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THE ILLUSTRATED JOURNAL OF AGRICULTURE

PUBLISHED BY THE DEPARTMENT OF AGRICULTURE FOR THE PROVINCE OF QUÉBEC.

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Subscription to the Journal of Agriculture.— Explanations.—

In reply to certain correspondents, we think it our duty to say that the government grant to the Agricultural Societies has not been diminished on account of the Journal of Agriculture. Here are the facts:

1. The Journal is no longer distributed gratuitously to the members of the Agricultural Societies.
 2. Each subscriber, being a member of an Agricultural society, has to pay 30 cents a year, and it is the duty of the secretary-treasurers of the societies to collect this sum.
 3. Instead of sending the subscriptions after collection to the government, the secretary-treasurers are to keep them in the box, and the government will retain an equivalent sum from the grant of the current year. Thus, any unnecessary despatch of money will be avoided, and the societies will lose nothing.
 4. If all the members of any society should refuse to subscribe, the secretary-treasurer of such society should immediately inform the Director of the Journal (Ed. A. Barnard, Esq., Whitfield, Que.), and the grant will, in that case, be paid without deduction.
 5. The secretary-treasurers, who still have lists of subscribers to send in, may do so up to January 1st, 1883. In all cases, no more of the government grant will be retained than an equivalent of the amount collected for subscriptions; which amount the societies will keep to reimburse themselves.
- The Legislature having found it impossible, on account of the heavy charges on the provincial treasury, to vote a sum sufficient for the entirely gratuitous distribution of the Journal, it is to be hoped that the real friends of agriculture will do their best to persuade the farmers to make the trifling sacrifice of 30 cents a year, each, and induce as great a number as possible to subscribe to the Journal.

FORESTRY.

CHAPTER III.

WHAT TREES TO PLANT.

The necessity of re-planting the woodlands having been, I hope, demonstrated to our satisfaction, and the different soils and localities fit for the work described, let us now consider what kinds of trees we ought to select for the purpose.

It is not advisable to go beyond the indigenous trees, that is, those which grow naturally in the country. It is true that there may be some chance of success with certain kinds of trees which, though not natives, are indigenous in countries which enjoy almost the same climate as our own. Still, these kinds are few in number, and besides, their use would be experimental, and, consequently, hazardous; so that, if they are tried at all, it should be on a small scale, and purely as an experiment.

But it is far otherwise with our magnificent native species; no risk is run with them, as they are sure to succeed in every spot where they are found to be indigenous.

CHAPTER IV.

A SHORT DESCRIPTION OF THE FOREST-TREES COMMON TO ALL THE PROVINCES OF THE DOMINION.

That the reader may the more easily form a judgment as to the value, the habits, and the characteristics of the trees of our country, I will give, here, a short account of the different species, beginning with those which are common to all the provinces, proceeding, afterwards, to enter more into detail in describing those which belong more distinctively to each individual province.

Two great divisions distinguish, botanically, our forest-trees: they are either deciduous or evergreen; that is, their leaves are shed in the autumn, or they retain them persistently throughout the year. The latter characteristic is common to all *conifers* except the *larix*, which sheds its leaves in autumn. I shall, therefore, divide the chapters describing the forest-trees into two sections: the first comprising the deciduous trees, the second the conifers.

In order to shed more light on the next part of my work, I append a list of all the different species of forest-trees of which I intend to speak, in this list will be seen the botanical name of each species, in French and Latin; the common or trivial name, in French and English, with a note pointing out the province or provinces in which each is indigenous. The list has been composed with the greatest care; and in order to avoid mistakes, and nothing is easier than to make mistakes in treating of so special a subject, I have trusted almost entirely in drawing up the list, to the information furnished by a publication essentially Canadian: *La Flore Canadienne*, by M. l'abbé Provancher. (1)

(1) The table here mentioned is too large for insertion in the Journal.

SECTION I.

DECIDUOUS TREES.

The following varieties of deciduous forest-trees are common to all the provinces of the Dominion :

Birch, Poplar-leaved,	Ash, Black,
" Canoe,	" White,
" Yellow,	Elm, White,
" Black,	Poplar, Balsam,
" Red,	" White,
Maple, Mountain,	" Cotton-tree,
" Sugar,	Willow, White,
" Striped,	" Yellow,
" Red,	Mountain-ash.



Fig. 1.

Poplar-leaved-birch.—Canoe-birch.—Yellow-birch.—Black-birch.—Red-birch.—

Almost all the birches having the same characteristics as regards their cultivation, I proceed to give a description which will serve for all the above-named kinds, pointing out, however, where necessary, any difference in their treatment. Cool, sandy soils best suit the birch. As its roots do not descend far, it does not require deep land. Its sap, which is abundant in spring, contains about 1% of sugar. The seed ripens in autumn, and may be sown either then or in spring, but as it is rarely ripe before November, it is generally necessary to wait till the latter season before extracting

it to the ground. If the seed is buried in damp sand, and kept in a cool place, it will preserve its germinating power for six months. A pound of this contains about 400,000 seeds, not more than 20% of which will grow; it should, therefore, be sown very thickly, on land in a roughish state, and only covered slightly by a pressure of the foot. If every thing goes well, the young plants will appear above ground in a month, and at the end of a year from sowing, they will have attained a height of three inches, when they may be transplanted into the nursery, to be finally set out in their permanent resting place when they are from two to three feet high. The poplar-leaved-birch at maturity arrives at a height of about thirty-five feet, and the canoe-birch measures sixty

feet by two feet in diameter; while the yellow-birch attains fifty feet by one foot, the black-birch seventy feet by three feet, and the red-birch fifty feet. I do not think these birches will pay to sow, but they ought to be preserved and cultivated in places where they grow naturally in succession to a fall of wood composed of resinous trees, a very common, if not a universal, occurrence. It may also answer to plant birch where moist sandy lands are to be found near a wood of these trees, in which a crowd of young plants are growing naturally. Plants of three years old, which can be recognised by the bark beginning to whiten, should be selected for this purpose. The white birch furnishes the material of which the famous bark-canoes are built; it is favourite wood for making boot- and shoe-pegs, as well as the reels or spindles on which thread is wound; and it is also used for making paper-pulp.

The black birch is considered excellent as firewood. The engraving 1, p. 98 represents the yellow-birch; No. 2, p. 99 shows its leaf on the branch with its catkin, or seed-pod; No. 3, p. 99 shows the seed, enlarged; and No. 4, p. 99 represents the branch and leaf of the black-birch, with its catkin.

Mountain-Maple.

This kind of maple, common enough in this country, never grows above fifteen feet high. I only mention it because it does well in dry rocky soils, and on the slopes of mountains. In these spots, it should be allowed to grow from the stump after cutting—a natural habit of this tree.

Sugar-Maple.

The most interesting tree of this part of the world. The numerous good qualities of this species, its usefulness in joiners', cabinet-makers', and cartwrights' work, its goodness as firewood, and the value of its sap, containing, as it does 50% of sugar, together with the unrivalled beauty of its foliage, have caused its adoption, conjointly with the industrious beaver, as the emblem of the French-Canadian nationality. The sugar-maple delights more especially in hilly districts, and in spots where the soil is dry, stony or gravelly, rich and light. Sandy land suits it least of all. The seed ripens in autumn, and should be sown at once. It might succeed if kept in dampish sand all the winter and sown in spring. The appearance of the seed is peculiar; it is like a double *samarre* with wings opposite each other. A pound contains 8,000 seeds, which should be covered one inch deep when sown. Slow enough is the growth of this tree, particularly at first, but when mature, it arrives at a height of eighty feet, measuring three

feet in diameter at the base, and sometimes even more. Fine plants from self-sown seed are often found in the underwood; they are easily transplanted, and take almost invariably. It



Fig. 2.

is a mere waste of time to attempt to set out large trees of this species: they hardly ever succeed. Engraving 5 represents the leaf of the sugar-maple, and No. 6, its seed.



Fig. 4.



Fig. 3.



Fig. 5.

Striped Maple.

When speaking of the Mountain-maple, I said that it should be preserved in the numerous hilly districts where it is found, and allowed to shoot again from the stump: and so with the striped maple. It serves the same purpose as the other, namely, to prevent the earth from being washed away, and

the rock from being denuded of its covering. It is never found more than twenty feet high. Engraving No. 7 shows the leaf of this maple.

Red-Maple.

After the sugar-maple, the *plane-tree* (*pseudo-platanus*?) or red maple is the most valuable. It differs from the former in that it prefers a damp habitat. Seldom more than fifty high, it ripens its seed in June, and the sooner after maturity this is sown the better. Rarely can good seed of this tree be bought, as if it once gets dry, it is worthless. With a sap less rich in sugar, the wood of the soft maple is also inferior to the wood of the sugar-maple, but, *en revanche*, it grows much more rapidly. The colour of its flowers gives its name to the tree. The seed is distinguished from that of other maples by measuring one inch from wing to wing, while the others measure two inches; and the colour, too,



Fig. 6.



Fig. 7.



