality may be lost to some extent, but growth is almost always gained. Farmers who breed for mere commercial purposes, and have no particular breed, generally like to have a frequent change of blood, as the animals seem to be healthier, and their calves are more easily reared, and grow better.

Breeders of Short-horns, on the other hand, who have attained a high reputation for their stock, and whose animals are sought after by foreign purchasers, who buy much by pedigree, find that they require to be very cautious in introducing fresh blood into their herds, even from other herds of pure descent. Such mixtures often disappoint expectation, and derange the character of the tribe to an unlooked-for degree, but when a right hit is made, and a good sire of fresh blood is got, the value of the infusion is immediately and decidedly felt. Such was the effect of Belvidere, for example, on

Bates' Duchess tribe, and of Buckingham on the herd of Richard Booth. Buckingham was not himself a very fine animal to look at, and no visitors to Warlabey, we are told, could appreciate his merits until they saw his offspring. Never, says Mr. Carr, were calves with backs so broad, ribs so round, shoulders so shapely, flanks and fore-quarters so full and deep; and there seems no reason to doubt that the freshness of the blood had much to do with the effect Buckingham had on the Warlabey herd.

VARIABLE FORCE OF INHERITANCE.

In improving any race of animals, breeders have proceeded upon the principle that like begets like; or, in other words, that the offspring will inherit the qualities of the parents. They have therefore gone to work by continually selecting the best animals to breed from, and it is by this constant selection of the best, carried on for a long series of generations, that our present breed of domestic animals have attained their high degree of excellence.

Although every one admits the truth of the proposition that the characters of the parents may be expected to re-appear in the offspring, yet the rule is subject to much modification, for we constantly see that the degree of resemblance varies much even in members of one family, all proceeding from the same parents. Some of the offspring will resemble the father, some the mother, while in others the features of both will be blended, or the resemblance may take after some of the grand-parents or collateral branches of the family, or even revert to some remote ancestor. Breeders of animals also observe that some individuals transmit their characters to their progeny much more strongly than others; and, in short, one would be inclined to say that the laws of inheritance are very capricious and unaccountable. This, however, no doubt arises from our ignorance, for the subject has not been studied with that amount of attention which it deserves.

INTENSITY OF BLOOD.

The laws that regulate inheritance have been surprisingly little studied, considering their vast importance, and are consequently but very imperfectly understood. Most breeders, however, seem to believe that long-continued transmission of any character tends to implant it more firmly in the race; and hence pure-bred animals, which are descended from a long succession of ancestors, endowed with the same features and qualities, will transmit these characters with a considerable degree of certainty to their progeny. This is what is meant by pure blood, or high blood; and it is alleged that, if we match two animals, one of pure blood, and the other of mixed descent, the characters of their progeny will generally most resemble the pure-bred parent. If, for example, we use a well-bred Short-horn bull with a set of cross-bred cows of no particular

breed, the features of the Short-horn will generally predominate in the offspring. As Mr. Berry expresses it, the excellencies of the one are the accumulated acquisitions of many ancestors; they are positive, and in comparison fixed, while the cows possess little or no determinate character, having been bred without regard to any point save to increase the stock on the farm where they were reared. If, on the other hand, the sire and dam are equally well bred, and alike in point of individual excellence, then the produce may be expected to have an equal chance of resembling either parent. For example, it may be observed that pure bred cows of the Black Polled breed, when crossed with the Short-horn, have often calves which are entirely black, without horns, and show little of the Teeswater type. Certain French breeders have found the same rule hold good with sheep.

Cooked vs Raw Fed

Various have been the experiments on the best way of preparing feed for hogs. The Hon. L. W. Stuart, of Maquoketa, Iowa, has been adding valuable facts to this subject by his careful experiments, which he gives in a late number of the *Excelsior*. He says:

Having made a series of experiments in feeding hogs upon corn prepared in different ways, I now desire, through the agency of your paper, to give the results to the public.

I commenced my experiments, Oct. 24, 1870, by weighing 20 hogs. With the exception of four, they were one year old in October and September. They had been fed two weeks previous to weighing for the experiment. The weight was 4,070 pounds. They were put upon the scales and weighed every Monday morning during the experiment. There was also an accurate account kept of the feed consumed each week, reckoning 56 pounds for a bushel of corn or meal. They were fed in a floored pen, and in troughs so arranged that no feed was wasted. Their sleeping apartments were also well provided with wheat straw. They also had the range of a small lot. When they were fed on dry feed they were well supplied with plenty of water. They were fed regularly three times per day. The experiments were continued for 70 days, closing on the second day of January, 1871, which day I sold them for five cents per pound as a basis for calculation in making up my estimates. The sum total in corn consumed in conducting my experiments the seventy days was 232 bushels. The net gain on the 20 hogs was 2,817 pounds, a trifle over two pounds per head per day. The weight at the time of selling was 6,877 pounds. The result of feeding was as follows:—

They were fed for 28 days on dry shelled corn, and consumed 83 bushels; made a net gain of 837 pounds, which is equivalent to

10.89 pounds per bushel, which sold my corn thus fed at 50 cents and 4 mills per bushel.

They were fed 14 days on meal, ground fine, and fed dry, and consumed 48 bushels; made a net gain of 553 pounds, which is equivalent to 11.76 pounds to one bushel of corn, which brought my corn to 58 cents and 8 mills per bushel.

They were fed 14 days on meal mixed up with cold water, and consumed 55 1-2 bushels; made a net gain of 731 pounds, which is equivalent to 13.17 pounds per bushel. In this trial I realized for my corn 65 cents and 8 mills per bushel.

They were fed 14 days upon cooked meal, and consumed 46 1-2 bushels; their net gain was 696 pounds, which is equivalent to 14.76 pounds per bushel; this sold my corn for 74 cents and 8 mills per bushel. Now taking the two extremes, I find I got 21 cents and 4 mills more per bushel for my corn by grinding and cooking than when fed whole and raw. After deducting one-seventh for grinding, leaves 21 cents per bushel. Now in making an estimate on feeding 100 hogs for the same time (70 days), I find I shall net \$245 62 more for my corn by cooking than by feeding raw, and after deducting one-seventh for grinding.

Had I ground and cooked the food for my 20 hogs, I should have made 663 pounds more pork than I did, which would have given me \$33 more had I cooked all the food; then my hogs would have eaten one-half bushel of corn more, so I deduct 15 cents, which would just leave me \$33 more profit. Had I fed whole corn for the 70 days, the 20 hogs would not have consumed as much corn within 24 1-4 bushels; at 30 cents a bushel the corn saved would bring \$7 62, but the lack in the gain of the hogs would be 1,387 1-2 pounds; at five cents this would bring \$69 37; deduct \$7 62, the cost for the less amount of corn consumed, and we have \$61 75 in favour of cooked feed on 20 hogs.

I find it will require 245.1 bushels of raw corn to make 3,480 pounds of pork, and only 232 1-2 bushels when cooked, a difference of 112.6 bushels in favour of cooked feed.

In order to make the same number of pounds of pork in the same length of time, it will require 33 1-3 hogs to consume a sufficient quantity of raw corn to equal 20 hogs fed on cooked feed, which would be equivalent to 100 hogs fed on raw corn. The 60 hogs would consume in 70 days 697.5 bushels of corn cooked, and the 100 hogs fed on raw corn would consume 1,035.3 bushels to make an equivalent amount of pork. In writing this article my only object is to give facts and figures.

A correspondent of the *Country Gentleman* says:—"The first milking of a cow that has just dropped her calf, and new buttermilk, should never be fed to swine, but should be poured into a swill barrel and diluted; then no bad effects would be likely to arise."

Hints to Cattle Breeders.

Prof. Miles, of Michigan Agricultural College, delivered an interesting lecture on Breeds of Cattle, before the Farmers' Institute, at the Illinois Industrial University. We take the following practical suggestions from an abstract of the lecture published in the report of the Trustees of the University :

It is important to acknowledge in the start that our breeds are not the result of accident; and this leads me to enumerate some of the qualifications which a good breeder must possess to attain the highest success in the art.

1. Definite ideas as to the kind of animals he wishes to produce. With many there is a lack of analytical power in determining good points. A man judges as a whole instead of in detail.

2. Persistence and perseverance in adhering to the plan marked out. A change of standard will result in failure.

3. A correct and educated eye, capable of detecting slight variations in form and quality. One must keep the balance adjusted in breeding, and be able to correct slight variations. Anatomy and physiology should be understood, though not technically.

4. The breeder should be free from prejudice and bias. The ownership of an animal should not blind him to its defects.

5. He should have good judgment, and be apt in tracing causes and effects. Many have failed in this respect.

6. He should be cautious, and not prone to jump at conclusions from insufficient data.

7. He should be an Artist, capable of forming an ideal model of perfection, and then of approximating to the conception already formed by moulding the plastic organization of the animal, so as to give it expression. Bakewell, Collins, Booth, Bates, Webb and Quartley, were men of this class. Breeding in fact is a fine art, and one of the most interesting and fascinating of pursuits.

Our native cattle are of diverse origin and have serious defects, the result of their mixed origin, and of a hap-hazard mode of breeding. One of the most remarkable types is the Texas cattle, originated from the Spanish cattle, and still somewhat resembling the cattle found around the Mediterranean. Our native varieties have also little in common, and vary a great deal among themselves. Hence it is desirable to improve our breeds.

In agriculture generally we find an advantage in the division of labour, and so in breeding. It is desirable to breed for milk and for beef. It is hardly possible to combine the two with the best success. The native animals have no special qualities, or definite character.

The advantage of the improved breeds is, first, that they have a definite character from a long course of breeding. The quick-

est way to get this fixedness is to get established breeds. The attempts to make breeds in this country have generally failed. Col. Jacques, although a cattle man, failed in the attempt. There is too great a variety of elements to work with, and it is a saving of time to begin with the established breeds. In the second place, we can select according to our needs and the locality. Different places need different breeds. At one of our Michigan fairs, farmers from Northern Michigan were inquiring "which is the best breed of sheep?" I replied, "you might as well ask which is the best turnip or potato. I don't know your farm or mode of farming. Each breed is adapted to a particular purpose, and you must choose accordingly."

Mistakes will occur from the diverse modes of treating the same breed. Mistakes are made in condemning small breeds, as the Devon, Galloway, &c. These are adapted to peculiar places and purposes. The Shorthorn is admirably adapted for certain ranges.

In selecting animals, look first to purity of blood. The pedigree is, the recorded evidence of breeding, but does not necessarily show purity of blood. The value of a pedigree depends on its completeness, and the character of the ancestors. Two animals of undoubted purity of blood would differ in value, if their ancestors were not of equal merit. "Like produces like," not precisely, but like the various ancestors as a whole. Ancestors of unequal merit result in unequal offspring.

Herd books are not always reliable. There are the dangers of accident and imperfect recollection. The breeder should also be familiar with the history of the breed he adopts, and with the origin and peculiarities of certain families. Certain strains will not sell among breeders.

These general observations apply to all the breeds.

COMPARATIVE VALUE OF CATTLE FOODS.—

From a paper prepared by H. S. Collins, of Collinsville, Conn., we extract a table showing the comparative values of different cattle foods, which is worthy of careful study:—

KINDS OF FOOD.	Per cent. of fat for 100 lbs.	Per cent. of targo of flesh for 100 lbs.	Total nutrient p. cent. in 100 lbs.
Potatoes	18.9	1.4	20.3
Sugar Beet	13.6	.9	14.5
Mangel Wurtzel	12.6	1.0	13.6
Parsnips	7.0	1.2	8.2
Carrots	6.6	.6	7.2
Swedish Turnip	5.2	1.0	6.2
White Turnip	3.3	.9	4.2
Best English Hay	36.3	13.5	49.8
Lucerno Hay	33.0	12.7	50.7
White Clover	40.0	18.7	58.7
Red Clover	18.7	22.5	41.2
Indian Corn	68.7	11.0	77.7
Rye Meal	55.8	14.3	70.1
Linseed Cake, English	61.0	22.1	73.1
Ditto American	48.6	22.2	70.8
Oatmeal	51.1	18.0	69.1
Barley	52.0	13.0	65.0
Peas	41.9	23.1	65.0
Beans	39.7	24.0	63.7
Buckwheat	52.1	9.0	61.1

Colts Injured by Heated Milk.

When the dam is used in hot weather upon the farm or road, so as to heat her blood, the colt should never be allowed to suck until she has fully cooled off. Let him fill himself before the mother is put into the harness, and if it is important that he should accompany the dam, tie him at her side so that he will be unable to draw milk until he is liberated; for it is much better that he should go hungry a few hours than to take his food while it is in a fevered state.

If the mare is to make a long distance in a hot day, and return at night, it is best to leave the colt at home, and draw the milk from the udder by the hand once or twice during the day, and then upon returning allow the colt to fill himself gradually as the milk is secreted.

Colts injured by heated milk seldom recover from it for a year or two, and many times never. They become reduced in flesh, get lousy in the fall, and during the first winter of their existence, when they need health and strength, as under any circumstances it is the most critical period of their growth, they have just life enough to enable them to move, and the second summer, the proper time for development, is spent in the recuperation of lost vitality.—*American Rural Home.*

The first volume of the *Herd Register* of the American Jersey Cattle Club has been issued. It contains the pedigrees of 537 bulls and 1,427 cows.

The *Rural New Yorker* gives 23,419,082 pounds as the amount of wool, on sheepskins, imported into New York in 1870, and 12,470,351 pounds as the amount of wool imported in the same time from Jan. 1st to December 31st. The total amount of wool in New York Jan. 1st, 1871, is estimated at 7,475,750 pounds.

NEW ZEALAND WOOL.—Mr. Geo. Cooper has sent us an excellent sample of fine merino wool, grown in Otago, in New Zealand, and from various accounts received respecting the climate, we should judge that this colony is well adapted for sheep husbandry, including the fine-wooled breeds.

At a recent sale of Mr. E. H. Cheney's shorthorns, at Gadsby Hall, Leicester, the total amount realised from forty-eight cows and eight bulls was £5,132 Ss. The average price of the cows was £96 10s.; that of the bulls £62 7s. The highest price given was £500 for the cow Cherry Princess, bought by Lord Dunmore.

SOWS EATING PIGS.—Young sows will sometimes eat their offspring, from costiveness, which may be prevented by feeding some laxative food, and rubbing the backs of the pigs with an infusion of aloes; or raw salt pork given to the mother will prevent her from eating her pigs. It has been given to them with success after they had eaten one or two of their pigs.—*Western Rural.*

CALVES WINTERING WITH SHEEP.—Animals of different kinds do not thrive well when housed in the same compartment.

THOROUGHBRED STOCK.—Lieut.-Col. Taylor, of London, has lately bought from Mr. Ashworth the two prize Shorthorn cows Lilla Languish, bred by Mr. Alexander of Kentucky, got by imported Sirias out of imported Lydia Languish, by the celebrated bull Duke of Gloster; she has a heifer calf by imported Sweetmeat, a bull of half Booth half Sir C. Knightly blood. Also, Souvenir of Thorndale, got by the 1,000 guinea bull 2nd Grand Duke, out of imported Daphne, who was also the dam of Hotspur, one of the finest bulls of his day; Souvenir of Thorndale has a bull calf by her side got by Sweetmeat. Lilla Languish was a prizetaker at the New York State Exhibitions at Utica in 1863, and at Rochester in 1864; also 1st prize at Provincial Exhibition Montreal, 1865. Souvenir of Thorndale took 1st prize in her class at Provincial Exhibition, Montreal, 1865; also at Kingston in 1867.

SHEEP WASHING—In reply to the enquiry of "A Friend of the Sheep," we repeat the opinion we have before expressed, that the practice as it is too often conducted after the manner described in our correspondent's letter, is of little or no use as far as the wool is concerned, and not without risk to the sheep. To be at once safe and efficient, the weather should be warm, the water itself—a running stream, or douche supplied by a dam—should not be too cold, the animals should be handled gently, and the cleansing be quick and thorough. The sheep should, without being driven over dusty roads, be at once turned in to a clean sunny pasture. Some prefer washing the wool altogether off the sheep's back; and in some countries the practice of washing the sheep in warm water has been lately introduced—a refinement which we are hardly likely to adopt in Canada.

THE DONKEY.—One hint obtained here (the London Zoological Gardens) may be useful in America—the donkey is employed to drag the roller over the gravel walks; he is too light to make more impression on the gravel than the roller will obliterate. This useful little animal is employed in Europe in various ways to great advantage; his introduction into the general field of labour is one of the things we have yet to learn. His appetite is easily satisfied, requiring less than a large dog; his labour even as a burden-carrier would well repay his importation; he pulls well in a small cart, and in this is most useful in cities to carry marketing. He would take the whole produce of a small kitchen garden as well as a horse, while his maintenance would be a very trifle. To the poor man he would prove in America an admirable help, not dainty as to the quality or quantity of his food.—*Smith's Journal Abroad.*

Veterinary Department.

Digestive Organs of the Ox

The accessory parts in connection with the mouth are the teeth and salivary glands. The former number thirty-two, and are arranged under two classes—the incisors or cutting teeth, and the molars or grinding. The cutting teeth are eight in number, and are situated in the lower jaw. In the upper jaw is the cartilaginous pad already noticed. The whole of the incisors and twelve of the molars appear as temporary teeth, the appearance of which is found to vary slightly according to the period of utero gestation. Sometimes, at birth, there will be no vestige of teeth; whilst in others the two middle incisors are visible. About the second week two more appear, and about the expiration of the third week the animal will have six temporary front teeth, and in from four to five weeks he has the full number of incisors. The teeth gradually change in appearance, until about the eighteenth month those in the centre are becoming very small, and when the animal is about two years old they are replaced by permanent ones. Their development is hastened or retarded according to the breed and manner in which the animal has been kept. As a general rule, the whole permanent front teeth take the place of the temporary ones when the animal is from three and a half to four years old.

The glands that secrete the saliva are the parotid, submaxillary, and sublingual. The first named is situated under the ear, and opens into the mouth by means of a long duct. It is formed of lobes and lobules, which finally terminate in vesicles forming the excretory duct. When the food is first taken into the mouth it is rolled hastily into a pellet, and swallowed without being mingled to any great extent with the moisture of the mouth. From the mouth the food is conveyed into the stomach by means of the oesophagus or gullet, which is a canal of considerable length and dimensions, and is formed of muscular fibres and a cuticular lining. The fibres are so arranged as to give to this canal the antiperistaltic motion, or power of again taking the food up into the mouth after it has undergone a certain process in the rumen or paunch. The stomachs of the ox are exceedingly complicated in their nature and arrangement, and consist of four compartments, viz., the rumen or paunch, the reticulum or honey comb, the omasum or manifold, and the abomasum or true digestive stomach.

OBSCURE IRRITATION.—A correspondent from Georgetown writes:—"I have a span of horses which keep in good condition, but appear to be annoyed with something I cannot understand in the head. The symptoms are—shaking and tossing of the head, and trying to protect their nostrils. I wish to know if any of your numerous correspondents could give any information on the subject as to cause or cure?" We cannot account for the irritation from the symptoms mentioned.

Defective Lactation

To the Editor.

SIR,—Could any of your readers furnish an explanation of the following curious anomaly in horse-breeding?

I have a mare now fourteen years old, from which I have obtained five colts in as many successive years. She had abundance of milk for the first three colts; but though the fourth was strong and vigorous, she had no milk for it; otherwise she was in splendid condition. I fed the colt with cow's milk, on which it thrived well. At the same time, with the view of obtaining milk from the mother, I left the colt for several weeks with her, and encouraged it to suck, which occasionally it did. I do not think, however, it ever obtained any nourishment in this way; for only a small quantity of clear viscous fluid could ever be drawn by the hand from the teats of the mare. The colt this spring was a puny, weakly creature, that lived only two days, and, strange to say, the mare, though in remarkably good condition, has shown no appearance of milk whatever. An explanation of these curious facts would oblige,

JOHN PATON,
Plattsville.

It is quite a common occurrence for mares and other animals to lose their vigorous milk-producing power after attaining a certain age, although retaining excellent condition. The nutriment, instead of going to form milk in a proper manner, appears more favourable to the production of fat.

Bog Spavin.

Bog spavin is an increase of synovia in the upper or chief joint of the hock; it lies upon the most inward and forward portion of that part, developing in front of the hock joint. It is a soft fluctuating swelling induced by the distension of the bursal cavity of the joint, which is filled with the natural fluid of the joint, though changed in quantity and quality, caused by inflammation of the mucous pouches. By pressure they impede the flow of blood, which gives the vein the appearance of being the seat of the disease.

Bog spavin is produced by repeated shocks to the limb, and in this respect resembles wind galls; though situated in a different locality, it is also liable to the same changes. The affections are the same, and are dissimilar only with regard to their relative situation. These shocks to the limbs are superinduced from a variety of causes, the first of which, in young horses, is from improper and over-rough handling in breaking the animal. If the colt is ambitious and spirited before he is broke, a great deal of unnecessary tyranny is used in subduing him, and by the time the task is accomplished, the poor animal, otherwise timid, kind and affectionate, is spavined, and, too often, left with his noble spirit broken. In older horses, bog spavin may be caused from overwork of any

kind, such as drawing heavy loads over rough roads, hard driving or riding long distances, and also from violent falls, a sudden fright, causing the animal to throw the whole weight of his body upon one or the other of his hind legs as he swerves from the path he is travelling, riding or driving him very fast and bringing him up all standing with a sudden tug at the reins, &c., &c.; all of which have a tendency to jar and strain the tendons, ligaments, and tissues of the hock joint, and a bog tumour is the result. Bog spavin, though not necessarily a cause of lameness, is at times liable to assume an aggravated type, and is often accompanied with thorough-pin. In such cases, if the animal is kept at work, lameness will surely supervene.

Treatment.—Pressure is not advisable with bog spavin, though useful in thorough-pin, except when the spavin is pricked, when a bandage is temporarily applied to cause a discharge of the lymph. Begin the treatment by giving the horse rest, absolute rest from all work. If the enlargement does not disappear, physic with a mild "condition" ball, and rub the affected part with the ointment of red iodide of mercury. If the enlargement returns apply a blister compounded as follows:—Mercurial ointment, three ounces; powdered flies, one ounce; camphor (dissolved in a few drops of spirits), five drams; olive oil, one-half ounce.

Let this be well rubbed in, and renewed at the end of the third week. After the blister is quite well, the spavin generally will have been removed. If traces of it remain, firing, as a last resort, may be applied to insure a cure.—"*Vulac*," in *Turf, Field and Farm*.

Grub in Sheep's Head.

Mr. J. Ashbridge, of Scarborough, has left at this office several specimens of the larva of the sheep gad-fly, taken from the heads of two sheep that died recently. It is not by any means clear that the animals died in consequence of the grub. Indeed, the symptoms which our informant mentions of a swelling under the jaw, could have no connection with the presence of this parasite. The gad-fly (*Cephalomyia ovis*) deposits its eggs in the nostrils of the sheep during the summer or the months of July and August. These eggs hatch out, and the maggot or worm crawls up the nostrils into the sinuses, where by means of tentacula (little hooks) it fastens itself to the lining membrane, and feeding on the mucus, remains there till the following spring, causing sometimes considerable irritation, but in otherwise healthy sheep giving rise to but little inconvenience. The worm completes its transformation by descending the nostril, dropping on to the ground, where it burrows beneath the surface, becomes changed into a chrysalis, and finally emerges as the perfect fly.

To prevent the deposit of eggs, it is the practice of some farmers to plough a furrow or two in the pasture fields, thus affording the tormented animals the opportunity of rubbing their noses in the loose earth, and protecting themselves from these insects. Others recommend smearing the noses with tar, fish oil, or various substances offensive to the fly. Many absurd and dangerous practices have been resorted to for the purpose of dislodging the grub. Injecting into the nostril tobacco, turpentine, tar and oil, &c., are among the remedies prescribed. Such applications should be resorted to with great caution. It is more than probable that in a large proportion of cases in which sheep die with these larvæ in the sinuses, the cause of death was some disorder quite distinct from the presence of the grub.

There is another affection commonly known under the same name—"grub in the head"—which is often fatal, and very difficult to treat. This affection is also called sturdy or gid, and is caused by the presence of a totally distinct parasite, or hydatid, in the brain. The situation of this last entozoon is truly within the brain or its membranes, whilst that of the gad-fly larva is in the nasal sinuses, outside the cavity of the skull. One is a comparatively mild disorder, the other intractable and generally fatal.

CONTRACTED FOOT.—The sole should be kept moist by means of a stuffing of tar and tow, and a leather sole should be applied under the shoe when the horse is used on hard roads. If worked for farming purposes, a leather sole is not generally required, and the shoe should be applied so as to give a certain amount of frog pressure.