Fig. 8.

is reddish, whereas the colour of the other maples is white or whitish. The cut 8 represents the leaf of the red or soft maple; and 9 the seed.

Black-Ash.

Low, damp, marshy places suit this tree. The seed ripens in autumn, and, should be sown immediately, if possible, but in this country, particularly in Quebec and Manitoba, it had better be kept in moist sand, and the sowing deferred to the spring, though, in this case, the seed sometimes takes a year to sprout. It would be better to sow where the trees are intended eventually to stand, rather than in a nursery-bed; four or five grains should be deposited at intervals of four feet



Fig. 9.

each way, and it would be as well to sow Indian corn or some other plant with the ash-seed, to check growth of weeds and to afford shade to the young trees. A pound of ash-seed contains about twenty thousand *pickles*, 80 % of which ought to grow. One inch is deep enough to bury it. If it must be sown in a nursery-bed, it should be two years old before transplantation. Should the seed come up sparsely, there is no need to be discouraged, for it sometimes happens that eighteen months elapse before the whole germinates. The black ash attains a height of about seventy five feet,



Fig. 10.



Fig. 11.

and its special characteristic is that its leaves come out very late in spring, and fall very early in autumn. Though slow in growth, this tree is useful for barrel-hoops etc. at a very early stage of its existence.

One of its good qualities is that it sprouts very rapidly from the stumps after felling ; and, consequently, if stook are hindered from browsing upon it, a good, thick underwood is soon formed, which only requires to be kept clean and trimmed to become a useful wood. The leaf of the black ash is depicted in the engraving no. 10.

White-Ash.

This ash rejoices in rich, deep soils, rather damp than otherwise, and shuns soils that are dry and too hard. At maturity, it attains a height of eighty feet, by two feet, and sometimes more, in diameter. It is a quick grower, and, in good soil, it has been known to measure thirty feet by seven inches in diameter twenty years from sowing. Cartwrights, coopers, and common cabinet makers, are always glad to get this wood, of which, except as to these details, all that I have said about the black ash may be predicated. Engravings 11 and 12, pp. 99, 100 represent the leaf and seed of this tree.

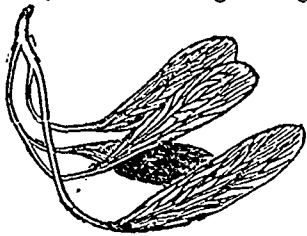


Fig. 12.

White-Elm.

The moist, rich, alluvial soils, which occur on the banks of rivers, are favourable to the growth of this tree. June sees the ripening of the seed, which should be sown at once, and covered very slightly. In less than a month it is up, and it reaches a foot in height the first season. Fifty thousand pickles are found in a pound of seed. The elm transplants well, and is cultivated almost like the maples. Seventy feet by three and even four feet in diameter is the size of this tree at maturity. It grows very quickly, and specimens have been found twenty five feet high by five inches in diameter



Fig. 13.

twelve years from sowing. Young plants, taken up in the forests where the soil being suitable to the elm they grow in great numbers, may be transplanted successfully the first year. The wood of the elm is much sought after by the cartwright, in spite of its tendency to shrink (*travailler*). Engraving 13 shows the leaf and seed of the American elm.

Balsam-Poplar—White-Poplar—Cotton wood—Aspen.

As all the poplars have pretty nearly the same characteristics as regards forestry-work, I will content myself with giving a description that will answer for all the above-named species, except where a special peculiarity may seem to demand our notice. Poplars like cool, light soil. I do not re-

commend them for all situations ; but for some districts, and particularly for Manitoba, I cannot sufficiently press their cultivation ; for, where wood is scarce and the demand immediate, the rapidity of their growth and the facility of their transplantation, render the poplar a most valuable tree. Besides, from the ease with which they are propagated from cuttings, they are found useful wherever they grow. They are planted in company with hickory, oaks, and walnuts, to protect the young plants by the shade they afford. Cuttings are made in this fashion : the wood is divided into pieces two

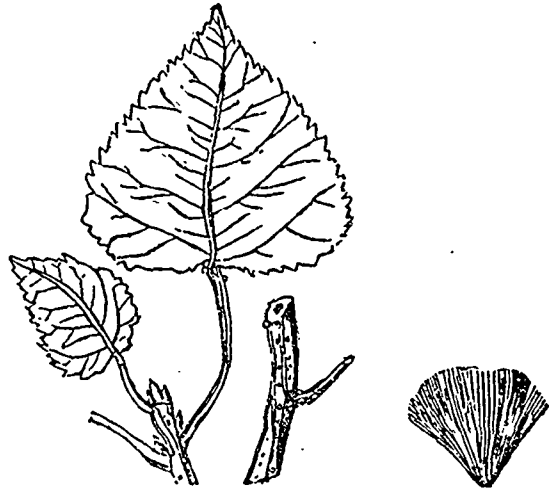


Fig. 14.

Fig. 15.

feet long ; the end which is intended to enter the ground is bevelled or cut *en biseau*, and is buried so deep that only a very little of the cutting is above ground. Wood of the year, or of two years old, may be used for this purpose. The cuttings should be made after the fall of the leaf, and set, at once, where they are to remain, at a distance of four feet apart between the rows and five feet in the rows, provided that poplars alone are to be set out. The land must be hoed and cultivated for the first three years. These trees are often found occupying the land as a second growth after the clearance of a forest of conifers. Where nothing better is to be had,



Fig. 16.

this second growth may be cared for, as it costs nothing and furnishes a fair firewood in a very short time. I cannot recommend my readers to sow poplars ; still, for the information of amateurs who may wish to do so, I may mention that the seed ripens early, in June, and *must* be sown at once in a damp soil. Very little covering is needed. It sprouts quickly ;

and if the young shoot is not visible in a few days, the odds are that it lacks moisture, a want always irremediably fatal.

The balsam-tree grows to sixty feet high by two and a half in diameter; the white poplar to eighty feet high—a very fine tree it is, too—the cotton-tree, reaches forty feet by one in diameter. The only one of these valued for its wood is the white poplar, though the cotton-tree furnishes good pulp for the manufacture of paper. Engravings 14, 15, represent the leaf and

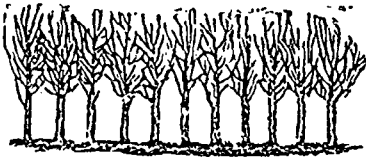


Fig. 17.

seed of the cotton-wood, and 24 a bough and the leaves of the aspen.

Willows—white and yellow.

The willows, though, according to some, they may not be indigenous in the country, have so spread themselves through out it, that they are able to dispute the rights of the original occupants of the soil, and on this account, I shall treat them as *autochthones*, and class them as such in my general list. The willow, *delights* in damp, light, alluvial soils, in valleys and on the banks of rivers; they *grow well* in strong land, and even in clays, and in the very worst soils they manage to get along. In fact, you cannot put them out of their place. They will grow from seed, which, ripening in spring should be sown at once and slightly covered, but they are always propagated by cuttings, just like poplars. The white willow grows to a height of sixty feet, but the yellow never exceeds forty. Their growth is marvellously quick, and under



Fig. 18.

good ordinary conditions, these trees have been known to attain a height of thirty feet by one and a half foot in diameter in ten years. As a firewood, the willow is preferable to the poplar and the fir, and has the advantage of beating both of them in rapidity of growth. It is hardly right to talk of the willows as forest-trees; their principal use is to act as nurses to the more delicate species, which in their early days require protection against the sun and wind. They are, also, very useful when planted on land subject to be worn away by streams which flood them in spring, and by the ice brought down by rivers. The willow is much employed to retain the earth on the naked sides of mountains, and to obstruct the rush of those destructive torrents which carry off the soil from the declivities and slopes of hilly lands.

When willows are cut for firewood, it should be done *pollard-fashion*, an operation which I will explain when I come to treat of wood-cutting, and which I recommend especially to the attention of the settlers on the N. W. prairies. Live hedges, and very strong if not pretty ones, too, may be made from the willow, and every three or four years they will furnish a fair firewood. Cuttings are made as usual, and are inserted in the ground a foot apart. A hedge is thus formed in two years, which is doubly useful: as a fence and for the stove, which hedge is shown in eng. 17. But instead of standing two feet out of ground, as in the cut, it were better that the outtings should be driven almost entirely

ought of sight. Eng. 18, shows a branch and leaves of the white willow, and No. 19, the same of the yellow willow.

Mountain-Ash.

This tree is of small importance to the forester. It is found mixed with a crowd of other species in cool, mountainous places. Seldom more than twenty-five feet high, the mountain ash ripens its seed in autumn, seventy-five thousand of which seeds go to the pound. Easily preserved as this is, it were better kept in damp sand; for when once dry it germinates with difficulty. The wood of the mountain ash is hard, and compact, but as it never arrives at a large size, it is of small utility. It is grown more as an ornamental tree than anything else; and, thanks to the lovely trusses of creamy flowers which it bears in spring, to be replaced in autumn by pretty bunches of red fruit which hang on the tree all the



Fig. 19.

winter, no more charming denizen of our shrubberies can be found. The engraving No. 20, shows the leaves and flowers of the mountain ash.

SECTION II.

CONIFEROUS TREES.

Of the varieties of coniferous trees mentioned in the general list, the following are those which are common to all the provinces of the Dominion:

- | | |
|--------------------|--------------------|
| White-Spruce, | Cypress, |
| Red " | Red-Pine, |
| Norway " | Balsam-Fir, |
| Tamarack, | Double-balsam-Fir. |
| Canada White-Pine, | |



Fig. 20.

White-Spruce.

The White-Spruce grows freely in almost every soil, and delights especially in those that are cool and gravelly. It

does not do so well in soils that are damp and heavy, and dies off soon in strong clays. The land need not be deep, for this tree has no tap-root—its roots are all laterals. Though the seed, which can be kept for two or even three years, ripens in autumn, still, it is advisable to sow in spring the seed of the previous year, of which one pound contains about fifty thousand pickles, 80 0/100 of which germinate under ordinary conditions. The seed is winged, as may be seen in the engraving: this is a common characteristic of the family, as of all the firs. They are contained, like those of all the conifers, in cones composed of overlapping scales. Sow thickly, and cover shallow with good mould, and then press the soil down: this is called *plomber*, in technical terms of the art. The seed germinates in three or four weeks, and at the end of the season the plant will measure three inches. The nursery-bed should be sheltered from the direct rays of the sun, and to this end it is covered with a trellis of laths sufficiently high to admit a man to hoe. Two years after planting out from the seed-bed, it is finally transplanted into its permanent location at three or four years old.

The white spruce attains a height of about fifty feet, and a diameter of two feet at the base. Forests composed of these trees may be felled every 10 or 15 years for lumbering purposes, provided that all trees less than a foot in diameter be

respect is less than the gain, where the ground is good and the usual thick-sowing is practised. The plants thinned out will produce stouter stalks and larger, better ears. In thin sowing, less plants will be torn out, the greater cleanness of the land, and the increased growth of the grain, more than paying for the loss, especially in foul land, which, in connection with the foulness, requires the harrow all the more where the sowing is thin.

Of course, care is to be taken that the ground is in proper condition, neither wet nor dry—just sufficiently moist to loosen up mellow. If too wet, it is of course hurtful; less so in sandy soil than in clay; if dry and hard, there will be little benefit. The question arises, how far the grain should be advanced when the harrow is applied. If quite small, it is clear that the harrow would seriously injure it, as the plant then is easily displaced, having little root. There is less danger when the plant is strong, and has secured a good foothold. This requires a growth of some five or six inches, and a still more advanced stage of growth would result in benefit, as is the case with wheat in the spring, which has its root well established, and will bear with benefit two harrowings.

The labor here is a mere trifle; only a few hours are required to pass the broad smoothing harrow over an ordinary field. If there is any benefit at all, it must exceed the little

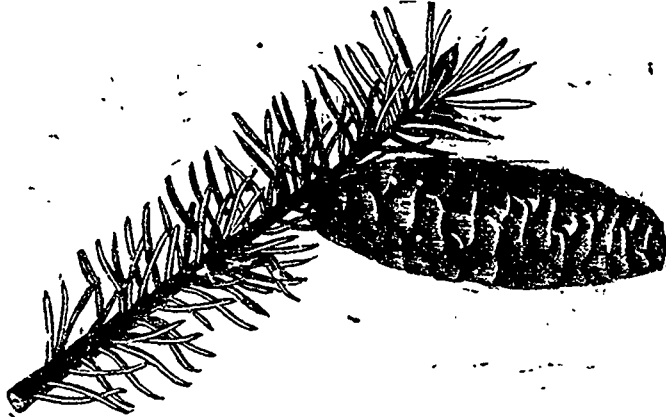


Fig. 21.



Fig. 22.

left standing. White spruce makes fair firewood and good building timber; but it soon rots if exposed to the air, and, viewed from this point, is inferior to pine. The quality of the wood depends entirely on the soil in which the tree is grown. Eng. 21, shows bough, and 22, the seed of the white spruce. (1)

From the French.

J. O. CHAPAIS.

Harrowing Spring Grains.

EDS. COUNTRY GENTLEMAN—I am glad to see the favourable results of harrowing spring grain which W. J. F. reports in his notes on page 718. The benefit of harrowing winter grain is conceded—why should it be different with the other grains? There has been sufficient experience to show that the results are much the same, namely, the loosening of the ground, equivalent to hoeing, and superior to cultivating hoed crops: as it works all the ground, including the furrow, it makes clear work throughout. What weeds have sprouted perish or are checked in their growth, the increased vigor of the grain preventing their successful recovery. There may be less foothold with spring grain than with winter wheat, and more plants may be sacrificed by harrowing. But the loss in this

(1) These engravings are some of those contained in the work.

labor thus expended, and there is authority to show that the benefit is considerable in the increase of the crop, and the greater cleanness of the land—a percentage of profit on the small outlay of labor, that is perhaps not surpassed, if equalled, on the farm.

The great principle that underlies all farming, is thorough working of the soil. Its benefit consists in the loosening up and fining the land, and thus fitting it for the admission of air and warmth, and the retention of moisture, which have their effect upon it, and through it upon the crops. This, to be fully successful, must be repeated as the growth advances, as with hoed crops, which, the more they are worked, are the better; and the principle holds good with wheat, and with grass lands where the sod is not thick. There is sufficient experience to show that it is equally beneficial to spring grain. One great advantage in this after cultivation is, that it is not expensive, is soon done, and at a time when the crowd of spring's work is over. F. G. Fort Plain, N. Y.

Devonshire Butter.

A curious discrepancy I have lately met with in the account by two thorough experts in the manufacture of butter from *clouted cream*. Mr Rowlandson, one of our best English practical farmers, now no more, published some thirty years ago, experiments in butter-making, and among them occurs

the following highly interesting one : Milk, forty-eight hours from the cow, was placed in a vessel of warm water, the temperature of which was gradually raised to 166° F., a Devonshire dairymaid guiding the operation. After standing till cool, the clouted cream was made into butter by simply stirring it with the hand. The skim-milk was churned in the ordinary way, but no butter at all could be made from it, so completely had the scalding process separated the butyraceous matter from the milk. The butter was perfect in colour and taste, and, as may be seen by the following table, exceeded in proportionate quantity that made by the usual methods.

	pounds
Sweet cream—overchurned.....	25.66
Acid cream—duly churned.....	21.87
Acid milk and its cream—duly churned...	23.97
Scalded cream—duly stirred.....	26.71

And now comes the curious part of the story : when salted for keeping, the butter from scalded cream turned rancid first, and this is accounted for, and very correctly accounted for, by the theory that the superior weight of butter obtained is attributable to the quantity of casein and coagulated albumen mechanically mixed with the butter.

Sir Thomas Dyke Acland, M. P., a thoroughly practical man in spite of his title, in an essay on the farming of Somersetshire, which I remember reading some thirty-five years ago, takes quite the opposite view of the question. He holds that the production of butter from a certain quantity of scalded cream is about 3/10 less than from the same quantity of cream treated in the usual way ; but, in revenge, he states that the Devonshire butter will keep free from rancidity far longer than the other. And my own experience, in this most trying climate of ours, leads me to the same conclusion. Let us try can if we can reconcile these two most opposite facts.

When Mr Rowlandson found his butter "coming", he, no doubt, continued stirring until he had worked it up into a mass, before he proceeded to wash it. On this supposition, the extra weight of the butter is easily accounted for—the whole, or almost the whole, of the casein and coagulated albumen would be inextricably locked up.

Mr Acland, as he was when he wrote, on the other hand, probably stopped stirring when the butter was formed into grains, and pouring off the skim-milk, placed the butter in cold water. Let any one try this, on never so small a scale, and he will see the particles of casein and coagulated albumen disengage themselves in the form of whitish flakes : and, if the butter-washing vessel is kept full with a slight trickle of water flowing into it, the flakes will accompany the water over the side of the vessel, and nothing but nearly pure butter remains behind. I need hardly repeat that these flakes, containing nitrogen as they do, are the main cause of rancidity.

The next time I get a chance, I will try and retain the overflowing flakes, by means of a sieve, and weigh them ; but I think there can be no reasonable doubt that they were the cause of the extra production of butter in Mr Rowlandson's experiment, as well as of the readiness of that butter to turn rancid after keeping. Q. E. D.

A. R. J. F.

Hoeing Sugar-beets.

I don't think our farmers can go on much longer planting their sugar-beets on the raised drills. The plan came from Scotland ; and though in that damp, cold climate it may be necessary, to admit of the horse-hoe and drill-grubber working with freedom, I cannot help thinking that, here, our South of England practice might be adopted with advantage. We don't want large beets : we do want a cheap way of hoeing them.