LEAKING OF MILK.—The leaking from the cow's teats, complained of by "A Reader," appears to result from weakness of the milk duct. We would advise milking several times a day at regular periods; and the back part of the udder to be bathed frequently with cold spring water, which might restore the parts to their regular condition.

SPAVIN.—"Farmer" is informed that in the treatment of spavin the horse must be allowed complete rest, and the hocks should be bathed with cold water several times a day, and the ablution continued for a week. Then apply a strong fly blister, to be well rubbed into the parts, which must be oiled every second day. After the blister ceases to act, wash it off and apply another. In cases of long standing, the most effectual remedy is the firing iron, or seton.

MARE DISOWNING HER FOAL.—A "Reader" writes:—"I have the misfortune of having a mare, which, after foaling, refused to nurse the foal. You will much oblige by informing me of the best method of nursing it, and the proper food required. The mare has almost lost all her milk. Perhaps you can give directions whereby her milk may be increased?" The foal may be raised by using cow's milk, to which should be added a little sugar, and as soon as possible encourage it to eat. When a mare refuses to nurse her foal, the sooner she gets rid of her milk the better.

The Dairy.

Making Cheese from a few Cows.

Sometimes people who have but two or three cows would like to make a few cheeses for family use. If there happen to be three or four neighbours similarly situated—that is, each having but a few cows—it will be a good plan for all to join together, delivering a certain quantity of milk daily at some central neighbour's house where the cheese is to be made. There will be no very great trouble in this, and by assisting each other all may be supplied. As the labour in manufacture will be no more for ten pails of milk than for four, and as the cheese can then be made up at once, it will be advisable to associate together wherever it is practicable. Now ten pails of milk will make say 25 gallons, and the 25 gallons will give a cheese of 20 pounds, and perhaps a trifle over.

If the milk is worked properly, the curds may be pressed in a hoop eleven inches in diameter, and about the same height. Small cheeses of this kind need not be bandaged. After coming from the hoop they should be oiled over with a little fresh butter to prevent the rind from checking, and may be placed upon the pantry shelf. They will need turning every day, giving the surface a smart rubbing with the hand, which will prevent the cheese flies from securing a safe deposit of their eggs.

If the rind of the cheese gets dry it will be well to oil again with fresh butter. If properly cared for the cheese will begin to be mellow in four or five weeks and will be eatable, though age will improve it, and when six months old it should be of delicious flavour and quality if well made.

But if the quantity of milk is too small to make a curd for one pressing, then resort may be had to what is termed double curds. These are managed after the following manner:—

The milk is treated precisely as if there was sufficient for a cheese. After the curds have been drained and slightly salted and are ready for the hoop, they are set aside in a cool place in the cellar until next day. Then after the next curds are ready, the previous day's curds are treated with warm whey, so that they may be broken up, when they are drained, and the two days' curds are thoroughly mingled together and salted. They are then put to press, and will unite together the same as if they had been a "one day's cheese." We have seen some most excellent cheese made in this way—cheese as fine in flavour and quality as one would wish to see.

Sometimes curds are kept in this way three days or more, until a sufficient quantity has accumulated to make a cheese of the desired size. In this way cheese can be made when only one cow is kept. Indeed we have

often eaten of cheese made from the milk of one cow, and it was very good cheese too; much better than some factory make which we have tasted.

There is another way of managing the curds called *grafting*. As soon as the curds are ready they are put to press. The next day the hoop is taken off, and a thin scale taken from the top of the cheese with a sharp knife. The top rind and the upper edges being pared off, the parings are broken up and warmed by the addition of whey. They are then mingled with the new curds, which are then placed in the hoop on top of the previous day's cheese and put to press. The two days' curds will adhere, and in this way small quantities of milk may be utilized in cheese-making. We once knew an old dairywoman, who kept a few cows and *grafted* her cheese three times. So nicely did she manage it, and of such really fine quality were her goods, that her "grafted cheese" sold in the market at the highest price, and some very sharp dealers never suspected how the cheese was made.

Grafted cheese should always be handled, for unless the whey is very thoroughly drained from the curds, the two sections or grafts will not adhere so firmly as the parts where they are not joined. It is a very good plan in *grafting* cheese, after paring off the rind as we have described, to cut across the cheese two or three times, taking out a small triangular strip. Some people after paring the rind make the upper surface rough by scraping with the point of a knife. This is done for the purpose of giving the new curds a stronger hold on those of the previous day.

Now that we have explained the manner of making "double curded cheese," we hope no one will be deterred from trying their hand at cheese-making on account of having the milk of only a few cows.—X. A. WILKARD, in *Western Rural*.

Curing Cheese.

At a recent meeting of the National Dairy-men's Club, held in Utica, the subject for discussion being "the ripening of cheese as affected by the mode of manufacture," Mr. Macadam said, in the course of an introductory paper, that in the ripening or curing of cheese he regarded the action of the rennet as the element that does the whole business; and therefore, in making cheese that are to cure quickly, we have only to place the rennet in the most favourable circumstances for promoting its growth all through the process of manufacture, and to cure slowly, the opposite. Now, the question arises—what are the most favourable circumstances for promoting the growth of the spores of the rennet?

First, is the presence of the greatest quantity of butter in the milk to be manufactured into cheese. Second, a larger amount of rennet added to such milk. Third, by using a lower temperature in cooking or scalding the

curd. Fourth, in the absence of a minimum amount of acid in the curd, when the salt is added; and Fifthly, a less quantity of salt added to the curd; also by keeping the cheese in the curing-room at a higher temperature. Cheese made from tainted milk will naturally cure more quickly than if the milk was good. An exactly opposite process will check the growth of the spores of the rennet in the milk, curd and cheese, and cause the cheese to cure more slowly. Cheese cured quickly ought to go into immediate consumption, as if kept, especially in warm weather, they deteriorate in quality very rapidly. The complaints of the English shippers about the defects in the colour and flavour of American cheese when held over winter, are doubtless mainly owing to the fact that these cheese have been cured too quickly to hold long.

Washing Butter.

In a paper on butter-making, read before the American Institute Farmers Club recently, Mr. Hecox, of Watertown, explained the plan he adopted for the purpose of thoroughly washing the butter, as follows:—

"I use a plain crank-churn; goes by hand. average time, twenty minutes for large, twelve for small churning. I do not claim to make more, or better butter from the same cream than with a dasher; but I do claim that I can do the work with one-half the time and labour. Much of this saving is caused by the convenience of washing, getting rid of the butter-milk water and in working the butter. As soon as I discover that the butter begins to separate, I put in a quart of cold water; this is to thin the milk, which will cause it to free itself more readily from the butter. I then churn until the particles are about the size of a large pea. I then draw off the milk and put in a gallon of water, churn, and draw again, and sometimes put in one more washing. The common way is to churn until the butter is about one solid mass. But how is the water to take effect on the inside of these large lumps of butter? I should about as soon think of washing the inside of a glass bottle by washing the outside. I think that in order to make the most and best butter in hot weather, it is particularly necessary to cool the milk immediately after milking. Milk in tin pails; have a tub, similar to a wash-tub, for each pail; set the pails in the tubs filled with cold water from a good spring or well; stir the milk and the water every few minutes until the milk is about as cool as the water. If you can get the milk quite cool before setting, and set shallow in the pans, it is better not to let the pans stand in water while the cream is rising, as the cream will be all up before the milk becomes very thick. Skim as little milk as possible with the cream, as that is the great secret about quick churning."

Exportation of Dairy Products.

At the recent meeting of the Northwestern Dairymen's Association, Hon. Z. Eastman read a paper upon the exportation and preparation of Dairy and Farm Products for sale in a foreign market. It was interesting throughout, but its length precludes our giving it entire, the following extracts being all that we can now find room for:—

I have never met with the statistical reports, neither am I, from knowledge obtained from any other source, able to give the amount of exportation of American cheese or butter into the English or any European market, or the time when the exportation commenced. I know, however, that it is a fact, that English cheese has been largely imported into this country for a long period of years (mostly confined to certain so-called high grades, as a luxury), and I presume that importation to some extent continues. But I believe it is a fair statement to make, that with the rise and success of the system of manufacturing cheese by factories, commenced the era of exportation. This systematic and more scientific and successful way of manufacture, has made it possible for our dairymen to become the cheese makers for the world, or for the cheese eating part of the world. It enables producers to arrive at a degree of uniformity and excellence, on which a wide reputation may be founded. The cheapness of our land investment, the lower cash value of stock, and cheapness of pasturage, in the aggregate of capital invested to the amount produced,—these, considered with the comparative low rate of transportation and freight, in proportion to the value of the article,—seem to make it certain that we can, and we ought, to compete with any part of the world in the production of butter and cheese. There is no danger of our coming in competition with cheaper land, stock, and production of unredeemed countries, like South America and Mexico, where they do compete with us in raw material like hides, because butter and cheese are the productions of civilization, and require some cultivation of brains as well as soil. Whereas in England, and very like it is the same anywhere in the Old World where the market is to be sought, a cow costs a deal of money, (\$30 to \$40—\$150 to \$200 in England) and I know that it is a fact that there are cows kept for dairy purposes, on land where the annual rental approximates in value to some dairy farms in this country. It is common for lands to be rented for farms, from \$10 to \$20 per acre, and near towns sometimes going far above these prices.

Then, I say, it is very strange, with these facts and figures on your side, on the advantages of production, that you cannot profitably compete with any part of the world in the market, with your butter and your cheese. You are now enjoying all the legi-

imate benefits of a home market; profit by it while you may. I am certain that there is to be a turn in the tide. The cheese dealers will assuredly be able some day, with your superior advantages in the way of production, to sell your articles in the Liverpool market, at a profit. Prepare to take advantage of, to make money by, that fact also.

Packing Butter for Market

At a meeting of the Jefferson County, Wis., Dairymen's Association, an essay was read from Messrs. Smith and Dexter, of Chicago, from which we take the following extracts:—

PACKING BUTTER.

Jars.—Use no jars except for a special order, or a known destination. They cost two cents a pound on their capacity; butter in them is burdened by a tax of 40 per cent. on the gross, on which freight or express charges must be paid; they cannot be sold with the butter to any extent; there is a loss by breakage or damage to butter, which express companies refuse to make good, and cost of delivering jars adds still further to charges against their use. These and other drawbacks are much more than the offset to any advantage derived from their use.

Tubs.—The best packages for general use are the Welch tub, made in New York State of white ash, in two sizes, holding sixty-five pounds and thirty-five pounds. They are largely in use in New York and other Eastern States, and are sold in Chicago at about 70 cents for a larger and 55 cents for the smaller.

Firkins.—It is an open question whether tubs or firkins are the best to keep butter in. We advise packing of one-tenth of the product in firkins, provided good ones can be obtained, made of oak, clear of sap, tight, smooth and good style; but in preference to rough leaky firkins, use tubs always—and use firkins only for spring and summer make.

Directions.—Mark on the side of every package its weight, when dry. Soak twenty or twenty-four hours before packing, in strong brine, and before churning see to it that a package is soaked, ready to receive the butter as soon as salted. Pack a firkin so that when the head is in it will be completely full, leaving no space for brine, nor room for the mass to shift from one end to the other, when the package is turned. This shucking process in loosely filled firkins works more mischief than the lack of brine causes in a tight firkin well filled. Cover the top of the butter with bleached cloth; cover the cloth with a fine sprinkling of fine salt. Put gross weight and dry tare on the cloth end of the package, so that the seller may bore the head not marked, and find no cloth. Tubs intended to be sent at once to market, or packed after warm weather is over, may be filled to the brim, as full as if struck off by a striker. We suggest a roller

for finishing tops of tubs; cover the top with bleached cloth, reaching over the edge of the tub, not tucked down inside; sprinkle with salt and strap and cover down snug, with three strips of leather, not folded over the top, but nailed through the rim into the edge of the cover, and cut off even with the top.

Tubs intended to be held through the season may be filled within one quarter of an inch of the top; cover with cloth as before, and fill to the brim with salt, add as much clear brine as the package will hold, strap down and do not disturb it till wanted, unless to add brine. As the water evaporates the salt crystalizes, forming a cover of hard salt, which should not be broken.

Use only Liverpool dairy salt, Ashton or other brands. Opinions as to the right quantities of salt differ fifty per cent. A slight excess is better and safer than a deficiency.

Allow no paper of any kind in contact with butter in any form. Use new bleached cloth, from which the sizing or starch has been removed by washing, and dip in brine before using. Put no salt directly on the butter, nor between layers in packing, nor on the bottom of packages, unless they were soaked in fresh water, then use as much salt in the package as will stick to the inside when bottom up. Use small nails which will not reach through into the butter. Keep packages bright and clean, remembering that they must not only be clean, but look clean, in order that external neatness may suggest internal excellence.

Churning Sour Milk.

Mr. N. A. Willard, in the *Rural New Yorker*, thus refers to the subject of churning sour milk:—

It is not necessary for milk to become "sour or thick" before churning, to make good butter. There is a difference of opinion among butter makers in regard to the proper condition of milk best suited for churning. Some contend that milk but slightly acid makes the best butter, others that the milk should be allowed to thicken. Good butter is made by either plan, if the milk be good, and all the conditions for keeping it be properly attended to. We know certain noted butter makers who insist that the best condition of the milk for churning—to get a superior quality of butter—is when the milk becomes thick and moist on the top of the cream. Where this plan is adopted, however, great care should be taken not to let the milk stand too long before churning, as in that case in hot weather it becomes too sour, and the butter will be sour also, and in cold weather it becomes bitter.

As skilful butter makers make good butter by churning milk when slightly acid, and also when it is thick or loppered, we are hardly prepared to decide as to the better system of the two. We hold, however, that the best system of butter making is to set the milk where it may be kept at an even temperature of about 60° for the cream to rise, and which should be taken off before

the milk sours. The cream then may be allowed to become slightly acid before churning. This is the plan usually adopted by noted butter makers of this country and Europe, who make an extra fancy article and obtain for it extreme prices.

In butter making it is essential to have good, clean milk, to keep it in a pure atmosphere, or at least out of the reach of foul odors—holding it at even temperatures and getting up the cream quietly. When milk is set in vessels surrounded by cold spring water the temperature is more easily controlled, and by getting up the cream on this plan and churning it, instead of the milk, there is less liability of making mishaps and of getting a poor article. We do not say but that good butter may be made by other processes, but they require more skill and watchfulness on the part of butter makers, and result in less uniformity of product than by the plan named.

Rennet.

At a recent meeting of the National Dairymen's Club, held in Utica, the subject of discussion being "rennet," Mr. H. Lewis, of Frankfort, spoke as follows:—

We often speak of the agents employed in cheese making, and by common consent designate heat, rennet, acid and salts, as the agents employed in changing milk into cheese.

Again, we speak of cooking cheese and scalding cheese, at a degree of temperature below that of blood heat.

Rennet is in fact the only agent employed in changing milk into cheese, and the quality of the cheese from first to last depends entirely upon the milk used, the rennet employed as the agent, and the degree of skill used by the cheesemakers.

This may look to some at first sight like whittling cheesemaking down to a small point indeed; and so it is, when we consider the fact that success in cheese making depends upon our strict attention, and at the proper time, to all the minutia of the business.

Again, cheesemaking is the most difficult, the most perplexing, the most recondite of all trades or occupations.

Notwithstanding this, success in cheesemaking depends upon three things, as I said before, *pure milk, good rennet, and a skilful cheesemaker.*

I have named these three things in the order of their importance. We sometimes find cheese of the finest quality made by persons without skill; but with all the skill in the world concentrated in one person, we could not expect cheese of the best quality produced from bad milk and bad rennet.

If I am correct in placing rennet second in importance in cheesemaking, every dairyman must realize the advantage gained by preserving and preparing rennet for use in cheese-making, in its purity.

Heat accelerates the action of rennet, and cold and salt retard its action; but from the moment of its introduction into the milk its work begins, and we first discover its work in coagulation, then in a continual hardening of the curd, by which the whey is rejected, and going on with its silent but important work in the cheese until that is brought to a state of ripeness which cheese must acquire.

to render it one of the best, and one of the cheapest, as well as one of the most nutritious articles of food.

How shall we prepare rennet for use in cheesemaking? Dip a sufficient quantity of whey from a sweet curd, or one-half gallon for each rennet to be used; heat it up to the boiling point, over a slow fire, and skim off all the albumen that rises to the surface.

Set the whey by until cold, then turn the whey off from the albuminous matter at the bottom of the vessel, and to each half gallon of whey add one rennet and sufficient salt so that there will always be a small quantity of salt undissolved. By rubbing the rennets three, or four times each day, for as many days, the liquid will be of sufficient strength for use.

Strain this into a jar to be kept for daily use, always keeping it supplied with salt undissolved.

Every time before dipping out for use, stir the liquid thoroughly.

The daily stirring will make the rennet of uniform strength, and also aid its keeping.

The rennet skins may be salted, and again dried, or put into another jar with half the quantity of whey first used, and by soaking and rubbing as before directed the liquid will, after a few days, be of about equal strength with that obtained at the first soaking, and may be strained into the jar with it.

The skins may now be returned to the jar, and sufficient whey added to cover them, a weight put on to keep them under, and sufficient salt to reach above the liquid.

The rennets will remain perfectly sweet any length of time, or until the jar may be wanted for a new batch of rennets. Then for each new rennet add a half gallon of whey as before; give the old skins a thorough rubbing and rinsing, after which they may be thrown away.

In preparing rennet for use in cheesemaking, two precautions are necessary. First. Every rennet should be carefully examined, so that no impure or tainted rennet will be put into the batch; and second, salt undissolved should always be kept in the jar while preparing it for use, and also in the jar from which the daily supply is taken.

Coloured Cheese.

A prominent dairyman, at the last convention of the Canadian Association in Ingersoll, characterised the condemnation of colouring cheese as absurd and opposed to "common sense." Coloured cheese might be highly injurious, but if people wanted it, "common sense" should urge us to give it to them. The consumer's health may suffer, but the cheese maker's pocket is filled; so let us go on colouring cheese. We are glad to find that the only argument that can reach these manufacturers is beginning to tell, and that people's taste and opinion are turning in a wiser direction.

The following extract from the *Prairie Farmer* is deserving of notice:—

The "slow poisoning" by deleterious additions is often much faster than many persons imagine. Let me state a fact that came under my notice several years ago:

A lot of highly coloured cheese was stored next door to the residence of my father. Doors closed I cannot say how long; but on

being opened the dead rats were lying in every direction! such rat holes in cheese!! they had probably eaten a little too much.

Why is it that we generally have a sore mouth for several days after a nibble at this modern coloured cheese, and are compelled to desist, and wait two or three weeks to get well; and then if we taste it again, have to pay the penalty as before?

In days of yore, we could eat the pure article, made by our mothers and sisters, two or three times a day, year after year, and nothing of the kind did we ever know. I believe that the amount consumed would soon be doubled, if not quadrupled, if the factories would drop all this matter of colouring. And I know for myself and some others that we would use ten times the quantity we have dared to consume of this high seasoned and false coloured article found in nearly every provision store in the city.

A Large Dairy.

It is said that the second largest dairy in America (the first being that of Chas. Webb Howard, of California,) is located about four miles from St. Louis. There are 800 cows in the stable. They are attended by Swiss milkers. The chief food used is ground corn, mixed with malt and oil-meal, cooked by steam. The average amount of material consumed per day is about 400 bushels of malt, 6,000 pounds cut hay, fifty bushels of corn meal, fifteen sacks of bran and oil-meal; cut hay and bran mixed together are also furnished. The summer pasturage of this mammoth dairy embraces an area of over 1,000 acres of fine rolling land, with numerous springs of pure water. The average daily yield of milk at the present time is 800 gallons, with eighty gallons of cream.—*Ex.*

French Butter in England.

According to the *Irish Farmers' Gazette*, there was imported from France into England, in 1869, butter to the value of 2,730,000 pounds sterling, and it commanded a high price in the London market, simply because it was not heavily salted, and was packed in snow-white, neatly shaped tins, of five, ten or twenty pounds weight. The *Gazette* also says it "would be well that the Irish farmers should know how to imitate the French mode of making up their butter, and recover the command of the English market." It is a fact, the reason for which we do not pretend to offer, that the European and American palates do not agree on the question of salted and fresh butter, Europeans almost universally preferring the latter. But we suspect the extreme neatness and apparent perfect cleanliness of the French butter packages had much to do with the price. In addition to that, however, the butter itself was in the best possible condition as to solidity and flavour. There are some things "they do better in France," and one of them is manipulating butter and putting it on the market in a shape to attract and please the most fastidious Londoner.

Grinding Cheese Curds.

The process of grinding curds seems to be coming gradually into vogue. We visited Dr. D. Wright's factory, at Whitesboro, to witness the operation of grinding by the use of a small oscillating engine, which does pumping, churning, etc. The curds are first treated after the American Cheddar method, by running off the whey just as it begins to acidify, and allowing the curds to drain and air while the acid is developing. It is then taken out in large chunks, put into the sink, run under the curd mill and ground, or rather picked to pieces, salted, and immediately put to press. If allowed to get too cold, it is difficult to make the cheese face. The curd mill or picker tears the curd to pieces as fast as one can conveniently feed it.

By this process a good deal of stirring is saved, no strainers or racks are needed, and the salting is done with more certainty and evenness. There is not so much danger of getting the curd too salt, and a few moments delay is not of so much consequence as it is when the curd is in the whey. It seems to be certain that a firmer cheese is secured. The gas which makes open cheese either escapes or does not generate, and hence a tainted or floating curd makes a cheese that stands perfectly true on the range without the least sign of "huffing."

That there is any real improvement in the quality of the cheese we are not prepared to say. The indications of tainted milk are still perceptible in the flavour, and cooling the curd retards putrefactive action, which will sooner or later show itself, especially if the cheese be subjected to excessive heat in the rail car, on ship-board, or in the store-house. Still, the advantages of the Cheddar process, and of grinding tainted curd, are apparent; but we concur in the opinion of Dr. Wright that, if the milk is all right, the old method is as good as any, so far as the quality of the cheese is concerned.—*Utica Herald.*

The *Utica Herald* reports that N. Smith, of Herkimer Co., N. Y., has made 14,200 pounds of cheese, shipping weight, from a herd of 20 cows in one year. He makes the cheese at home, and sells often, thus saving shrinkage. This is a remarkably large yield—710 pounds of cheese per year for each cow.

CALIFORNIA BUTTER.—A recent issue of the *N. Y. Tribune* says:—"The small arrival of California butter produced quite a sensation. It was in two pound cylindrical rolls of fine grass colour, waxy and high flavoured, such as our finest State will be one month from now. It has not been sold, but would readily command 50 cents per pound for its novelty, if not its real merits. Despite the disadvantages of climate, California is now making a quality of butter and cheese that will successfully compete with ours."

Entomology.

The Colorado Potato Beetle.

Our worst apprehensions have already been more than realized respecting the invasion of our country by the pestilent hordes of this most destructive insect. Not only have they made their appearance in the extreme western counties of Canada, but they seem to be spreading over the whole peninsula south and west of Lake Ontario. Mr. D. Falconer, Postmaster at Newry, township of Elma, county of Perth, has sent us two *live* specimens that were found on the potato in his neighbourhood; Mr. E. Baynes Reed informs us that they are swarming about London, county of Middlesex; and now Mr. J. Pettit sends us specimens captured at Grimsby, on Lake Ontario, and states his supposition that the beetle already occupies the whole country between the St. Clair and Niagara Rivers. This is assuredly an alarming state of things, and may well create grave anxiety in the minds of all the people of this country.

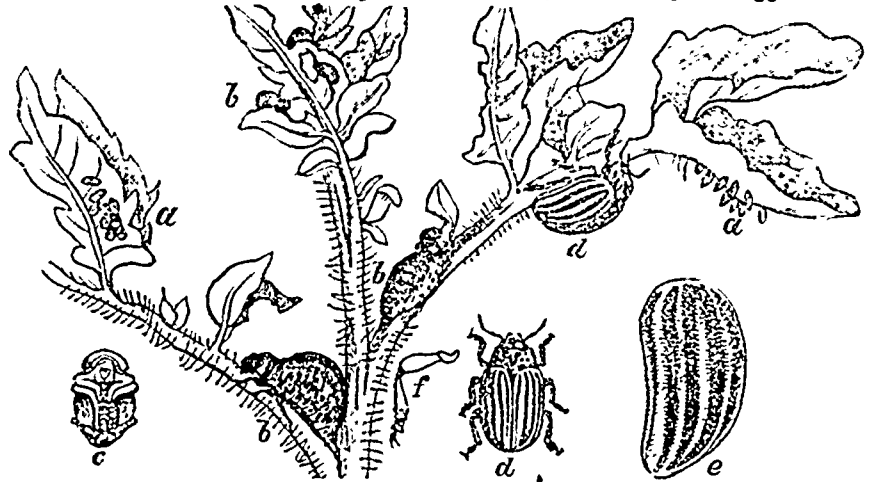
More than a year ago, before a single specimen of this insect had found its way into the country, we warned the community by articles in THE GLOBE and CANADA FARMER, in lectures in several places, and in conversation, that this pest was coming, and advised that active measures should be taken to prevent its obtaining $\frac{3}{4}$ foothold in the country. In August of last year we announced the landing of the enemy at Windsor, and repeated our advice that prompt efforts should be made to repress it; since then we have time and again reverted to the subject, but nothing seems to have been done. What was literally "everybody's business"—for it will affect every man, woman and child in the country—has been idly regarded as "nobody's business." And what is the result? The country is becoming overrun by an infinitely worse than Fenian army, and before long we shall have to record the destruction of hundreds of thousands of dollars worth of potatoes!

What is to be done to stay the progress of the ravages? Much can be done if all will co-operate, though we can hardly hope now to "stamp out" the pest. Let every one use his utmost efforts to exterminate the foe in his own fields or garden, and the result will be most satisfactory; but if only one here and there take the trouble to destroy the insects as they appear, of course but little benefit will be derived; he may, perhaps, save his own crop, but it will be a ceaseless, uphill operation. Let the Township and County Agricultural Societies, throughout the western portion of the Province at any rate, move in the matter, let them appoint committees of intelligent, energetic men to watch for the appearance of the insect, to disseminate information, arouse the attention of the people everywhere, and see

that every remedy is employed that is known to be efficacious. Let rewards be offered for the destruction of the creature, and, if possible, let fines be inflicted upon those who carelessly permit it to increase and multiply without let or hindrance.

As the subject is so important, and many of our readers may not keep on file the old numbers of this publication, we reprint the description of the insect that we gave last year:

"The Colorado Potato-beetle, regarded as a mere specimen, and not considering its destructive qualities, is a very beautiful insect indeed; its wing-covers are cream colour, with five longitudinal black stripes on each; its head, thorax, and under side orange-red spotted with black; when flying, its expanded wings are of a bright rose colour, giving it a beautiful appearance as it flies in the sunlight. There are about three broods of larvæ in the year, each of which goes underground to pass into the pupa state, the two first broods coming out of the ground



in the beetle state about ten or twelve days afterwards, while the last one stays underground all winter, and only emerges in the beetle state in the spring, just in time to lay its eggs upon the young potato leaves. The eggs are of a yellow colour, and are laid in patches of twenty or thirty on the under side of the leaves. The larvæ are of a deep orange-red colour, with a black head, black margin to the thorax, and two rows of black spots along each side; they are, when fully grown, about half an inch long, and have the body much humped up about the middle of the back. The larvæ are quite as voracious feeders as the beetles themselves. The insect belongs to the same family (*Chrysomelidae*) as our common Three-lined potato-beetle (*Lema trilineata*, Oliv.), but is larger and very much more destructive.

The accompanying illustration, representing this insect in its various stages, will enable anyone to recognize it and distinguish it from the common three-lined potato beetle. The engraving and references need scarcely any explanation; *a* shows the eggs, *b*, the larva; *c*, the pupa; *d*, the perfect beetle; *e*, a single wing cover; and *f*, a leg—both greatly magnified.

The depredations of the Colorado beetle are almost entirely confined to the potato plant, though it occasionally feeds upon the egg plant, horse-nettle (*Solanum*), tomato, ground-cherry (*Physalis*) and Jamestown weed or thorn-apple (*Datura*), all of which belong to the botanical family Solanaceæ. Its original food-plant in the Rocky Mountains is a species of wild potato (*Solanum rostratum*), to which it was confined until the advance of civilization brought the cultivated potato within its reach.

It is satisfactory to learn that this creature has many insect foes which tend to keep it in check and prevent it from having everything entirely its own way, though they are as yet quite insufficient to stop its progress from one part of the country to another. In the *American Entomologist* for November, 1868, there are enumerated about a dozen different species of insects that prey upon the Colorado beetle in some one or more of its stages, viz., a parasitic two-winged fly (*Tachina*), which lays its egg on the living

larvæ, from which a maggot hatches out, burrows into the body of its victim, and eventually destroys it; from different kinds of Lady-birds—the Spotted (*Hippodamia maculata*, De Geer), the Nine-marked (*Coccinella 9-notata*, Herbst), the 13-dotted (*H. 13-punctata*, Linn.), and the Convergent (*H. convergens*, Guer.), all of which are common in Canada—these little beetles, which are so useful in destroying the plant-lice or aphides of the hop, devour, both in their larval and perfect states, the eggs of the Colorado beetle, and thus, as we may say, "nip the evil in the bud;" the Spined Soldier-bug (*Arma spinosa*, Dallas), which thrusts its beak into the enemy's larva, sucks his body dry and throws away the empty skin, the Bordered Soldier-bug, (*Strictus fimbriatus*, Say), the Many-banded Robber-bug (*Harpator cinctus*, Fab.); a large species of Tiger-beetle, and several species of the Common Ground-beetle, to which we some time ago drew attention as being thoroughly beneficial insects. All of these, and many others, assist in the good work of keeping the enemy in check, but as they are not sufficient to cause his complete rout, man must come forward and lend his aid also".

Remedies.—The following are the remedies

that we have already recommended:—"When the insect makes its appearance, make a few small heaps of potatoes here and there in your field; the beetles will be attracted to these for food, and you can then easily kill them by going round every morning and crushing under foot all that you can find. This will prevent them laying their eggs and producing a fresh brood. Again, plant your potatoes, if possible, in a field surrounded by timber; or, if that is impracticable, surround it with a wide border of Indian corn. If all these means prove insufficient, then you will have to resort to the use of 'Paris Green,' which, being a preparation of arsenic, is a deadly poison. Be very careful then how you use it; never leave it for a moment within reach of children or careless grown people. Mix it with eight or ten times as much flour, ashes, plaster, or slacked lime, and dust it over the affected plants through a coarse muslin bag or sieve attached to the end of a stick. Keep to windward of it when at work, and apply it when the dew is on the foliage."

Wire-Worms.

We are requested by G. S., of Kingston, Ont., to suggest a remedy for the ravages of wire-worms. He states that "he sowed a field of barley last year, and found it in large patches completely destroyed by this insect; in a field of potatoes it was also very destructive, eating into the heart of the tubers, so as to injure their sale and to altogether destroy many. A neighbour who has suffered much from the ravages of the wire-worm says that he has tried large quantities of salt, but has found it ineffectual in ridding the land of them."

Our correspondent's complaint is no new one either here or elsewhere. Curtis, the great English authority on these subjects, says that "of all the insect enemies with which the farmer has to contend, there are none which are more fatal in their effects and more difficult to overcome than the wire-worms." And we are quite sure that there are large numbers of farmers and gardeners both in Europe and America who will fully subscribe to this statement, and join in lamentations over the ravages of this pest.

"Wire-worms," as they are commonly designated on account of their long cylindrical form and hard integument, which gives them a resemblance to pieces of yellow-coloured wire, are the larvæ of a family of beetles (*Elateridæ*), of which no less than 117 named species have been taken in Canada, and almost every collector of insects has a considerable number of unnamed specimens as well. The beetles are popularly known by the names of "spring-backs," "skip-jacks," "snapping," or "click-beetles," from the peculiar power they have of springing up into the air and recovering their proper position, after having been laid

upon their backs. As their legs are very short, they are unable to turn over when on their backs, and consequently would be very helpless creatures if it were not for this singular faculty of springing. The apparatus by which they perform this motion is very simple; it consists of a hard spine situated between the first pair of legs on the under side of the thorax, and a corresponding cavity on the under side of the abdomen, placed in such a way that the spine can easily enter into it. When the insect is on its back, and wishes to return to its natural position, it depresses its head and tail until the point of the spine is forcibly pressed upwards, and suddenly jerked out of the cavity; this movement instantly forces the middle of the back down again to the same level as the extremities, and creates a spring which sends the insect many times its own length up into the air; while in the air it turns over and alights upon its feet. This process is, no doubt, quite familiar to all our readers; if not, they can very soon observe it by catching one of these beetles and watching its movements.

Wire-worms are stated by a Swedish naturalist to remain as long as five years in the larval state, during the greater part of which time they feed upon the roots of wheat, barley, oats, grass, turnips, &c., and cause frequently immense damage to the crops. The eggs from which they are derived are deposited by the parent beetles in pastures and neglected fields, and other places undisturbed by cultivation; the young worms, when hatched, feed upon the tender roots of almost any kind of plant, and as they grow older attack the stalks and other parts as well; they are especially partial to potatoes, turnips, and other roots. They will always be found most numerous and destructive in fields and gardens formed from freshly-broken up pasture land, and are considered to be most formidable in dry seasons, though they require some moisture in order to live. All sorts of remedies for them have been suggested and tried, but few are satisfactory. When a field is observed to be badly affected by them, it ought to be ploughed up and kept in fallow for a season, taking care to keep ploughing it as often as possible, and to burn up all rubbish, stubble, &c.; this will destroy the eggs and starve out the worms. Lime and soot, to be applied to the soil before sowing any grain, are highly recommended by some, but are of doubtful efficacy. Salt on sandy soils is considered to be efficacious, but not on heavier clay lands. In a garden or small field they may be got rid of by strewing about slices of potato, turnip or apple, and examining the under-side every morning, when numbers will usually be found feeding upon the bait. Moles are very useful in destroying them in meadows, and a large number of our small birds devour them with avidity; ducks, turkeys and fowls will pick them up in ploughed fields, and toads are not averse to making a meal upon them. Our advice then is, break up and fallow your infested fields, ploughing often, and burning up the rubbish, and encourage in every way the farmer's best friends, the small birds. Make it an absolute law of your households that not one of them is to be shot or stoned, get your neighbours to do the same, and believe us, not many years will pass before you will find your insect plagues enormously diminished.

Mud-dauber Wasps.

We have received from C. C., Port Hope, Ont., a lump of clay taken from inside the roof of a shed; when entire it contained eleven insects. The sender desires to know what it is, as he had never seen anything like it before.

We have been so familiar from early childhood with these rough clay nests of the "mud-dauber wasps," which abound on the inside of the roofs of barns, sheds, and other outhouses, as well as in various naturally sheltered places, that we thought every one was fully acquainted with their origin. They are the work of various species of a genus of wasps, called "Mud-daubers" (*Pelopæus*), some of which are probably well known by appearance to most of our readers. For instance, few can have failed to have noticed a steel-blue wasp that delights in moist or muddy places, and is perpetually quivering its wings; it may often be seen so basking in the hot summer sunshine, on fences and other exposed places. The species of this, as well as some other genera, are remarkable for having a long and finely attenuated waist, as it may be termed, uniting the thorax to the abdomen.

To quote the description of a French species (which corresponds very closely to our own), from Duncan's splendid work on "The Transformation of Insects," the creature "is very slender, and does not seem fitted to carry burdens, but nevertheless it seeks clayey spots, and beats up small portions with its mandibles, and carries them off in order to construct its nest. It begins by forming one chamber, which is hollowed out in the clay brought from a distance and stuck on to a wall, and as soon as it is finished the female goes a-hunting, and, curiously enough, selects the most dangerous, bold, and well armed creatures there are for its prey. It does not hesitate to attack spiders; in fact, it rather enjoys the fight with them. Doubtless the strong sting of the *Pelopæus* is a terrible weapon, and if it touches the spider there is an end of the combat; but if not, this last insect has its web at hand, threads of which it can throw with great rapidity and exactness."

"The *Pelopæus* is both bold and prudent, and approaches the web flying carefully, and usually it manoeuvres so well that the spider is stung before it can do anything; but it sometimes does happen that the spider is prepared for the attack, and the *Pelopæus* finds its movements paralysed by some fine threads being thrown over it. Then the spider encircles its enemy with layers of web, and devours it. But it does not often happen that the *Pelopæus* is captured; on the contrary, it usually manages to bring one, two, or three spiders to its nest, according to their size. They are introduced, and an egg is deposited close to them, and then more clay is brought, and all is closed. Thus the first chamber is constructed and victualled, and then the female builds a second one on the side of the first, and upon the same horizontal line, and fills it in the same manner; then the third and the fourth cells are added, and sometimes there are six or eight of them. If a nest be detached from a wall (or ceiling) before the second metamorphosis has commenced, the cells will be noticed (as in the specimen before us) to be occupied either by larvæ or by cocoons, which have been made by them after the attainment of their full growth. The cocoons are made out of a paper-like tissue, and are soft and shining, and of a brown tint."

Correspondence.

Farming Implements forty Years Ago.

To the Editor.

SIR,—I was brought up in the Isle of Wight, England; and if there is, an old-fashioned place in Britain, certainly the Isle of Wight deserves the palm. This is attributable almost altogether to the facts—first, that there were no manufactures whatever on the island, the population being mostly agricultural; and secondly, that the occupiers of the land were almost always owners, or some family connection of the proprietor. Hence it usually followed that, as things had formerly been, so they continued to be. Tools and implements that had been used by our fathers, had also been used by their fathers, and, after the much needed repair, or renewal of the worn part, were destined to be used by the grandson. I am sure some of the manure forks we used weighed 8 to 10 lbs., and were formed of iron, heavy enough to kill an American by the very look of it. An English blacksmith told me that he used to require 12 lbs. of iron to make a fork. Our waggons were also enormous, heavy, lumbering vehicles, a load for two horses to take anywhere even when empty; and when loaded, five or six horses were always applied to move it about. The load so carried was about 80 to 100 bushels of wheat, sometimes 120 to 150 bushels; the horses were immense, great heavy brutes, weighing 1,800 to 2,000 pounds, and I believe sometimes reaching 2,500. This gigantic team would have to leave their stable at 5 o'clock in the morning to be enabled to get through an ordinary short day's journey; their pace seldom exceeding two and a half miles an hour. When we came into possession of the business, we supposed ourselves somewhat more enlightened than our neighbours, and discarding the heavy waggon and slow large horses, procured some waggons not half the weight, but still nearly twice as heavy as those our Canadian farmers use at the present day. We also horsed these vehicles with coach horses, about the same quality and weight as Canadian farmers use generally, but probably somewhat larger. Ploughs, harrows, carts, &c., were equally discarded, and lighter ones procured. I perfectly recollect an amateur ploughing match which took place on our farm. There were twelve four-horse plough teams, all sent by our own immediate friends; and to compete with these was our little plough, just like what is now used here, called at that time the "Tickle Swing Plough." All the teams were started at the same time, and each ploughed an acre. Our light two-horse plough, with only two quick-stepping coach horses, beat the four-horse team by one and a half hours in ploughing an acre. Ours were

fast walkers, and went across the field at about three and a-half miles an hour; whilst the others could not be made to move more than two miles in the same time. Our work was well done, and the quantity completed in so much less time, that the advantages of the two-horse team, with light plough and no driver, over a four-horse team with driver and heavy plough, were quite clear to any unprejudiced mind. The result was that almost all the farmers who were present at the match purchased the swing plough within two weeks, and by dividing the teams and compelling the drivers to take one half and the ploughmen the other, nearly double the work was done. Amongst other improvements, we were the first in our part of the country to construct the cradle—now so generally in use in Canada. We made it of steel, and it differed but slightly from those now used. I believe a steel cradle would now supersede all wooden ones, as more useful and certainly much lighter. At that time rollers were always made of stone, and of course were necessarily small in diameter, and usually about eight feet long. Now they are constructed like our Canadian rollers, of wood, sometimes formed like a cask hooped, or banded with iron, and of course of large diameter. One horse can with these improved implements, if of 30 inches diameter, do double the work that could be done with the old stone roller of about 12 inches. Where a furrow was at all deep, the roller of the small size, constructed of stone, could hardly be got out of it; whereas scarcely any impediment is afforded by any ordinary furrow to one of the above diameter. C.

The Canada Farmer.

TORONTO, CANADA, JUNE 15, 1871.

Utilizing Sewage.

The question of the disposal of sewage, considered in its economical and sanitary aspects, has occupied very considerable attention during the last few years in Great Britain and other countries. The practice that till recently prevailed of conducting the refuse of cities but a short distance from its source, and discharging it into some neighbouring river, has been found fraught with evil; not only defiling the water supply of the inhabitants, but giving rise to fever and malarious diseases by contaminating the air along the banks and vicinage of the polluted streams. Various expedients have been proposed and tried to obviate these disastrous consequences. Among the most successful methods adopted, that of utilizing the sewage water for the purposes of irrigation has met with the largest number of advocates in Great Britain. It has been tried extensively at Barking, Croydon, Rugby, Carlisle, and in the neighbourhood of Edinburgh; and the results as regards the crops in all these localities have on the whole been most favourable. At Hastings, and some other places also, a modification of the common practice has been

attempted, which has elicited a good deal of discussion, but does not promise to be so efficient or free from exception as its early advocates sanguinely predicted. This new method has been called the "A. B. C." process, from the initial letters of the three principal ingredients employed, namely—alum, blood and clay. The process aims at extracting from the sewage the fertilizing matter which it contains, and reducing it to a dry and marketable manure; while the sewage water, when thus treated, is so far purified as to admit of being discharged into a town river, or other large body of water, without polluting it. This change is sought to be effected by the addition to the sewage of what is known as the "A. B. C." compound, consisting of animal charcoal, blood, clay, alum, magnesia, and a few other chemicals, the principal ingredients, as already mentioned, supplying by their initials the name which the process has received. Whether this method, feasible as it appears, will ultimately be generally adopted, seems doubtful. At present the weight of testimony is in favour of the ordinary application of sewage water to irrigate fields, more particularly of pasture grasses, though its utility is by no means confined to these crops, but has been demonstrated in the growth of grain, roots, and the various products of the market garden.

Sewage irrigation, however, has not escaped opposition, and, no doubt, unless properly conducted, is open to serious objections. It is necessary, for example, that the fields to be flooded should receive no more of the fluid at a time than the soil can readily absorb. If any superfluous quantity remains long exposed on the surface, the surrounding air is rendered offensive and insalubrious. But where proper care and management have been exercised this danger has been avoided, and neither the health of the animals fed on the produce, nor that of the human inhabitants of the neighbourhood, has suffered.

A new danger has lately been mooted in connection with this important subject. Dr. Cobbold, and other microscopists, have brought to light the fact that the pasturage of sewage crops tends to increase very largely the number of parasitic ontozoa infesting the animals thus fed. This discovery has created some alarm; but the advocates of sewage irrigation contend that where the system has been longest in operation no ill effects have been observed among the animals grazed or fed on sewage farms; nor have the milk, meat and vegetables from the same source, though largely consumed in such districts for human food, produced any apparent increase of parasitic diseases in the neighbourhood. The objection is sufficiently serious, however, to call for the most careful investigation.

There can be no question that the soil itself is the natural absorbent and most efficient disinfectant of nearly every kind of impure water; hence, after percolating

through this natural filter, water, though derived from the foulest sources, is found to issue in springs, clear and sweet and wholesome, without a trace in taste or odour of its original impurities.

The deodorizing and disinfecting power of soil is the grand principle in the so-called "dry earth" system of dealing with the matter under consideration; and where this most efficient method can be carried out, it has much to recommend it. But there are practical difficulties in the way of its application in large cities which will probably prevent its general adoption. In the country, however, and on farms especially, we believe it is altogether the most economical, easy and effectual method of dealing with such refuse matter, rendering it not only inoffensive, but converting it into a most valuable fertilizer.

Whatever scheme may be adopted in the towns that are situated on the shores of our great Canadian lakes, there is not the shadow of an excuse for the gross mismanagement that too commonly prevails. Even though no system of utilizing the sewage of such cities be employed—if it is simply wasted by being discharged into the most convenient part of the adjacent bay or lake—with such a vast body of pure water close at hand, there is no reason why the inhabitants should not be provided with all they need without drawing the supply from the polluted vicinity of drain mouths, wharves and harbours. By carrying the pipes out to a sufficient distance into the lake, an abundant supply of the purest water might be obtained at comparatively small expense; and were the cost tenfold what is really required, the importance of the advantages to be secured would justify, and indeed demand, the outlay.

The too general neglect of such obvious and simple expedients for guarding health calls for emphatic condemnation. It is well for us that we are not altogether at the mercy of "corporations." If Nature were not more bountiful and provident than man, our cities and even rural districts would soon become depopulated by inevitable disease. Happily, in that wider domain beyond our control there are laws and operations that largely counteract the sources of harm. The waters deposit many hurtful matters which they receive, or they collect, in such ample abundance, that the great bulk is unaffected by the pollution; in the air, while its vast volume serves to dilute what would otherwise prove baneful, there are agencies that wonderfully conserve the due proportion and salubrity of its elements; and the earth, by a marvellous alchemy, besides nourishing the vegetation on its surface, converts the filth and poison it absorbs into pure and sparkling streams. These lessons from the great laboratory of Nature, if heedfully studied, and thoughtful minds are engaged in the task, will assuredly lead to practical applications of immense importance to us all.

Immigration

The increasing tide of immigration has long been recognized as one of the most fruitful sources of the rapid material progress of our own country as well as of the United States. Of the latter especially, for it has there been tried for a much longer time and on a much more extensive scale. During the last half century seven millions and a half of emigrants have sought for themselves homes within the bounds of the Great Republic. The calculation has often been attempted as to what amount of wealth has thereby been brought to the land of their adoption. The estimate in any case is but an approximation, but if the very low figure of \$500 be fixed upon as the value of each immigrant to his adopted country, we find that the national wealth of the United States is in this way every year increased by 190 millions of dollars, and that since 1848 three thousand millions of dollars have through immigration alone been added to the material resources of the country. This is only one view of the subject, however, and not by any means the most important. The influx of such numbers of labouring, industrious citizens quickens the whole energies of national life, and gives a mighty impulse to all those varied organizations and divisions of labour so necessary to the development and success of all enterprises calculated to secure the permanent material prosperity of the country. The United States have among their inhabitants representatives of almost every nationality in the world. Even Abyssinia sends five, while Paraguay is credited with one only. Egypt gives 20, and Corsica as many as 12. The great bulk, however—indeed more than half—come from the British islands. During the last 51 years as many as 516,192 have come from England; 1,416,619 from Ireland; and 84,623 from Scotland, while a large number from the British islands are not specially marked as coming from any particular locality. Altogether, during these 51 years, 3,857,793 have left Great Britain and Ireland for the United States. Germany comes next in point of numbers, sending during the same period 2,363,483; while France sent 245,812, and Sweden and Norway 153,928. China gives 109,502, and British America is put down for 284,491, though in that number there is no doubt included all those who come by the St. Lawrence route for the far West. It is very interesting to notice how year by year this great immigrant tide has increased in volume.

In 1820 the total number that came to the United States was 8,385. The next year a few hundreds more. Then down to a little over six thousand; then up to ten, eighteen, twenty-seven, sixty thousand, and so on, till we come to the year 1854, when it reached its highest figure of 427,833. The immigration of 1870 was nearer that of 1854 than any other year has been.

The number of emigrants both of native and foreign birth that embarked for foreign countries from any part in the United Kingdom, from 1815 to 1869, inclusive, was 6,786,697, and of these 4,276,597 went to the States, 1,356,476 to British America, 971,358 to Australia and New Zealand, and 152,266 to other parts.

A large influx from France to the States is expected during the present and succeeding seasons, but we doubt much if such expectations will be realized. The French are not an emigrating people, and even the Alsacians and Lorrainers may reconcile themselves to a change of nationality sooner than to a change of residence. For the two past years the emigration to Canada has been larger than it had been for many years before, though not much more than a tenth of what went to the States. We might have had a great deal more than actually came our way if anything like a corresponding zeal had been shown by our officials with that always exhibited by the servants of Uncle Sam. They know the value of immigrants, and take some trouble accordingly to secure them.

Free Importation of Improved Breeding Stock.