We have two sorts of horse-hoes : Garrett's and Smith's—the former, dear and complicated ; the latter, cheap and simple : the work of both is excellent. An engraving of Smith's horse-hoe may be seen in the Journal for March 1883, p. 161. In Southern England, turnips have for many years been drilled, four rows at once, on the flat, covering a width of six feet. When this is done, and the turnips are fit, Smith's horse-hoe, passing between the four rows, cleans the intervals admirably, and with the utmost rapidity. So far so good ; but the young plants, shooting up all the more vigorously for the stirring the ground has received, soon grow together, requiring immediate attention. If they cannot be thinned out at once, they become interlaced, are drawn up prematurely, and the spindling plants, when at last set out at the proper distance, resemble trees in a neglected plantation : all their robustness is gone.

Now let the horse-hoe be set so that in crossing the piece of turnips or beets a space of, say, 5 inches be untouched between each hoe. The indiscriminate slaughter of thriving plants may, at first, be alarming, but when the fallen have withered beneath a scorching sun, it will be evident that, if the plant was regular at starting, sufficient for a good regular crop remains safe. The beets will then stand at intervals of 18 inches by 15 inches, after the bunches are singled.

The singling is best done by children—the younger the better, as the smaller they are the nearer they are to their task, and pliancy of fingers, not strength, is what is wanted. Of course, there should be an attentive manager over the little band. After thorough singling, a very little hoeing will be wanted, as the leaves of the beet will soon cover the ground ; and prevent all weed-growth.

The expense of this method is, comparatively speaking, trifling. Charging horse-work at half a dollar a day for regular farm-horses—quite enough, too—as one horse and the driver can go over 6 acres a day, it will stand something like this :

For, say, 6 acres.—	
One straight-hoeing.....	\$1.00
One cross-hoeing.....	1.20
Children singling, at 60 cts per acre....	3.60
Hand-hoeing, at 40 cts	2.40
	8.20
For one acre	1.37

Or about one-fifth of what it costs at present ! The charge for cross-hoeing is purposely given higher than the charge for straight-hoeing, as one lad can both steer the implement and drive the horse with reins when the work lies in the direction of the rows, as a steady horse won't swerve when he see the path plain before him ; but in crossing the rows, a second boy must be employed to keep the horse straight. I have seen the work done most successfully in many parts of England, and I am sure it has only to be tried here to be universally adopted.

And it is not only on account of its cheapness that the plan deserves trial. Every farmer knows that, in his business, certainty is a great element of success. I have seen, even in the Island of Montreal, many acres of roots spoiling for want of hands to single them—labour was scarce, or other jobs pressing. But, with the horse-hoe used in this way, the cultivation of the beet or other root-crop can be carried forward from the time when it peeps above ground until its spreading leaves hide the land from our sight.

A. R. J. F.

CORRESPONDENCE.

Stanbridge P. Q., Oct. 11th 1883.

To the Editor, *Illustrated Journal of Agriculture*.

Seeing an article in the October number of your Journal on sheep, it suggested the idea of making some inquiries on that subject.

I have a farm that will keep about twenty cows and the teams. A part is upland, which is mostly pasture, and which has got very weedy and foul, and as we term it here bound-out. The balance of the farm is low land and is in meadow and arable land. One third is what we term Beaver-meadow or in other words it grows a fine wild grass—the balance of my hay is timothy and clover from the newly seeded meadows.

Would sheep do well on such a farm and would they clean and improve the pasture?

What breed of sheep would you recommend, and how many sheep can be kept in the place of a cow?

An answer through the columns of your Journal would greatly oblige

An Inquiring Farmer.

The farm occupied by "An Inquiring Farmer" would suit sheep very well indeed. In fact, it seems out for that purpose. The sheep would improve the old pasture immensely, if it were kept well fed down, and by growing rape, vetches, &c., on the richer low-lands, and folding the sheep on the uplands, the whole farm in a short time would be entirely changed in quality of soil.

Seven sheep I take to be the equivalent of one cow of good size. The best sheep for rough work are the Downs, but an "i. f." would probably have to content himself with half-breds. I will enter more into the question in the December number of the Journal.

A. R. J. F.

Montreal, 16 Oct. 1883.

A. R. JENNER FUST ESQ.

My dear Sir,—I have to apologize for the delay in answering your last letter, but I have been from home for a few days, and since returning, have been so busy getting my grapes to market that I have not had a moment to spare. Below, I give you a list of varieties of vines which I have growing on my place, with a comparative statement of their time of ripening.

BLACK GRAPES.

Beaconsfield Champion or *Talman*: This seems to me to be the best adapted to our climate; bearing well and ripening its fruit early, but has obtained a bad reputation for sourness from its habit of coloring about ten days before ripening, and being placed on the market green. When really ripe, it is a very eatable grape.

Early Victor, new variety, not fruited.

Eumelan, not fruited.

Worden, not fruited.

Moore's Early seems to ripen about ten days later than *Champion*, and not unlike the *Concord* for taste.

Telegraph ripens about with *Concord*.

Concord was coloured but not ripe when the frost took it.

Rodgers 39 not fruited.

Wilder R., No 4, not fruited.

Cottage much the same as *Telegraph*, but with a very tough pulp.

I have two or three more not named, and not fruited with me yet, so can't speak of them.

RED GRAPES.

Delaware ripened before frost.

Byghton ripened before frost.

Jefferson, not fruited.

Dracut Amber, not fruited.

Salem was barely ripe before frost.

Lindley just ripe before frost.

Agawam not fruited.

Massasoit about with *Lindley*.

WHITE GRAPES.

Lady Washington, not fruited.

Pocklington, not fruited.

Prentiss, not fruited.

El dorado, not fruited.

Martha ripe before frost.

Chasselas de Fontainebleau, not fruited.

The above are all two year-old vines with the exception of *Champion* and *Salem*. Very truly yours,

D. H. FERGUSON.

Montreal, 16th Oct. 1883.

Dear Sir, - The writer would be very much obliged, if you could answer the following, in the next number of the Journal. Would a young man having \$3000 or \$4000 possess sufficient capital to purchase (and stock) a moderate sized and well cultivated farm (say 80 to 100 acres, 60 to 80 cleared) in this province? Townships preferred. What wages would be paid a good Farmer and wife, and what are the general terms of engagement?

Hoping for this information in your next issue,

I am, Sir, yours,

AN ENQUIRER.

A young man who understands business could buy a farm and stock it well for the sum mentioned, provided he was willing to live hardly for the first few years. Farms of the size mentioned are to be had for from \$2,500 to \$4,500, with plenty of time for payment. I should advise the intending purchaser to retain a good amount of cash for stocking his farm, as that is where most beginners fail in this country: it is better to pay interest on part of the purchase-money of the farm than to buy cattle on credit.

A good Farmer and his wife would come pretty high, as really intelligent men, who understand their work and will do what they are told, are scarce here, as indeed, they are every where. As wages are by no means in a settled state at present, I can hardly say what should be paid the couple in question, but I should think from \$22 to \$28 a month ought to be enough—with board, of course; but all depends upon the style of man required. The terms of engagement must be strictly annual, lest they desert in the spring, when greater gains are to be made.

A. R. J. F.

Alma Farm, Knowlton, Oct. 20th.

Dear Mr Jenner Fust,—Yours of the 17th duly came to hand, so I take the first chance to answer as far as I can. A good, trusty farmer and his wife, who both understand farm work so as to be able to go on and do and direct it when the master has told them what he wants done, would get about \$30 a month and board. I give mine \$400 a year, but he has been several years with me, and I know I can leave and have every thing not only safe, but as well looked after as when I am at home. Out of that, the wife has to pay any help she chooses to have in the house. I would not give a new man whom I did not know so much.

The crops, generally, in this county are good: hay excellent, oats fair, corn middling, potatoes extra, wheat and barley above average. Cheese factories have done well, and there will be a lot of new ones next summer in consequence; and butter will not be so plentiful hereabouts.

Stock is rather high, but horses a little lower than two months ago. Yours in haste,

S. A. FISHER.

OUR ENGRAVINGS,

Sussex Bull.—This is a specimen from Mr Whitfield's herd. The breed has been wonderfully improved since I saw them at Lewes, in 1852. Then, they were coarse, rough, raw-boned brutes, only fit for draught and second- or third-rate beef; rarely coming under the butcher's hand before they were eight or nine years old. They are not easily distinguished, now, from the larger Devons. No good milkers, but very precocious; in fact, they make beef quicker than any other breed, judging from the youthful examples shown at the Smithfield Club for the last few years.

Hampshire Down Ram.—Barring the near-side leg, a good engraving of a good specimen of the breed. Strong enough for our climate, I think; at least, I don't fancy any man with an eye for a sheep can find much fault with this one.

Forest Trees.—

Turnips as a basis—a departure.

Colonel F. D. Curtis replies to "Anpere."
To the Gazette.

Turnips can be made a blessing in more ways than one. In the great West, where corn is so abundant, I suppose turnips are despised or considered of very little account. The large ranges of corn-fields afford a great amount of fodder in the autumn; but even in the West, with this bountiful advantage, there is a time when the frosts have so injured the cornstalks that they contain very little nutriment, and, however plentiful the supply, cattle will shrink in condition if confined to them for food. At this period, turnips may be made to supply ample food and in a form as cheap as anything of equal value, not excepting corn. Meal feeding, or its equivalent, must be followed at this season of the year for fattening animals—cows or any kind of stock—if it is desired to hold them in condition.

Even where the custom is to let the cattle range in the corn-fields to eat ears and all, with the hogs following them, it might be well to have a change to a turnip field. The succulent and cooling effect of the turnips and the leaves most certainly would counteract the dry and heating action of the corn. In my opinion they would be just the thing to keep cattle healthy, while allowed all the corn they would eat, and I am sure they would conduce to better digestion and more rapid fattening. There can be no doubt that they would be valuable for breeding animals. A Western farmer who is rank in corn notions—and who among them is not?—will probably sneer at my suggestions regarding turnips, and will say there is no good in such watery stuff. It is the very fact that they are "such watery stuff" which gives them their chief value. The same criticism may be applied to grass, as it is "watery stuff" compared to dry hay or corn. Yet it is this same kind of "watery stuff" which animals require to keep them healthy, and on which they thrive the best. It constitutes the greatest panacea for the ills of the animal kingdom, and many a fevered horse, hog, cow and steer, could they have spoken, would, no doubt, have thanked the Giver of all good gifts for "such watery stuff." It is the want of more succulent food which has laid the foundation of hog-choleera, and Western breeders will find, in time, that an exclusive corn diet will injure their stock. Like whisky drinking, it "will fetch them" in the end.

With all the want of appreciation of turnips in this country and the general notion of farmers that they will not pay, let it be remembered that the farmers of Great Britain pay their rent with "such watery stuff;" and that their annual rent is more per acre than the average price of American farms. (1) This fact I consider to be a conclusive argument, and a complete rebuttal to all prejudices and notions to the contrary.

(1) Average rent of English land is \$6.00 an acre. A. R. J. F.

Turnips do possess a value not only to bridge over the frosty period and afford wholesome and plentiful food in the place of frost-bitten and almost worthless grass and stalks, but as supplementary food in connection with good feeding, in which form they add to its value by making it more digestible, and by keeping the stomach in better tone and creating a healthy appetite and more invigorating blood. In addition to these values, which are enough to compensate for all the trouble and cost of growing the crop, they put land in the best possible order for any kind of a crop, and at the same time they will add to its richness if fed on the ground. This is an idea that few American farmers fully appreciate, viz: the importance and value of feeding crops on the ground to enrich the land. Our processes are more of the robbing order—to gather rather than to spend. Turnips may be made to do an important work in the older States in the way of renovating the soil. Every farm should have a big patch or field of turnips. The best could be gathered and stored for winter feeding, to make beef and mutton and for the young animals, and the balance be fed out on the ground. This course of feeding cannot continue in our rigorous climate all winter, as it does in England, but it may be continued during a period of two months; and, what is of the most importance, during the very time when other foods, in the form of pasture, are almost worthless, and to depend upon hay and grain is most expensive. The loss of flesh in stock before going into winter quarters is in the aggregate immense, and cannot be avoided without extra feed in some form; for during the latter part of the fall, pastures can not furnish sufficient nourishment to keep stock growing, or even to hold their own. There are a great many patches of land about a farm which may be utilized to good advantage by putting in turnips. The process is exceedingly simple. All that is required is to make the ground rich, and it matter not how or with what fertilizer, barn-yard manure or some sort of phosphate; and to make the surface mellow, and then scatter the seed and cover it slightly. A rake can be used to do this; brush drawn over it, or a roller. Surely, no crop requires less culture. This is not all. It can be made to follow other crops, and really costs nothing except the labor of putting in; and when fed on the ground there is no cost in harvesting. The refuse leaves and small ones will go quite far in paying the cost of harvesting.

Turnips may follow a crop of spring grain, wheat, or early potatoes; or an old pasture may be turned over and made an excellent place for them. A clover sod, after the hay has been gathered, is nicely adapted for them, as the ground will naturally be mellow. A couple of plowings will fit a pasture sod for them, and make the sward rotten, which will be all the better to make a prompt growth. Wood ashes are a good fertilizer for turnips, and the best of any single thing. They feel the effect of plaster and also of phosphates as much as any crop. I have often had a large amount of feed from turnips sown in the corn-field, especially where there were skipped hills, or the corn was thin from any cause. It is good economy and time well spent to sow turnip seed in every vacant spot in the garden, or in the corn or potato fields, as something can be had for almost nothing, and at the same time the weeds will be kept under. I hope to see the time when turnips will be one of the regular crops of the farm, and, as one outgrowth of this reform, more meat produced, which will enlarge the area of producing manure from the barn-yard. This is what every farmer wants, a big barnyard and plenty in it. There is no other basis which will be lasting, and to accomplish this end should be the study and effort of every farmer.

F. D. CURTIS.

Saratoga Co., N. Y.

Leguminous Plants.

BY SIR J. B. LAWES, BART., LL.D., F. R. S.

1. In a field at Rothamsted where continuous crops of barley are grown, red clover is occasionally sown with the barley on a portion of the land. The amount of nitrogen and mineral matter removed in the clover hay is very much larger than the amount of these substances removed in the barley; but the crop of barley which follows the clover is much larger than that which follows the barley alone. Analysis of the surface soil also shows a larger amount of nitrogen where the clover was grown.

2. All attempts to grow red clover continuously in the adjoining field have failed, although a great variety of artificial manures as well as the ordinary manures of the farm have been used. Large crops of other leguminous plants have, however, been grown on this field, some of which remove both more nitrogen and more minerals than would be removed in the clover.

3. Upon an unmanured garden soil, red clover has been grown continuously for thirty years, and the seed sown this year is growing most luxuriantly. The surface soil of this experiment shows by analysis a large reduction of nitrogen.

4. A permanent pasture was manured for twenty years in succession with a considerable amount of nitrate of soda. The crops of hay removed every year were large, and consisted almost entirely of grasses, with hardly any leguminous herbage. In 1876, the application of nitrate of soda ceased, and on that and each year since a manure containing potash, soda, magnesia and phosphate of lime has been applied. The result of this treatment is that since the application of nitrate ceased the crop of hay has declined considerably, and the leguminous herbage has greatly increased.

In parts of the experiment this year the *lathyrus* (wild vetch)—a leguminous plant with a creeping root—occupies several square yards of the land. The growth is from one foot to eighteen inches in height, and so thick as almost to exclude all other plants. On another part of the plot white clover has spread, and there the grass grows with considerable luxuriance. On other portions of the plot there are either no leguminous plants at all, or only isolated specimens of perennial red clover. Here the grass shows great signs of poverty and it is quite certain that this poverty is due to the absence of available nitrogen.

I have here brought together some very interesting results bearing upon the source of the nitrogen of the leguminous plants; and I think it is quite possible that those who hold the source to be in the atmosphere and those who consider it to be in the soil, might, from the results I have brought forward, derive some arguments in support of their respective views.

A correspondent in the COUNTRY GENTLEMAN very justly remarks that a science which is a creation of yesterday cannot compete with one like astronomy, which has its centuries of observation and record. The facts I have brought forward are the result of but a few years of observation, and yet what a wide field of inquiry is opened by them!

Assuming it to be a fact that the surface soil of the garden has lost large amounts of nitrogen by the growth of clover, while the soil in the field has by the same process gained some nitrogen, are we to explain these contradictory results by saying that the plant in the garden, finding abundance of nitrogen in the soil, will not take the trouble to extract it from the atmosphere, or that, finding all the nitrogen it requires near the surface of the soil, it will not push its roots into the subsoil to obtain its supply?

If the clover had failed to grow upon either of the soils, the argument in favor of the atmospheric supply of nitrogen

would have been quite as valid as that in favor of the source being in the soil; but the continuous growth of the clover in the rich soil, and its failure in the poorer one, rather point to the source being in the soil. A new feature in the case, however, turned up when it was found that in the same soil, where red clover had failed, several other leguminous plants were able to flourish, as vetches, sainfoin, lucern and Bokhara clover produced large crops on land which had received no manure containing nitrogen for thirty years. Surely it might be said this is a point in favor of those who support the atmospheric theory!

If we turn from these results on arable land to those on pasture, we see that the minerals have encouraged the growth of clover, and the grass has become more luxuriant where the clover is growing. Whether this luxuriance will continue where the latter grass is now growing remains to be seen.

In a paper which we have recently published on fairy rings, we have established on tolerably good evidence that the fungus destroys large amounts of the organic matter in the soil, and appropriates to itself the nitrogen contained. Its action is more like that of an animal than a plant, in burning off large quantities of carbon to obtain the nitrogen it requires. By removing the fungi as fast as they were formed, I satisfied myself that the growth of the grass was not due to the decay of the above-ground growth of the fungus alone, for I found that the removal made little, if any, difference in the luxuriance of the grass. It is to the under-ground action of the fungus, therefore, that we must attribute its beneficial effects upon the pasture. By its action the total amount of organic matter in the soil is reduced, but at the same time portions have been rendered available as food for the grass.

A question of considerable importance has still to be solved, as to whether plants with green leaves also possess the power of feeding upon organic compounds, and if so, whether some plants possess the power more than others.