The expediency of encouraging the importation of improved stock for breeding purposes is recognized by our own and other Governments. An exemption from duty is allowed on such animals coming into the Dominion, and by a recent change in the United States tariff the obnoxious interdict against the free importation of improved breeding stock from Canada has been removed. With regard to our own regulations in this matter, though due consideration is given to the general claims of importers, there seems to be some unnecessary formalities that have been found very embarrassing and vexatious. It surely might be admitted, without requiring any elaborate proof, that the very fact of importing a male animal of superior class from Great Britain could only be for breeding purposes, and with the view of improving the live stock in the country; neither would any one be likely to import across the Atlantic a female of these breeds for any other purpose. Why then should it be necessary, as we are informed an order in Council has decided, that the importer, to entitle him to the exemption, should produce a written certificate from the breeder of the animal, endorsed by a magistrate in his neighbourhood? More than one enterprising importer, ignorant of this regulation, has been compelled, after his arrival in this country, to lodge a considerable sum with the custom house authorities until such time as the requisite documents could be procured from England. This seems to us a petty piece of obstruction. Greater liberal-

ity might surely be exercised in carrying out the principle of free importation of such valuable aids to the development and improvement of our agricultural industries. It is well, at all events, that those who are about to embark in this expensive enterprise of importing breeding stock should know what is required, and obtain the necessary documents at the time of their purchase, or at least before they leave British shores.

Growing Crops for Manure.

The winter of 1868-9 will be remembered by almost all farmers in Canada as one most unusually disastrous to the turnip, and root crop generally, throughout the Dominion. Thousands of acres of turnips were entirely destroyed by frost, and never harvested; consequently they were of necessity left to rot on the ground where they grew. In the spring following we called attention to the advisability of turning this calamity to advantage by recording the result of such decaying manure on the following crops. Some parties were observant enough to attend to the hints and suggestions thus thrown out, and nearly all who have given us any account of their experience describe the effect of such decomposed vegetation on the succeeding crop as most astonishing. So much was this felt by a few, that the plan of growing the root crops for manure *alone* was in one or two cases believed to be a paying operation. Many other people naturally argued that if farming in Canada was to depend on growing growing roots for manure, to be allowed to rot on the ground, the cost would far exceed the profit. The idea, however, may be worth more than the cursory thinker would imagine. Clover, the seed of which is very expensive, is grown often for manure alone; and why should not other crops be turned to similar use?

Leaving this question, however, for others to decide, and confessing for our own part a very natural reluctance to grow any crop simply to turn under, we shall be glad to hear from any parties who have observed the results on any subsequent crops of the turnips or other roots that were unavoidably rotted in the ground at the season to which we have referred.

We would also direct attention to the article of our valued correspondent C., in another column, on "Silver Beet for ploughing under," and recommend others to accept his offer and suggestions, so that they may fairly test the merits of this plant, of whose value our esteemed friend is so sanguine.

There is every reason to expect a considerable addition to the imported stock in the country during the present year. Among other enterprising breeders, the son of Mr. John Miller, of Thistle Ha', Pickering, has sailed for England with the view of purchasing Durham cattle. Mr. Hunter also, of Pilkington, who was so successful with his young Shorthorn bull and heifer at the last Provincial Exhibition, has left on a similar errand.

Implement Trial.

As already intimated, it is the intention of the Agricultural and Arts Association to hold a competitive trial of implements during the present summer, as early as the grain fields to be cut can be ready for the reaper. Arrangements are not yet sufficiently completed to announce either the time or place of holding the trial; but at the next meeting of the Council in June, it is probable these will be definitely settled, and due notice given to the public. The time will probably be about the middle of July.

It is now about seven years since anything of the kind was attempted. On that occasion, when the trial was held under the auspices of the Board of Agriculture at Hamilton, considerable interest was excited; and as great progress has since been made in the department of agricultural machinery, there is no doubt that the coming competition will be still more attractive and valuable.

From the published programme of the Council of the Association, we learn that the competition will be open to all; that entries must be forwarded on or before the 20th of June, to the Secretary of the Association, H. Thomson, Esq., Toronto, enclosing one dollar for entry money. This regulation, it is emphatically stated, will be rigidly enforced. It is therefore highly important that intending competitors should not delay making their entries beyond the specified time. The entries must be made in the name of the producers or manufacturers only.

The judges will be directed to regulate their decisions by reference to the quality, style, and price of the implements submitted to their examination, and especially the adaptation of the article to the purpose or purposes for which it is intended. All unnecessary or inappropriate ornamentation is forbidden, and any superfluous finish or decoration will forfeit the exhibitor's claim to a prize.

The prize list is divided into three classes, Class 1 comprising machines for hay-making and harvesting. Three prizes are offered in each of the following sections—Mowers, Reapers, Pea Harvester (horse-power), Sulky Horse Rake.

Class 2—Machines for preparing products for use—includes Threshing Machines, Fanning Mills, Straw Cutters, Grain Crushers, and Machines for sawing wood—three prizes in each section.

Class 3—Implements for tilling the ground, includes Ploughs, Gang Ploughs, Cultivators, and Harrows—three prizes for each.

Farmers as well as manufacturers will feel much interest in this competition, and it is to be hoped that the trials may in future be much more frequently repeated, if indeed it may not be found desirable and practicable to hold them annually.

Labourers' Wages in England and Wales.

From a Parliamentary return printed by order of the House of Commons, 24th April, 1871, we learn the average earnings of agricultural labourers in England and Wales for the first two quarters of 1870, as furnished by the Guardians of the different Poor-house Unions. These returns show that the average wages are higher than they were at one time, not very long past, but that still they are at a very low figure generally, and that more especially in purely rural districts far away from any manufacturing or mining centres. What is more distressing, however, than the mere amount of the wages, is the fact often mentioned in the accompanying remarks that employment is irregular, and at certain seasons very uncertain. The average wages are given, but it is not by any means left to be inferred that employment can always be secured at these rates. It is sometimes said that farm labourers are placed at a great disadvantage in Canada during winter, as if there were no such thing as "slack time" in England. Painful experience tells whether there is or not. In some quarters work is done by the piece or task, and then more is earned, though not more on the average of the year. Dorset is still, as formerly, noticeable for its low wages, though something of an advance is to be marked even here. Men get from 8s. 6d. to 12s. a week, or from two dollars and a York-shilling to three dollars. It is to be noticed that these rates are without food. Women get from seventy-five cents to a dollar per week, and even at these rates are, in many districts, not much employed; while boys under sixteen have from seventy-five cents to a dollar and a half. In Hereford, again, men have from two-and-a-quarter to two-and-a-half dollars per week, with a quart or two of cider per day. In reference to Worcester-shire, where the average wages for men range from two-and-a-half to three dollars a week, the remark is made "the wages of the best agricultural labourers are not reduced, yet more and more are every day unemployed." In Lincolnshire, one of the best agricultural counties in England, and one where the highest wages are given, men have from three and-a-quarter to three-and-three-quarters dollars per week, and women, when employed, earn about twenty-five cents per day. In Westmoreland wages are sometimes as high as four dollars and-a-half per week, without food, but that seems about the very highest paid, and that at the busy season of the year. In a few localities, men during baryest will earn by piece-work from a dollar-and-a-quarter to two dollars a day, but this is quite exceptional. Single able-bodied men, when hired by the year and boarded with their employers, have from \$90 to \$100 per annum, but this is not general. Upon the whole, it does not seem that

men's wages will average for the whole of England more than \$3 a week, if so much; while women cannot be said to earn more at rural labour than from 75 cents to \$1 50 per week, and with very precarious employment at that. Children under 16 get from seven York-shillings to a dollar-and-a-half, without food, though the younger ones are down sometimes as low as 25 cents for a week's work. And yet employers are so infatuated that they will sometimes look with a jealous eye upon all efforts made to induce labourers to emigrate, and will counterwork these efforts in every way possible! while here, in Ontario, labour is at a premium, and not to be had either in town or country. There is not a man shovelling up the mud from our streets in Toronto that is not getting at least a dollar a day. And if any one wish a little digging to be done in his garden, he finds he has to pay handsomely for it. The labours of Miss Rye and others in the way of bringing female help to the country are worthy of all commendation. Yet they have not slackened the demand in the least appreciable degree. There are more families in Toronto without servants, though both able and willing to pay for them, than there were two or three years ago; and the same thing is true of the country all over. Of course people must lay their account with some difficulties in coming across the Atlantic, and in seeking a home in a new country, but the contrast between the condition of the competent labourer in Ontario, and that of his compeer in England, is as noticeable as can well be thought of, while the prospect of getting to something better, which in the old country is *nil*, is here shown by thousands of instances to be as encouraging as could well be expected.

The Weather and the Crops.

The past month of May has been remarkable as one of the driest that has been experienced in Canada for many years. The total amount of rainfall has not indeed been greatly below the average, but nearly the whole quantity fell in one or two storms, and the general character of the season has been one of excessive drought. As the result of the dry weather setting in so early, after a somewhat cold season, which had kept back vegetation, nearly all spring crops have suffered to some extent. Hay will in all probability be short, and require cutting early to secure what there is in a proper condition. Spring wheat and barley also will probably fall below the average yield, though timely rains might yet effect a material improvement in these grains as well as in the straw. Fall wheat is faring much better, in most places looking very promising, and will, to all appearance, be early ready for the reaper.

The drought has been very extensive, and our neighbours in the adjacent States are suffering from the same cause.

Our meteorological report from the Toronto Observatory is as follows:—

May, 1871, has been marked by considerable changes of temperature and high cool winds, accompanied by excessive aridity of the atmosphere.

The average temperature at Toronto was 54°.15, or 2°.6 above the average; but 2°.1 colder than May 1870. The extreme of heat was on the 30th, reading 85°.0. (This, although high, is far exceeded in the western part of Ontario, where, during the forenoon of that day, at several places widely apart, the thermometer indicated 97° and 95° in the shade.) The lowest reading was on the 15th, 32°.4. The warmest day, 30th, with an average temperature of 74°.58, or 18° above the average of that day. The coldest day, 8th, 41°.55, or 8° below the average of that day. Hoar frost recorded on 2nd, 6th, 8th, and 9th.

The amount of cloudiness has been much less than usual, there being 6 clouded, 15 partially so, and 10 clear.

The prevailing winds have been N. and W., blowing with considerable force on some days.

The amount of rain is about two-thirds of an average fall for this month, amounting to 2.30 inches, of which 2.25 inches fell in two days, the 4th and 25th; in addition, a slight sprinkling fell on the 3rd, 5th, and 16th, but without exception, so long continued and general a drought has not been experienced so early in the season for over thirty years.

THE COLORADO BEETLE.—We refer our numerous correspondents who have sent us specimens of Potato Beetles to the article on the subject in the present issue, and accompanying illustration, whereby they will be able to recognize the new invader, and distinguish between the Colorado Potato Beetle and the Three-lined Potato Beetle, which is of small size, and has only *three* lines.

The persevering efforts at acclimatization made by the different Australian colonies, backed by the valuable aid received from the mother country, have resulted in great progress. Thus, the Victorian Society has fairly established the pheasant, the deer, and the trout, and though success has not yet been achieved with the salmon, owing partly to the unsuitable character of the streams, the attempt will not be easily given up. A couple of years ago four ostriches were received from South Africa and were sent to the Wimmera District, in the northern portion of Victoria, where the flock now numbers sixteen, and the young birds have outgrown their parents in stature. Some time since a public sale of feathers, taken from these birds, took place in Melbourne, when "fancy prices" were obtained. Much attention has been also bestowed on the Angora goat and the cultivation of silkworms. It is expected that the silk industry will soon be making bold strides.

Horticulture.

EDITOR—D. W. BEADLE,
CORRESPONDING MEMBER OF THE ROYAL HORTICULTURAL SOCIETY, ENGLAND.

Fruit in Nova Scotia.

NO. I.

We have received from an able and enthusiastic fruit grower, residing in King's county, Nova Scotia, a most valuable and interesting letter, the greater portion of which we lay before our readers. He says:—

"The portions of Nova Scotia best adapted to the growth of fruit are the valley of King's and Annapolis and the western part of Hants County, on the shores of the Basin of Minas. This is owing not only to soil, but to the protection afforded by the 'North Mountain,' a range extending from Cape Blomidon to Digby Gut, shutting out the cold winds and sea fogs of the Bay of Fundy. Some good fruit is also grown in the interior of Lunenburg, Queen's, and Yarmouth Counties, in situations sheltered from the sea, in some parts of Colechester and in the island of Cape Breton, on the shores of Bras d'Or Lake."

APPLES.

"These seem to be at home in this valley (the valley of King's and Annapolis, above described,) and I know of none that have been discarded as 'tender.' Some kinds are condemned as not being suited to this climate, simply because they do not bring their full perfection of colouring and flavour—as for example, the Fall Pippin makes a fine, large, healthy tree, yielding large, good looking fruit, but it is lacking in colour and flavour five years out of six. Our list of apples is large, and constantly increasing by the importation of foreign trees. The leading kinds are Baldwin, Blenheim, Pippin, Bishopshourne, Broadwell, Calkins Pippin, Chenango Strawberry, Colvert, Canada Reinette, Chebucto Beauty, Dutch Codlin, Emperor Alexander, Esopus Spitzenberg, Early Bough, Flushing Spitzenberg, Gravenstein, Golden Russet, Golden Pippin, Hubbardston Nonsuch, King of Tompkins County, King of the Pippins, Pomme Grise, Porter, Ribston Pippin, Rhode Island Greening, Snow Apple, Twenty Ounce, Talman Sweet.

"Diseases of apple trees are almost unknown. There is now and then a case of frozen sap blight, and an occasional cancerous appearance about the forks of the branches of some unhealthy or neglected tree, together with winter killing of nursery stock, which latter is occasioned by injudicious cultivation.

"We have a full share of insects. The most widely diffused and most destructive is the caterpillar *Clisocampa americana*, but it is easily kept under by the careful orchardist.

The Canker Worm, *Anisopteryx pomataria*, has been occasionally very destructive, but it seems to have some natural enemies which cut them off, as they do not continue for more than two or three years, but about that time disappear altogether. The Bark Louse, *Aspidiatius conchiformis*, is very troublesome in some localities, especially when neglected and allowed to make head. Strong alkaline washes, applied in the month of June, have proved to be the best remedies. The Two-striped Borer, *Saperda vittata*, has done some injury in many places, but is being better understood and looked after. The Codlin Worm, *Carpocapsa pomonella*, is very common, but not very injurious, except in orchards that have been mown for some time. The Fall Web Worm, *Hypocntrix vector*, has been increasing for some years; it has not done much harm yet, but must be looked after.

PEARS.

"We have not been as successful with these as with apples, but the cultivation of them is increasing, and many new kinds are being introduced. As yet the Bartlett stands at the head of the list of autumn sorts. Paradise d'Automne, Beurre Bose, Golden Beurre of Billon, Seckel, Frederick of Wurtemberg, Onondaga, Marie Louise, Flemish Beauty, Vicar of Winkfield, Winter Nelis, Duchesse d'Angouleme, Louise Bonne de Jersey, Rosttizer and Bloodgood, with many other kinds, have been fruited and approved. We have the following native varieties, which rank as high with us as either of the others.

"MARIA.—This fruit was first brought into notice by the late Hon. C. R. Prescott, and named by him in honour of his wife. It originated in the garden of the late Curran, Esq., of Windsor. Tree is hardy, small; young wood feeble, light coloured. Fruit is medium in size, round, yellow, fine grained, battery, rich; ripens ten to fourteen days earlier than the Bartlett; quality very good.

"BURBRIDGE.—One of the oldest native pears we have. The original tree is still standing on the farm of the late Col. Burbridge, near Port Williams, and though nearly a century old, is still vigorous. Tree large, upright, young wood stout and dark. Fruit small to medium, Bergamot shaped, skin greenish yellow, bronzed in the sun, sweet, gritty, but rich and high flavoured; ripens a few days earlier than the Bartlett; tree is hardy and prolific.

"LORD CORNWALLIS.—This was grown and named by the late Benj. Woodworth, Esq., of Cornwallis. Tree medium sized, rather spreading, young wood greyish. Fruit large and handsome, pyriform, as brilliantly coloured as Frederick of Wurtemberg, but, like it, rather variable; quality good; season, October.

"SUTTON'S GREAT BRITAIN.—A seedling from the Bartlett, by Wm. Sutton, of Cornwallis. The tree is vigorous and hardy, young wood very stout, short jointed, and

dark. Fruit large to very large, pyriform, slightly bronzed or russeted in patches, and sometimes with a blush in the sun. Flesh is coarse grained, juicy, good. A good market fruit, ripening ten days after the Bartlett. The tree is a great bearer.

"With regard to diseases of the pear, I may say that what is usually known here as frozen sap blight has sometimes been prevalent. The winter of 1868 was very fatal to young trees; it was estimated that three-fifths of all the young non-bearing pear trees in the Province were lost by it. The leaf blight frequently attacks the young trees in the nursery.

"Of insects, the Slug, *Sludion cerasi*, has been troublesome the past few years. Last summer I saw many trees, both pear and cherry, completely denuded of foliage by them. Wasps sometimes injure the fruit by eating holes in the finest specimens, to the great disgust of the careful amateur cultivator."

We must defer the continuation of this paper till another issue.

Mulching Newly Transplanted Trees.

A correspondent of the *Country Gentleman* says that the past spring he set out one hundred apple trees. Part of these he mulched with about four inches of coarse hay and straw, the rest he kept nicely hoed. All these trees are living except one, but those he kept hoed have made the best growth—over a foot, notwithstanding the drought. A near neighbour, who set last year, lost nearly half of his trees this summer, but then he had the pleasure of harvesting a poor crop of oats, sowed close up to the trees.

Keeping the surface of the soil mellow, by frequent stirring, is doubtless the very best mulch, but it is so apt to be neglected, to be crowded out by the pressure of farm work, that the safer way for our farmers is to put on a liberal mulch before dry weather or haying time sets in, and put their oat crop in another field.

A celebrated agriculturist used to say that the best fertilizer was cultivation; hence those who will attend faithfully to the stirring of the surface of the soil around their newly-planted trees, for a few years, will combine the advantages of the best mulch with the best fertilizer.

NEW GERANIUM—PINK QUEEN.—In the *Floral Magazine*, for March, we notice a fine coloured plate of this New Geranium. The foliage is of an intense deep green, with a broad black zone in the centre of each leaf, the flower of a very deep carmine pink, much deeper than in Christine or Beaute de Suresnes. It is said to be a free flowering variety, a very important requisite in a useful bedding plant. It is sent out this spring by Messrs. Downey, Laird and Laing, of Edinburgh, and will probably be in the hands of our enterprising florists next season.

Plants for Edging.

The Dwarf Box has been heretofore the plant most commonly used for edging flower beds and walks; but in our climate it suffers so badly in winter, unless constantly covered with snow, that it often presents in spring a very unsightly appearance. By the introduction of the dwarf growing varieties of the arbor vite we are made quite independent, and have in them an admirable substitute for the dwarf box.

The varieties known as Ericoides or Heath-leaved, Tom Thumb, Hoop's Dwarf and Booth's Dwarf, are all finely adapted to this purpose, being naturally of a dwarf habit, and admitting of being trimmed to any desired form or height. In addition to these qualities, they are quite hardy, never suffering from our most severe winters.

These plants grow slowly, and full grown specimen plants are held at high prices, but small plants, such as are most desirable for planting for edging purposes, can be obtained at much lower rates. We think plants of Tom Thumb, six inches high, are sold for six dollars per hundred, and Hoop's and Booth's Dwarf for ten. In those parts of the country where the snow does not remain all the winter at a sufficient depth to protect the box, these hardy evergreens will be found a most charming substitute.

Grafting Orange Trees.

To the Editor.

SIR,—I have orange and lemon trees, of eight years growth, that have not yet borne. Will you inform us of the reason, and what must be done to make them fruitful. If to be grafted, when? and where shall we obtain scions?

N. HERRING.

Seedling oranges and lemons require to be grafted in order to produce fruit. This is best done when the stock is starting nicely into growth, and the scion yet dormant. To obtain these conditions it is usual to keep the tree from which the scions are to be taken in a cool house or in the cellar, while the stocks are started into growth in a warmer house, giving the stock about three weeks the start, then bringing the tree from which the scions are to be taken into the same house where the stock is, and as soon as the sap begins to circulate freely take the scions off and insert them into the stock. They may also be grafted later in the summer, just before the wood of the scions is quite fully ripened, though the spring is considered the most favourable season. Scions may be obtained from most of the larger greenhouses about Toronto. Any of the gentlemen owning large bearing trees would be most happy to furnish a scion or two, which is no doubt all that will be required. If any large number be needed, it will be necessary to apply to the large greenhouse establishments that keep orange and lemon trees already grafted for sale.

The Currant Worm.

We are informed by Dr. E. Worcester, of Waltham, Mass., that the currant worm, so destructive to a favourite fruit, may be fully and almost immediately destroyed by the use of *carbolate of lime*. The doctor tried the powder in many instances during the present summer, and found that while it was fully as effective as hellebore, it was less disagreeable, less costly, and perfectly safe. The method of using it is to sprinkle it over the vines as soon as the worm makes its appearance, bringing it well in contact with the leaves, and soon the insect is destroyed. It will need but two or three applications, and the work is done. In this way, for a few cents, large quantities of currant bushes may be saved, and the fruit allowed to mature, and no danger whatever incurred. Neither the foliage nor the fruit is in any way injured by the carbolate of lime.—*Journal of Chemistry*.

[A friend who tried the carbolate of lime last season, tells us that he found it quite effectual as long as the worms were young, but not after they had attained their full growth, while the hellebore seemed to be certainly fatal in all cases. He found that it was not necessary for the hellebore to come in contact with the worms, but when some was placed on the upper surface of a leaf, it not only caused the worms on the under side to fall off, but *killed* them. Still, we should prefer to use the carbolate of lime, and we advise our readers to destroy all the worms with it before they get large. *Et. Jour. of Hort.*]

Substitute for Grafting Wax.

I had no regular grafting wax, and yet wanted to graft some apple trees. I tried various substitutes, but none of them answered. I thought of covering some cotton with a thin solution of resin and grease, making in fact a sort of sticking-plaster of it. This I did, and cut it into strips about three-quarters of an inch wide, hanging them on a little pole for use. After cutting and fitting the grafts, I took about 10 inches in length of these strips, and bound the graft round and round, using the sticking part next the tree. It answered splendidly, and the grafts were retained in their position as rigidly as if they grew there. The weather could have no perceptible effect on them, as the grafting strips stuck fast to the graft, and were perfectly water tight. The speed with each graft was made was something worth noticing; and to prevent the cotton sticking to the fingers, nothing more was requisite than to use a little grease on the operator's hands. I afterwards found that about 5 inches long by 1 inch wide, was quite sufficient for each strip, and much more convenient.

C.

String Beans.

Our favourite is the *Newington Wonder*. The pods are long, slender, green, crisp and tender—a wonderfully productive variety.

Refuge—Pods very tender, good flavour, extensively cultivated for pickling.

Early Valentine—An old favourite, very early, and the pods tender and excellent, continuing a long time in a green state.

As a pale, snap bean, the *Indian Chief* is perhaps the best, unless the new *Giant War* bean should prove to be superior. To keep up a succession and constant supply of snap beans during summer, several plantings are necessary; but there is little use of putting any kind into the ground until it becomes warm. Plant peas early and beans late, is a good and safe rule.—*Rural New Yorker*.

Small Birds.

A writer in the *Field* says that after vainly trying all sorts of expedients to keep sparrows and other small birds from his fruit and young vegetables, he found the following plan completely efficacious:—

“What, you will ask, is my talisman? Simply a ball of grey or whity-brown linen thread. I take a ball of this in my hand, fasten the end of it to one of the twigs of the gooseberry or currant bush, and then cross the thread backwards and forwards from twig to twig in perhaps a dozen different directions, fasten off, and the thing is done; and it will last two years—the thread on the trees, I mean. It is not necessary the thread should be white or coarse; it ought rather to be fine and dark—a thing to be felt, not seen. I have watched the birds after performing the operation; they come boldly to settle on the trees, and they strike against these to them invisible snares, for such no doubt they deem them to be; they fly off in a terrible hurry, and settle on the walls or trees round about, longing and getting hungry, till at last they disappear, and you will see them no more.

“As regards peas and other seeds which I always sow in drills, I simply stretch a thread, sometimes two, along each drill at about two inches from the ground, supporting it at that height by little forked sticks. If you put it much higher than this, the birds do not seem to care for it—it does not touch them: that is the grand secret, something which touches them, something they do not well see, nor know what it means.

I have seen people put thick white string with feathers tied to it, and perhaps two feet from the ground. The birds soon understand these, and care little for them; in short, I know to my cost it sometimes acts as a lure, a notice to the birds that there is something to be had worth looking after. I will answer for it, any one adopting the plan I recommend will never have cause to complain of the birds, however numerous they may be.”

Cauliflower

This delicious vegetable has been but little cultivated by our farmers hitherto, and we desire now to commend it to their attention, and to suggest that it will be found to be a very pleasant and valuable addition for their own table, and profitable to those who live near large towns where there is a market for vegetables.