VETERINARY DEPARTMENT.

Under the management of D. McEachran M. R. C. V. S.

(Address P. O. Box 1265, Montreal.)

TO OUR READERS.

The object aimed at in this department is to make it as useful as possible to our readers; and to enable us to do so it is necessary that we have their co-operation in so far at least as to let us know on what special subjects they desire information. We shall take pleasure in replying to any questions, and in giving advice when asked for, or in writing articles on subjects which may be suggested of common interest to our readers generally. Such assistance would lighten the labour of writing when the writer knows that some one at least has a special interest in it, and hopes to profit by its practical application. Please address your communications as above.

PREPARATIONS FOR WINTERING STOCK.

Already the tints of autumn warn us that the summer is past, the cold nights succeeding hot days are having their effects on animal as well as vegetable life; not only do the leaves turn yellow, and the grasses brown, but the coats of the different varieties of stock are becoming dry, thick, and dusty; all betokening a preparation by nature for the coming cold of winter. This is a subject which we in this province may consider with advantage, convinced as we are by long experience that in the treatment of animals, both in health and disease, the maximum of success will be attained by studying nature, following nature's laws, and seconding her efforts. In the different species of wild animals, nature adopts different methods of preparing for winter. Some escape it altogether, by migration. Most, however, especially quadru-

ped, guard against it by a thickening of the coat and laying on of flesh, both of which are essential to them to withstand the severe cold of winter.

Let us "look on this picture and on that."

We find in the great prairies of the North-West (the home of the buffalo, the antelope, and other wild animals of the graminivorous order), the grasses during the summer are luxuriant and succulent—They rarely seed, hence the albumenoids remain in the stalks, which, drying on the roots, yet retain sufficient circulation to preserve them from the destructive evaporation which leaves nothing but a dry, innutritious, brittle fibre, as seen on our domestic grasses propagated under cultivation and from seed. Hence, we find, as winter and cold weather approaches, these wild animals become fat, their coats long and thick, and winter finds them prepared for it. What do we find within the cultivated regions? the plough has upturned the native grasses, and seed-producing grasses have replaced them, which, nutritious and succulent before seeding, after seeding, become fibrous and innutritious, owing to the albumenoids being transferred from the plant to the seed: hence, we find that our domestic animals, if fed on grass alone late in the autumn, instead of laying on flesh as the wild animals do, lose flesh, and become rough and hide-bound.

From this, then, we learn that our animals should begin the winter in fat condition—hence, late pasturing is inadvisable, and where, from economical motives, they are kept out late in autumn, grain, in moderate quantity, should be given to replace the albumenoids in which the ripened grasses are deficient.

Our readers will find it an economy to begin the winter with their stock in good condition. It will cost less to keep them fat during winter than to make them fat if poor.

A thrifty farmer will first calculate the quantities of his crop in relation to the number of animals he has to feed, and will then know what he has to sell. He should never, as many do, sell what he has marketable, and try to carry his animals through the winter on the refuse, with, often, a scanty supply of that.

We should never forget that we should only borrow from the soil those nutritious products rich in the elements of which the animal body is composed, pass them through the alimentary canals of our animals, then return the plant-food to the soil again, in the form of manure, enriched perhaps by the addition of nitrogenous elements derived from oil-cake, cottonseed-cake, or other richer products of other soils.

Next in importance to feeding for the winter is housing. The natural heat of the body is produced by the active chemical operations constantly going on in connection with digestion and respiration in the living animal. It is well known that farinaceous and oleaginous foods are heat producers: hence, we find that in cold climates the latter especially are instinctively consumed by man and beast. It is also a clear inference, that the more food an animal requires to produce heat, the less he can apply to produce enlargement or growth of body—hence we deduce the lesson, that to prevent the food being consumed as fuel, and insure its being applied to growth and development, we should lessen as much as possible the necessity for such production of animal heat, by the substitution of artificial heat. This can be done by warm housing and clothing. Let our readers think this problem out, and practise what the inference teaches.

Starting with the assumption (which is correct) that animal heat is necessary to animal life, and that it is produced chiefly by chemical action in connection with digestion and respiration, will be evident that the proportionate generation of heat will depend, first, on the heat-producing quality of the food supplied, and, secondly, on the quantity of such animal heat required

to compensate for the expenditure. In other words, the colder the atmosphere in which the animal lives, the greater will be the expenditure of heat and heat-producing food, and the converse is equally true. The warmer, (within a healthy degree) the byre or stable is, the less the demand for heat-producing food, which is also fat-producing. It is merely, then, a matter of calculation to determine whether it pays a farmer or stock-owner to minimise the expenditure of animal heat, produced by food (which means money), by providing warm, comfortable accommodation in the form of good buildings, or to expose his stock to cold and inclement weather, relying on the animal heat produced by food alone.

We will forestall their calculations by the statement of the fact that experience has demonstrated that every argument is in favour of warm housing. Every experienced cattle-feeder knows that he can save a large percentage of food by keeping the feeding stock warm. Many carry the idea too far, to the injury of the animals' health; but all know that an animal kept in a warm stable will do with nearly one third less food than one in a cold or exposed one.

It is therefore quite evident to any one conversant with the farm buildings of this province that sufficient warmth is not provided artificially by good buildings. By all means, have the wooden walls clapboarded, if possible lined, and filled in with sawdust or some suitable filling; let the damp, cold stone-wall be lined; let the doors be made to fit close, and be doubled where much exposed; bank round the foundations and make the stock-houses warm and comfortable. Do not however produce heat, as is too often the case, by leaving great heaps of manure in the stable; on the contrary, make sure of pure air at all times by ventilation and cleanliness.

Let our readers try it for this winter: drain and ventilate but keep warm; and we can assure them of a very great saving in food and a decided improvement in their stock.

(To be continued.)

De Omnibus Rebus.

Mr McEachraun has again begun to contribute to the Journal. I call the attention of our readers to his first paragraph: it is almost impossible for any one to keep on writing scientific articles without knowing on what points his readers are likely to desire information.

THE VINEYARD. On Michaelmas day, I paid a visit to Mr Ferguson's vineyard at Pointe Claire. The season, as my readers know, has been far from a propitious one for the grape-crop, and I must confess I was surprised at the flourishing state of the vines. Two years ago, the land was a mass of weeds, and the vines, utterly neglected, grew as like an English untrimmed hedge as possible. In 1881, Mr Ferguson began the difficult task of restoration, and he has really done wonders in the short time he has been about it. I don't mean to say that the cultivation is perfect; that could hardly be expected; but there are very few weeds to be seen, and though the land would have been all the better for another stroke or two of the horse-grubber; still, the work has been more than fairly done. The soil is of varied quality, from stiffish clay to light sand, and is on the *boulder-clay* formation. One remarkable fact was presented for study: the best land produced the strongest and healthiest vines, and the largest crop of grapes; but the berries were *much* later in ripening than where the soil was inferior. Does not this teach us that, in a climate like ours, where the ripening is every thing, the later grapes, if grown they must be, should be planted in the poorest parts of the vineyard? if I must say what I think, it would be better to reject them altogether. The Champion (Talman?) was ripe, Rogers' red, no 15 was nearly ripe, but all the rest were as sour as verjuice; in fact,

my poor teeth could not hold the pipe for twenty-four hours after tasting a lot of them.

As far as I could learn, the yield expected was about four tons to the acre; one hundred and twenty five baskets a day were being sent off by rail and waggon, each basket weighing about twenty-three pounds; in round numbers a ton, and a quarter, which, at three cents a pound, which they are fetching wholesale, would give \$240.00 an acre. Whether this would pay or not is a question I am incapable of deciding, as I have no experience in the cultivation of *outdoor* grapes. I take it to be very like hop-growing tempting, but hazardous.

I tasted, at luncheon, a sparkling wine, made from the Champion grape, which was highly jolly stuff; very lively and exhilarating, but not intoxicating. I could drink a couple of

The upper part of Mr Ferguson's farm, a very poor soil indeed, in fact, utterly exhausted by a bad system of cropping, is to be devoted to sheep-farming, with rape folded off; an essay in which I heartily wish him success.

Buckwheat and Corn.

Very much injured by frosts all over certain districts of the province. Some of the northern parts escaped, by one of those mysterious causes which baffle all calculation. Rougemont was severely smitten; Montreal the same; Kamouraska escaped scot-free! Will any of my readers kindly let me know how the flax-crop bore itself? There will be a good demand for linseed this year, as the English farmers have better prospects, and will have more money to spend in arti-



SUSSEX BULL.

bottles of it, I am sure, without discomfort. There was a nice little bouquet, no apparent sweetness; the colour was rich, and the wine perfectly clear. An excessively ill-used sample of still wine was offered me, but it had been decanted so often that exposure to the air had completely flattened it. In neither of the wines was there any perceptible acidity; whereat, I must confess, I was astonished. Four thousand gallons are to be made this year, and I wish Mr Ferguson would try my plan of arresting the fermentation before it has completely run its course, by racking the wine into sulphured casks, and thus retaining a little more body. At present, all the wines of this sort I have tasted are too thin on the palate.

cial food, particularly as, by a law, passed after great opposition from the House of Lords (*landlords*), the tenant-farmers of Britain have a right (inalienable) to compensation for all unexhausted improvements on quitting their farms.

HAY.

There is, as I anticipated, a vast quantity of inferior hay in the province. It won't sell in any market, so it must be consumed at home. The merest trifle of crushed linseed, soaked in boiling water, with a little salt, will make this hay palatable to any stock. It should be chaffed, with one third straw, and the linseed soup (lots of water) sprinkled over it.

It may be given warm or not, just as convenient. Not much trouble, and, as linseed does not cost more than two cents a pound, not much expense. A quarter of a pound of linseed per head for cattle, and a proportionate amount for sheep—a quarter of a pound for seven sheep—would do the stock more good than will be believed before trial.

Permanent pasture.

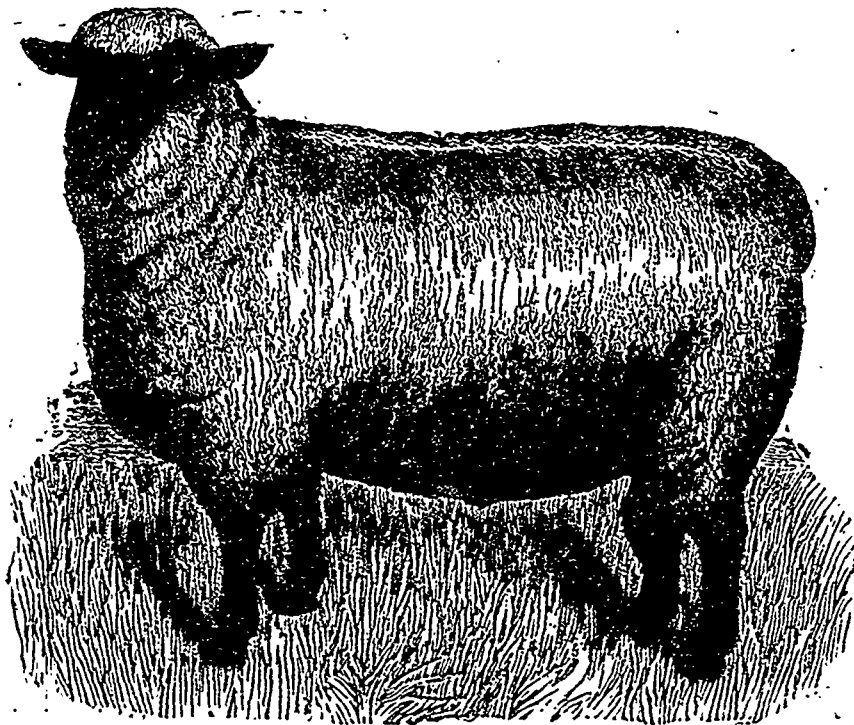
Some Ontario papers have been pleased to ridicule my plan for permanent pasture in the province of Quebec. Have the scoffers ever seen the lovely green lawns of Montreal! None finer can be seen in England, and the reason is simple: the grass is kept constantly mown. Once let a perennial grass seed down, and good bye to its perennality (forgive the coiner). If any one doubts the possibility of permanent pasture here, let him visit Mr Cochrane's farm at Compton, and, on looking over the fence opposite the gate leading up to the house, he will see as fine an upland pasture as any grazier could wish

ROTATION.

A curious course of cropping is pursued by some of the winners of the prizes in Ontario for the best cultivated farms. After grass, pease, wheat, oats, roots; and then barley sown down with grass-seeds! what land it must be to stand such exhausting work. An end must come to it sooner or later, however, and that end cannot be far off. Can this be the reason why the average wheat-crop in Ontario is only sixteen bushels per acre, at the utmost, while the average of England is twenty eight bushels? It looks like it. Four-sixths in grain and pulse can't be good farming.

The future by the past.

A little work, bearing the above title, has been sent me for review. The author, Mr J. C. Swann, has some droll and decidedly original ideas; e. g.: "A good remedy for any and all diseases of cattle is to mount a horse and run them until the bowels are thoroughly loosened!" v. p. 33 of the



HAMPSHIRE DOWN RAM.

for. But timothy and red clover won't do it; mixed grass-seed, must be used, and the herbage kept regularly fed down. I utterly deny the good to be derived from leaving *foggage* to protect the young grasses. In Viger garden, six years ago, a bare spot was sown down with grass-seed, and, in spite of my advice, was allowed to grow up uncut the first year. It had to be re-sown, in consequence, while another piece, sown at the same time and kept closely cut from the first, formed a beautiful turf within eighteen months of sowing. At the present time, October 10th, the grass-plats in Dominion Square are being out, for the last time this season probably, as close to the ground as possible; and, judging from the past, they will be as fresh as paint next spring. But no one must expect to mow timothy and red clover for half a dozen years, the hay standing till the seed is nearly if not quite ripe, and have a permanent pasture afterwards.

book. The following is a very different style of thing: "Never plough trash or stubble under late to sow wheat on, but have your land firm by all means." I am offered the work for twenty-five cents, and the retail price is seventy-five cents! Thank you, Messieurs the publishers, I would rather not.

A. R. J. F.

Progress in Farm Drainage.

EDS. COUNTRY GENTLEMAN—I have read just now with more than ordinary interest the article entitled "Drainage—Information Wanted," in your impression of the 30th ult., by Mr. FRENCH of the Treasury Department at Washington, who, like myself, has old associations with the subject of land drainage and the progress of agriculture. Mr. French says: My "Farm Drainage" was published nearly a quarter of a century ago, and my publisher now suggests that I make

some addition to it for a new edition, bringing the work down to the present time. And it will afford me great pleasure to aid Mr. French in so doing, for the public, and farmers more especially, are very apt to overlook, in the profusion of the day, much of the better class of agricultural literature of the past. I had an instance of this only the other day, in which an English agricultural paper "took the words of the Lord out of the mouth of his prophet," in an article on the destruction of the wire worm, entirely unconscious, apparently, of my paper on the subject, published in the Journal of the Royal Agricultural Society of England nearly forty years ago—recommending (as possibly some of your readers may remember) a dressing of 500 pounds per acre of rape cake in lumps, as a sure remedy. My writings on, and practice in, drainage operations, date back to fully forty years ago, when I first proposed the formation of drainage companies, and advocated, along with Smith of Deanston, Baily Denton, and others, an advance of public money, under certain conditions, to landowners for works of drainage. Mr. French may remember, perhaps, that in the early history of the modern art of drainage, when the old and shallow work was generally discarded and the more effective and durable system was insisted on, a prolonged controversy arose as to the depth and distances of drains. Mr. Parkes and others advocated in all cases a depth of not less than from four to five feet, and claimed for the greater cost in cutting that a much farther distance apart for the drains might be adopted with efficiency. Others, whose experience and observation justified the opinion, contended that no dogmatical rule, except that of securing the drain from any damage by the plough or other cause, could be laid down, but that such work must be done as to depth and distance in accordance with the character of the soil and subsoil; and when I say that the experience of the past forty years throughout England has completely established the common-sense practice and expelled all theoretical notions, I state what may really be regarded as the settled acme of the art of land drainage. It must not, of course, be inferred that the tendency has been to lessen the depth of drains, but simply that the execution of the work is in every case to be guided by the character of the land to be operated upon.

In 1853, when I first came to this Continent, I exhibited at the New-York State Agricultural Show, held at Saratoga in the autumn of that year, a model of the drain-tile machine which I had brought into use in England, and for which I had the honor of being awarded a silver medal. Many varieties of these machines have long been in use in England, and are, no doubt, at the present day very numerous in the United States. In Canada, I question whether there are more than three or four at work. Of machines for cutting drains, I know of none that are in use anywhere, and I concur with Mr. French when he says he has never yet seen in operation any machine that can perform what is required. The most apparently promising contrivance was that brought out some years ago by Mr. Fowler, (1) by which the pipes, strung on a succession of ropes, were drawn under ground at a depth regulated by a screw on the machine, and preceded by a cutter on the machine, like the old mode drain-plough. I saw this machine at work on one occasion, which at once satisfied me of practical difficulties which must prevent its working effectively. And although, like your correspondent, I should be glad to see a machine that would perform the operation, I must confess I hardly expect it. And really such an application is not specially desirable, for good drainers, with the perfect tools now in use, cut drains in subsoils free from stone, three and four feet deep with a surface width of not more than 12 to 15 inches, so that a two-inch pipe fits the bottom exactly, thus extracting the least quantity of earth,

(1) And exhibited at Gloucester 1853.

and reducing the labor to the minimum point. There is a cleanness and accuracy in the section of a well cut drain, which greatly facilitates the proper laying of the pipes, and which would hardly be possible to secure by a machine. When I was in England ten years ago I visited the show-yard in the implement section of the Royal Agricultural Society at the meeting in Cardiff, and there was no drain-cutting machine exhibited, and at the meeting of the society in York, last July, none was shown.