This vegetable belongs to the cabbage tribe, and like the cabbage, requires that the ground shall be in a high state of fertility. The seed may be sown in May, in beds prepared for that purpose; and after the plants have attained the size at which cabbage plants are usually transplanted, they should be set out in rows about three feet apart, and eighteen inches apart in the row. The ground should be stirred with the hoe occasionally, kept free from weeds, and soil and plant treated as we do cabbage. When the cool and moister weather of autumn comes, the cauliflowers will begin to head, and just before the heads begin to branch, while the surface is yet white and nearly even, they should be cut, and cooked by boiling; or if not intended for home consumption, sent to market. If there should be any which have not headed when winter approaches, they can be taken up and planted out in a little earth in the cellar, the plants set close together as they can stand, and they will head there, affording a very nice vegetable for the table, oftentimes quite up to Christmas.

There are several varieties of cauliflower, but we name only two of them, which we believe will be found to be the most desirable in our climate.

Le Normand.—The leaves of this variety are toothed and waved on the margin, and it usually yields fine large heads, eight to ten inches in diameter. It is a hardy sort, and seems to endure well the extremes of our climate.

Witcheren.—This is also a hardy sort, being able to withstand the droughts of our summers better than most other kinds. In seasons when these droughts prevail, this variety has yielded fine heads when others failed.

To Protect Trees from Mice.

For the benefit of all having fruit trees in danger of being girdled by mice, I would say, a sure preventive is to remove all dead grass, manure, &c., which is a harbour for the vermin, and wrap around the body of the tree a strip of common roofing felt and secure with a string. The strip should be cut about eighteen inches long, and wide enough to go around the tree and lap. The felt being saturated with coal tar, nothing will trouble it. The expense of the felt is four and a-half cents a pound; one pound will cover twenty trees. In the spring remove. I will warrant this to be a sure preventive.—I. M. SHOWERMAN.

Pruning the Blackberry.

Persons having cultivated the blackberry are possessed of sufficient knowledge to understand the fact that the longer they allow the canes to remain unpruned, the lateral branches are proportionably shorter, and the fruit smaller. To obtain the largest size berries and the largest quantity too, cut back the leading canes to not exceed four feet in length, and shorten in also the lateral branches. This will be found to increase also the breadth of the stool, affording more bearing room, and generally to result in greatly improving the crop. It is not too late yet to shorten-in, where it has been much neglected, as we often see it in some gardens.

In July, the young wood, which by that time has grown over the tops of the old-bearing canes, should be clipped, especially the lateral branches. It will have the best effect upon the following year's crop.—*Germantown Telegraph*.

Black Knots on Plum Trees.

Cut them all off immediately; they will spread all over the tree if left. I have a nice row of cherry trees. Three years ago a few black knots appeared on the limbs. I intended to cut them off, but neglected to do so, and the following spring the tree was covered (nearly) with them; also many appeared on the next tree to it. The tree never leaved again, but is now dead as a hammer. I cut off everything that showed signs of black knots from the rest of the row, and I think they are saved. I cut open several of the knots, and found them filled with small worms or grubs. I think they are as dangerous to a plum and cherry orchard as epizootic aphtha is to cattle. Brother farmers, be sure to cut them all off and burn them.—*Massachusetts Ploughman*.

Sprouting Potatoes.

Sprouting the white potato will advance the crop two weeks. They should be cut so that about two eyes are allowed to each piece, and these should be planted in hot-beds, with very thin covering of soil; or it is better to plant in boxes, and set these in a hot-bed, so that after they are properly sprouted they can be at once carried to the place of planting. If the nights should be anyway cold, protect with a thin covering of straw when the plants make their appearance above ground. Some persons who want a large quantity sprouted, cut the potatoes as desired, and spread them on boards, boxes or crates, in a dark place, and when sprouted, say from an inch to an inch and a half, expose them to the light, moistening two or three times a week with tepid water. They should be planted out so that there is not more than two inches of soil over the top of the sprouts.—*Germantown Telegraph*.

Grape Culture.

"I want large vines for immediate bearing, not less than two years old, and three years old if you have them. I don't like to wait so long for fruit." So write many of our customers. Ah! yes, well, let us see about this "immediate bearing" business. Every person that has had any experience in digging trees knows that the great mass of new rootlets and fine fibres are formed at the end of the main roots and the side branches.

Now, in digging young stock from the nursery rows, certain rules are generally given and followed as regards digging—that is, to strike away a certain distance from the plant with the spade, and to a certain depth, and then cut under the plant and raise it out. After the tree or plant gets a certain age, the roots run out so far that it is utterly impossible to take them up and save all the root and especially that part which is of the most value to the vigour and life of the vine

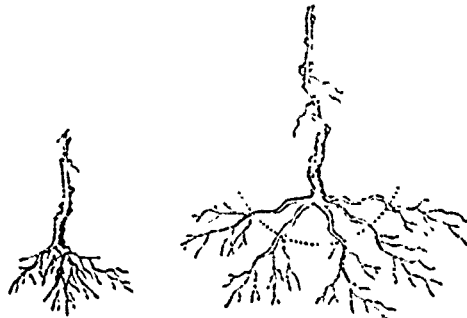


FIG. 1.

FIG. 2.

We will illustrate this by two rough sketches. Fig. 1, shows a young one year old plant—the roots all in a bunch, and all easily raised out entire with the plant. Now, when this is transplanted—the roots properly spread out in their new bed—it will hardly be checked in its growth. On the other hand, a two or three year old plant will grow similar to fig. 2, the dotted lines showing where the spade cut the roots. One will see at a glance that the part of the root from which the plant receives the most nourishment is cut off.—*Small Fruit Recorder*.

The advantages arising from planting evergreens in orchards are set forth by F. R. Elliott, in the *Journal of Horticulture* for April. He says:—"The ameliorating influence of the evergreen extends really but about fifty feet; yet within that distance the bodily system of man feels it perceptibly, and so, reasoning with careful observation of animal and vegetable life, each year tells me more and more that to ensure success and perfect development of either, certain warmth and shelter, &c., must be had. In the animal it is by means of artificial shelter and clothing in which they can be placed; but in the vegetable it must be the subduing influence of one plant upon another, and the evergreen, from long experience, is proved the safeguard and ameliorating nurse of the deciduous tree

Garden Tools.

As an amateur gardener, and not as young as I used to be, I have had my attention turned towards doing as much work as possible with as little labour as could well be expended thereon. Nothing troubles me so much as digging. Whether it is caused by increasing years or growing reluctance to arduous labour, I can scarcely decide; but certainly I found digging with a spade much harder work than I did twenty years ago, although I am still just as fond of gardening, and our garden, as I ever was. To meet the digging difficulty, at the instance of a manufacturing friend, nearly three years ago, I procured a four tined garden fork, and I now have exchanged it for one of five tines. I can dig with this implement nearly twice as much in the same time, and the manufacturers seem to have had a special eye to weak backs, for the new mode of bending the flat tines, lengthening the handle, and also putting a bend in it at the strap, and adding an extra tine or prong, caused the fork to do the work so much easier, as to make young gardeners out of old ones. Our Canadian manufactured tools certainly are quite in unison with American idiosyncrasy and certainly few will deny that that mainly consists in doing as little work as possible themselves, and where it is impossible to avoid doing some, to be able to use a tool that works to the very best advantage and most easily to the worker.

It will pay any one to buy one of these five prong forks for digging. They are useful for everything; even where earth has to be moved, you can do a great deal more with it than with a spade, and far easier. I use ours for all kinds of digging except in sod. Last autumn a man brought some potatoes to my house, and in filling them into the bushel measure from the waggon he used a potato fork. This was made of steel tines one-quarter inch diameter, and so arranged as to be the same shape in all respects as a grain shovel; the points of the prongs were, however, quite blunt, and on that account did not cut or wound the potatoes in the least, whilst at the same time all loose earth was effectually sifted out, and the potatoes left quite clean, without any adhering or loose earth. I thought this an excellent tool.

C.

The editor of the *Gardener's Magazine* says that if there is one prevailing fallacy in grape culture, which we should always be on our guard against, it is, without question, the tendency to afford the vines more nutritive aid than they can appropriate. Many more vines are injured by excess of food than by deficiency. In the vegetable kingdom the same law prevails as in the animal; it is not the quantity of food taken into the system which affords nourishment, but the quantity actually digested.

Celery Culture.

Celery is one of those vegetables with which the amateur often makes his most decided failure, although it is one of the most certain crops with the professional gardener; the cause of difference in results being attributed to care and culture at the proper time. Those who intend growing this vegetable on a large scale should always consult the best and most thorough works on the subject; but the man who only wants a few hundred head of celery may produce them by adopting the following plan:—

THE SEED BED.

Celery seed usually germinates slowly, and the plants are exceedingly small and tender when they first appear; consequently a carefully prepared seed bed is positively necessary. If there are no hot-beds that can be used for this purpose, select a warm spot on the south side of a fence or building, and as soon as the frost is out of the ground dig up a bed, say three feet wide and ten feet long, cover it with fine manure, two to four inches deep, and dig it in and mix it with the soil. Rake the bed level and sow the seeds evenly over one-half the surface, leaving the remainder vacant, and for use when the plants are large enough for their first removal. Pat down the surface with the back of a hoe or spade, and this will usually cover the seed sufficiently deep; if not, sift on a little very fine soil. Give the bed a good soaking of tepid water, applied through a watering pot with a fine rose. It will not do to dash on water with a pail or some similar vessel.

The seed bed must be frequently watered, and never allowed to get dry, until the plants appear, and thereafter sufficiently to keep them growing. If the plants come up too thickly, thin them out; but as soon as large enough to handle, take up and transplant into rows, beginning on the vacant end of the bed, placing them four inches apart each way; and a bed of the size named will hold about three hundred. The plants may remain in this position until wanted for final planting in the garden, which we usually do about the first to middle of July. Plants that have been transplanted in the seed bed can be safely removed at almost any time, whether the weather is moist or dry.

FINAL PLANTING.

We adhere somewhat tenaciously to the old practice of trench planting for ordinary garden culture. A trench is dug of the required length, or several of them, four feet apart, and one spade deep, which, as a general thing, will not be more than six or eight inches, and about a foot wide. This trench is then half filled with fine stable manure, and this is mixed into the soil in the bottom of the trench. The trench, when thus prepared, will be about four inches deep, exclusive of the soil, which has been thrown out upon either bank. The plants are then set in the centre of the trench six inches apart, and, after planting, carefully watered. The reason why we like the shallow trench is the convenience of watering, as when applied it is sure to reach the roots and not spread over the surface, as when level culture is adopted. From this time forward, until the blanching is commenced, all that is required is to keep the plants growing by careful culture, such as frequently stirring the soil and giving water when required.—*Rural New Yorker.*

New Indian Azaleas.

The *Florist and Pomologist*, for April, figures two beautiful new Azaleas, of which it says they "may be honestly recommended as possessing distinct features and an ornamental character, and as being acquisitions of no mean order to this growing group of gay spring flowers.

"These new varieties are named *Fanny Fillery* and *Acme*. *Fanny Fillery* is a sport from *Triomphe de Gand*, obtained some three or four years since by Mr. Fillery, of Welbeck. It has, we hear, a strong, healthy habit, and is a profuse bloomer, the flowers keeping perfectly true as to colour and marking. The flowers are of average size, of a bright rosy pink colour, the upper segments richly spotted with deep crimson, sometimes nearly over the whole surface of the central one, and the edge being of a pure white, breaking inwards in an irregularly feathered manner. Its bright and showy character places it in the first rank in the variegated group, and we believe it will be found to be the best of its class; certainly it is a very fine and valuable Azalea.

"*Acme* is a self-coloured Azalea, of good quality, and is remarkable for the great substance of its blossoms, and for its rich, deep, rosy-crimson colour, a peculiar tint which we have not seen in any other variety."

"The varieties of Indian Azalea are by no means difficult of culture. Young, free and healthy plants should be chosen; and if of the weaker small-leaved varieties, they should be grafted on free growing stocks; if of the more robust sorts, they are better on their own roots. The best time to re-pot is about the month of June, or when the plants are in active growth. In potting, the soil should be made quite firm around the mass of roots, so that the water applied may not run through the new soil, leaving the old mass dry—a fertile source of mischief to the plants. While in active growth, they delight in a close moist atmosphere; the syringe should be freely used, and the plants shaded from the mid-day sun; but as soon as they have made their growth, they should be exposed by degrees to more air and light, and less water must be given, though the earth must never be allowed to get dry. It is of the first importance to the production of fine blossoms to have the flower buds set as soon as possible, as the quality of the flowers will be in proportion to the perfection of the ripening process. If the plants are sufficiently advanced to be set out of doors for a few weeks previous to the autumn rains coming on, it will benefit them; but in exposed situations it will be necessary to protect the pots from the sun, which may be done by standing each pot within one a size larger. The proper soil to use is silvery sand, mixed up with a good portion of silvery sand, and some small pieces of broken pots. Clean pots should be employed, and they must be carefully drained."

Gesnera Bægelia Exoniensis.

This is truly a gem. It is not often we see such beautiful foliage and flowers combined. It is one of the finest plants I know of for table decoration, as the rich, dark, velvety hue of the leaves, and the bright colour of the flowers, contrast admirably with a white tablecloth; under the chandelier as it stands amongst the glittering silver and glass, it is, indeed, perfection. For the decoration of the conservatory or stove it is also most valuable.

I have a specimen about two feet through, with upwards of a dozen spikes of magnificent flowers. It is as fresh and beautiful now, in February, as it was at Christmas. The flowers are of an intense orange scarlet, with a yellow throat. The leaf is of a very dark velvety texture, studded all over with minute red hairs, almost like plush.

I remember some years ago, when I first saw *Gesnera Suttoni*, how much I admired it. This year I have had several other varieties growing side by side; they have done flowering for some time, but *G. exoniensis* is as fresh as ever.

When I received my plant several of the leaves were somewhat damaged with the journey. I cut three of these off, and cut the stock of the leaf about half an inch from the base. I next took three small pans and half filled them with crocks, on these put about two inches of peat, and filled up with silver sand. I then placed the leaves on the sand and pegged them down. From these I have now more than a dozen nice young plants, and by next winter they will be strongly established. I mention this merely to show how easily it can be increased.

I am growing mine in our stove, side by side with *Dalechampia Roeziana rosea*, in full bloom; and hanging over it, on one of the supports of the stove, is *Thurbergia Harrisii*, producing masses of bloom, its lovely blue flowers contrasting most pleasingly.—*F. P. L., Cottage Gardener.*

Fruit near Kingston.

An earnest horticulturist writes to us that the Bartlett, Louise Bonne de Jersey, and Flemish Beauty, do well in that locality, though some think the Bartlett a little tender. Cherries, except the very hardiest kinds, are a failure. Of grapes, the best (with him) are, other things being equal, the Adirondac, Hartford Prolific, Rogers' Number 3, Delaware, and Sweet Water; that is, so far as yet tried, and he had many varieties. Currants do well, with the exception of the Cherry currant. Raspberries stand the winter, six kinds of them, without laying down; and the Whitesmith gooseberry is as fine as in England, and as well flavoured. The two best strawberries, so far, are Wilson, and for flavour and general purposes the *Triomphe de Gand*. Apples, generally, also succeed when carefully attended to. He says that he does not succeed with the Concord grape, whether owing to want of judgment in his treatment of them or to inferiority of climate, he cannot tell. Last year they were very fine, but last year was an exception.

This circumstance points to the climate as being in fault in the matter.

The Apple Tree Borer.

"If there be any plague of insects, next to the potato bug, which has haunted my sleeping hours, and should rank me a saint in my waking ones, for not breaking the third commandment, it is the apple-tree borer. For ten years I set out fruit trees, combined any amount of 'eternal vigilance' with cold steel and knee pads, only to see them, one after another, succumb to the little pests, their trunks looking as though they had received a double dose of malignant small-pox. Not content with attacking the base of the trees, they would go as high as the lower branches, and drill themselves into the crotches.

"I was in despair; and when I had written to some great light in horticulture of my trouble, and was coolly informed 'that the fruit grower in every new country was subjected to such *little* inconveniences,' I was perhaps, — something else. I was about to give up vanquished, and after committing my orchard to the flames, retire with all the honours of war—glory nowhere—when I was advised to try the following method, which for the past two years has proved, with me, a decided success.

"In the spring, just before vegetation starts, level the ground, and pack it firmly around the foot of the tree, in a circle of from two to four feet in diameter, according to the size of the tree. Take unleached ashes and air slaked lime in equal parts, well mixed, and apply to the circle thus made, covering the ground all over two or three inches in depth. Then take strong soap suds, or what is better, a solution of half a pound of sal soda to one gallon of water, and wash the entire trunk and the base of the limbs thoroughly. Repeat this operation in the fall of the year, just before freezing weather, covering the ground with the mixture of ashes and lime, and washing the trunk and base of the branches with the solution of sal soda. If any one who is as badly troubled with the borer as I have been, and has never seen this simple recipe, will try it, I know that if his experience equals mine, he will send me post paid the largest apple his rejuvenated trees bear and that can be allowed in the mail bags.

"All of my trees that were not damaged before I tried this plan are as fine and thrifty as any I ever saw, and I have not as yet found the mark of a borer upon them."—*Tilton's Journal of Horticulture.*

We have copied the foregoing account of this gentleman's experience, in order that the readers of the CANADA FARMER may see how a little intelligent care will accomplish the most desirable results, while much labour not guided by knowledge is only toil in vain, resulting in disappointment and vexation. If this cultivator had given a little attention to the study of entomology; if when he had found his trees infested with the borer he had read an article on the natural habits of the two borers that usually infest apple trees, such an article as every Canadian farmer can find at pages 69 and 71 of the Report of the Fruit Growers' Association of Ontario, he would have learned how both to lighten his labour and secure the victory, to say nothing of bug-haunted dreams and temptation to profanity. He would have learned also that the great spread of lime and ashes, from two to four feet in diameter, around the trees, however valuable as a

manure, was quite useless in preventing the insects from attacking them. If the wash of sal soda, potash, weak ley, soft soap, or any other alkali, be thoroughly applied to the trunk from the root to and along the base of the branches, and repeated when washed off by rains in that part of the year when the winged insect deposits her eggs, in this Province from the middle of May to middle of August, it will be found quite sufficient. At the surface of the ground the bark is more tender than on the trunk of the tree, and here the borer particularly delights to deposit its eggs; therefore a quart or so of unleached ashes, or of ashes and lime mixed, placed upon the ground against the collar of the tree, will be useful in preventing the beetle from laying her eggs on this most vulnerable part, but beyond a mere circle covering the bark of the tree at the surface of the ground, will have no effect upon the borer. Again, the application advised in the fall, just as the ground freezes, is wholly unnecessary. During the winter there is no danger of eggs being deposited on the bark, or anywhere else. If they have been deposited during the summer, and the grub has hatched and lived, which cannot be if the bark has been well coated with an alkali; but if the grub *has* lived, it has already penetrated through the bark and into the sap wood of the tree, quite beyond the reach of the wash or anything else than cold steel.

Let us then remember the lesson, that labour to be profitable must be guided by knowledge. This fruit grower failed in his attempt to preserve his orchard, not for want of industry, but for want of knowledge, and when told of a remedy, he expended a great deal of unnecessary labour because he was yet ignorant of the reason why the remedy was efficacious.

Lessons of the Garden.

Every gardener must be an infidel—I am, and I glory in the fact—on the subject of infidelity. The proofs and the precepts of natural and revealed religion are brought so frequently and impressively before him, that he cannot believe in unbelief. He takes a seed, a bulb, a cutting (who made them?); he places them in the soil which is most congenial (who made it?); the seed germinates; the bulb spindles; the cutting strikes; he tends and waters (but who sends the early and the later rain?); and the flower comes forth in glory. Does he say, with the proud Assyrian, "By the strength of my hand I have done it, and by my wisdom?" Does he not stand rather, with a reverent wonder, to consider the Lilies, (the Amatum, it may be, the glowing Amaryllid, or the lovely Eucharis, in robes pure and white as a martyr's,) until the very soul within him rises heavenward, and "Thy hand hath made them all," in his psalm of praise.

And the truths of Revelation, the histories and the prophecies of the Older Testament,

the miracles and parables of the New, are taught as constantly and as clearly to the gardener in his daily life. In our gardens always

"There is a book who runs may read,
Which heavenly truth imparts,"

ever reminding us of that Eden wherein were all things pleasant to the eye and good for food; of Gethsemane, and of that garden where our crucified Lord was laid. What is our love of flowers, our calm happiness in our gardens, but a dim recollection of our first home in Paradise, and a yearning for the Land of Promise. Here in the wilderness we love to reclaim these green spots from the brier and thorn; to fence and to cleanse; to plant and sow; to sit at eventide, when work is done, every man under his vine and under his fig tree, with thankfulness and hope. With hope, because these our gardens—scenes though they be of brightest beauty to our eyes, and sources of our purest joys—do not satisfy, are not meant to satisfy our hearts' desires.—*Rev. S. Reynolds Hole*

STRAWBERRIES.—Those who want large strawberries, and plenty of them, should give their strawberry beds a liberal top dressing of well rotted manure, and mulch the surface of the ground heavily between the plants. Fresh cut grass, old hay, short straw, all these make a good mulch, and this mulch makes a great difference in the crop of fruit.

THE COL. CHENEY STRAWBERRY.—We are under obligations to Mr. Purdy, the able editor of the *Small Fruit Recorder*, for plants of this new variety of strawberry. These have been carefully planted, and, when fairly tested, we shall give the readers of the CANADA FARMER our opinion of the merits of this new claimant for popular favour.

ORCHARD CULTURE, &c.—"A subscriber," writing from Lancaster, Glengary, wishes to know what book will give him directions for raising and cultivating apple trees especially, and the general management of an orchard. Barry's Fruit Garden will meet our correspondent's wants the best of any work yet published.

WATERING PLANTS WITH HOT WATER.—It has lately been shown, by careful experiment, that sickly potted plants, even some that have almost died cut, can be greatly benefited, and sometimes, indeed, entirely restored to vigour, by applying warm water to them instead of cold. In certain cases, oleanders which had never bloomed, or did so only imperfectly, after being treated with luke-warm water, increasing the temperature gradually from 140° up to 170° F., produced the most magnificent luxuriance of bloom. Similar results occurred with an old plant of Hoya, and also with an India rubber tree which had nearly withered away. In all these cases the application of water heated to about 110° F., without any other precaution, caused a new and flourishing growth.

Poultry Yard.

Turkey Raising.

For the last ten years a multitude of farmers east of the Hudson, and not a few west, have made more money from their turkeys than from any other one kind of stock. Ten well managed turkey hens will give a larger net profit than ten cows, if, in addition to good management, the farmer has good luck. The first six weeks in the life of the young are the most perilous. After that time, they are comparatively safe. Some men out of a batch of a hundred, never lose one—and this is the way they manage them. Let the mother of the new-born brood choose her own time to leave the nest. Taking off is always bad policy. As soon as the nest is left, make a yard, twelve feet square, by setting boards edgewise. Remove the turkey and her brood into this little pen, wherein they should be kept for at least six days, after which they may be let out in the middle of the day, and permitted the range of an acre; but they must always be gathered at least an hour before sundown into the pens, to remain until the dew is off the next morning, and all the day, if there is the least appearance of a storm. When the mother leaves the nest, wash the naked parts of her body thoroughly with tobacco juice, to kill the inevitable lice; and at the same time dust thoroughly the young with some vermin-destroying powder. No one thing kills as many young turkeys as these parasites. As a preventive, sulphur and snuff, mixed in equal quantities, and dusted on the nest after the turkey has been sitting two weeks, is recommended; but nothing should prevent the washing of the mother, or the dusting of the young, the day the mother leaves the nest, and two days after the young have left the shell. Young turkeys require but little food, but they need to be fed as often as once an hour for the first week. Coarse-ground Indian meal, mixed with sour milk curds, and fine chopped hard-boiled eggs, is the best feed for the first month. After that, the eggs may be left out, the meal ground a little coarser, and the curds, if you have them, used in larger measure than at first. As soon as they can swallow whole grain, give them that, and then all trouble in this direction is at end. Until they are two months old, they must be driven to some shelter every night, and never be allowed to remain in the fields through a long or heavy rain. Even when one-quarter grown they will die from exhaustion, trying to follow the vigorous and unrearing mother, if wet with but a heavy dew. Three rules, then, must be observed, if those who attempt to raise turkeys would secure success: First—Be sure to free both old and young from lice immediately upon the old ones leaving the nest. Second—Feed frequently at the beginning with strengthening food. Third—Never let the young turkeys get wet, either with dew or rain, until their feathers afford their bodies if not complete, at least partial protection.—*Ex.*

Is Poultry Keeping Profitable

Upon this subject the *Western Rural* makes the following just and sensible remarks, giving some cogent reasons why poultry should be kept upon the farm, and as to the profits arising therefrom:—

“For several years poultry have been very profitable, eggs and chickens commanding a high price. By a little attention to their breeding and management, poultry may be made very valuable to the farmer in many ways, one of the most important being the excellent manure which they make. A comfortable frost-proof poultry house should be constructed, in such position that the hens will have access to the orchard, for they are exceedingly useful for destroying the curculio, the apple worm, and other hurtful insects. Plum trees in a poultry yard generally yield an abundant crop of fruit, perfectly free from the attacks of the curculio. The best breed of fowls are always the most profitable; but even these should not be kept more than two or three years. Old hens should be got rid of, and young, vigorous pullets put into their places. The floor of the poultry house should be covered with wood ashes, dry muck, or old sawdust, for the purpose of absorbing the offensive smell. The house should be cleaned out frequently, and the manure left in a shed, or in large casks or boxes, until required for use in spring; its effect on field or garden crops is remarkable.”