It would savor somewhat of presumption in one whose operations have been mainly on the clay lands of England, to offer advice to so able and practical and authority as Mr. French, but from what I have seen of the various soils in Canada, I consider that very effective work could be done on all the northern portion of this continent at a very much less cost than in England. Whereas, on the strong lands in England drains must be from 24 to 30 feet apart, double that distance, or even more, would be perfectly effective here. The frost on this continent, by its disintegrating action on the subsoil, is really an important factor in land drainage.

Milby, P. Q., Sept. 3.

JOHN H. CHARNOCK.

The above article, from the pen of my old friend Mr. Charnock, is worth attention. I perfectly agree with his ideas about draining machines, and also in his statement that drains here, in our comparatively mild clays, may be safely placed at double the customary distance in England, but from my own practice in the London Clay, in Kent, and in the alluvial soils in Gloucestershire, I must confess I still hanker after the four foot drain; still the hankering may be in part attributable to my acquaintance with the eighteen-inch work of Essex and Cambridgeshire, in the Saffron Walden and Ickleton districts. I was reading only the other day Mr. Charnock's description of his method of destroying the wireworm by the use of rape-cake in lumps. The article in question won the Gold medal of the English R. A. S. in 1844, and I have quoted it more than once in this Journal, giving due honour to Mr. Charnock: v. April number for 1885, p. 181.

A. R. J. F.

A Visit to "The Hills" Farm.

EDS. COUNTRY GENTLEMAN—A few weeks since I made a brief visit to "The Hills," a beautiful farm near the village of Frelighsburg, P. Q., formerly belonging to the late Hon. N. S. Whitney of Montreal. This gentleman, who died quite suddenly a few months since, took this farm some twenty years since in an impoverished condition, and had succeeded in bringing it into a fine state of cultivation and improvement. This was accomplished by drainage, proper rotation of crops, raising root crops, &c. This season, the roots, consisting of carrots, soft turnips and swedes, were looking remarkably well, and will assist materially in keeping the stock through the winter. Mr. Whitney took an active interest in all things pertaining to the farm, orchard, and garden, and, as a consequence, evidences of this interest were to be seen on every hand. For this northern climate, a fine orchard has been established, in a portion of which is an extensive apiary, while the vegetable, fruit and flower gardens are the finest of their kinds, and show plainly what can be accomplished on a farm by well designed and well executed labor. This old homestead is the summer residence of the family, and is greatly preferred to the usual resorts. I am pleased to learn that the family will continue to occupy it, and that a younger son, when his education is completed, will continue on in the good work in which the father took so much interest.

I was sorry to hear that it had been found advisable to dispose of a part or the whole of the excellent herd of Ayrshires that Mr. Whitney had been a score of years in getting together. It is one of the representative herds of the country, and has

been frequently advertised in the COUNTRY GENTLEMAN. He made several importations himself, and bred with much judgement and care, always with reference to certain traits which he endeavored to impress upon the herd, and succeeded. Such men as Mr. Whitney, thorough going business men, have done much for the interest of agriculture, and when they are removed by death there is a great loss, and their memory should be cherished.

E. R. T., Franklin County, Vt.

I hear that the Ayrshire herd of the late Mr. N.S. Whitney of Frelighsburg, will shortly be offered for sale. The cattle have been fully bred, never forced for show purposes, and are worthy of the attention of all who are on the lookout for genuine, practical dairyman's stock. I am glad to hear that the family intend still to retain the homestead.

A. R. J. F.

State of Crops, etc.

In parts of Manitoba 50% of the wheat and oat-crop was damaged by frost.

A correspondent from Stratford, Ont., states that the present harvest, barring hay, is the worst known in the history of Canada. The Mark Lane Gazette still sticks to it that the wheat-crop in England is even worse than was expected: but it must be remembered that this paper is, and always has been, the organ of the corn-factors, and is, I regret to say, utterly untrustworthy. Hops, for which \$1.05 were refused last year, are being sold, in the States, at 20 cents per pound.

The wheat-crop in the States is officially stated to be 112,000,000 bushels below the average.

At Poughkeepsie, Concord grapes are selling for two cents a pound, retail!!!

A. R. J. F.

Packing Eggs for Incubation.

Mr Voitellier, who is an important breeder of poultry, gives, in his paper (*L'Aviculteur*), the best way, according to his experience, of packing eggs for incubation:

"Latterly the favorite method of packing eggs has been in the upright position. As this means offered some difficulty, it was seductive at first sight and warmly adopted. We have in vain sought to understand the advantage of this system. It is said the egg keeps better, because it is less liable to be shaken. Let the air-bladder be at the end or at the side, it is exactly the same: consequently, the shaking cannot be weakened. As to its being kept fresh for a longer period by being kept in an upright position, we protest *in toto* against that point. In every question of incubation, or of breeding in general, nature is the best, or, more properly speaking, the only rule to follow; to depart from it is wrong. Now, when birds are at liberty, and every other day, their eggs keep perfectly well for twenty to twenty-five days, and the whole brood comes out simultaneously, the first being as strong as the last. Was there, it may be asked, ever found a pheasant or a partridge's nest with the eggs upright? The shape of the egg sufficiently indicates that the natural place is on its side, as well during incubation as before, and to maintain it in a different position would be more hurtful, but in any case there is no advantage. Eggs put into an incubator in an upright position would never hatch; all the experiments which have come to our notice on this subject are conclusive.

"In our opinion, the old classic way of packing in sawdust is most practicable and the most simple, provided deal sawdust is used; but it must not be too dry or too damp. When too dry, it tends to absorb the aqueous principles of the egg; when too damp, it produces in time fermentation and a smell of mustiness, the action of which is hurtful to

the egg. Deal sawdust is preferable to oak sawdust, because the latter gives to the egg a coat of coloring which it is difficult to remove by water. Bran is often used in preference to sawdust, as being softer, and deadening in a great degree, by a sort of elasticity, the shaking of the journey. Sawdust answers the same purpose, and has not the disadvantage of depositing on the shell a sort of fatty substance, which fills up the pores and stops the circulation of air during incubation. Sawdust has still a greater advantage, that of maintaining the eggs in an equal temperature; it is an excellent insulator against cold or heat, and it cannot be replaced either by cardboard boxes, paper or even out straw. Upon the whole, as far as incubation is concerned, the question of packing is quite secondary; when you want to send away eggs, let them be as fresh as possible. That is the grand secret, and they will not then suffer during the journey, and will produce fine and vigorous chicks."

SIMPLE CURE FOR GAPES.—The easiest and best remedy for gapes in chickens is caustic lime, either air or water-slaked. It should be dry and powdered. Take the chicken in the left hand and open the mouth, keeping it upright, and then drop a pinch of the dry lime into it. Held in this position a few seconds until it is obliged to breathe, when it will inhale some of the lime; then let it go. One application of the lime in this manner has cured, in my experience, every case of gapes, some of them in the last stages. After trying a number of remedies I find this the best of all, as it is simple and sure, and does not injure the chicken. The lime kills the worms.

F. D. C.

Charlton, N. Y.

Obtaining a Herd for the Dairy.

EDS. COUNTRY GENTLEMAN—Success in dairying depends almost entirely upon raising the best crops, using the best crops, using the best machinery, and keeping the best stock. But the best cows are not necessarily pure-bred cows. A cow that will produce 20 pounds of butter in a week, or 500 pounds in a year, and sells at \$3,000, is not the best cow for the ordinary dairyman. Such an animal is valuable principally, because she will produce other animals having as good quality as herself. Good dairymen can stop short of such animals and be perfectly safe. The man whose profits from his dairy are determined by the number of pounds of butter produced, should buy the best ordinary dairy cows. If he is unable to purchase from the farmers in his immediate neighborhood, he should buy in the nearest cheap market. Good, healthy, medium-sized cows, of a kindly disposition, are the best foundation stock for any ordinary dairy herd.

Having a good ordinary herd, it takes only a few years to breed up to a herd of grade Jerseys, Ayrshires, or anything else to which the farmer's fancy may incline. I know of several dairies, the value of which has been doubled in the past few years by such a course. The object is to have a herd in which there are no culls, and of such breeding that each animal will possess a superior productive capacity. This is the most economical kind of a herd. Many herds, otherwise good enough, become unprofitable because they are not properly cared for. We feed our cows wheat straw and cornstalks all winter, and even if they escape "lifting" in the spring, we wonder why they do not yield more. Feed the best food, and abundantly both summer and winter; provide good warm stabling in winter, and see that the cows do not want for sufficient pure water in summer. These little details are very economical, and will be found to pay.

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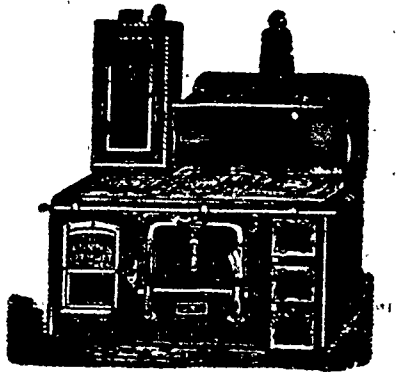


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