Packing Eggs with the Large End Down.

Mr. Geye in some years ago recommended the packing eggs, either for hatching or for table, with the large end downwards. The recommendation little heeded at the time, has been revived by Mr. Wright, who received a hint to the same effect as Geye's from a lady, and put the suggestion to the test by a series of experiments. This lady reasoned as follows:—“Keeping eggs on the small end appears to me to cause the air bubble to spread, detaching it from the shell, or rather from its membranous lining, and after being so kept for a fortnight the air bubble will be found to be much spread and the egg to have lost much of its vitality, though still very good for eating.” She then described her success with keeping the eggs in the contrary position, saying “Owing to this method of storing, such a thing as a stale egg has never been known in my house; and as regards success in hatching, for several seasons, when I was able to attend to my poultry myself, of many broods set every egg produced a chicken.”

Mr. Wright, in reference to his own experience, says:—“After considerable patient testing of both methods throughout two seasons, I can now say without hesitation that there really is a marked difference between the vitality of eggs kept more than a few days, according to the position in which they are placed. It will be found, as this intelligent lady states, that the air-bubble in one case is much more spread than in the other. This can be tested at once, but of course of

itself proves nothing. The great point is—and it is in this way the matter is especially interesting to all fanciers—that eggs are perfectly good for hatching at a month old when stored with the large end downwards; and thus the eggs of valuable birds may be kept till a hen is ready for them, or eggs may be sent from distances which under the old plan would give little hopes of success.”

Housekeepers, as well as breeders, will do well to take note of this suggestion, and test the matter for themselves.

Egg Swindling.

The *Gardener's Monthly* calls attention to the practice of swindling in eggs which prevails extensively on the other side of the Atlantic among poultry fanciers. Breeders in Canada who send for eggs from Great Britain, should be careful that they deal only with parties of approved reputation. The authority to which we refer states that it is the custom of the fraudulent dealer in eggs to fill them before they quit his hands. No one needs to be told that to render an egg useless for the nest is easy enough without spoiling its appearance. A few seconds' immersion in boiling water will accomplish the object of the cheat. A smart shock, accomplished by a quick movement of the hand while the egg is grasped firmly, will sufficiently rupture the membrane and disengage the fluid contents to serve the same purpose. It matters not how eggs are killed, it is a fact that they are killed preparatory to being sold at from one to five shillings each, and that is the infamy we feel it our duty to expose. Those who kill eggs can always be taken themselves to the same argument as those who kill garden seeds. They can repudiate the accusation of fraud by charging the purchaser with unskillfulness in obtaining progeny. When seeds have been in the ground a month, and there is no plant to justify the sowing, who is to say the seeds have been killed in heated ovens before the purchaser obtained them? When eggs have become rotten in the warmest nest, who is to say that they were dead when first placed there? In such cases it is fair to make general deductions, as it may be said, with little fear of contradiction, that fully three-fourths of all the eggs sold to amateur breeders of poultry are as dead as door-nails at the very moment they are packed up in compliance with their “obliging” and “prepaid” orders.

Rearing Fowls for Market and Eggs

THE BEST BREED TO REAR FOR MARKET.

The best breed of fowls to rear for the market, or as egg-producers, depends upon locality; for while, in some places, one variety is deemed the best, in others it would prove the reverse. Our own opinion is, that, for a market fowl, the Brahmas and Cochins will, under almost all circumstances, prove the most desirable, they being less liable to

disease, feathering up quickly, and can be bred to weigh, at from four to six months of age, eight to ten pounds. Another good table fowl is the Dorking (cock) crossed with the Brahma (hen). The flesh of this cross is sweet and nutritious, and acquires at early age the plumpness of the Dorking at maturity. There are other breeds, however, which are said to be desirable to rear for the table. Many claim that the French breeds of fowls are of this number; but this we very much doubt, as their flesh lacks the buttery, golden colour that attracts the eye of the epicure. They may prove valuable as egg-producers, but they lack many good qualities as a table bird. Dorkings are undoubtedly at the head of the list as table birds, but of late years have become so subject to disease that we question the feasibility of rearing them profitably for market in our changeable northern climate.

THE BEST AS EGG-PRODUCERS.

As egg-producers the Hamburgs are claimed to stand at the head of the list. This claim we are prepared to dispute; for, as winter layers, we find that the Brahma, Cochon, Leghorn, Poland, and Houdan stand relatively in the position here named. That the Hamburgs are good egg-producers we admit; but that they are any better than a number of non-setting fowls, so called, we deny. The richness and meanness of their eggs are not to be compared with those of the Poland, Leghorn, Houdan or Brahma; and their eggs lack the size of those named. All things considered, we have no hesitancy in saying that for eggs we should name the Poland; for the table, Dorkings, and for early marketable chickens, Brahmas and Cochons.

A correspondent of *Moore's Rural New Yorker*, who has had considerable experience in rearing fowls for profit, says:—"The Farmer's Breed is the breed for profit. It consists of Brahma hens and coloured Dorking cocks—the chicks from which are hardy, easily reared, grow fast, and in four months, without extra feed, will dress four to five pounds each of fine grained, well-formed, plump-breasted, well-coloured flesh, fit for the table of any amateur or epicure, and always commanding a good price in market. The hens from this cross are even better and more continuous layers than either pure Brahma or the Dorking; but if wanted to breed again, the farmer must keep one coop separate of Brahmas—say a cock and two hens—and so also of the Dorkings, and thus yearly with the cross of pure bred birds, cocks of the Dorkings, and hens of the Brahmas, keep up the 'Farmers' Breed for profit.'" —*The People's Practical Poultry Book.*

EGG EATING HENS.—The *Journal of Agriculture* gives the following remedy for this habit:—Break an egg and dust the contents nicely with fine Cayenne pepper, afterwards turning the egg round so as to get the pepper below the yolk, if possible, and leave the egg in the offender's nest; or, if he catches her in the act of eating an egg, let him drive her away quietly and place pepper in the remainder of the egg, endeavouring, as stated before, to get the pepper underneath. He will very soon see her running furiously about with distended beak. If one dose is not sufficient, administer another, a little stronger; but I think once will be enough, for I saw the remedy tried, and it turned out to be a perfect cure.

Household.

How to Get a Piano.

This is a question often asked by many an anxious farmer's wife, after visiting a neighbour who has a piano; and this question at first sight may seem difficult to answer. Before entering on the difficulty of finance, and the means to make or save the necessary amount to buy a piano, let us consider the advantage to be derived from its introduction into every farmer's household. In the first place, there can be no manner of doubt that anything we can do to lighten the cares of our wives and daughters, or enable them to more cheerfully bear with the necessary labour and privation incident to farm life, will be fraught with benefit, and nothing will do this to a greater extent, or in a more pleasing manner, than to have family music and a piano to provide it. There certainly are some grumbling, unideal sons of humanity who will say: "What do we want a piano for? Our girls are busy enough as it is making bread, milking cows, washing dishes, and the other thousand and one household duties that are always to be done about a farmhouse, and have no time for playing on the piano." Such a man may almost as reasonably say they have no time for sleep. Such an old obstructive need not expect that the females of any household can go on from week to week without some home recreation and amusement. "We," the men on the farm, are actively engaged out of doors, and have some change, excitement and relaxation in going to town or market, or the like; but unless our daughters go with us they have literally none, except going to meeting, which generally only occurs on Sunday. Whereas if they had a piano, when work was over, or sometimes when it could be hurried through by a little extra exertion, what more delightful mode of passing an evening than have the opportunity of enjoying, and letting others enjoy, a little music; and let me tell the above old "obstructive" that his neighbour's sons would be quite as likely to "pull out" and get their day's work over an hour sooner to be able to run over to our intelligent friend's house who advocates buying a piano, and whose daughters can play it. Nothing helps work along more than to feel that some such innocent enjoyment awaits its completion. In truth, the piano is at all times and seasons a welcome addition to any household, and especially to the female portion of it.

Farmers must not think they can keep their girls and boys at home and make them contented and happy, whilst they deny them such innocent amusement.

Let me now proceed to answer the question: How can I get a piano for my daughter; and that too without seriously cramping the head of the family? Let us suppose \$100 a year in addition to the first payment of \$100 has to be found, (the first \$100 hav-

ing been previously saved by some means as the nest); that will be due in about a year from date of receiving the instrument. Did you ever know a whole family set their determination to work, to do any one thing *within reason*, and not be able to do it? I never did; nor can you cite any instance. Where all are to be so much gratified and amused, and where all determine to help, it is as good as done already. The produce of two extra cows, with calves raised, will nearly pay \$60 of the amount required, and allowing \$18 more, the produce of one sow and sale of her young ones, and twenty extra hens, and sale of their proceeds, will do the rest.

I yesterday was talking to an old woman who three years since planted out fifty black currant trees, to help out house-keeping; and for two years past she has sold \$20 worth of currants each year from a small patch not more than 8 square rods. I saw the bushes myself. Almost every inmate of a farmer's family can have some one or two young animals given, specially devoted to the piano instalment, and only requiring some extra care to be worth some \$20 or \$30 in one or two years. The cost is not felt; it only requires the will and the determination to succeed, to enable any one to answer the question under consideration by an immediate order for the instrument.

I would suggest, in conclusion, to any one who has not got the cows just at first, and whilst things are "turning round," persuade your father to buy you two cows on credit. He will have to pay for them, it is true, when the note given for them matures; but then, after the piano is paid for he has the cows, so it is only a question of about two years' use of the money, or even less, and you have got a piano. C.

Good Glue and Mucilage.

The best quality of mucilage in the market is made by dissolving clear glue in equal volumes of water and strong vinegar, and adding one-fourth of an equal volume of alcohol, and a small quantity of a solution of alum in water.

The action of the vinegar is due to the acetic acid which it contains. This prevents the glue from gelatinizing by cooling; but the same result may be accomplished by adding a similar quantity of nitric acid. Some of the preparations offered for sale are merely boiled starch or flour, mixed with nitric acid to prevent their gelatinizing. Gum tragacanth possesses very great adhesive properties, and is sometimes used in hair dressing, for the purpose of stiffening the hair. A preparation for the hair, known as Bando-line, is nothing but a solution of gum-tragacanth. Gum-arabic dissolved in water will not gelatinize from the influence of cold alone; but in order to prevent its decomposition or fermentation, acetic acid and alcohol are added. The high price of this gum prevents its being extensively used in the preparation of mucilage; in fact, this article seldom contains any gum arabic whatever. All these preparations, including the renowned Spaulding's composition, are far inferior in their sticking properties to the ordinary solution of glue in hot water, universally used by cabinet makers and carpenters.

This preparation is not quite so convenient for general use, as it must be applied hot, and the articles glued must be tied or pressed together for some time; but the satisfaction of doing a better job ought to more than repay the extra trouble.—*Manufacturer and Builder.*

FARMERS' PUDDING.—Heat one quart of milk to boiling, then stir in slowly one teacupful of Indian meal. Mix with this about six good apples pared and sliced, and add two table-spoonfuls of sugar, one of butter, and a little allspice and nutmeg. Pour the whole into a deep dish and bake until done, or about 40 minutes.

ASHES OF HARD AND SOFT WOOD.—It is generally supposed that the ashes of pine wood is not so rich in alkalies as that of hard wood. In his "Muck Manual," Dr. Dana says that, "in equal weights, pine ash affords four times more alkali than the ash of hard wood." At the same time a bushel of hard wood ashes yields more alkali than a bushel of pine wood ashes; the ash of the pine being much the lightest. According to analysis, only about 13½ parts in a hundred of hard wood ashes are "soluble," while of the yellow pine fifty parts are soluble.

TO CURE HAMS.—The following receipt for curing hams obtained the first premium offered by the Maryland State Agricultural Society:—Mix 2½ lbs. saltpetre, finely powdered, ½ bushel fine salt, 3 lbs. brown sugar, ½ gallon molasses. Rub the meat with the mixture; pack with the skin down. Turn over once a week, and add a little salt. After being down three or four weeks, take out, wash, and hang up two or three weeks, until it is dry. Then smoke with hickory wood three or four weeks, then bag, or pack away in a cool place—not a cellar—in chaff or hay.

TO MAKE SCREWS HOLD.—In driving screws into soft wood do not use a bit to make a hole for them; use the gimlet screw and make a hole with the brad-awl, just large enough to allow the screw to start. The screw will cut its own way, and as the wood is all there, it becomes compressed, and the threads are well filled and solid. In hard wood, bore a hole no larger than the core of the screw, leaving the threads to cut their full depth. A little linseed oil will assist in running the screw in and prevent the breaking of the thread in the wood; it will also preserve the screw against rust.—*Carriage Journal.*

TIN-FOIL FOR PRESERVING LEMONS.—The report of the Agricultural Bureau at Washington contains the following:—Tin-foil has long been used, with excellent effect, as a preservative from the air, of various substances that require such seclusion, especially chocolate, tobacco, cocoa, butter, efflorescent and deliquescent salts, &c. Quite recently a new application has been made of it in the preservation of lemons, which, as is well known, soon become dry and hard when exposed to the air, and ultimately parchment-like and covered with mold. The foil, however, has the effect of preventing such drying up, and of keeping the lemons fresh for an indefinite period of time. In one experiment, after an interval of two months, the lemons had only lost 1½ per cent. of their weight, and in three months a little over three per cent., and in some cases even less than this. Oranges, similarly treated, lost only about five per cent. in two months, and on the removal of the metal covering, both kinds of fruit were found to be as fresh and fragrant as when the experiment commenced.

Poetry.

The Sweetest Advent.

Ring out your gladdest strain to-day,
O heart of mine, so silent long!
The breath of Spring begins to play
Across the hill tops cold and gray.
The prelude of a summer's song
Floats up the valleys sweet and clear,
And down the pathway of the year
Fair June, with girle girt with flowers,
Walks rosy footed, up the hours.

Dear advent of the budding time!
Foad mother of each fragrant bloom!
To-day all life renews its prime,
As Nature strikes her chant sublime
Of resurrection from the tomb.
And all that breathe take hope of breath,
And say again—' There is no death,
The Winter's sleep but waits the Spring
To wake and resurrection sing!"

I'm ringing again your gladdest strain,
O heart of mine, so silent long!
Across the valley-land and plain
Comes low and clear a soft refrain
The prelude of a summer's song,
And in the green of sunny slopes
I see fruition of all hopes,
For what was dead, and cold, and gray,
Is live, and warm with life, to-day?

The Return of the Birds.

BY WILLIAM CULLEN BRYANT.

I hear from many a little throat,
A warble interrupted long,
I hear the robin's flute-like note,
The blue bird's skanderet song.
In open meadows and the russet hill,
Not yet the haunt of grazing herds,
And thickets by the glimmering rill
Are peopled with birds.

O cheer of spring, why come so soon
On leafless grove and herbless lawn
Warm be the yellow beams of noon;
Yet winter is not gone.

For fast shall sheet the pools again,
Again the blustering east shall blow,
Whirl a white tempest through the glen,
And load the pines with snow.

Stay, for a tint of green shall creep
Soon o'er the orchard's grassy floor,
And from its bed the crocus peep
Beside the housewife's door.

Two Pictures.

An old farmhouse with meadows wide,
And sweet with clover on each side,
A bright-eyed boy, who looks from out
The door with woodbine wreathed about,
And wishes his one thought all day
Oh! if I could but fly away
From this dull spot, the world to see,
How happy, happy, happy,
If I happy I should be!"

Amid the city's constant din,
A man who round the world has been,
Who, 'mid the tumult and the throng,
Is thinking, thinking all day long—
Oh! could I only tread once more
The field-path to the farmhouse door,
The old green meadow could I see,
How happy, happy, happy,
How happy I should be!"

Apiary.

Handling Bees, Smoker, &c.

To be a successful bee-keeper the persons keeping them should see their bees often, and know at all times their actual condition. To do this satisfactorily we must have the moveable frame hive in some form, and be able to open it and take out the frames at pleasure. "But," says one, "the bees will sting. I should not dare open a hive full of bees." Yes, we know the bees will sting if you are careless, and in taking out the frames you hit them one against another, thus jarring and smashing the bees and honey. But if you will be careful, and use a little smoke when needed there will be no trouble. When you wish to open a hive step to the back side of it so as not to interfere with the bees flying out and in, remove your cap, and with your knife or something else, pry gently. If the weather is warm the propolis will be soft, and the honey-board will come off without jarring a particle. Have on hand some smoke, and as soon as you raise the honey-board blow in some to keep them quiet. Begin two or three frames from the one you wish to take out, and with your knife or fingers move them away a little, then take the one you wish out. After the first, you can take out any you wish by setting one down on the outside of the hive. With the blacks and hybrids you will want smoke; but as far as my experience goes, with the pure Italians you will need no smoke.

I will describe a smoker which works with me like a charm, and what suits me I think will suit any one. Take a piece of sheet iron and make a tube eight inches long and two inches in diameter. This is easily done with small rivets used by timmen, and almost any person can make it. Now, make a plug for each end, tapering each down to a point. Bore a quarter-inch hole in the plugs, and cover the large ends of the plugs with wire cloth, which should be bent so as to raise them in the centre; this keeps trash from filling the holes in the plugs. Next—one end is nailed fast, and the other is left moveable, so that it may be taken out when the pipe or tube thus prepared is to be filled with decayed wood, which is to be kindled at the open end of course. You yet want a handle, which is made by boring a two-inch hole in a piece of one-half inch plank, and shaping it to suit you. Then slip the tube into it, and it may be fastened by inserting a nail between the wood and the tube. One plug should be shaped convenient to be held in the mouth when blowing smoke through the tube. When you wish to use the smoker insert the plug made for the mouthpiece, and then you can smoke the bees sufficiently in a short time. By adding fuel occasionally you can keep it burning any length of time, keeping one end open when not in use. Do not use tobacco for smoke, as it stupefies the bees and makes them irritable for several days after. Now a word for the Italians. I find them very peaceable when compared with the black bees. I can open a hive of Italians at any time when they are raising brood without smoke, and not have one offer

to sting me, unless by some mishap I jar them so as to arouse them, which takes considerable. Beside this you can find the queen readily; the young bees do not drop from the comb as the black ones do, and as far as my experience goes, they will make one-third more honey. I have one stock of Italians that gave me one good swarm and 125 pounds box honey the first season. The Italians, to be pure, should all have three yellow bands and some will occasionally show the fourth.—*M. DOOLITTLE, in National Bee Journal*

Early Swarming.

Mr. James Hossack writes from the neighbourhood of Cobourg, informing us that he "had a swarm of black bees on the 12th of May."

We are inclined to believe that Mr. Hossack is mistaken. It is quite too early for a natural swarm to issue. It sometimes happens that bees swarm out in the spring without any apparent cause, and cluster in the same manner as if the hive had cast a swarm, where they remain for some time, then return to the hive, or go into some other hive, and in some cases go into the woods. Several cases of this kind have occurred in our immediate vicinity this spring. If this is not the case with Mr. Hossack's bees, then certainly he has had the first swarm of the season.

FERTILIZING QUEENS.—Mr. Doolittle communicates to the *American Bee Journal* a plan of fertilizing queens, which he thinks far preferable to any other mode of artificial impregnation. The method was practised by a neighbour, and is as follows:—He selects a stock with plenty of the best drones, and sets it fifteen or twenty rods from any other stock, and as soon as the queen hatches he clips one wing. He then raises a bed of sawdust three or four feet square, lays thereon a good broad bottom board, and sets the hive on it, so that the queen can crawl back when she comes out. He has tried queens in this way for three seasons, and they are all very prolific. A queen can be introduced from any stock, and in and in breeding thus prevented.

The bees throughout the world, as known collectively to the richest cabinets, number about 2,000 species.

In working among bees, woollen gloves or mittens are objectionable, as everything rough or hairy has an extremely irritating effect upon them.

When bees begin to fly in the spring, it is well to feed them a *lith*, even when they have abundant stores, as a small addition to their hoards encourages the production of brood.—*Langstroth*.

If young queens are allowed to issue at will they are pale and weak, like other young bees, and for some time unable to fly; but if confined the usual time, they come forth fully coloured, and ready for all emergencies.—*Langstroth*.

Agricultural Intelligence.

Agricultural and Arts Association

MEETING OF THE COUNCIL.

A meeting of the Council of the Agricultural and Arts Association was held Wednesday May 4, in the Board-room of the Agricultural Hall. Mr. Stephen White was in the chair; and there were also present the Hon. D. Christie; Messrs White, Farley Wilson, McDonald, Shapley, Murton, Cheate, Young, Bushland, Gibbon, Graham; and the Revs Dr. Burnett and Bethune.

The minutes of the last meeting were read and confirmed.

BEE-ROOT SUGAR.

The SECRETARY read an analysis made by Professor Croft under the auspices of the Agricultural and Arts Association, of the following varieties of sugar beets, grown last year from imported seed, carefully selected, and furnished by Mr St George Harvey, of this city.

No 1 White Silesian, green top; average weight 4 lb; water, .92.63; cellulose or woody fibre, 1.2265; soluble saline matter, .9333; insoluble earthy matter, .0745; sugar, including albuminous matter and pectine 5.14.

No. 2 White Silesian, red top; average weight 4lb; water, .88.25; cellulose or woody fibre, 2.4370; soluble saline matter, 1.634; insoluble earthy matter, .068; sugar, including albuminous matter and pectine, 7.64.

No 3 Knowles' Improved; average weight 2lb 15oz.; water, .89.92; cellulose or woody fibre, 2.73; soluble saline matter, 1.677; insoluble earthy matter, 1.2; sugar, including albuminous matter, 6.16

No. 4 Villmorine's Imperial; average weight 1 lb; water, .86.05; cellulose or woody fibre, 3.394; soluble saline matter, 1.19; insoluble earthy matter, .111; sugar, including albuminous matter and pectine, 9.22.

No. 5 Mudgeburg; weight 2lb, 1oz.; water, .91.69, cellulose or woody fibre, 2.821; soluble saline matter, .799; insoluble earthy matter, .118; sugar, including albuminous matter, 5.17

Mr. S. G. HARVEY, representative of the Canadian Beet-root Sugar Company, explained to the Council that a number of experiments were being made in the raising of superior beets for the manufacture of sugar. Until the experiments had been made, and the results ascertained, the Company was not in a position to state definitely where the works would be located; but there were no fewer than thirty-six counties had made application for sugar beet seed, and seventy-six parcels of it had been distributed gratis for experimental purposes. Mr Harvey also stated that an application had been made to the Dominion Government for a charter, but the Company was not particularly anxious to press for it, as Sir F. Hincks could not guarantee the Company against a heavy excise duty. There was a hope, however, of a favourable view of the matter being taken by the Government. The speaker stated that two extensive beet-root sugar factories in England have offered to subscribe for £10,000 sterling of stock (Cheers) The Board of Agriculture, he had no doubt, could do much in promoting the manufacture of beet-root sugar in Canada.

ACCOUNTS.

A few accounts were presented, and Mr YOUNG suggested that they should be sent to a committee composed of the Hon. D. Christie, Rev. Dr. Burnett and Mr Cheate.

On the motion of Mr GRAHAM Mr Young's name was added to the Committee.

The motion as amended was passed unanimously.

ADMISSION OF CANADIAN ANIMALS INTO THE STATES.
The Hon. Mr CHRISTIE read the following from a letter which he had received from Mr Conger of Michigan:—

"It having passed the United States Congress that the words "beyond the seas," refer to stock imported from Canada, the following instructions were issued from the Treasury Department: To admit to free duty animals from beyond the seas, when imported for breeding purposes, the owners thereof will be required to produce to the Collector of Customs at the port of importation a certificate from the United States Commissioner at the port of shipment, showing that the animals are, to the best of his knowledge and belief, intended for such purposes; and also a statement of the owner, made upon oath, that the said animals were actually purchased abroad, and imported into the States for the bona fide purposes of breeding and improving et c."

THE 1871 PRIZE LIST

The SECRETARY then read the report of the Prize List Committee. The report showed that a considerable increase had been made in the amounts of the various prizes awarded to the exhibitors of horses, cattle, sheep, and grain. The proposed increase is as follows:—Road and carriage horses, \$131; agricultural horses, \$132; heavy draft horses, \$33; Durham cattle, \$186; Devon cattle, \$126; Herefords, \$126; Ayrshires, \$126; Galloways, \$62; grade cattle, \$51; fat and working cattle, \$60, for sheep—in Cotswoolds, \$60; Leicester, \$60; Southdowns, \$36; hropshires, \$26; fat sheep, \$16; large pigs, \$20; Suffolks, \$20; Berkshire, \$40; Essex, \$20; any other breed, \$20; poultry, \$54; implements, \$219; small do, \$53; field grains, \$50; field roots, \$3; horticultural articles, \$200; dairy products, \$48.

The Board recommended the trial of implements early in the ensuing summer.

On the motion for the adoption of the report, Prof. BUCKLAND suggested the propriety of placing racers upon the same standing in the prize list as other classes of horses.

The Hon. Mr. CHRISTIE argued that it was most injudicious to encourage the raising of fast horses in Canada, inasmuch as it fostered a gambling spirit among the young men of the present generation. He deprecated the system now pursued in the States, of having a trotting track at the exhibition held, and hoped that the Council would do all in their power to prevent such a custom creeping into Canada. He suggested that the English system of giving really good prizes for the best horses for general purposes, be adopted.

The report was then adopted *nem con*.

THE KINGSTON BUILDINGS.

The SECRETARY reported to the meeting that in reply to a communication with regard to the preparation for the exhibition at Kingston, the Mayor of that city had stated that nothing had been done except the appointment of a committee.

THE TRIAL OF IMPLEMENTS COMMITTEE.

The following gentlemen were appointed upon the committee to make arrangements for a competitive trial of agricultural implements during the ensuing summer:—The Hon James Skead, Hon. D Christie, Messrs. Graham, Chas. Bykert, M.P.P., Stephen White, McDonnell, Murton and Wilson.

THE PROVINCIAL EXHIBITION.

A deputation was appointed to confer with the authorities in Kingston respecting the requisite accommodation for holding the next exhibition.

PRINTING CONTRACTS.

The tender of THE GLOBE for the printing of the association for the ensuing year was accepted.

The council then adjourned until 8 p.m.

EVENING SESSION.

The Council resumed its sittings at 8 p.m.

REPORT OF THE EXECUTIVE COMMITTEE.

The Executive Committee presented their report, which was as follows:—

Entries to be made on or before the twentieth of June to the Secretary of the Association at Toronto, enclosing a dollar for entry money.

The Committee recommend that the Secretary be instructed to advertise at once for offers of fields

suitable for the trial of implements of the following sizes, viz:—

Fall wheat, 20 acres; grass, 20 acres; for ploughing, (sod) 15 acres; peas, 10 acres; logs for 10 cords of wood, and land suitable for testing cultivators and gang ploughs.

The following prizes were recommended to be given at the trial of the implements:—

Mowers—1st prize, \$20; 2nd do, \$15; 3rd do, \$10.

Reapers—1st prize, \$30; 2nd do, \$20; 3rd do, \$15.

Thrashing Machines—1st prize, \$20; 2nd do, \$10; 3rd do, \$5.

Pea Harvesters—1st prize, \$12; 2nd do, \$9; 3rd do, \$6.

Fanning Mills—1st prize \$3; 2nd do, \$6; 3rd do, \$1.

Straw Cutters—1st prize, \$8; 2nd do, \$6; 3rd do, \$1.

Sulky Horse Rake—1st prize, \$12; 2nd do, \$9; 3rd do, \$6.

Ploughs—1st prize, \$25; 2nd do, \$20; 3rd do \$15.

Harrow—1st prize, \$12; 2nd do, \$9; 3rd do, \$6.

Cultivators (double)—1st prize, \$20; 2nd do, \$15; 3rd do, \$10.

Grain Crushers—1st prize, \$12; 2nd do \$9; 3rd do, \$6.

Machines for Sawing Wood—1st prize, \$20; 2nd do, \$15; 3rd do, \$10.

Gang Ploughs—1st prize, \$20; 2nd do, \$15; 3rd do, \$10.

The report was adopted.

Several accounts were presented and recommended to be paid.

Several matters of detail were discussed, and the meeting adjourned until the 21st of June, at two o'clock in the afternoon.

Canada Stock for Colorado and the West.

Two gentlemen from Colorado Territory, Messrs. Prower and Brewer, have recently visited Canada, and made extensive purchases of thorough-bred stock for importation to their own country.

Mr. Prower purchased two Herefords from F. W. Stone, Guelph, viz., yearling bull Colorado Chief, at \$150, and two-year old heifer Gentle 12th, at \$250; also, four Short-horns, of which three were yearling bulls; 3rd Duke of Clarence, \$350; Moreton Knight, \$300; Pilgrim, \$350; and a yearling heifer, Cambridge 11th, at \$300. From Geo. Craig, Beachville, Short-horn bull calf Young Napier by Gen. Napier \$199, \$200. From Thos. Friendship, St. Johns, a two year old Short-horn bull Canada Lad, by Bell Duke of Oxford [S36], \$400. From Wm. Douglass, Onondaga, and Robt. Douglass, Elgin, two year old Short-horn heifers at \$350 and \$300 each; two bull calves at \$150 each; one bull calf at \$120. From other parties, five Short-horn yearling heifers at \$160 to \$70 each. From Col. Taylor, London, his Short-horn heifer, 3rd Duchess of Portland at \$400, and two year old heifer Bonnie Doon at \$225. Mr. Brewer purchased 125 long-wool rams and 25 ewes, mixed Leicesters and Cotswolds, at \$6 to \$10 per head. This is one of the first importations from Canada to receive the benefit of the new law admitting stock for breeding purposes into the United States duty free.

In addition to sales included in the Colorado list above given, Mr. Stone has lately sold the following Short-horns—Yearling bull Sixth Grand Duke of Moreton, red, the

first prize animal in his class at the Provincial Exhibition held in Toronto, 1870, to Alex. Campbell, Dresden, Missouri; two year old bull Third Grand Duke of Cambridge, to Thomas Reid, Egremont; yearling bull Third Grand Duke of Oxford, to R. Hunt, Blenheim; four year old bull, His Majesty, red, to John Reading, Guelph. Also the following Herefords: to John Hawes, Guelph, cow Gentle 2nd; heifer calf Gentle 14th and yearling bull Dominion Prince; to G. S. Burleigh, Mechanicsville, Iowa, cow Princess 2nd and yearling bull Guelph Baronet; to C. P. Bowditch, for Mrs. A. Ayrault, Genesee, N. Y., yearling bull Wellington Chief. Also, Berkshires as follows: to H. Q. St. George, Oakridges, 8 months old boar pig; to W. H. Barbee, Frankfort, Ky., two very superior sow pigs; to G. L. Barbee, Georgetown, Ky., two very fine sow pigs; to S. M. Shepard, Charleston, Ill., 6 months old boar pig; to Joseph Leslie, Simcoe, 8 months old boar pig; to A. H. West, Detroit, Mich., two fine gilts 8 months old.

Mr. Stone states that the average price of 46 Berkshire pigs, from three months old and upwards, sold in 1870, was \$50 each—the average on the 9 just sold as above mentioned was \$60 each, gold. Mr. S. adds:—“The demand for pure bred stock is good and increasing, and no doubt, now that the duty is off stock for breeding, the demand for superior animals will very much increase in the Western States.”

Short-horn Auction Sales in Great Britain in 1870

In Mr. Thornton's recent catalogue of short-horn sales, a table is given showing the number of lots of short-horn cattle sold in 1870, the highest, lowest, and average prices obtained for them, and the total sum realized from each sale. We glean from it the following particulars:—Total number of sales, 42; number of cattle sold, 1,853; highest price obtained, 800 guineas; lowest price, 4 guineas; average of all the sales, £37 19s. 6d.; aggregate of all the sales, £70,363 13s. These figures do not include the Irish and Scotch sales, nor the Birmingham and York collective sales, nor a few drafted animals from different herds, most of which were young bulls, offered at stock sales and markets in England; yet they exhibit a most favourable contrast with the results obtained in 1869 throughout the United Kingdom. There is one-fourth increase in the number of head sold—1,853 against 1,477—over £2 increase in the average price per head, and nearly £18,000 increase in the total sum realized. Eighty-three animals were sold for 100 guineas and above, averaging about £180, against 30 animals in 1868, and 52 in 1869. The highest price, 800 guineas, was given for a heifer, but, as she has since failed to breed, a large portion of this sum has since been returned. The next highest sum paid was 500 guineas for a two year old heifer. Only 9 of the 83 were bulls, the highest bringing 240 guineas. Most of the

trade for bulls, however, is transacted privately, when higher prices prevail.

The table to which reference has been made is merely a summary of public sales. Much business is done privately, at high prices. The sale of 14 animals from the Aylesby herd for 2,000 guineas is quoted; also the sale of Capt. Gunther's 2 Duchess heifers for 2,500 guineas, and of 7 animals from the Warlaby herd for 5,000 guineas, for exportation to America, Australia, and Canada.

At the Irish draft sales there has been a great increase in prices. Mr. Welsted's 14 averaged £34 1s. 10d.; Earl Fitzwilliam's 14 averaged £31 4s. 9d., and Mr. Crosbie's 26 averaged £23 13s. 1d. In Scotland prices have been similar to those of last year; three lots averaging £32, £32 13s., and £30 7s., respectively.

An enormous foreign trade has been transacted, much of which was done privately, Mr. Cochrane alone spending nearly £15,000 in pure-bred animals.

Agricultural Education in Sweden

Prof. Cook, of the New Jersey Agricultural College, is furnishing the *Country Gentleman* a series of valuable articles as to Agriculture and Agricultural education in Europe. He visited the two Agricultural Colleges in Sweden; one at Ultuna, with a farm of 1,000 acres, eight resident and three special professors, and 56 students—30 with whom work is optional, 20 who work each day, and 6 young women students in the dairy department. The highest class is for those who are preparing to manage farms or to teach. The course of instruction occupies two years, and the fees are \$202 50 the first and \$162 the second year, the students receiving instruction, board, use of room, bed and fuel. In all 202 students have graduated in this department, most of whom have found employment. The second department is for those who are preparing to be foremen on farms. The course occupies two years, the students receiving no pay, except board, room, fuel, light, and instruction two hours a day during winter. All who graduate find employment. In the Dairy Department but six girls are received, for one year. They work every day, milking, feeding, cleaning, and making cheese and butter. There were 40 applicants for the six places.

The College at Alnarp has a farm of 1,300 acres, and a similar plan—with a department for teaching horse-shoeing, with a three months course.

The Royal Agricultural Academy, near Stockholm, has a farm which is both self-sustaining and a teacher, although no students are received. Prof. Dunnfelt is in charge of it, and keeps the people well informed of what is being accomplished.

In addition to these, there are Agricultural Schools and selected farms in every province, where young men are received, taught the best methods of farming, working steadily, and receiving instruction in the winter evenings in the common branches of education.

"Points" in Wool.

The importance of the wool product of Australia is well known, and considerable attention is given to promoting the improvement of the sheep, particularly as regards the fleece. The Agricultural Society of Sidney, in its prizes on wool, this year adopted for the first time a "scale of points" for the use of judges, viz:—Length, 100; density, 100; softness, 60; fineness, 120; elasticity, 70; evenness of fleece, 90; soundness, 150; condition, 150; weight, 160; total points, 1,000. The experiment appears to have worked quite satisfactorily. The correspondent of the *London Times* says that most of the prizes went to wool from New South Wales, but the colonies of Victoria, Queensland, South Australia and Tasmania, were also represented. We infer from what is said that the above scale was the same both for clothing (Merino) and combing wool.—*Country Gentleman*.

Chinch bugs are already making their appearance in the wheat fields of Illinois.

More timber is being planted in Iowa this spring than during the five previous years.

Last year California produced 20,000,000 pounds of wool—nearly one-third of the clip of the United States.

Orchard grass is receiving much attention among farmers in the Atlantic States. It is the earliest and latest of all the grasses, and if properly managed with other grasses, is excellent both for pasture and hay.

The wheat prospect in Central Illinois is represented as very encouraging. The growing wheat stands thick upon the ground, and the recent rains and warm sunshine have given it a luxurious appearance. Growers predict the earliest harvest known since Illinois was settled.

The West Durham Agricultural Society intend to throw their Fall Exhibition open to the Province. Intending exhibitors are requested to transmit \$1 to the Treasurer, Mr. M. Porter, Bowmanville, before the first of June.

THE MICHIGAN STATE FAIR.—The Executive Committee of the Michigan State Agricultural Society have decided to hold the next State Fair at Kalamazoo. The people of Kalamazoo have undertaken to erect all the necessary buildings without expense to the Society; to give a lease of the National Park grounds, and also to contribute very largely toward defraying the necessary expenses of the exhibition.

The enterprising farmers of the county of Kent are this year once more importing thorough bred stock. Mr. Shaw, of Camden, has just received nine thorough-bred Durham cattle from Lincoln and Wellingford. The President of the Kent Agricultural Society also returned from the east this week with two thorough-bred Durham bulls, ordered by two farmers of Harwich.

A paper published in the county of Mass. says that notwithstanding the Bedford Cheese Factory levied 40 per cent tax upon the stockholders for current expenses the only year it was worked, the enterprising farmers and dairymen of Mystic are investing their surplus cash in additional cows, and a cheese factory is now nearly completed.

Nine hundred bushels of flax seed have been sold this spring in Listowel for seeding purposes. The farmers are sowing it more extensively now, as they find it pays.

It has been decided to hold a grand agricultural exhibition in Constantinople next year. The Porte has under consideration a proposal for an industrial exhibition at Smyrna.

It is stated by the *Vindicator* that the strawberry crop in the neighbourhood of Oshawa will prove a partial failure. Nearly half the plants of Mr. French were winter killed, and other growers, but not all, report similar loss. The plants uninjured promise to bear abundantly. Mr. French's berry crops, both Black Caps and Kittatiny, promise well, being wintered safely. Early cherries are also a failure, the severe frost of last winter being the cause. Other fruit trees are well covered with blossoms.

General Capron, Commissioner of Agriculture, reports that tea culture is fast becoming a recognized industry in the Western and Southern States, and that in a few years enough tea will be grown on native soil to meet the home consumption. He states that the transplanting of tea to these sections has been a great success, and that the prospects for its rapidly becoming an important feature are most encouraging. Some 40,600 plants have been distributed South and West, and so well have they thriven that the department is in turn distributing the seed from those raised in North Carolina.

SILK-WORM EGGS FOR CALIFORNIA.—A large quantity of silk-worm eggs has just arrived in San Francisco from Japan. They consist of 135,000 cards, costing in Japan \$675,000. The eggs were contracted for in Japan by a French house, at five dollars per card. Through the embarrassment of the war in France, the house was compelled to cancel all orders by telegraph, and could not meet engagements already executed. The Japanese merchants, eleven in number, on whose hands the eggs were left, immediately purchased a vessel, with which they took their stock to the California market.

Another shipment of live stock to Nevada is mentioned by the *Paris Transcript*. Two gentlemen from Chesterfield, in Blenheim, went to Nevada some years ago, and there have commenced farming, viz: Messrs W. Fairbairn and J. Nichol. Mr. Fairbairn being home on a visit this spring determined to take back a thorough bred bull for himself, and Mr. Nichol also sent money to import a heavy draught stallion. The selections were made and the animals were shipped from Paris station on Monday last, and we think few better animals ever left Canada. The bull "Duke of Cumberland," is 20 months old on the 10th of May next, and weighs 1,350 lbs. He was purchased from Mr. George Edgar, near Galt, for \$400. The stallion is of the Clydesdale breed, is rising two years old, and was bought from Mr. John Powell, Brooklyn, Ont., for the sum of \$350. It will take two weeks of steady travelling before the animals reach their destination in Douglas and Esmeraldo Counties, Nevada.

A farmer in Indiana recently cut down an oak tree which measured eight feet and nine inches in diameter across the stump, and produced fourteen and a half cords of wood, 400 fencing posts, and six two horse loads of chips. He sold the wood at \$4 per cord, 400 fencing posts at 50 cents apiece, and the chips at \$2 50 per load; total, \$273.

The *Pleasant Valley Fruit and Vine Reporter* says that grape growers in the State of New York generally concede that the vine is not injured by the loss of sap termed bleeding. There may be some difference in this respect between varieties; those which are strong growers may not feel the loss of sap like those of feeble growth.

Galt cattle fair on the 10th instant was moderately attended by sellers, there being not more than 100 head of cattle on the ground. The *Reporter* says buyers were plentiful and did not talk of falling markets; but, with few exceptions, the cattle exposed were only moderate in quality. Raising price was 4 to 5c live, and altogether about five car loads changed hands. Milk cows showed poorly and prices were extravagant, so that sales were few.

We have had the pleasure, says the *Belle-ville Ontario* of May 11, of seeing some fine specimens of Ayrshire stock that arrived last night, direct from Scotland. They were imported by Mr. Hugh Brodie, of Ameliasburgh, a gentleman well known for his liberal enterprise in this connection, and who has just returned from a visit to his native land. Mr. Brodie was also entrusted with a commission to purchase from the best herds of Ayrshires that he could find for Mr. J. H. Morgan, of Ogdensburg, N. Y., one of the most successful stock raisers in the United States, and for several others in the adjoining counties, whose herds have already become famous for their superior milking qualities. No doubt an infusion of new blood will still further enhance their value for dairy purposes. To farmers of this country, now that the cheese factories have become a success, these importations are of incalculable value.

The *Kingston News* says the grain forwarding business by way of Kingston and the St. Lawrence has opened well this year. There is now a large fleet of vessels in port, the last batch, probably, of the great spring fleet. From this forward till the fall the arrivals can hardly be expected to come in so thickly. Some of the American ship captains, with true American impatience, have complained of the delay in unloading to which they have been subjected; but the causes of the delay that has occurred have been entirely exceptional. There has been no lack of barges; but by an untoward accident two of the floating elevators have been disabled both at the same time. This accident has led to the suggestion of erecting an elevator storehouse, which would be a great advantage did it exist, but the economy of the floating elevators in transshipping directly into barges is such that it is doubted whether a storehouse could compete against them, except, of course, in special emergencies. The experience of forwarders in the grain trade goes to show that it is a business which baffles all calculation, because its success depends so much upon the fluctuations of the markets and the demand for American grain as it exists in England.

Miscellaneous.

Small Birds.

The following extract is part of an interesting report on birds by Mr. M. L. Dunlap, published in the Transactions of the State Horticultural Society of America:—

In this bird investigation we need accurate observations instead of theory. Facts are worth more than the fancies of the poets, who have from time to time defended, not only our song birds, but those of beautiful plumage: while they have consigned kites, hawks, and mousing owls to the tender mercies of the shot gun.

If we find that kites, hawks, and owls destroy mice and other vermin, we should certainly protect them; if, on the other hand, the robin gives us his morning carol to clear his throat for cherries, we may consider between the value of his music and the market price of cherries. Let us not, therefore, be hasty in our conclusions, but do even-handed justice though the heavens fall—with the skylark.

I must confess that my birds are well behaved, taking but a limited share of toll, and that in a very modest way. Last season I had about 150 bushels of the Early May cherries, and it is possible that the birds ate one or two bushels, just by way of keeping up a taste for this fruit. Some one may ask if I have not made a compact with the birds—they to forbear to eat my cherries, and I in turn to defend them before the august tribunals of the people. No such thing: I deny the soft impeachment. Aforetime I have not been so fortunate; for of the only crop of Delaware grapes that I have grown, the cedar birds took over half, and they have been quite free to sample my Black Caps and Purple Canes.

"Exempt this year from their depredations, can you expect the same immunity the next?" Yes, under the same condition of things. "Please tell us what they are." So I will. The native forest is five miles distant, my fruit having been carved out of the "Grand Prairie," where it sweeps towards the vermilion of the Wabash, to the west; within the vision of a field-glass are the fringes of timber that border the lazy Sangamon; half way is Copper Slough, the head waters of the Kaskaskia, winding its silent way amid the rank sedge grass of its marshy borders, innocent of forest growth.

The wrens and robins love the prairie, and delight to rest in its humble clumps of hazel and wild plum, and especially happy to make their summer home about the abode of man, and between feeding on noxious insects, seeds, and berries, they chirp and sing, with the honest intention to discharge the rent due to the farmer or fruit grower in the most satisfactory manner.

The cedar-bird, the blue-jay, and birds of this class, nest in the old forest, or along its borders where man has hewn out his home, but of these birds I do not propose to discourse, they are not my birds, but belong to the woodland proper, for no blue-jay ever sends its dissonant notes athwart my prairie home, nor does the oriole hang his pensile nest on the swaying branches of my apple trees. The wrens and the robins come to me in force, with an occasional blackbird, mocking bird, martin, cat bird, and swallow. These cat, sleep, sing, and rear their young in my grounds. Sometimes the cedar-bird pays me a visit, but I have never invited him to a social equality with others of my feathered friends, for he is a sort of sneak-thief from the distant grove, from whence he makes forays on the crops of small fruits. The sap sucker stops on his way to the north, and again on his return, leaves his *work*; but he is always careful to go above the line made by the soda-wash, and when that extends upward among the branches, he passes on. Why he has such an aversion to washes of this kind I do not know, for he does not stop long enough to ask or answer any questions. He mainly follows along the fringes of river forest, and only stragglers wend their cheerless way over the long sweeps that make up the "Grand Prairie;" they cannot stop to breakfast on grass, and are thankful to find some stray orchard whereon to make a feast. The damage he does to prairie orchard is inconsiderable. But where Lake Michigan sweeps westward, their numbers increase in this *cul de sac*, and they do no small amount of mischief, not only on the apple, but the conifers and mountain ash. Citizens thereaway have my gracious permission to shoot them—when they can catch them.

The robins and wrens become almost domesticated: they appear to understand our wants, and direct their energies accordingly. Our hired men work for wages, board and washing; these birds ask no wages, only board in part, and do their own washing; this is certainly very reasonable on their part. I should not forget to mention the quails, of which one or more coveys make their home with me: they never appear to ask anything even in the way of food, and yet they must do a large amount of work in the way of insect eating. In common with the robin, they are fond of the wild strawberry; and just here is the whole secret of my good understanding with the robin. In the beginning, that is, when I first put the steel clipper into the virgin soil of "Rural Home," the Early Scarlet and McAvoy's superior strawberries were freely planted, and the robins as freely fed on them; of course they planted the seeds under every newly-set orchard tree, and as there was left a narrow strip along the rows uncultivated, these bird-planted strawberries grew and flourished, and extended themselves along the orchard rows. Now, Mr. Cock Robin is a connoisseur in

fruit, and very much prefers the full ripe strawberry to half ripened cherry, for we send the cherry to market before it is fairly ripe, his taste is therefore for the strawberry in preference to the "Early May." I doubt if he will eat the large English Morello at fall, at least he has not mine, and they hang on the tree until dead ripe.

All through the spring my grounds are kept nearly clear of insects, and it is but seldom that a nest of caterpillars is to be found throughout its whole extent of over 100 acres of orchard and shelter-belts. As the crop of wild strawberries begins to diminish, Mr. Robin turns his attention for a few days to the closing scenes of the Black Caps and Purple Canes, and no doubt would be thankful to have us plant the "Miami" to extend the season: and if the so-called everbearing sorts would produce a crop, no doubt he would give us an extra twitter and a song for the favour of an extended plantation of these.

In the spring, just as the plough turns up the dormant insects from their winter hibernation, and leaves them exposed to the chill air, the crow-blackbird is at my heels, picking up these fellows before they cease to be astonished at their sudden uncovering. Writers on rural economy have often commended the bird for getting the early worm, but they do not seem to reflect upon the sad condition of the worm. In this case, at least, we may infer that it is the early spring instead of the "early worm" that is alluded to, and that the blackbird had an opportunity to rid us of our insect enemies. I concur in this view of the subject. After the corn is planted, and its tiny blades begin to appear, he admonishes me that it is time to commence its culture. "Put in the sulky plough," he twitters, "for I must have them; scratching for them is not my forte; stir the soil that I may get them; stir the soil that the sun and air may hasten the growth of the plants, so as to put them beyond their power to be injured; if you don't I shall have to make a few partial meals out of the corn itself, yet I prefer the worms." We heed this modest request of our honest black friend, and he has never disappointed us in this respect. Of course no foraging boys are permitted to disturb his young amid the leafy shelters of the orchard.

I do not permit any boy with deadly gun to kill or maim any of my birds. Even the mousing owl and the pouncing hawk shall have my protection, and when the latter hovers over the barn-yard, with mischief in his eye, I give him the benefit of a gyratory motion of my finger and thumb, with the remark "Well, old fellow, you had better go back to mousing, for Chanticleer has just retired under the Conifers with his family, and is safe beyond your reach."

Were I located near some river, forest, or in the nook of some prairie grove, where the feathered tribe should decide to feast on

my fruits and make no adequate return, but after dinner go back to the leafy dells of their forest home to do their singing, I might have a different report to make. But my birds eat, sleep, sing, and rear their young on my grounds, except (as I said before) the cedar-bird comes over from the grove on special occasions, much to my annoyance.

Prairie chickens will eat the buds from the young beans, but they only do so in the distant field.

On the whole, my birds require less pay for the same labour than any man I can hire, and as at present advised, they shall be continued on the list of *employes* for an indefinite period.

Suitable Floors for Basements.

One of the greatest faults of house-building is to be found in want of foresight and care in the preparation for and laying of the floor. Invariably the ground under such floor is so dug out as to leave what is termed an "air space" between it and the joists; and for the circulation of the air, it is likewise necessary to leave holes in the foundation walls for the purpose. Now all this airing of the underside of the floor is procured at the expense of the comfort of the upper surface, and consequently of that of the house itself; for the inch flooring is but slight defence against the cold which must necessarily find its way beneath.

A far better mode of flooring basements, cottages, dairies, etc., is to spread on the ground a bed of air-slacked lime, on which the joists should rest and be sunk, say an inch or two deep, so as to leave no chance for air to enter, and at the same time effectually keep out all vermin, as they will not attempt to burrow in lime. At first sight, this seems to be an expensive mode of securing comfort, but it is quite the contrary. Ten bushels of lime is ample for a square of ten feet (one hundred square feet) and there are very few localities in which lime is not cheap and plenty. Such an underlaying of lime will prove a most desirable preservative of basement of floors, and render a dwelling sanitary, warm and sound.—*Technologist*.

Tanning Leather.

I send you a recipe for tanning leather, which may prove useful to any farmer who is not acquainted with it. Soak the hide eight or nine days in water, then put it in lime; take it out, and remove the hair by rubbing it, and soak it in clear water until the lime is entirely out. Put one pound of alum to three of salt, dissolve in a vessel sufficiently large to hold the hide; soak the hide in it three or four days, then take it out, let it get half dry, and then beat or rub it until it becomes pliable. Leather prepared by this process will not do so well for shoes, but answers well for ham strings, back bands, and various other purposes on the farm.—A., in *Southern Cultivator*.

The Farmer's Workshop.

There are farmers who save money (or rather think that they do) by letting shoes fall off their horses' feet sooner than have them reset at regular intervals. I have been round farm buildings in which every implement was broken; if mended, it was by means of a piece of rope or a wire, or in some such inefficient manner. I was at a farmer's house the other day, and being struck with the neat and orderly appearance of his buildings and implements, and the general absence of promiscuous bolts, clevises, chains, &c., I asked how it was that he kept everything looking so neat.

He took me to his workshop, a small portion of his wood-shed, enclosed, plastered, and a stove in the corner, a bench and wooden vice, a stand and iron vice, tressels, and a small but choice collection of tools. Now, every farmer is possessed of a hammer, a hatchet, a saw, and perhaps quite a few other tools; but in too many cases, if you should surprise him by a visit, you would find the hatchet in the wood-shed, hacked by cutting up old boards with nails in them; the hammer on the brace, just behind the door in the barn; a chisel here, and a gimlet there; not one in good order—actually un-serviceable.

Now, my friend's workshop was as neat as his drawing-room. His tools were all sharp, and hanging up in order; he could lay his hand on any sized bit, or on a chisel of any breadth, in a minute. Every bolt, clevis, or piece of iron or wood, that could be of any possible use, was brought in here and placed in a certain spot. There were bolts, nuts, bridle bits, chains, old hinges, plough points, gate catches, and hundreds of those innumerable articles which the farmer is always wanting, and upon which he can so seldom lay his hand when required.

In this little room my friend had improved many a wet hour, and being always prepared to mend a break, his implements were all in splendid order.

Now, some farmers think that they must be mechanics to use tools with advantage. Nothing of the sort. Keep tools sharp, in their regular places, and with but little practice any farmer may mend any ordinary breakage.

When I first came to the country I hardly knew a plane from a chisel, and now, with nothing but practice in my own workshop, I save myself many a dollar which formerly I paid to the carpenter and blacksmith. Time is money, and no one who has not had experience can appreciate the saving to be effected when we have not to wait on the leisure of the mechanic.

C. E. W.

THE WORST OF ISMS.—"What keeps our friend Farmer B— away from us?" was the anxious question proposed by a vigilant minister to his clerk; "I have not seen him amongst us," he continued, "these three weeks; I hope it is not Socinianism that keeps him away." "No, your honour," replied the clerk, "it is something worse than that." "Worse than Socinianism? Heaven forbid it should be Deism!" "Worse than Deism." "Good Heavens! I hope it is not Atheism!" "No, your honour; it is something worse than Atheism!" "Worse than Atheism? Impossible; nothing can be worse than Atheism!" "Yes, it is, sir—it is *Rheumatism!*"

The Width of the Rim of Wheels.

A load on wheels with wide rims will run much easier on the soft track, than if the rims were narrow, provided the rims do not sink into the mud or dirt so far that it will close over the felloes. But where the track is not soft wheels with narrow rims are much the best. Wheels with a six or eight inch rim, for going on meadows, where the ground is rather soft, or on ploughed ground, would enable a team to take a much larger load than if the rims were narrow. But when wheels with such rims come where both narrow and wide rims sink in very much, wheels with narrow rims would be infinitely better. The wider the rims of wheels are, the heavier they must be made, and the wheels should be as light as is consistent with strength and the purpose for which the waggon is to be used.

Some men will say, "Let me have a wheel the felloes of which are two inches wide, and one and a half inches deep, with a tire three-fourths of an inch thick." But this often makes a needlessly heavy wheel, and no stronger than if the felloes were one and three-fourths of an inch wide, and two and one-fourth inches deep, with tire half an inch in thickness, which is thick enough for ordinary purposes. There is no good reason why the wheels of a common waggon should weigh from thirty to forty pounds each more than other wheels of the same strength.

Wheels are often made with a smaller number of spokes than there ought to be, because the hub is sometimes too small to receive any more, and sometimes to avoid the labour of making them. There is a regular rule for determining the number of spokes in a waggon wheel, which is regulated by the diameter of a wheel. The greater the diameter of a wheel, the larger must be the hub and the number of spokes in it. The spokes, where they enter the felloes, should be from seven to ten inches apart—never more than ten inches. The forward wheels of ordinary waggons have twelve spokes, they should never be made with less; and the hind wheels fourteen and sometimes sixteen. Wheels usually have even numbers of spokes, but when the joints of the felloes are on the tenons of the spokes, or when bent felloes are employed, the number of spokes may be odd.

Wheels designed for ox-carts and horse-carts are often made twice, and even thrice, as heavy as necessary, through ignorance of the strength of materials and the relative proportion which one part should bear to the other.—*Manufacturer and Builder*.

TO FIND THE AREA OF A CIRCLE. Three-quarters of the square of the diameter will give the area. Suppose the diameter of a circle is 6 feet. Multiply 6 by 6—36, three-fourths of which is 27, the number of square feet contained in the circle. When greater accuracy is required, multiply the square of the diameter by the decimal .785.

How to Load a Waggon

Some three or four weeks ago the question was asked whether a waggon should be loaded heavier on the hind than on the front wheels. Your reply, though not asserted to be conclusive, implied that the load should be equally distributed. I propose a scientific elucidation of the subject, which will prove that the load should be heavier on the hind wheels, in the proportion of their diameter to the diameter of the front wheels.

A wheel is a lever, whose long arm, theoretically, is the distance from the ground to the centre of the axle; the short arm is a pivot; but, practically, it is impossible to construct a lever of such proportions. Hence, in calculating the advantage of the lever, a wheel or a lever, allowance must be made for the size of the axle, and for friction dependent on size, other things being equal. Without going into too elaborate a discussion, it will be sufficient to say in general terms that the power gained by a waggon wheel is in proportion to its semi-diameter, and hence that the load on a waggon should be placed proportionally to the diameters of the front and hind wheels.

Suppose the front wheels are four feet, and the hind wheels five feet in diameter—then five-ninths of the load should rest on the hind wheels and four-ninths on the front wheels.—*Cor. Rural New Yorker.*

The Correct Length of Whiffle-Trees.

A horse cannot draw as well with a whiffle-tree twelve feet long as with one two feet six inches in length, because the line of draught is not in the proper direction to be most effective. Nor can two horses, harnessed abreast, draw well with whiffle-trees ten feet long, while their heads are coupled close together, because they must travel sidewise, more or less, in which position no animal can exert all his strength to the best advantage in hauling a load.

Horses draw best with the double whiffle-tree just long enough to allow them to stand close to each other, having the single whiffle-trees attached directly behind them, and just long enough to meet in the middle. When the double-tree is very long, each horse must draw more or less sidewise, if the coupling lines and the neck-yoke are not made long enough to allow them to move directly forward, without having their heads turned towards each other. In order to determine the correct length of whiffle-trees, let two horses stand side by side with their sides three inches apart; then measure from the centre of one horse to the other on their backs. This will give the length for a neck-yoke, and the correct length for the double-tree, between the joints where the single-trees are to be attached. When a neck-yoke is only eighteen inches long, and the double-tree of the proper length, horses will be required to move more or less sidewise. For the same reason, oxen often get into the habit of hauling sidewise, because the yoke is too short. Neither oxen nor horses can travel easily and freely when their heads are turned towards, and the butts from, each other.

Whiffle-trees for ploughing should always be as short as they can be made, without bringing the traces against the legs of the

team. A very long double whiffle-tree tends to make a plough take too wide a furrow slice. If the clevis be adjusted to take a narrow furrow slice—when the double-tree is too long—the plough will not run at all satisfactorily. The horse in the furrow will not be able to walk squarely in his place, because the line of draught is such as to keep crowding his hind feet out of the furrow on the ploughed ground. The length of the double whiffle-tree and the neck-yoke for a sleigh, should be just as long as the sleigh is wide, from the centre of one runner to the centre of the other.—*Manufacturer and Builder.*

Greasing Waggons.

The following extract from the *Scientific Press* has already appeared in these columns; but it refers to a matter of so much importance and so much neglected, that we have no hesitation in once more bringing it before the attention of farmers:—

"Greasing buggies and waggons is of more importance than some people imagine. Many a wheel is ruined by oiling too plentifully. A well made wheel will endure constant wear for ten to twenty years, if care is taken to use the right kind and proper amount of oil; but if this matter is not attended to, the wheel will be used up in five or six years, or may be sooner. Lard should never be used on a waggon, for it will penetrate the hub and work its way out around the tenons of the spokes and spoil the wheel. Castor oil is a good material for use on an iron axle; just oil enough should be applied to a spindle to give it a light coating; this is better than more, for the surplus put on will work out at the ends and be forced by the shoulders and nut into the hub around outside the boxes. To oil an axletree, first wipe the spindle clean with a cloth wet with turpentine, if it won't wipe without it. On a buggy or carriage, wipe and clean off the back and front ends of the hubs, and then apply a very small quantity of castor oil, or some especially prepared lubricator near the shoulders and point."

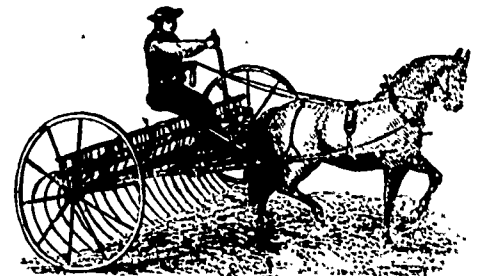
TO DRIVE AWAY RATS.—A writer in the *German Town Telegraph* says that keeping a goat is a sure way of driving rats from the premises.

A FANCY FARMER'S OPINION.—The Rev. Henry Ward Beecher does not take a rosy view of farming. In writing to the *New York Ledger*, he says:—"If one has money and leisure he may carry on a farm in the Eastern States with great enjoyment. That is as pleasant a way to spend money as can be devised—not excepting the management of fast horses and fast yachts—for both of these deteriorate in the using, and some go under, while the farm steadily rises in price and value. The farm is an institution designed to promote health and comfort in the expenditure of money. Money is the one manure which the farm greedily covets." Mr. Bonner appends a note to the effect that if Mr. Beecher is correct, "The best way to make money out of the farm is to sell it. As for the fast horse let them go—we do."

HOUSING AND PAINTING FARM IMPLEMENTS.—Every farmer should ask the following questions, and act according to the reply his own good judgment will give: How much does it cost to move mowing machines, harrows, rakes, etc., from the field? How much will new ones cost when these are rotted down? How much will a few quarts of paint cost, and how much utility will be added to farm tools by the use of it?

Advertisements.

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Double " " " " " " " " " " " "	3 50
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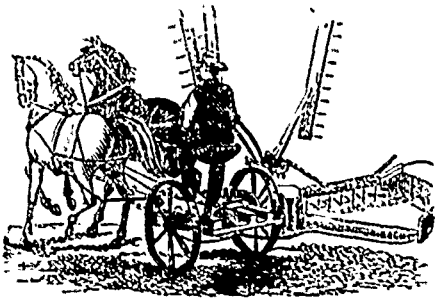
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EPPS'S COCOA.

GRATEFUL AND COMFORTING.

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Reaper and Mower, with Johnson's Self-Rake Improved
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We believe this machine, as we now build it, to be the most perfect Reaper and Mower ever yet offered to the public of Canada.

Among its many advantages, we call attention to the following:

It has no gears on the Driving Wheels, Enabling it to pass over marshy or sandy ground without clogging up the gearing, thereby rendering it less liable to breakage. It is furnished with four knives two for mowing and two for reaping, one of which has a sickle edge for cutting ripe, clean grain, the other a smooth edge for cutting grain in which there is grass or seed clover.

It has malleable guards both on the Mower bar and Reaper Table, with best cast steel Ledger Plates. It is also furnished with our new Patent Tilting Table for picking up lodged grain. This is the only really valuable Tilting Table offered on any combined Reaper and Mower. The Table can be very easily raised or lowered by the Driver in his seat without stopping his team. This is one of the most important improvements effected in any Machine during the past two years.

Any one or all of the arms of the Reel can be made to act as Rakes at the option of the Driver, by a Lever readily op-

erated by his foot. The cutting apparatus is in front of the Machine, and therefore whether Reaping or Mowing the entire work of the Machine is under the eye of the Driver while guiding his team. The Table is so constructed as to gather the grain into a Bundle before it leaves the Table, and deposits it in a more compact form than any other Reel Rake.

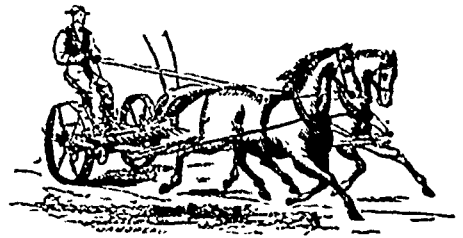
The Table is attached to the Machine both in front and rear of the Driving Wheel, which enables it to pass over rough ground with much greater ease and less injury to the Table. The Grain Wheel Axle is on a line with the axle of the drive wheel, which enables it to turn the corners readily.

The Rakes are driven by Gearing instead of Chains, and therefore, have a steady uniform motion, making them much less liable to breakage on uneven ground, and more regular in removing the Grain. The Gearing is very simple, strong and durable. The Boxes are all lined with

BABBIT METAL.

The parts are all numbered, so that the repairs can be ordered by telegraph or otherwise, by simply giving the number of the part wanted. There is no side Draught in either reaping or mowing, and the Machine is so perfectly balanced that there is no pressure on the Horses' necks either when reaping or mowing. All our malleable castings, where they are subject to much strain, have been twice annealed, thereby rendering them both tough and strong. Our Johnson Rake is so constructed as to raise the Cam so far above the Grain Table that the Grain does not interfere with the machinery of the Rakes or Reels. We make the above Machines in two sizes—No. One, large size for Farmers who have a large amount to reap—No. Two, medium size for Farmers having more use for a Mower than a Reaper. With the exception of difference in size, these Machines are similar in every respect. Our No. 2 Machine supplies a want heretofore unfilled, viz.: A medium between the Jun. Mower and large combined machine, both in size and price. We shall distribute our sample machines in March among our Agents, that intending Purchasers may have an early opportunity of examining their merits, and we guarantee that all Machines shipped this season shall be equal in quality and finish to the samples exhibited by our Agents. We invite the public to withhold giving their orders until they have had an opportunity of inspecting our Machines, as we believe that they are unsurpassed by any other machines ever yet offered on this continent. We also offer among other Machines,

Johnson's Self-Raking Reaper, impro-



ved for 1871, with two knives, smooth and sickle edge, and malleable guards.

Wood's Patent Self-Raking Reaper.

Buckeye Reaper No. 1, with Johnson's Self-Rake.

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Ohio combined Hand Raking Reaper and Mower.

Cayuga Chief Jr., Mower.

Buckeye Mower No. 1.

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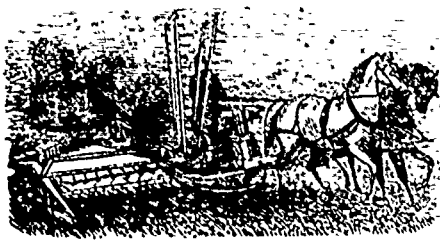
All our Machines are warranted to give satisfaction, and purchasers will have an opportunity of testing them both in Mowing and Reaping before they will be required to finally conclude the purchase.

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ANT. ROOZEN, Florist has pleasure in intimating that his Catalogue for 1871 is now ready, and will be forwarded to all applicants, free. Ant. Roozen's \$4 collections for out-door culture contains 24 Hyacinths, 75 double and single Tulips, 12 Polyanthus, and 200 Crocus, larger collections in proportion. All bulbs such as Lilacs, Gladstoll, Anemones, Ranunculus, Crocus, C. Imperialis, &c., at the lowest prices. Orders should be sent by 15th August. ANT. ROOZEN, 48 D., London, Ont. v3-5-31.

Markets.

Toronto Markets.

"CANADA FARMER" Office, June 12th, 1871.

There is no particular change to report in the condition of the breadstuffs market, nor does there seem any reason to expect such an advance in price as to justify holders in keeping back their supplies.

FLOUR AND MEAL.

The Market is held quiet and steady. Flour—Superfine, \$5 25 to \$5 40 Oatmeal—\$5 30 to \$5 50 Cornmeal—\$3 75 to \$4 Bran, in ton lots at \$18.

GRAIN.

Wheat—Soules, \$1 25 to \$1 28; Spring, \$1 25 to \$1 26. Barley—Nominal at 58c Peas—Very little in market; price nominal at 85c. Oats—48c. Rye—80c. Nominal.

HAY AND STRAW.

Hay has been in good supply, selling at \$10 to \$15. Straw scarce at \$8 to \$10

PROVISIONS.

Pork—Mess, \$17. Bacon—9c. Hams—12c. Cheese—12c to 13c. Butter—14c to 16c. Eggs—10c to 12c.

THE CATTLE MARKET

Beves (live weight) \$3 to \$5 per cwt. Sheep—\$3 to \$6. Calves—\$3 to \$7. Lambs—\$2 to \$3. Wool—33c.

PROVINCIAL MARKETS.

Montreal.—Flour—Extra \$6 40 to \$6 50, Fancy, \$5 90 to \$6, Welland Canal Superfine, \$5 50; Superfine No. 1 Canada Wheat, \$5 45 to \$6, Superfine No. 1 Western Wheat, \$5 45 to \$5 50; Superfine No. 2 Western Wheat, \$5 15, to \$5 20; Bag flour, \$2 50 to \$2 75; Wheat.—Western, \$1 29 to \$1 34, Oats, per 32 lbs., 44c, to 45c. Butter—Dairy, 16c to 17c, store packed, 15c to 16c. Ashes, Pots, \$6 20 to \$6 25, Peats, \$7 15 to \$7 20. Pork, Mess, \$16 30 to \$17, Peas, per 60 lbs 97 1/2c, to \$1. Rye Flour, \$3 75 to \$4.

Hamilton, June 6 —Wheat, Dehl, \$1 33 to \$1 34; Soules, \$1 20 to \$1 30; Treadwell, \$1 20 to \$1 27; Winter Red, \$1 24 to \$1 26; Amber, \$1 25 to \$1 26; Spring, \$1 25 to \$1 28. Barley, 50c to 50c. Peas, 80c to 82c. Oats, 50c. Flour, Superfine Extra, \$7 to \$7 50; Extra, \$6 50 to \$7, Superfine No. 1, \$6 to \$6 50; do. No. 2, \$5 50 to \$6; fine, \$5 to \$5 50. Oatmeal, \$3 to \$3 25. Cornmeal, \$1 75. Bran, \$1 to \$1 10. Shorts, fine, \$1 25; coarse, \$1 10 to \$1 20. Butter, rolls, 15c to 16c; do, tub, 15c. Eggs, 12 1/2c. Cheese, 14c to 16c. Potatoes, \$1 50. Honey, 25c. Apples, per bag \$2; dried do, per bush, \$1 25. Wool—American fleece, 35c to 35c; Canada fleece, 31c to 32c; superfine pulled, 28c; combing, pulled, 27c to 28c. Hides and Skins—Green, No. 1, inspected, \$3 50; do No. 2, \$7 50, Catskins, green, 10c; do dry, 25c; lamb-skins, 25c; pelts, 12 1/2c.

London, June 6 —Spring Wheat, \$1 20 to \$1 32; Red Fall do, \$1 10 to \$1 25; White do, \$1 15 to \$1 30. Barley, 50c to 52c. Corn, 75c to 83c. Rye, 65c. Oats, 46c to 48c. Peas, 70c to 80c. Clover Seed, \$4 50 to \$5 25. Timothy Seed, \$4 to \$4 75. Butter, 14c to 16c. Eggs, 12c to 14c. Potatoes, 50c to 80c. Hides, green, 7c to 8c; do, dry, 12c to 14c. Catskins, green, 10c to 12c, do, dry, 25c to 30c. Sheepskins, 50c to \$1 12 1/2. Wool, 30c to 35c.

Guelph, June 6 —Wheat Spring, \$1 25 to \$1 30; do, do, \$1 30 to \$1 36, Treadwell do, \$1 30 to \$1 35. Barley, 50c to 55c. Oats, 40c to 46c. Peas, 75c to 74c. Butter, many packed, 13c to 14c, do, rolls, 14c to 15 1/2c. Potatoes, 90c to \$1 30. Apples, \$1 to \$1 25. Sheepskins, 60c. Hides, \$6 50. Wool, 34c to 34 1/2c.

New York.—Flour, steady and in fair enquiry. Receipts, 6,000 barrels; sales, 8,000 barrels. Prices unchanged. Wheat, firmer; receipts, 30,000 bushels; sales, 43,000 bushels at \$1 52 for Spring wheat; \$1 64 for common and white Michigan, \$1 64 to \$1 65 for Winter Red and Amber Western, \$1 64 to \$1 65 for Amber and State; \$1 67 for White Canada, in bond. Corn, scarce; a shade firmer, receipts, 91,000 bushels, sales, 52,000 bushels at 70c to 72c for mixed Western unsound; 72 1/2c to 73 1/2c for sound. Oats, a shade firmer; receipts, 44,000 bushels, sales, 29,000 bushels at 60 to 70c for Western and Ohio. Pork, a shade firmer at \$15 12 to \$15 25 for new mess. Lard, dull at 9c to 10 1/2c for steam; 10 1/2c for kettle. Butter, 10c to 15c.

Contents of this Number.

Table listing various sections and their page numbers, including THE FIELD, STOCK DEPARTMENT, VETERINARY DEPARTMENT, THE DAIRY, ENTOMOLOGY, CORRESPONDENCE, EDITORIAL, HORTICULTURE, POULTRY YARD, HOUSEHOLD, POETRY, APLIARY, AGRICULTURAL INTELLIGENCE, MISCELLANEOUS.

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